



MY SHADOW WORLD

GROUP 308

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Abstract:

Loneliness is an increasing problem in Denmark with a serious impact on mental health, especially among the age group 18-34. Interestingly, this demographic is also the most active group engaging with digital games. This presents an opportunity to portray the feeling of loneliness through a digital game for this particular age group. With the focus on explorers and slayers as the player types, the resulting game has environment and storytelling as the focal point. An iterative approach was used to develop different prototypes of the game. To evaluate the final prototype of the game, tests were conducted with 27 test participants from the target group. The tests made use of the think aloud method, semi-structured interviews and a System Usability questionnaire. The results from the final test showed that the game could portray the feeling of loneliness, but also highlighted that loneliness is subjective experience perceived differently by individuals.

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1. Introduction

The experience of loneliness is a subjective negative feeling, often associated with an individuals understanding of lacking meaningful social connections (Bhagchandani, 2017). Loneliness can have significant negative effects on mental health which can lead to health problems such as anxiety, depression, suicide, problems with overall well-being (Park & Majeed, 2020). The problem of loneliness has been increasing in Denmark the last ten years from 5% in 2013 to 12% in 2023. In 2023, one in four Danish citizens experienced some degree of loneliness. The age group in Denmark experiencing loneliness the most, is the 16-34 year old (Mary-Fonden, 2024).

It is crucial to identify techniques to tackle the increasing problem of loneliness, where an opportunity could be found in digital games. Nowadays more than half of the worlds population engages in digital games, which is an increase over the past 20 years. In Denmark, 80% of the population plays digital games and the age group playing the most, is the 16-34 year old (Danish-Producers-Association, 2023). Interestingly, there is an overlap between demographics most affected by loneliness and those who frequently engages with digital games. This overlap presents an opportunity to address the increasing problem of loneliness through a game experience.

Within the gaming community, different player types exists, making it worth exploring these categories to make a better game experience for this particular age group. This will help better understand the differences in player behavior and experiences. By examining these types, a game can be designed while aligning with player preferences for a specific target group (Hamari & Tuunanen, 2020).

By combining the research about loneliness and digital games, this project aims to explore how to create a game revolving around the feeling of loneliness and the portrayal of this, while exploring how storytelling, environment and design theory can contribute to this. The project will therefore take a closer look upon how to create games for emotions, how to use storytelling in games and different elements of design theory.

The project will focus on creating a game for 18-34 year old Danish citizens who identify with the player types: slayer or explorer. The game will portray the feeling of loneliness by using knowledge from design theory and different player types. Other games with similar purposes, like *Sea of Solitude*, *The First Tree* and *Firewatch* will be analyzed to identify storytelling techniques and design elements that can be adapted for this project. The analysis of these games will look into how these games balance narrative, gameplay mechanics, and aesthetics to handle emotions. The paper will also present the process of designing and implementing the game from a paper prototype to developing a functional game in Unity. Tests of the game will be conducted using methods like: observation, think aloud, semi-structured interviews, and the system usability questionnaire, where the feedback will provide insight into the usability and how well the game portrays the feeling of loneliness. Afterwards the data from these tests will be analyzed and the results will

be evaluated and discussed. Lastly, the paper will go through how the game could be developed further in the future. This includes ideas for improving the design, adding new features, and making it better based on player feedback.

2. Pre-Analysis

In this opening chapter, a short introduction to the problem is presented from a broader perspective to enlighten the problem before the Analysis.

2.1 Loneliness in a Worldwide Perspective

The feeling of loneliness is an increasing worldwide problem that can affect anyone of any age. Lack of social connections has a serious impact on mental health. Studies by the World Health Organization (WHO) (World-Health-Organisation, 2021) show that loneliness can be linked to several mental health issues such as anxiety and depression. WHO has in 2023 announced a commission on Social Connection to enlighten loneliness as a pressing health threat. The new commission will analyze the central role of how social connections can improve health for people at all ages. The new commission aims to establish a global agenda on social connection by raising awareness and creating collaborations to promote solutions for countries, communities, and individuals (World-Health-Organisation, 2021). WHO's Director General Dr. Tedros Adhanom Ghebreyesus has stated:

"High rates of social isolation and loneliness around the world have serious consequences for health and well-being. People without enough strong social connections are at higher risk of stroke, anxiety, dementia, depression, suicide and more," (World-Health-Organisation, 2021)

Based on the research from WHO (World-Health-Organisation, 2021), efforts are already being made to raise awareness and increase the number of people experiencing loneliness. It seems to be a worldwide problem which generates more discussion.

To simplify testing and focus more precisely on a target group, it could be helpful to limit the focus to a single aspect.

2.2 Denmark's Actions Against Loneliness

As previously written, loneliness is a serious pressing health threat around the world, and Denmark is no exception. In Denmark, the number of people experiencing loneliness has been increasing the past ten years and especially in young adults between the ages 16 to 24 years (Life, 2023).

In June 2023, 600.000 Danes experienced loneliness to some extent. The Danish Parliament together with the Red Cross have presented 75 initiatives to reduce the number of lonely people by 2040 to 300.000.

One point of the actions against loneliness is to offer psychological treatment to people with social problems stemming from loneliness (Life, 2023).

Along with the Red Cross, DaneAge have played a leading role in developing a national strategy to reduce loneliness in Denmark. The National Partnership Against Loneliness

brings 115 stakeholders together across regions, companies, organizations, and civil society to propose Denmark's first strategy plan against loneliness, which was published in May 2023 and supported by the Danish government (National-Partnership-Against-Loneliness, 2023).

The partnership's efforts are grounded in the belief that loneliness arises within five key areas of life, where it should be prevented and addressed:

- Home and living
- Daycare, school and education
- Leisure and communities
- Working life and employment
- Health and care

The strategy outlines the focus areas, while the action plan offers concrete actions and initiatives to reduce loneliness in Denmark (National-Partnership-Against-Loneliness, 2023).

2.3 Initial Problem Statement

From this Pre-Analysis, it has become clear that loneliness has a serious impact on mental health, leading to issues like anxiety and depression. It is a worldwide problem and efforts are already being made to find solutions against the increasing problem. This inspired the idea for the project. Since the theme of the semester is Visual Computing, we want to see how we can apply it in a creative way and make a game. At the beginning, it all began with defining an Initial Problem Statement:

How can we develop an interactive experience that alleviate the negative emotions of loneliness with the help of visual computing?

3. Analysis

This chapter will look at the problem of loneliness, find a target group, analyze other games portraying mental health issues and look at how to design games. In the previous chapter 2 (*Pre-Analysis*), the problem was discussed from a broader perspective. This chapter will narrow the focus and look at it from a focused perspective.

3.1 Loneliness

Loneliness is a subjective negative feeling associated with individuals own experience of lacking social connections. If individuals perceive themselves as lonely, they will experience it as such. Loneliness can also arise from social relations which are not fulfilling or meaningful. Humans are naturally social creatures who need engagement with others and loneliness often relates to the feeling of being cut off from this important and fundamental social interaction (Bhagchandani, 2017).

In psychological terms, loneliness is understood as a state of mind which will lead people to feel empty, isolated, and unwanted. Loneliness can also give rise to other feelings such as sadness, frustration and helplessness which can leave someone feeling misunderstood and exhausted. People who experience loneliness crave human contact, but they might have a difficult time establishing meaningful connections. Loneliness can be described as the subjective gap between a persons current social relations and their desired level of connection. Due to this subject gap it is important to research different types of loneliness (Bhagchandani, 2017).

3.1.1 Types of Loneliness

Loneliness is a broad term which comes in many forms and affects individuals differently. It can be categorized into several types:

- Interpersonal loneliness: The result of loosing a significant or intimate relationship (Bhagchandani, 2017).
- Social loneliness: When a person is excluded from a group and actively rejected (Bhagchandani, 2017).
- Cultural loneliness: When a person belongs to another culture than the one they are in at the given time (Bhagchandani, 2017).
- Intellectually loneliness: When a person is intellectually or educationally out of sync with their family, friends or social group (Bhagchandani, 2017).
- Psychological loneliness: When a person has experienced a trauma which then separates them from people around them (Bhagchandani, 2017).

- Existential or cosmic loneliness: When a person is experiencing a sense of isolation which comes from the awareness that we are alone in facing life's fundamental question. Cosmic: the realization of being alone in the universe (Bhagchandani, 2017).

3.1.2 Health Issues

In the previous chapter 2 (*Pre-Analysis*), we found that loneliness can cause serious health issues. It is therefore important to look more into which kind of health issues these are and how to help yourself or someone who might experience loneliness.

Loneliness is not only a state of mind, but can lead to several mental health issues.

Mental Health Issues

People who experience loneliness might also experience troubles with sleep and cognitive difficulties, which can lead to low quality of life and have an impact on their physical health. The feeling of loneliness has the largest effects on mental health, which includes depression, anxiety, suicide and overall well being. However, this results might have been influenced by the large number of studies focusing on the connection between loneliness and mental health, rather than on other health issues. (Park & Majeed, 2020).

According to the article *"Loneliness and Mental Health: The Mediating Effect of Perceived Social Support"* (Park & Majeed, 2020) previous research has researched connection between loneliness and anxiety symptoms across various age groups including young people, students, adults and older adults. The connection between symptoms was also studied for loneliness and depression (Park & Majeed, 2020).

3.1.3 Social Support

Social support refers to the extent to which an individual receives help, guidance, comfort and information from their social connections. Social support can include informational, practical and emotional support. It can be difficult to recognize if someone is experiencing loneliness. Some signs to look for if you suspect someone might be lonely is this: (Park & Majeed, 2020).

- The individual is more isolated then they used to be.
- They are losing interest in the things they used to enjoy.
- They might have a hard time sleeping.
- Starts eating unhealthy, smoking or drinking more than they used to.

We can look for potential signs, but the only way to confirm if someone is experiencing loneliness is by having a conversation with them about it. How to help someone who experience loneliness (Park & Majeed, 2020):

- Talk to them: Talking to someone about how they feel can help put everything into perspective. Start the conversation by asking them how they feel (Collier, 2020).

- Listen: When someone starts to open up about how they feel, it is important to listen. It can bring relief just knowing there is somebody who will listen to them (Collier, 2020).
- Be patient: Individuals who experience loneliness might have a hard time connecting to somebody else, especially if they have been feeling lonely for a long time. Being patient and taking the time to reach out to them can be a good first step (Collier, 2020).

If someone is experiencing loneliness and need someone to talk to, they can consider reaching out to Startlinjen, a danish anonymous helpline offering free conversations for individuals. They can be contacted at the number: +45 35362600 (StartLinjen, 2024).

3.2 Target Group

3.2.1 Loneliness in Denmark

In chapter 2 (*Pre-Analysis*) it became clear that loneliness is an increasing worldwide problem (World-Health-Organisation, 2021). Loneliness in Denmark is looked closer at, to make the testing of the final product easier and the target group more approachable. Loneliness has been increasing in Denmark the last ten years. A study by Mary Fonden has conducted research upon loneliness in Denmark and made interviews and questionnaires with 4453 participants. Individuals who experience a severe level of loneliness has gone from 5% in 2013 to 12% in 2023. In 2023 the study figured that one fourth of the Danish citizens felt some level of loneliness (Mary-Fonden, 2024).

The two groups experiencing loneliness the most was primarily young adults from 16-24 year old with 17% feeling a severe level of loneliness and 25-34 year old with 22% feeling a severe level of loneliness. Men and women in these age groups experience almost an equal level of loneliness. The civil status of those who experience the greatest level of loneliness is singles with 19%, while it is only 8% with the civil status: "married" and "in a relationship" that experience loneliness in comparison. The job status of the three groups experiencing the highest levels of loneliness across all civil statuses are: 16% of those pursuing an education, 19% among the unemployed and 25% among those absent due to illness (Mary-Fonden, 2024).

3.2.2 Digital Games and Danes

The Producers Association have constructed the report "*The Importance of Digital Games*" (Danish-Producers-Association, 2023) with the aim of highlighting what digital games mean to Danes. Today, more than half of the world's population plays digital games, marking a significant increase over the past 20 years. The Producers Association's study shows that four out of five Danes now play digital games (Danish-Producers-Association,

2023).

When we look at which age group that plays digital games the most, young people clearly lead the way, with 72% of 16-24 year old playing daily or weekly. In terms of gender, 80% of women and 77% of men have played digital games in the past year. However, men spend more time gaming, with 46% playing over an hour a week compared to 40% of women (Danish-Producers-Association, 2023).

Danes play various game genres across age groups, with creative games being 57%, action games being 51%, and sports games 42% being the most popular among 16-24 year old. Digital games are a significant part of daily life for Danes, especially among those aged 16-39, with minimal gender differences. The understanding of different player types can provide insight into their motivations, preferences and behavior (Danish-Producers-Association, 2023).

3.2.3 Using Different Player Types

Player type models focus on explaining the difference in player behavior, experience and emotions. A way to increase the player engagement is to design around individual preferences for certain game mechanics. The models suggest that certain player types are more or less approachable to specific game mechanics (Busch, 2016). Therefore, in the next section, we will analyze two different player type models that explains how individual preferences influence player behavior, helping us to design game mechanics directed towards these preferences. We will look into how to understand player types, by looking into how they are categorized to understand their behavior, where the use of Bartle's taxonomy will be included, to understand the bigger perspective of player types.

Whereas, we will look into The Nine Quantic Gamer Types, which includes a more detailed motivations across all types of games.

3.2.4 Understanding Player Types

When looking into player types, they are divided into four categories, but it is important to note that a player does not necessarily only fit into one category, they usually fit into multiple. This shows why it is important to use different player type frameworks to better understand and address different players motivations and behaviors. The four categories listed below is to identify groups of people that are consistent as possible, but still differ from each other in different ways (Hamari & Tuunanen, 2020).

- Geographic
- Demographic
- Psychographic
- Behavioral

Player Typologies

The article "*Player Types: A Meta synthesis*" by Juho Hamari and Janne Tuunanen (Hamari & Tuunanen, 2020) focuses on papers that conceptualize player typologies based on motivation, traits, and behaviors. It highlights that geographic and demographic factors have been overlooked in player typology research, with most studies focusing on psychographic and behavioral aspects. Because of the lack of studies of geographic and demographic typology research we will be focusing on Psychographic and behavioral factors.

- Psychographic segmentation divides players into hardcore and casual types (Hamari & Tuunanen, 2020).
- Behavioral segmentation focuses on player behavior. Divided into veterans who are experienced, rarely die, and complete games quickly. Solvers take their time with puzzles and prefer games that does not take long to complete. (Hamari & Tuunanen, 2020).

The behavioral types lean against Bartle's taxonomy, making it important to consider them together when analyzing how players interact with games (Hamari & Tuunanen, 2020).

Bartle's Taxonomy of Player Types

Bartle is one of the most referenced authors with respect to player types, there exists four different player types with Bartle (Hamari & Tuunanen, 2020).

- Achievers
Wants to achieve the goals of the game and the pleasure is challenge (Hamari & Tuunanen, 2020).
- Explorers
Wants to get to know the breadth of the game and the pleasure is discovery (Hamari & Tuunanen, 2020).
- Socializers
Interested in relationship with other people and seek the pleasure of fellowship (Hamari & Tuunanen, 2020).
- Killers
Interested in competing or defeating others (includes helping others) (Hamari & Tuunanen, 2020)

Bartle's player types includes two dimensions to playing: Acting vs interaction and Player-orientated vs World-orientated (Hamari & Tuunanen, 2020).



Bartle's figure illustrates the overlap between player categories, indicating that players cannot be confined to a single type. Achievers focus on acting upon the world, explorers prioritize interacting with the world, socializers engage with other players, and killers focus on acting upon other players (Hamari & Tuunanen, 2020).

3.2.5 The Nine Quantic Gamer Types

The nine quantic gamer types were determined through a segment analysis of the 500.000+ gamers who have taken the Gamer Motivation Profile based on their score on the 12 motivations measured in their model (Yee & Ducheneaut, 2015).

The nine quantic game players:

- Acrobat
- Gardener
- Slayer
- Skirmisher
- Gladiator
- Ninja
- Bounty Hunter
- Architect
- Bard

The nine quantic game types have different aspects and preferences which lead to different types of gameplay styles.

Some players seek challenging solo experiences, while others prefer relaxing task completion or fast-paced team interactions. Certain types focus on strategic planning and customization, whereas others value rich narratives or social interactions (Yee & Ducheneaut, 2015). The slayer gamer type enjoys games with powerful creative visions and carefully selected narratives and experiences. Slayers are solo gamers who look for slower paced accessible gameplay. They do not care that much about strategic planning, but prefer to just experience the game as it goes (Yee & Ducheneaut, 2015).

3.2.6 The Impact of Different Player Types

To determine the specific player types that align with our game, we analyzed the different categories of players and their characteristics. Bartle's Taxonomy provides a foundational framework for understanding player motivations (Hamari & Tuunanen, 2020), while the Nine Quantic Game Players offer a more nuanced perspective on player preferences and behaviors (Yee & Ducheneaut, 2015). By analyzing these models, we get a deeper insights into the motivations and preferences of different player types.

Together, explorers and slayers complement a storytelling game focused on loneliness by appreciating immersive environments, emotional narratives, and solo exploration that fosters a deeper connection with loneliness as a theme. They are therefore chosen as the player types for this project, as they align with the category of players who engage with games to experience and immerse themselves in a creative environment, while discovering different puzzle solving challenges.

3.2.7 Playing Alone and Playing with Others

The comparison between playing video games alone and playing socially has proven that each mode can impact the well-being differently (Vella et al., 2015). It is therefore crucial to look at how the game experience can be affected by being a singleplayer or multiplayer game to achieve the best game experience for the theme loneliness as possible. It might require different strategies to keep the player satisfied and engaged.

While solitary play can make the player feel more independent and immersed while playing the game, social play can help players build relationships and have meaningful social interactions, both can have a positive impact on a players well-being, but in different ways. (Vella et al., 2015).

3.2.8 Target Group for the Project

After researching the increasing problem of loneliness in Denmark, Bartle's Taxonomy and The Nine Quantic Game Players a target group was identified as Danish citizens in the age

group 18-34 who is either the player type: explorer or slayer. As the findings from chapter 2 (*Pre-Analysis*) showed, loneliness is a worldwide increasing problem (World-Health-Organisation, 2021). From this knowledge, the game could potentially have a secondary target group, including people from all over the world.

3.3 Designing for Emotions

The feeling of loneliness is a crucial part of the game, so it could be important to look at how we could design for emotions. In the book *How Games Move Us* by Katherine Isbister (Isbister, 2016), the author challenges the misconception that games emotionally numbs players or promote isolation, arguing instead, that games offer a unique emotional palette for designers to explore, that is distinct from other media like books or movies (Isbister, 2016).

Games differ from other media because games offer players a chance to influence the outcome through their own efforts. Said in another way by Sid Meier: "A game is a series of interesting choices". When playing a game, the players feelings are tied to their goals, decision-making and consequences. In brain scans of players playing a game vs. a person watching someone else playing a game, the active gamers had more activity in the parts of the brain related to reward and motivation than those who watched. Choice and control plays a part in creating emotional experiences for players (Isbister, 2016).

3.3.1 Flow Theory

Flow is the experience of getting "in the zone". A state where a person's worries vanishes, and time feels as if it has melted away. The term flow was coined by psychologist Mihaly Csikszentmihalyi and refers to a pleasurable optimal performance state (Isbister, 2016). There are eight factors getting in to the state of flow and these are:

- A challenging activity requiring skill
- A merging of action and awareness
- Clear goals
- Direct, immediate feedback
- Concentration on the task at hand
- A sense of control
- A loss of self-consciousness
- An altered sense of time



Figure 3.1: Flow factors(Isbister, 2016)

Note that they are not all needed to get into a state of flow. Jenova Chen researched flow in games, noting that players' descriptions of games they enjoy or feel immersed in often mirror the characteristics of the flow experience (Chen, 2007). When a player is "in the zone", it reflects a balance between the game's challenge and the player's abilities. If a game is too hard or too easy, it can lead to frustration or boredom, causing players to quit. To design for a wide range of users, Chen recommends:

- Mix and match the components of Flow
- Keep the user's experience within the user's Flow Zone
- Offer adaptive choices, allowing different users to enjoy the Flow in their own way
- Embed choices inside the core activities to ensure the Flow is never interrupted (Chen, 2007).

3.4 Design Theory

To design the game, we choose to look at design theory to get at greater understanding of how to design important elements of the game so it aligns with the target group and the player types. Design theory is a framework of principles, concepts and a system of ideas which explains how and why design works. It combines elements, such as design principles, color theory, design thinking and graphics elements to understand how design impacts user behavior, emotions, and experiences (Stevenson, 2020)

It helps align game mechanics, visuals, and storytelling with player expectations, ensuring an engaging experience. By applying design principles, we can identify and address potential challenges, enhancing the game's usability and overall engagement (Stevenson, 2020).

3.4.1 Designing for experience

When designing a game you design an experience, it is not the game itself that is the experience but it is the game that enables the experience (Schell, 2008).

It is essential to design games so the intended experience matches what players actually feel. Each player's experience is unique, as it is shaped by their individual perspective, background, and state of mind. Therefore, designer should think about what they want the player to feel and design the game mechanics, story and the environment to evoke the intended emotions.

By being able to analyze others experiences and understanding them will help creating more meaningful game experiences for players (Schell, 2008).

3.4.2 Essential Experience

The goal of designing an experience is to identify the key elements that shape and define it. The Lens of Essential Experience is used to stop thinking about the game and start thinking about the experience for the player.

The main idea is that the essential experience can be created in a way that feels unique from real-life experiences. Sound can be used to emphasize a real experience or to strengthen elements to show a certain feeling (Schell, 2008).

These three points is important to look at when designing an essential experience:

- What experience do i want the player to have?
- What is essential to that experience?
- How can my game capture that essence?

To be able to separate the experience from the game is very useful to have a clearer picture of the ideal experience and its essential elements. It gives the design something to aspire to, and therefore without a goal, it just a shoot in the dark (Schell, 2008).

3.4.3 The Game Consist of Elements

There is different ways to break down what elements form a game, but according to the book *"The Art of Game Design"* (Schell, 2008), the elements is called tetrad and were found to be very useful. It is important to note that none of the elements are more important than the others, that is why the tetrad is arranged in a diamond shape to not show any relative importance, but to help illustrate what is more or less visible for the player. (Schell, 2008).



Technological elements are the least visible to the players, where aesthetics is the most visible and mechanics and story are in the middle. The four elements are all essential for developing a game (Schell, 2008).

The four basic Elements:

- **Mechanics**

Mechanics is what makes a game a game. Mechanics are the procedures and rules of the game, they describe the goal of the game. It describes how players can and cannot interact with certain objects and what happens when they try to. (Schell, 2008).

- **Story**

The story is the flow of the game and it can be linear, pre-scripted, branching or emergent. When a story has been made, the mechanics will be chosen to strengthen the story. The aesthetics helps reinforce the ideas of the story and the technology that are best suited for the chosen story (Schell, 2008).

- **Aesthetics**

The aesthetics of the game is how the game looks, sounds and feels. The aesthetics have a direct relationship to a player's experience and therefore the most important aspect of game design. When a certain tone has been chosen, technology is needed to amplify it. It is important to have a story with a set of events that let the aesthetics appear at the right pace and have an important impact (Schell, 2008).

- **Technology**

The technology is referring to all the materials and interactions that make the game possible. The game's technology enables certain features while placing limitations, creating constraints that allow players to explore unintended actions. Technology is the medium where the aesthetics take place in which the mechanics will occur and the story will be told (Schell, 2008).

3.4.4 The importance of Design Theory

By applying principles like The Lens of Essential Experience and The Tetrad of Game Elements we can focus on providing the intended player experience while we balance mechanics, the story, aesthetics and technology. It will not only improve the final work, but also help align the games goal with player expectations, which can result in a more engaging or memorable experience (Schell, 2008).

3.5 Storytelling in Video Games

The player types for the project enjoys narrative-driven games. It is therefore important to gain knowledge about how to create storytelling in games. Storytelling in video games is the art of conveying a narrative to the audience who is experiencing the video game. A game developer is also a storyteller. The core of any story is its conflict, which should remain central during game development. Scoping the conflict early is more important than making it overly grand. Act-structures, like the contract model also called home-away-home, guide the progression of events, ensuring the narrative flows logically from one stage to the next (Skolnick, 2014). This model starts the story at home, which can mean being physically home or metaphorically feeling at home with themselves. In the story a break of harmony will make the character go away from home. In the end of the story after experiencing disharmony, the character will find their way home again (Bechsgaard, 2024).



3.5.1 Characters and dialogue

Stories often feature a hero and a villain, making the narrative easy to follow. The hero is often the character whose eyes we see through. If the audience relate to the hero and have more sympathy for the situation, it can make them feel stronger emotions. As the story progresses, the hero evolves, facing challenges, taking risks, and making sacrifices (Skolnick, 2014).

Dialogue in video games primarily provides context and explains the narrative. Following the "less is more" principle, unnecessary lines should be removed to strengthen the story. It is also important to note that it is faster to verbally refer to something than to describe it (Skolnick, 2014).

3.6 Visual Computing

The initial problem statement requires the use of visual computing, we will therefore look at different types of visual computing to get an overview of what can be used for this project. We will later in chapter 7 (*Implementation*) use the ones most suitable for this project.

3.6.1 Shaders

Shaders are a set of instructions executed by the GPU in order to alter and change every single pixel on a screen simultaneously. Opposed to the CPU which is a single pipeline for executing one task after the other, the GPU consists of pipelines for each pixel which can execute various numbers of tasks all at once. Each pipeline in the GPU has to be independent in order to run parallel, and is therefore blind to each others commands and its own previous task (Vivo & Lowe, 2015).



Figure 3.2: Before & After Shader

There are several kinds of shaders, but two types that are commonly used are fragment and vertex shaders:

- Fragment shaders are used to change the color and appearance of a vertex by altering the RGBA (Red, Green, Blue, Alpha) value which is then rendered by a series of pixels (MDN-Web-Docs, 2015).
- Vertex shaders are used for geometrically changing manipulating coordinates in a 3D space, and can be used as an effect for stepping on grass, snow or other surfaces

is applied to a 3D model, allowing it to replicate the captured movements with precision (Menache, 2019).

There are various methods for capturing the motions, some of them are:

- Cameras
- Electromagnetic fields or ultra sounds
- Mechanical systems based on linked structures

Cameras are one of the simplest tools to start with when using motion capture. They record and convert the different views of the motion, which are used to map the positions of key points together. They will each display one or more markers (Menache, 2019).

Different Types of Motion Capture

There exists different ways of human motion capture. They can be classified as:

- Optical Passive: Uses infrared cameras to track reflective markers. These markers can bounce back light (Adobe, 2024).
- Optical Active: Uses special cameras which follows LEDs that will light up as they move (Adobe, 2024).
- Inertial: Uses sensors which send motions to a computer Adobe, 2024.
- Video/Markerless: Uses no sensors. The software analyzes the motion directly from video footage Adobe, 2024.

Markerless motion capture is a method for capturing motion without using suits, markers or any specialized hardware. A video of the motion is captured and AI can be used to identify points on the human body and get the motion from the captured video footage. This provides an easier and efficient way of using motion capture without having any special equipment (Menache, 2019).

3.7 State of the Art

Many games and projects have been created in effort to portray mental health problems such as loneliness. During this section some of these games will be analyzed and evaluated for features, effects and ways to portray mental health. After the games have been analyzed, key takeaways will be presented to implement in this project. The section will also use knowledge from section 3.4 (*Design Theory*) to analyze the games using the four important elements from section 3.4.3 (*The Game Consist of Elements*). This will help and inspire us on how we should develop and create the final game. Some of the focus points of the analysis will be how the environment is used and designed, how the storytelling is managed and developed, the main character's features, the introduction to the project and overall use of sound.

- Introduction
- Storytelling
- Environment
- Main Character
- Quests/tasks
- Sound
- Controls

For this project three games have been chosen for closer examination and as inspiration sources for development. All of the games have been played through to enhance the understanding of them. The three games are:

- Sea of Solitude
- FireWatch
- The First Tree

3.7.1 Sea of Solitude

Sea of Solitude was released in 2019 by the developers of Jo-Mei Games and has won several awards for its design and theme handling (Jo-Mei-Games, 2019). The designer behind the game Cornelia Geppert explains in a Ted Talk that the game was not created to solve a problem or to give therapy, but to spark a feeling of recognition in the player, by portraying different kinds of loneliness which most people have experienced. The goal of the game is to confront huge and scary monsters, who represent different forms of loneliness, and not necessarily killing them, but to learn how to manage and live with them.

The scenery of the game is a manifestation of the main character's mind, making it possible to create physical beings and features as a metaphor for feelings, problems and the state of mind of the main character. The game also contains many features which is a clear metaphor of the theme such as the main character being a monster herself, which is the way the main character sees herself, and the backpack she carries which is filled with heavy experiences throughout the storyline.

The environment of the game is changing throughout the game and is heavily affected by the main character's state of mind which is influenced by negative emotions such as loneliness, despair, hopelessness and worthlessness. This is shown in the beginning of the game where the entire world is flooded by the main characters tears, but a spark of joy (portrayed as a character) makes the world a bit more manageable as the sea level drops and some buildings are exposed. Later on in the game all water has disappeared and the



same world can now be experienced for the third time. Throughout the game the environment can quickly change from chaotic thunder and rain to peaceful sunshine, heavily supported by sound effects and music. Especially the dark and rainy environment, sets the mood and atmosphere of something scary and overwhelming, which is how the feeling of loneliness often is perceived.



Sea of Solitude processes six different confrontations with loneliness. The first time this happens in the game is when we meet the main antagonist of the game, the self-destruction which is portrayed as a giant sea monster that tries to swallow the main character. Through the rest of the story, the player meets social loneliness, obsession, depression and self-doubt. A big part of the game is how each loneliness is represented as different monsters. One of the first encounters with loneliness is walking through a school filled with kids represented with shadow monsters.

The shadow monsters consist primary of a dark shadow shader making the completely black, with a shadow/cloud outline. The monsters are completely faceless with the exception of a pair of red glowing eyes. This makes the monsters themselves non-personal and even more scary, while their efforts to hurt the character seems more personal. When the monsters are drawn into light they dissolve and disappear.

Furthermore the game presents obstacles and challenges that represents interpersonal

loneliness, obsession and self-doubt. Sea of solitude explores different kinds of loneliness, but the overall theme of the game is psychological loneliness, which the main character battles from start to finish, as the entire game is a representation of the main characters mind as a result of being incapable of handling trauma. The sad environment and use of sound during the game amplifies the experience and helps the player get immersed in the story.

3.7.2 Firewatch

The story-driven first-person wilderness game *"Firewatch"* is created by Campo Santo, and is a story about a man named Henry who in 1989 decides to take a job as a fire lookout deep in the forest (Campo-Santo, 2016). The game starts with some background story only shown with a black screen, background music and some text. Even with the simple introduction the player is already intrigued and feels involved in the story, as there were some choices under the introduction. The game was released in 2016 for Linux, Microsoft Windows, OS X, Xbox One and PlayStation 4.



The gameplay is filled with dialogue between Harry and his supervisor Delilah, who talks through a radio. The player never meets Delilah, but a deep connection is made through the conversations both between the two characters, but also between the player and Harry. By playing with a first-person perspective while getting deeper into a conversation over the radio, an immersive bond is created to the main character. The feeling of loneliness in the game is represented by Harry, and conveyed during the game, as the player learns more about his background story. The environment of the game is also very noticeable as the forest at first can seem a bit overwhelming and big, but as the story evolves the player also becomes more familiar with the different paths and parts of the

world.



The gameplay is very environment controlled, and as calming and nice it can be to experience the nature and solve small task, it is also very dramatic and suspenseful how the story evolves. The game changes from a chill and peaceful vibe into an almost scary and powerful plot twist.

During the game, the player is equipped with radio, which is his only source of contact to other human beings, and a flashlight which toggles on and of by pressing the key "F". Even though there are traces of other people and living things during the game, you never meet another person face to face. By being all alone but still moving around what other people left behind, makes the absence of human contact even stronger.

3.7.3 The First Tree

The First Tree is a third person indie 3D game developed by David Wehle (Wehle, 2017), that directly transits from a cinematic opening scene into gameplay. The player will play as a fox, in the wilderness of Alaska, who at the beginning of the game has just woken up and clearly looks around for something. As soon as the player gain control of the fox a conversation between a woman and a man starts. The man, Joseph, tells the woman who is his wife, Rachel, about a dream he had about a fox searching for her missing kits. Throughout the game Joseph tells many stories, which the player finds out is about Josephs father, loss and grief. The player explores the landscape in different seasons of the year. Scattered around the landscape the player will find different objects which represent the center of the stories Joseph tells as the object are from distant memories.

David Wehle developed the game to process the loss of his father, and to communicate with other people going through the same feelings as he, or to understand his grieving feelings. The game was a very personal game for David to develop, and it was a way for him to express his feelings without talking about the loss of his father. The game is mostly developed by David himself, even the narrator Josephs voice is of David, and Rachel's voice is of his wife Elise (Wehle, 2017).

At the very end of the game, a UI container appears on the screen, making it possible for the player to write a message to the main character's children. This element wraps up the whole story and directly ask the player to chose the ending and put a few words on what they think the story lead up to. This also gives the developers an idea of what the player has felt throughout the game, and which purpose it conveyed for them.



The game is very focused on storytelling, and the environment plays a big part in in the atmosphere during the game. The only controls for the game is movement and the key "E" for interacting with objects, which is shown in the beginning of the game.

3.7.4 Alan Wake

The best-selling author Alan Wake and his wife Alice heads out for a vacation to a small town, Bright Falls. Alice suddenly goes missing and in his search for his wife Alan finds loose pages from a book scattered around town. When reading the pages, it becomes clear that the book has been written by Alan himself, something he has no memory of doing (Remedy-Entertainment, 2012).

The game was developed by Remedy Entertainment and published in 2010. It is a third-person shooter with a twist of psychological mystery (Remedy-Entertainment, 2012). Bright Falls and its surrounding realistic environment contains a gloomy and intense atmosphere, which enhances the feeling of being scared of what is around the corner, when the character is all alone in the woods. The gameplay only contains a few sources of light,



which puts focus on the rest of the environment, where especially the dark and intense weather plays an important role.

Remedy has packed the game with collectable items for the player to unlock achievements. Items such as coffee jugs and stacked cans. Moreover, radios and televisions can be found in small wooden house, lookout towers, and trailers. Listening to or watching the shows gives the player more details about the story and game. All collectables will be saved in the main menu. The collectible items sparks an interest for exploring the world, and check every last stone and bush for collectible items or easter-eggs, which makes the overall experience more complete. During the game papers are gathered which are memories of earlier and future events, that the main character have written himself but then forgotten. This way both the player and the main character remebers and understand the story together.

Only equipped with a flashlight and gun, the player, playing as Alan, has to overcome a supernatural darkness which has taken over townsfolk and has become what is refereed to as the Taken. To kill the Taken, the player must first weaken them with light. As the game evolve several weapons are introduced such as flares, shotgun, and hunting rifle. When pointing the flashlight toward the Taken sparks emerge from where they are hit, a sound is added to the damage which sounds as something being absorbed or all-consumed.

3.7.5 Takeaways from State of the Art

Each of the examined games contains a variety of features that helps them to portray the feeling of loneliness. In this section, we will present the key takeaways from State of the Art, which will be used for the design and development of the game.

Sea of Solitude takeaways

Sea of Solitude states that there is more than one way of feeling alone, and that a game can communicate these feelings through the environment. One way the environment in Sea of Solitude portrays loneliness is with the help of dark skies, rain, thunder and wind and an overall a dark and intense atmosphere. Another interesting element of the game is how they portray the monsters so that they seem scary and non-personal.

Firewatch takeaways

Firewatch contains many elements that portrays loneliness well. The conversations with the characters supervisor, while moving around constant reminders of earlier presence of other people, but never meeting anyone face to face, emphasizes the feeling of loneliness. Besides the environment and conversations through radio, the flashlight and start animation will be elements of inspiration for creating this project.

The First Tree takeaways

The storytelling in The First Tree and the ending with the option of writing a message, is key elements of the game for inspiration. The way memories are shown as randomly placed objects, which leads to a story is also an element with a new and interesting take on how to show and portray a feeling. The games' storytelling, driven by the narrative voice, plays a central role in guiding the story and shaping the experience.

Alan Wake takeaways

Alan Wake's realistic art style will serve as inspiration for the game's art direction. The realistic art style serves as the key element of creating the atmosphere to help convey the feeling of realism and the player being in the game. The flashlight in Alan Wake and the way the game deals with enemies will serve as an inspiration to how the shadow monsters are combated in this project.

3.8 From Initial Problem Statement to Final Problem Statement

The initial problem statement broadly addresses loneliness as a theme, which leads us to focusing on different types of loneliness, the effects of it and ways to show social support against loneliness. As researched in chapter 2 (*Pre-Analysis*) approaches the problem of a worldwide perspective, it has become clear that the focus must be narrowed to a specific

demographic for the final game to have a more approachable target group. Based on the findings about the target group in section 3.2 (*Target Group*) the target group is narrowed to Danish citizens from age 18-34. The age of the target group is not only significantly effected by the increasing problem of loneliness, but is also the ones most actively engaged in playing digital games.

Apart from the age group, the target group consists of the two player-types; *Explorer* from section 3.2.4 (*Bartle's Taxonomy of Player Types*) and *Slayer* from section 3.2.5 (*The Nine Quantic Gamer Types*), who benefits from the story- and environmental influence in the game.

Researching design theory in section 3.4 (*Design Theory*), has highlighted the importance of using this approach to design the game for the player types with environments, sound, and storytelling techniques in mind. While using the knowledge about visual computing in section 3.6 (*Visual Computing*) to complete the visual aspect of the game.

3.9 Final Problem Statement

From the research in this chapter a Final Problem Statement was formed:

How can we create a game experience for 18-34 year old Danish citizens using visual computing, design theory, and storytelling to portray loneliness for the player types: explorers and slayers.

4. Requirements

To answer the final problem statement, requirements was made to guide the further process of developing and designing the game. These requirements helped us keep the needs of the target group in mind. The requirements are divided into usability, user experience and technical requirements.

4.1 Usability, User Experience, Technical

Usability is a measure of how easy the user can use the product to achieve a goal. User experience refers to the overall experience the user have with the product (Schroeter, 2023). The technical requirements describe the technical aspect to address the system performance and what needs to be implemented to execute successfully (Garcia et al., 2024). To be able to archive these goals, the technical requirements provide a concrete framework of what needs to be implemented to support usability and a successful user experience.

4.1.1 The Requirements

User experience and Usability Emphasizing Loneliness

- In section 3.2.1 (*Loneliness in Denmark*) we found that loneliness is an increasing problem. We must therefore ensure that we portray the feeling of loneliness as researched in section 3.1 (*Loneliness*) as it is a great part of the project. To do this, we could use the knowledge from *Sea of Solitude* in section 3.7.1 (*Sea of Solitude*) about how they design the environment.
- Helping people understand what they can do about loneliness is important for the project. We must therefore include a section at the end of the game to provide information on what to do if you or someone you know is feeling lonely. We will use the guidance from section 3.1.3 (*Social Support*) on what actions to take.
- We must include specific types of loneliness from the section 3.1.1 (*Types of Loneliness*). Using this knowledge will guide us in scoping how we portray the feeling of loneliness through the narrative.
- In the game *Firewatch* from section 3.7.2 (*Firewatch*) we found that we can emphasize the feeling of loneliness through a minimum amount of communication and with faceless characters. Therefore we must ensure that the character has minimum communication with the rest of the world to better emphasize the feeling of loneliness.
- We must design the game to clearly communicate its message to the target target group, ensuring it portrays the feeling of loneliness, similar to how *Sea of Solitude* achieved this through its environment and storytelling, as we found in Section 3.7.1 (*Sea of Solitude*). To accomplish this, we can apply the insights from the four elements

in section 3.4.3 (*The Game Consist of Elements*), with a focus on the concepts of *aesthetic* and *story*.

- The game must include sound and music like in the game *The First Tree* researched in section 3.7.3 (*The First Tree*). This will help emphasize a real experience using theory about music and sound from the section 3.4.2 (*Essential Experience*).
- The game must present the problem of loneliness through the character like in *Firewatch* and *The First Tree* from sections 3.7.2 (*Firewatch*) and 3.7.3 (*The First Tree*).
- The character must be designed with the target group in mind, making it easier for them to identify with the *aesthetic* of the character. We must use theory about the four elements from section 3.4.3 (*The Game Consist of Elements*).
- In section 3.3.1 (*Flow Theory*) it reveals there are eight factors to create a flow state experience. As we want the player to focus more on the experience, we must ensure that the player can achieve a flow state which leads them to focus more on the experience of the game.

Enhancing Narrative and Gameplay

- We must include an introduction to the game through a short animation with sound and dialogue like the game *Firewatch* from section 3.7.2 (*Firewatch*). This will strengthen the experience as researched in section 3.4 (*Design Theory*) about the narrative.
- The player types of the game is slayers and explorers researched in sections 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*). They enjoy a selective narrative, therefore the game must use theory about storytelling from section 6.3 (*Storytelling*).)
- We must use the knowledge about *mechanics* and *story* from the four elements in section 3.4.3 (*The Game Consist of Elements*) to combine mechanics in a way that strengthen the story.
- The game must contain a narrating voice like in the game *The First Tree* from section 3.7.3 (*The First Tree*). This will be a great part of the *story* as it is one of the four elements from section 3.4.3 (*The Game Consist of Elements*).
- We must provide intuitive and learnable controls like the games from State of the Art in section 3.7 (*State of the Art*). This is important because the player should focus more on the experience rather than the controls. We must minimize the cognitive workload for the player by using theory about constraints from section 3.4.3 (*The Game Consist of Elements*).

Technical

- We must make use of the knowledge about visual computing from section 3.6 (*Visual Computing*) to create parts of the environment. This will help create the *aesthetic* of the environment which is an important design element from section 3.4.3 (*The Game Consist of Elements*) which is important for player types of the target group: slayers and explores researched in section 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*).
- We must make use of the knowledge about motion capture from section 3.6.2 (*Motion Capture*) to create the animations for the shadows more efficiently. This will help us create the precise animations without spending too much time on it.
- In the section 3.2.7 (*Playing Alone and Playing with Others*), we found that playing alone can make the player immerse themselves more in the game. Therefore, the game must feature a single-player to allow the player to immerse themselves more in the game.
- We must include environmental effects to emphasize the feeling of loneliness like in the game *The First Tree* from section 3.7.3 (*The First Tree*). To do this we must use theory about *aesthetic* from the four elements in section 3.4.3 (*The Game Consist of Elements*).

5. Methods

This chapter goes through the different methods used during the process of developing the game. This is a general description of each method and the details on how they are used will be covered in other chapters.

5.1 Qualitative and Quantitative Data

Complementary methods is a term when using both qualitative and quantitative data. Combining both kinds of data, will give a deeper and more nuanced understanding of the data. Two complementary methods (Björklund, 2021):

- Surveys/questionnaires and interviews
- Surveys/questionnaires and observations

Surveys and questionnaires will give quantitative data of perspectives, observations and interviews will give qualitative data of behavior, opinions and experiences. When using these methods together, we achieve a higher understanding and we will get more answers for the questions we might have beforehand. The qualitative and quantitative methods chosen to be used must be complementary methods to answer the questions as correct as possible (Björklund, 2021).

For this project, we will use qualitative methods for evaluating the emotional experience of the game. We will use quantitative methods in terms of the usability of the game. Both surveys, interviews and observations will be combined when testing the prototypes of the game.

5.2 Deductive and Inductive Data Collection

One strategy of collecting data is the deductive method, which works off already existing theory. The purpose of the deductive method is to begin broadly with an already existing theory, and then work towards a more narrow end, by collecting empirical data and testing a hypothesis to either confirm or deny the existing theory. This method is used to create focus from the beginning on testing and measuring concrete data and hypothesis.

In contrast to the inductive method which purpose is to create a hypothesis after processing data about a connection or pattern. The inductive method is more open and searching for a connection rather than testing an already known theory. It aims to generate new theories or hypotheses by first exploring raw data, instead of starting with a predefined theory. This method is particularly useful in areas where little research exist, as it allows new insight to occur without being limited by existing theories (Jachna, 2007).

The deductive method is going to be used in the final test of the project for observations during the gameplay of the test participant. The reason for this is to set focus on specific

observations during the game. Since there is going to be different observers during the test, the deductive method will make sure that all observers are paying attention to the same things. The inductive method will be used for when analyzing the data from the semi-structured interview of the final test in section C.6 *Final Test Interview*.

5.3 The Iterative Process

The iterative design process is a method for constantly improving a product. It is a method where a prototype is tested by the target group to collect feedback, which will be used to adjust and improve the prototype. The cycle of developing, testing, collecting feedback and adjusting the prototype again and again can be done until a final solution of the product has been developed. It is a great way for design and developing teams to create different iterations of the product to achieve the best solution for the target group as possible (Eby, 2019).

The iterative design process allows us to refine our game by testing prototypes, which will ensure it evokes the intended emotional response. By getting feedback from each iteration, we align the game design more closely with the emotional goals for the player experience.

5.4 Personas

Personas are a description of users of the product. It is a way for designers to focus on how they can design products. Personas do not describe specific people, but they are realistic. Each persona has a unique set of goals, a description of the user's behavior, activities and so on. Usually a product has more than one persona and they will each describe a bigger part of the target group of the product. A persona will help guide the design process and decide if a design will have a positive or negative effect for the user. Personas will also remind the design team that the product will be used by real people (Sharp et al., 2019).

Personas will be created for this project. They will be based on the target audience's age, gender, civil statuses and working statuses from the report "*Ensomhed i Danmark*" by Mary-Fonden (Mary-Fonden, 2024). They will also be based on the player types *Explorer* and *Slayer* from section 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*). This will guide the design process by ensuring that features and mechanics are aligned with the preferences of these personas. Personas will also remind us to design for real people, evaluating how our choices may impact the intended player experience. The personas will be created in section 6.2 (*Personas for the Project*).

5.5 Game Design Document

Creating a Game Design Document plays a key role in the design phase of game development. In the production stage the Game Design Document is used to have a clear vision of the design, development and flow through the process. When using best practices in requirements can help organize and connect game elements during the pre-production as

well as production stages, leading to better and more enjoyable player experiences (Salazar et al., 2012).

By using a design document in this project, we will ensure that all the design elements: environment, storytelling and mechanics will align with the project goal.

5.6 Prototyping

Prototyping is the process of developing the product which will allow developers to test different aspects of it. In games, that could be mechanics, playability and the overall concept. It is an important process of developing anything since it provides feedback on potential changes which should improve the game (Sharp et al., 2019). This project will make use of the following prototyping methods.

5.6.1 Low Fidelity Prototype

Low fidelity prototyping is a simple and quick way of creating a version of the product which can easily be changed and modified. Low fidelity prototypes does not resemble the final product and is not meant to be a part of the final product. They are important at the early stages of development for exploring ideas a low fidelity prototype could be a paper version of the product or a storyboard as they are easy a quick to change and modify (Sharp et al., 2019). The first prototype for this project will be a paper prototype, which can be seen in section 6.4 (*The Paper Prototype*). This will help us create a quick prototype where we can test and explore quick ideas.

Storyboard

A storyboard visualizes the game in an early stage. It consists of a lot of pictures or drawings inside squares and each square will represent a key scene. A storyboard will then help plan the games' flow and identify any adjustments early in the process. Storyboards are also great to use when working with storytelling in games(Maio, 2024).



Figure 5.1: Storyboard template
(Skolnick, 2014)

This project will use the findings about storytelling from section 3.5 (*Storytelling in Video Games*) to create a story centered around a core conflict. A storyboard will be developed in section 6.3.1 (*The Storyboard*) to visually highlight the key points of the story. The storyboard will help plan the progress of the story. This approach ensures that the story remains a driving force in the game.

The Wizard of Oz Method

Wizard of Oz prototyping is another low-fidelity prototype method which allows a design team to simulate features, which has not been fully implemented. The Wizard of Oz method is a way of testing features, which will require higher technical solutions by using a lower cost of technologies (Suleiman, 2024). This project will use The Wizard of Oz in the early stages of prototyping. This approach allows us to simulate parts of the game, ensuring that not all elements need to be fully developed before the final testing of the game. This can give valuable feedback early in the process, refining the prototype before the final test.

5.6.2 High Fidelity Prototype

While low fidelity prototypes focus on the early stages of the design process and gathering feedback to improve the design ideas, high-fidelity prototypes are used in the later stages to finalize and polish the design. High Fidelity prototyping closely mirrors the final product in appearances and functionality, while the elements and functions gives a more realistic experience when tested. A high fidelity software prototype is more complicated to modify or change as it is implemented in a programming language and often requires time and effort to adjust or restructure (Sharp et al., 2019). The high fidelity prototype for the game will be developed as the first and second Unity prototype.

5.6.3 Horizontal Prototyping

Horizontal prototyping refers to a method of prototyping with a wide range of functions but with little detail. It is a way of creating a simplified version of a product to test its core mechanics and the user experience. This process helps quickly evaluate features, interactions and the overall design to gather valuable feedback early on in the process. The opposite method of horizontal prototyping is vertical prototyping. Vertical prototyping is a more detailed version of a specific aspect of the product, offering into what the the specific aspect will look like in the final product (Sharp et al., 2019). Horizontal prototyping will be used for this project to outline the game's main mechanics and user experience, allowing for early testing and feedback to improve the overall design before focusing on detailed development.

5.6.4 Paper Prototyping

Paper prototyping is a simple and quick way to create a prototype. When paper prototyping simple materials is used to create a playable version of the game idea. This approach allows for a quick test to figure out how rules and mechanics work together without focusing on visuals or coding (Schell, 2008). As written in section 5.6.1 (*Low Fidelity Prototype*) the first prototype of the game is a paper prototype, which allows us to not have the game fully implemented before the final test.

The Formal Loop

The formal loop will guide the process of creating a prototype even more (Schell, 2008).

1. State the problem
2. Brainstorm more possible solutions
3. Choose a solution
4. List the risks of using that solution
5. Build a prototype to reduce the risks
6. Test the prototype if it is good enough. Stop!
7. New Problems? Try again:)

In this project, the formal loop will guide the development of the game idea and its iterations in section 6.1 (*Idea Development Process*). By addressing problems, exploring solutions, and testing prototypes, the process will ensure that the final game is aligning with the project's goals.

5.7 Sample Size

An important factor whether it comes to qualitative or quantitative data, is that the sample of users being measured represents the population which is intended to make statements. It plays a critical role in determining the reliability and validity of statistical estimates in user research. However, bias can occur if the sample is not carefully selected, leading to results that not accurately reflect the population (Sauro & Lewis, 2012).

5.7.1 Representativeness vs Randomness

When collecting a sample size, we can look into two different types.

- Representativeness

It is a specific sample size picked out to consist of the chosen target group. A large sample size is not always necessary for interpreting quantitative data. However, issues may arise if the sample lacks representativeness. Even a small sample size can achieve meaningful insights, as long as it effectively represents the target population.

No statistical adjustments can make up for drawing conclusions about one population based on data collected from a different population (Sauro & Lewis, 2012).

- Randomness

Refers to the process of selecting individuals for the sample without consideration of specific characteristics related to the target group (Sauro & Lewis, 2012).

As we will not have the time or resources to gather a large sample size, we will make use of both the small representative sample size and the small randomness sample size in section 9.2 (*Sample Size of the Final Test*). Some of the participants will be randomly selected, while the others will be chosen because they fit the explorer and slayer player types.

5.8 Thematic Analysis

Thematic analysis is efficient for analysis qualitative data and turning it in to quantitative data, by finding re-occurring themes (Varpio, 2020). We plan on using this for analyzing the Qualitative answers in interviews in the final test in section C.6 (*Final Test Interview*). We will turn them into positive and negative statements made on certain themes of relevance. The reason for this is to make the result more compatible and readable to which themes are implemented with most and least success.

5.9 The Think Aloud Method

In the think aloud method, the participants are asked to express their thoughts on what they see, do and feel while testing a product. Different tasks are given for the participants to complete when interacting with the product. When using the think aloud method, two protocols can be used: Concurrent think a loud, where the participants express their thoughts while testing and the retrospective think aloud where the participants discuss their thoughts after completing a task. By asking participants to verbalize their experiences while interacting with the game, we can gain a deeper understanding of how effectively the game's design create emotions. While performing the tasks, the participants are being observed and notes are taken on their behavior. It is important to note that this can lead to subjective observations, so other methods should also be included during the test to back up the data from the observations (Panagiotidi, 2021).

For this project, the think aloud method will be used to understand how the game's design evokes the intended emotional responses during gameplay. It will gather feedback which is useful for future iterations. This approach will help refine the game's design to better meet the emotional goal of loneliness and the essential experience from section 3.4.2 (*Essential Experience*).

5.10 Observations

Observation is a qualitative method that includes several types, techniques and approaches. Observation can be subjective and lead to subjective results, as one person might notice

something the other is not aware of. The method is divided into three parts (Ciesielska, 2018):

- *Indirect observations*
- *Participant observations*
- *Non-participant observations*

The non-participant observation method includes observations of participants without actively taking part in the activity, but just how people interact with a product and their behavior while using it. This aims to understand the participants reactions during their experience of the product (Ciesielska, 2018).

We will use non-participant observation to watch how participants react without us being directly involved.

Another observational method is structured observations, which involves observing specific behaviors in a more organized way compared to other observational methods. The setting is typically natural, such as a classroom, with a structured framework that introduces specific tasks. Instead of recording everything, the focus is limited to particular behaviors of interest (Cutler, 2019).

For this project, the structured observation methods will be used during the final test in section 9.4 (*Observations from the Final Test*). This approach ensures that observations are more objective and quantifiable. Since all six group members will be observing, focusing on the same things allows for consistent data collection.

5.11 Semi-structured Interview

A semi-structured interview is a method to collect qualitative data. Some of the questions has been prepared and some of them has not. The interviewer will ask the questions which has been prepared, but they can also choose to ask about certain details of part of the answer, to achieve a more qualified answer. A problem which could occur with the semi-structured interview is bias-research, where the interviewer by mistake will ask leading questions to achieve the answer they want. If this is not the case, semi-structured interviews will be able to lead to more detailed information (George, 2023).

We will be able to explore deeper into the players' emotional response when using a semi-structured interview at the end of the tests. This will give us feedback and qualitative data about the players experience with the game.

5.12 The System Usability Scale

The System Usability Scale (SUS) is a 10-item questionnaire. Each item is rated on a five-point scale, which goes from "strongly disagree" to "strongly agree". The odd-number items are positively phrased and even-number items are negatively phrased. The participants will complete the SUS questionnaire right after testing the product. The SUS is a

reliable tool, which has been tested to give consistent results. It is used to provide overall information about the usability (Sauro & Lewis, 2012). The SUS questionnaire is valuable not only for assessing the game's usability and creating an intuitive flow, but also ensuring an enjoyable game experience. It helps achieve full immersion by balancing the game's usability, by not making it too challenging or too easy (Schell, 2008).

The System Usability Scale Standard Version		Strongly disagree					Strongly agree				
		1	2	3	4	5					
1	I think that I would like to use this system.		☐	☐	☐	☐	☐				
2	I found the system unnecessarily complex.		☐	☐	☐	☐	☐				
3	I thought the system was easy to use.		☐	☐	☐	☐	☐				
4	I think that I would need the support of a technical person to be able to use this system.		☐	☐	☐	☐	☐				
5	I found the various functions in the system were well integrated.		☐	☐	☐	☐	☐				
6	I thought there was too much inconsistency in this system.		☐	☐	☐	☐	☐				
7	I would imagine that most people would learn to use this system very quickly.		☐	☐	☐	☐	☐				
8	I found the system very cumbersome to use.		☐	☐	☐	☐	☐				
9	I felt very confident using the system.		☐	☐	☐	☐	☐				
10	I needed to learn a lot of things before I could get going with this system.		☐	☐	☐	☐	☐				

Figure 5.2: The System Usability Scale (Sauro & Lewis, 2012)

The SUS is sensitive to changes and is a great tool for detecting them as well. If the system has been changed, the SUS will be able to detect these changes. The changes will always be represented in the answers from the test participants. Making it easier to see whether the changes which has been made affects the system negatively or positively. It is also important to be critical towards the collected data and potential outliers (Sauro & Lewis, 2012). Therefore, prioritizing the SUS questionnaire can give us insight into whether the game's usability is good for players to focus entirely on the game, achieving a flow state where they feel immersed and connected to the experience. This also helps to see if players spend less energy figuring out mechanics and more on enjoying the game's atmosphere, story, and experience. We will use the SUS during the tests of the two Unity prototypes in sections 8.3.2 (*Results from the System Usability Scale from the First Unity Prototype*) and 8.4.4 (*Results from System Usability Questionnaire of Final Test*).

5.12.1 Calculation of the SUS score

The SUS provides a score when it has been calculated. The average SUS score is 68. As written previously, the SUS consists of positively and negatively worded items, to calculate the SUS score the items must be converted first (Sauro & Lewis, 2012):

- For positively worded items (odd number items), we must subtract one from the test

participants answer (Sauro & Lewis, 2012):

$$x - 1 \quad (5.1)$$

- For negatively worded items (even number items), we must subtract 5 from the test participants answer (Sauro & Lewis, 2012):

$$5 - x \quad (5.2)$$

The converted numbers are added up and multiplied with 2.5, to make the range go from 0-100 instead of 0-40 (Sauro & Lewis, 2012).

5.12.2 The SUS score Range

The system can be given a grade from F to A+ depending on how high or low the SUS score is. The SUS score must be above the benchmark: 68. A SUS score at 68 is considered average, scores above 68 is above average usability, while scores below 68 is below average usability. This table shows which SUS score range determines the grade (Sauro & Lewis, 2012):

Table 8.6 Curved Grading Scale Interpretation of SUS Scores		
SUS Score Range	Grade	Percentile Range
84.1–100	A+	96–100
80.8–84	A	90–95
78.9–80.7	A–	85–89
77.2–78.8	B+	80–84
74.1–77.1	B	70–79
72.6–74	B–	65–69
71.1–72.5	C+	60–64
65–71	C	41–59
62.7–64.9	C–	35–40
51.7–62.6	D	15–34
0–51.7	F	0–14

Figure 5.3: The SUS score range (Sauro & Lewis, 2012)

5.12.3 Detecting outliers with z-scores

Potential outliers can occur in with any data and the SUS is no exception. It is therefore important to be critical of the data and it is possible to detect the outliers with the use of z-scores. The z-score can be calculated by knowing the mean and standard deviation of the sample and is given by this formula (Sauro & Lewis, 2012):

$$z = \frac{X - \mu}{\sigma} \quad (5.3)$$

X: The data point, μ : The mean, σ : The standard deviation

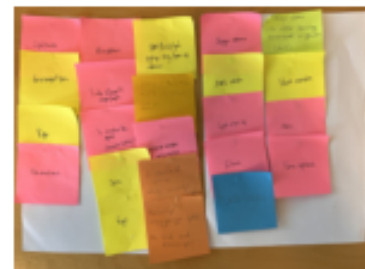
Z-scores below -3 or above 3 are considered extreme values and can be treated as outliers. A z-score indicates how many standard deviation a value is from the mean. Therefore, values -3 or 3 standard deviations away from the mean is considered as outliers (Sauro & Lewis, 2012). For this project, we will use the z-scores to detect outliers with the SUS scores from the two tests of the Unity prototypes in sections 8.3.2 (*Results from the System Usability Scale from the First Unity Prototype*) and 8.4.4 (*Results from System Usability Questionnaire of Final Test*). This method lets us analyze the data without making subjective decisions about the outliers ourselves.

6. Design

This chapter will go through the design process from the initial brainstorm to the concept based on what we researched about design theory in section 3.4 (*Design Theory*) and about the target group in section 3.2 (*Target Group*). The research from these two sections were kept in mind to design a game that aligned with the target groups preferences and motivations. We made use of different methods from chapter 5 (*Methods*) to continuously refine the design until the final prototype was completed.

6.1 Idea Development Process

The knowledge from the section: 5.6.4 (*The Formal Loop*) was used to develop the game idea. The formal loop has seven steps. **First step:** We stated the problem, which was the final problem statement seen in section 3.9 (*Final Problem Statement*). **Second step:** We brainstormed possible solutions. Ideas were written on post-it notes, which were placed on A3 papers to gain an overview of all the ideas. Afterwards the ideas were categorized into categories involving mechanics, feelings, overall ideas and themes. We talked about what to keep and what to put together, to get closer to an idea. All the post-it notes were then put together for different game ideas and a top three were picked. Each group member voted on their favorite. The pictures below shows the process of the *second step* with all the post-it notes.



Third step: We chose a solution which can be seen in section 6.1.1 (*The Game Design Idea*). **Fourth step:** After choosing a solution we listed the risks of using that solution. The greatest risk for the project was the players not getting the theme and the emotional goal of loneliness. So the further development of the game always had that in mind. **Fifth step:** We created a paper prototype which can be seen in section 5.6.4 (*Paper Prototyping*). **Sixth step:** The paper prototype was tested and evaluated in section 8.1 (*Test of the Paper Prototype*). This prototype was good enough to allow us to start developing a more technological prototype.

6.1.1 The Game Design Idea

After brainstorming possible solutions on how to design a game centered around a specific emotion, we decided on a first-person experience where the player is stranded on an island

in the middle of the ocean. The idea of this, was to enhance the feeling of being shut out from the rest of the world with no place to go to or no one to talk to. A first-person perspective was chosen to immerse the player directly into the character's experience, allowing them to see and feel the world through the character's eyes. In section 3.2.7 (*Playing Alone and Playing with Others*), we found that playing alone can create a deeper personal experience, therefore we chose to make a first-person game, with no one else on the island except the player, to symbolize separation from society. The island includes small environmental details, such as abandoned objects or a quiet beach, included to evoke feelings of being forgotten or left behind.

The game is designed to provoke an emotional response by immersing the player in an isolated journey. The animation introduction, where the player wakes up in a lighthouse to the sound of a mysterious radio mentioning a missing person, is to create a feeling of the player's only connection to an unknown person. This is to emphasize the lack of human contact, and strengthen the sense of isolation on the island. The open environment encourages the player to engage with the surroundings, uncovering small details that tell a story of abandonment and past events. In the section 3.3 (*Designing for Emotions*), we found that choices and control of the player plays a part of creating an emotional experience for the player. The puzzle solving is to create some isolation that mirrors the inner struggle of trying to find clarity or purpose when faced with loneliness.

Along the way, the player will meet shadow monsters, where memories from the players past appears when the shadow monsters are killed. This element strengthens the emotional connection by linking the player's progress to uncovering the character's past, making the experience feel more personal and reflective, as described in section 3.4.3 (*The Game Consist of Elements*), where certain mechanics can strengthen an emotion. At the end of the game, the shadow monsters reappear, but this time, they cannot be killed. The player collapses to the ground, and an input field is displayed, inviting the player to write about the emotions the game evoked. The overall idea was for the player to be able to explore the environment around the island, solving puzzles and create a connection to the player. The aim of these elements was to create a flow and get the player "in the zone" as we found from the section 3.3.1 (*Flow Theory*). Collapsing to the ground as the game fades to the input field for reflection encourages the player to confront their feelings directly, turning the gameplay into a personal and introspective experience.

The method from section 5.5 (*Game Design Document*) was used after developing the idea for the game. By creating a game design document, we made sure everyone understood how the game should be designed. The design document can be found here A.1 (*Design Document*).

The Character

The character in the game was created with the target group in mind from section 3.2 (*Target Group*). Since the target group is not defined by a gender, we aimed to create a character without a specific gender, allowing everyone to relate to them. Since the game is

first-person, we did not have to create the characters' look, because we did not want to risk the player not identifying with the aesthetic of the character from section 3.4.3 (*The Game Consist of Elements*). It was important that the character felt lonely to portray the feeling of loneliness, aligning with the Final Problem Statement seen in section 3.9 (*Final Problem Statement*) and fulfilling one of the requirements:

- *The game must present the problem of loneliness through the character like in Firewatch and The First Tree from sections 3.7.2 (Firewatch) and 3.7.3 (The First Tree).*

6.2 Personas for the Project

For this project, we used the knowledge from section A.2 (*Personas*) to design a better product and to keep the target group in mind while designing. The target group of this project is Danish citizens in the age group 18-34, as a greater percentage of them experience loneliness compared to other age groups (Mary-Fonden, 2024).

Digital games also play a great part of the daily life for Danish citizens in this age group, with a minimal gender differences (Danish-Producers-Association, 2023).

The target group was analyzed through Bartle's taxonomy of player types and the nine quantic gamer types, with explorers and slayers as the primary player types (Hamari & Tuunanen, 2020),(Yee & Ducheneaut, 2015). The personas is in the appendix as well A.2 (*Personas for the project*). Additionally, the personas were also created based on insights from the section 3.2.1 (*Loneliness in Denmark*), which highlighted the connection between civil, working status and level of loneliness.

The use of personas in the design process allowed us to focus on these player types, so we could design game mechanics and narratives that resonate with players exploratory preferences and specific design for their motivation to make sure we succeed in creating an experience for the them. This is also to make sure we always have the user in mind, to be able to create a meaningful interaction.

Based on research from the analysis, we discovered that the explorers and slayer player types prioritize visual appeal and enjoy exploring a world with puzzle-solving tasks, rather than focusing on competition or strategy.

This was beneficial in terms of knowing what mechanics to focus on when the implementation began, to ensure the design choices align with the player types preferences. Therefore, we focused on creating a beautiful environment open do explore and including easy puzzle solving tasks, to keep it interesting and necessary to explore even more.

Sophia

The Creative Player Explorer

About

Age: 28
Status: Single
Gender: Woman
Occupation: Graphic Designer
Location: London

Sophia is a highly creative person, who has a strong sense of aesthetics and enjoys incorporating her taste for craft and design into both her professional and personal life. Outside of work, she likes to spend time with her roommates, watch movies and TV series, read, play video games, sew and craft, watch Formula 1, and play golf with family members.

Game background

Sophia is an experienced gamer and has been gaming for around 10 years. She has played lots of different game genres, but has found single-player games with a rich storytelling and exploration world, open ending and creative game play most enjoyable. She uses games as a form of mental escape and personal challenge, and can spend hours immersing into the game.



Player Type

Slayer's Player Type
Explorer
Slayer

Goals

- To succeed and be strong after a long workday.
- To play solo and avoid every corner of the game.
- To experience a rich storytelling and to explore the game's lore and secrets.

Motivations

- Like challenging quest.
- Open to creative exploration and solving of puzzle.
- Immersion game.

Frustrations

- Games that are too linear or too fast progression.
- Overly competitive games.
- Complex multiplayer with story and exploration.

Oliver

The Creative Player Explorer

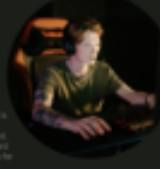
About

Age: 18
Status: Student
Gender: Man
Occupation: Student
Location: London

Oliver is doing a gap year to explore different parts of the world and to gain further education. He wishes to work with creative people, particularly related to design or fashion or crafts. Oliver is an outgoing, confident person, who enjoys spending time with his friends and friends, whether it's a video gaming, organizing board game nights, or making suggestions for new ideas.

Game background

Oliver was introduced to gaming in a young age by his older brother. He enjoys the thrill of being the main character in action-shooter games, immersing himself in their storytelling, mechanics and solving challenges. He enjoys some form of mental engagement like the strategic or tactical, puzzle or creative challenge. He plays both competitive and multiplayer games, and especially enjoys games that offer a rich and immersive world, a powerful story or complete against others in team-based environments.



Player Type

Slayer's Player Type
Explorer
Slayer

Goals

- To see gaming as a form of relaxation after work.
- To play with friends after completion of their school projects.
- To immerse himself in rich narratives.
- To get a sense of achievement after completing challenges.

Motivations

- Overcoming challenges.
- Immersing without opponents.
- Feeling like a hero.
- Creative gameplay, problem solving, puzzle or strategy.
- Powerful story.

Frustrations

- Too heavy reliance on general mechanics.
- Lack of story depth.
- Complexity in challenges, individual contribution in team games.
- Complexity in challenges, too much tactical mechanics over fun.

Alex

The Immigrant Player

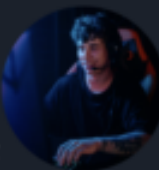
About

Age: 28
Status: Single
Gender: Man
Occupation: Psychology Student
Location: London

Alex is a budding psychologist with a deep interest in understanding human behavior and motivations. His academic background provides him with a unique perspective on the world, which also influences how he approaches challenges in gaming. It is important for Alex to spend time alone with his family, because he enjoys reading books, which usually, explore psychological topics through dramatic scenarios, and then compare his internal body story with learning and reading.

Game background

Alex wanted to get introduced to gaming around his late years. He enjoys the mental stimulation and challenging games provide. He enjoys those with a rich narrative or intellectual depth. He enjoys solving puzzles and mysteries, the story and world setup, learning about the world by the way of it. He likes gaming in more than one environment. It is an extension of his intellectual curiosity. He doesn't enjoy games where he can't read the story.



Player Type

Slayer's Player Type
Explorer
Slayer

Goals

- To experience thought in narrative of his game.
- To succeed and be confident.
- To apply his learned in psychology to understand the motivations and behaviors of characters.
- To engage with games that offer a combination of mental challenges and emotional depth.

Motivations

- Experiencing to overcome difficult challenges, mental or moral dilemmas, and deep emotional characters, world and story.
- Challenges of puzzles.
- Focus on achieving difficult tasks.

Frustrations

- Too much focus on grinding or repetitive mechanics.
- Overly complex mechanics or shallow character development.
- Games that focus on single team mechanics.
- Complexity in multiplayer games with too much focus on strategy.

Lucia

The Immigrant Player

About

Age: 28
Status: Single
Gender: Woman
Occupation: Business Student
Location: London

Lucia is a dedicated technology student who works part-time as a full assistant at the National Hospital. Her academic and professional life requires focus and precision, traits that carry over into her personal life and hobbies. She is very dedicated to everything she does, Lucia enjoys spending time by herself or with her close group of friends. She is a frequent writer and often shares her thoughts for her friends where they discuss and make creative plans. She enjoys taking breaks for them as well. Despite her immersion, she is highly social with those closest to her and loves the comfort of familiar company.

Game background

Lucia is a passionate gamer, who enjoys and loves to play alone games that allow her to immerse herself in compelling narratives, challenging gameplay and exploration. Games are a way for her to escape and recharge from the pressures of her study and work life while maintaining her mind engaged. She enjoys games which provide her with a sense of personal achievement. She prefers single-player games.



Player Type

Slayer's Player Type
Explorer
Slayer

Goals

- To enjoy immersive, story-driven games.
- To feel like the hero while experiencing a compelling narrative.
- To relax and unwind after studying and working.
- To be challenged and sense the feeling of achievement from completing complicated missions or puzzles.

Motivations

- Story fulfillment in absorbing challenges.
- Deep narrative.
- Improve skills and achieve mastery over difficult tasks.

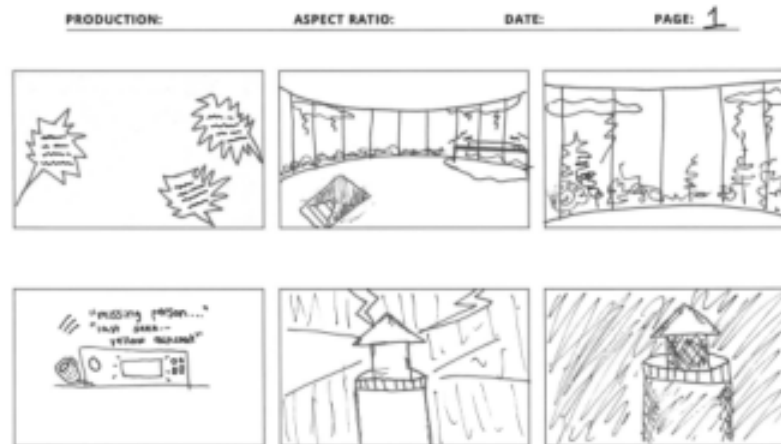
Frustrations

- Games that are too fast-paced.
- Too much focus on combat.
- Action-shooting story.
- Multiplayer games that require constant social interaction competition with others.
- Heavy repetitive mechanics.
- Not feeling motivated engaged.

6.3 Storytelling

6.3.1 The Storyboard

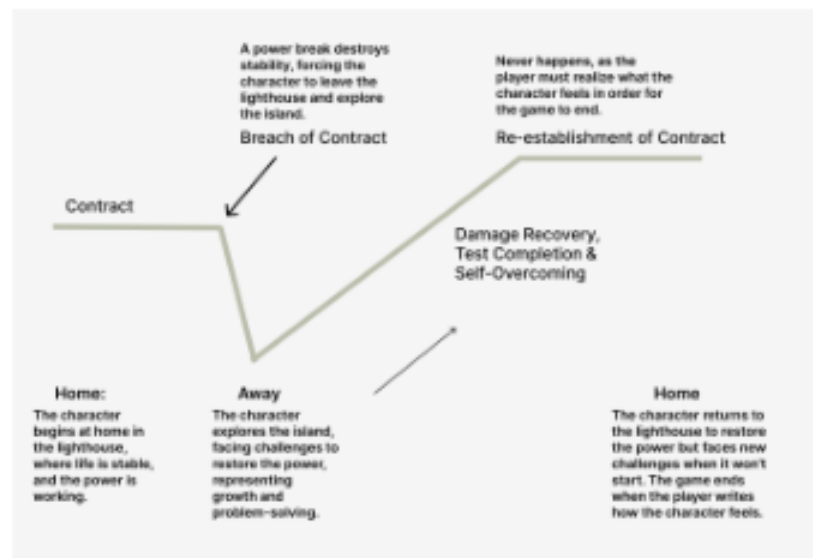
In section 3.4.3 (*The Game Consist of Elements*) we discovered the importance of using storytelling as it is one of the four elements. The player type slayer from *The Nine Quantic Game Types* in section 3.2.5 (*The Nine Quantic Gamer Types*) enjoys narrative and storytelling in games. It was therefore important to use storytelling as part of the game to satisfy the needs for the personas previously created in section 6.2 (*Personas for the Project*). With the research from section 5.6.1 (*Storyboard*) we found that we could use a storyboard as the game made use of storytelling. This would help create a quick prototype of the story with the key scenes. The storyboard was made on paper and the drawings was quickly sketched to visualize the key scenes of the game. The storyboard consisted of five pages of six squares and can be found in appendix A.3 (*Storyboard*).



6.3.2 The Core Conflict and the Contract Model

In section 3.5 (*Storytelling in Video Games*) we found that the story must have a core conflict and that we could use the contract model. In the game the core conflict is always that the power is off. Even when the character faces other problems, the core conflict remains the same. Other problems could be: facing the shadow monsters, killing the shadow monsters and finding the code for the keypad. The core conflict remains the same through all the problems, the character must still find fuel to turn the power back on after solving these problems.

The story of the game used the contract model to create a story where the character started at home in the lighthouse. Because of a power break, the character must go away from home and explore the island to get the power going again. At the end, the character returns to home, the lighthouse, to turn the power back on. According to the contract model, there should be a re-establishment of the contract by the end. However, in this case, that does not occur, as the power remains off. Instead, the game ends when the player reflects on what they believe the character feels. It made it easier to create the story by having a core conflict and using the contract model. Here is the contract model for the game:



6.3.3 The Memories

In the game *The First Tree* from section 3.7.3 (*The First Tree*) we discovered how different objects could be used as memories placed around the world to guide the narrative of the story. In the game *Alan Wake* from section 3.7.4 (*Alan Wake*), we discovered how these memories could be presented with a piece of paper appearing on the screen with text. Using the findings from section 3.1.1 (*Types of Loneliness*) helped us focus on two types of loneliness through the memories. The types of loneliness we used was social- and interpersonal loneliness as they are both effectively used to emphasize loneliness in the game *Sea of Solitude* from section 3.7.1 (*Sea of Solitude*). Social loneliness was used for the memories about the glasses to portray the loneliness of being excluded and rejected from a group. Interpersonal loneliness was used for the memories about the diary to portray the loneliness of losing someone, highlighting the sense of loss and loneliness that follows losing someone close. The objects, types of loneliness and memories can be seen in the figure below:



The diary date was designed as a puzzle to engage the player type explorer from

Bartle's Taxonomy in section 3.2.4 (*Bartle's Taxonomy of Player Types*) by using the date to unlock a door with a keypad. At the same time, the memories was designed especially for the player type slayer from The Nine Quantic Game Types in section 3.2.5 (*The Nine Quantic Gamer Types*) to engage them as they enjoy narrative driven games and storytelling. This is one examples of how different parts of the game combined the two player types.

6.4 The Paper Prototype

In section 5.6.4 (*Paper Prototyping*) we describe how a paper prototype can be created to quickly sketch design ideas and create a low fidelity prototype. The low fidelity prototype could easily be modified and change, which made it ideal for trying out design ideas. The reason for creating a paper prototype was to make a quick and simple prototype to outline the basic structure and design of the game.

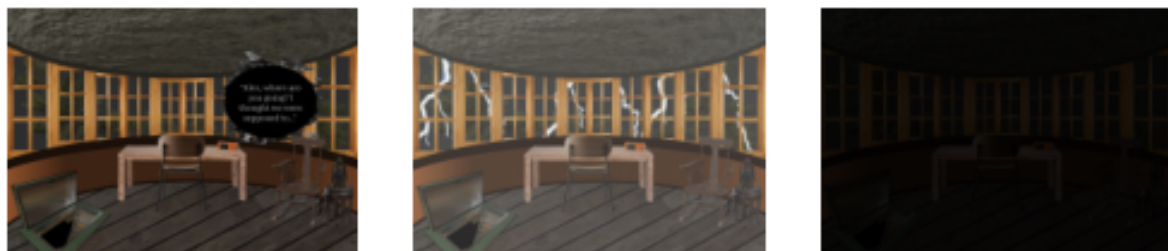
The prototype is a visualization of the island, buildings, environment and the character. To create the paper prototype we used materials such as paper, color pencils, wooden sticks, tape and scissors. The character was a LEGO figure. This process was crucial because it allowed us to test and refine ideas before going anywhere with implementation. It was helpful to get an idea of the relationships between elements and we discovered some design ideas were impractical or were not clear enough.



We realized that certain environmental features needed to be resized or repositioned for better navigation and gameplay flow. It led to specific design choices such as adjusting the size of the island and adding clear pathways to enhance the player's sense of direction. Additionally, this paper prototype also helped to prioritize what elements to focus on during development. We decided to emphasize environment and storytelling, as we in section 3.4.2 (*Essential Experience*) found that the essential experience is an important factor when designing to portray an emotion. Including small details, such as scattered objects and playing a sound during the test, helped establish a strong foundation for the game's development before implementation.

6.4.1 Figma Start Scene

The start scene of the game was not fully developed before the final test of the Unity prototype. We there made use of the findings from section 5.6.1 (*The Wizard of Oz Method*). This allowed us to simulate features, which had not been fully implemented. By using this method we could test features, which would require higher technical solutions by using a lower cost technology. It were used for testing the paper prototype and the first Unity prototype. The Figma Start Scene aligned with rest of the design choices in the design document, but it did not require any implementation. Each click on the screen triggered a new event, showing key scenes, animations, and dialogue which would later be implemented in the game. Here is some pictures of the Figma start scene and the rest is found in the appendix A.4 (*Figma Start Scene*).



6.5 Design of environment

The target group of the project are the player types explores and slayers. As seen in section 3.2.6 (*The Impact of Different Player Types*), these player types have a pleasure of discovering, enjoy games with selected narrative and aesthetics experience. Therefore the environment was important when designing the game to align with their preferences. This also aligns with the findings from the section 5.6.4 (*Paper Prototyping*) where we learned that it was important to emphasize on environment and storytelling.

As seen in sections 3.4.2 (*Essential Experience*) and 6.1.1 (*The Game Consist of Elements*) the aesthetic is a great part of the emotional goal. After drawing inspiration from section 3.7.4 (*Alan Wake*) a dark an intense atmosphere is the aim in order to create settings that enhances the wanted emotion. Therefore designing a world that grants this experience was essential. To address that, we took the layout of our paper prototype which we felt had potential to work as a map for the project and keeping our inspiration in mind we built an environment that would emphasize on darkness and bad weather. We build a weather system with rain, thunder, clouds, wind, fog, trees blowing in the wind, grass and a ocean with waves. Representing the dark negative thought pattern a lonely person can have. We choose to draw inspiration for these environment choices, because these features are widely used in the game *Sea of Solitude* from section 3.7.1 (*Sea of Solitude*), where the environment is the focus to emphasize an emotion through a game. To represent a feeling of being stuck we added cliffs and hills extending all the way around the island. We also turned almost all light in the game off except for the flashes from thunder strikes and the players flashlight. In order to cater to our target group and the findings from the paper

prototype we built a path system that all connects, so the player could explore different areas but still be on track with the assignment.

In the game *Firewatch* from section 3.7.2 (*Firewatch*) we found how placing different objects in the environment could create the sense that someone had been there before and left. Therefore it was important to design and leave different objects around the island to evoke the feeling that the character might have been left behind.

6.5.1 Design of the Shadow Monsters

From the game *Firewatch* in section 3.7.2 (*Firewatch*) we learned how emphasizing loneliness by using faceless characters to strengthen the feeling of being disconnected from others. From the game *Sea of Solitude* in section 3.7.1 (*Sea of Solitude*) we learned how creating monsters can represent potential struggles and emotions, using their design and behavior to personify feelings of loneliness and isolation. This inspired the design of the shadow monsters with as little physical appearance as possible to enhance the feeling of loneliness and at the same time being disconnected from other people as it was only their silhouette which was presented. In section 3.7.4 (*Alan Wake*) we found how to make these monsters disappear, by using a flashlight. The images below are inspirations for the shadow monsters in the game. Old fashion TV noise will inspire us in our further designing of the shadow monsters disconnected appearance. As we researched in ?? (*Shaders*) shaders can be used to manipulate the coordinates in a 3D space, which as we can see in the image below the noise moves in the x-axis.

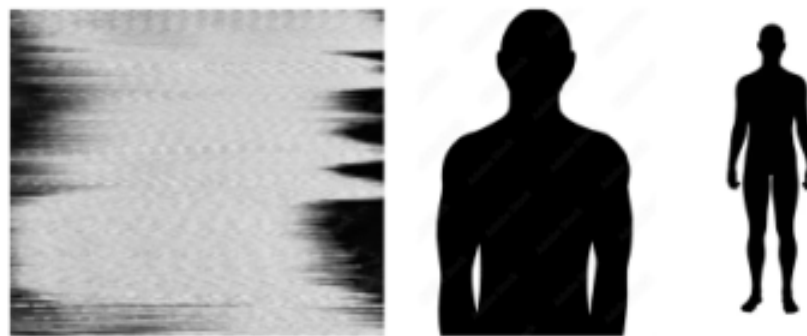


Figure 6.1: (Adobe-Stock, 2024)

6.6 Sound Design

When designing the sound. Since we did not have any test result regarding sound from the paper prototype we instead looked at the findings from section 3.4.3 (*The Game Consist of Elements*) where the *aesthetics*, in this case the sound and music has a direct relationship with findings from section 3.4.2 (*Essential Experience*). It was therefore important that the sound matched with the overall environment and feeling of the game as the games from *State of the Art* in section 3.7 (*State of the Art*). The sound and music in the game should

give a dark vibe to represent the feeling of being alone and blend in with the visuals of the game as much as possible like in the game *Sea of Solitude* from section 3.7.1 (*Sea of Solitude*).

6.6.1 Sound for the Environment

We decided to use the sound of ocean waves surrounding the island to remind the player that they were isolated. This was completed by addition of blowing wind from the forest and night animals occasionally peeking through the sound picture. We used thunder and rain storm to emphasize the dark theme.

We decided to design sound effects on interactive objects and footsteps that played different sounds depending on what material the player walked on. These design choices was made to to keep the *aesthetics* in the game high by making the experience as immersive as possible as we figured in.

The games main theme music was created with focus on a simple dark piano melody with a mystic synth slowly adding more instruments. The different sounds can be found in appendix B.10.1 (*FMOD Tutorial*)

6.6.2 Designing the Dialogue

Dialogue was also part of the sound design. From the game *Firewatch* in section 3.7.2 (*Firewatch*) we learned how we could emphasize loneliness by creating minimal communication with the rest of the world through a radio. This inspired us to add a radio that gets cut off to create a sense of no communication. We used one of the group members voice for the radio and another for the characters voice. The dialogue was created to strengthen the *story* as it is one of the four elements in section 3.4.3 (*The Game Consist of Elements*).

6.7 The End Scene

One of the requirements was:

- *Helping people understand what they can do about loneliness is important for the project. We must therefore include a section at the end of the game to provide information on what to do if you or someone you know is feeling lonely. We will use the guidance from section 3.1.3 (Social Support) on what actions to take.*

As the game is designed to portray a feeling of loneliness and the increasing problem in Denmark (Mary-Fonden, 2024). It was important to provide information and social support at the end of the game to create a full-circle experience for the player and to connect the narrative into real-world resources. This aligns with the findings from section 3.3 (*Designing for Emotions*), as we did not want to give our users a feeling of loneliness, but portray how it can feel like through specific design features that strengthen loneliness with the use of the findings from section 3.3.1 (*Flow Theory*). Creating the emotional impact to the end of the game might help encourage the users to support others who might struggle with different types of loneliness.

6.8 Design Choices based on Feedback

We used the iterative process from section 5.3 (*The Iterative Process*) to design, develop and evaluate the game. This method allowed us to refine the game by testing prototypes, collect feedback and use it to improve each iteration. This is some of the feedback we collected from the test participants during the first test of the unity prototype from section 8.3 (*The Test of the First Unity Prototype*):

Statements from the test of the first Unity prototype:	How it was in the first Unity prototype	How it was in the final Unity prototype
"The signs were not clear enough and I was confused about the different names of the houses"	Fewer signs, without text or information about the different houses.	More signs, with clear text and information about the different houses through the dialog.
"There were not enough things to explore around the island"	Minimal objects and easter eggs around the island	Added more objects and easter eggs like benches, a picnic table, ducks, and Wilson ect.
"The middle path was boring"	No objects, easter eggs or ducks on the middle path.	Added objects, Easter eggs, and ducks were added to the middle paths.
"The mouse is too sensitive"	Mouse too sensitive.	Made the mouse less sensitive.
"I was confused about the enemies"	The enemies were just cubes moving towards the player with no animation or shaders.	The enemies were changed to a human body with an animation and shaders.
"I could not see the glasses on the ground at first"	The glasses had no shader applied and they were too small.	A shader was applied to the glasses, and they were resized.
"I was confused about the end scene"	When colliding with the final enemy, the end canvas was triggered. The player should type what they thought the character felt. No information about loneliness was provided afterwards.	When walking out the generator house the last time, the end scene was triggered with animation and the end canvas with what the character feels. Information about loneliness was provided afterward.

The feedback about exploring the island, the signs and the middle path feeling too boring led us to add more objects and signs to the environment. This was crucial because the environment is important for the personas, who values exploration. The environment is also a part of the *aesthetic* from the four elements in section 3.4.3 (*The Game Consist of Elements*). The feedback about the mouse being too sensitive led us to making it less sensitive. This was important for the usability of the game as could also have an impact on the emotional goal as researched in section 5.12 (*The System Usability Scale*). The feedback about the glasses being too small led us to resize them. It was important to make these changes as the *story* was important for the player types: slayers and explorers and it is one of the four elements from section 3.4.3 (*The Game Consist of Elements*).

The rest of the feedback involved the end scene and shadow monsters being confusing. These two were not finished yet but were already planned to be done for the final prototype. The sound and dialog were not implemented in the game yet either, but were important to the game as the sound is a part of the essential experience from section 3.4.2 (*Essential Experience*) while the dialog was a part of the *story* which is one of the four elements in section 3.4.3 (*The Game Consist of Elements*). The sound where therefore a high priority for the final prototype.

7. Implementation

This chapter will go through the process of implementing and developing the game in Unity with the requirements, design theory and the personas from sections 4 (*Requirements*), 3.4 *Design Theory and Personas for the Project* (*Personas for the Project*) in mind. It will go through the different features including visual computing, mechanics and sound.

7.1 Designing 3D Assets in Blender

Blender was used as a 3D modeling program, to make some of the assets. The 3D assets were created in different ways using both YouTube tutorials which can be seen here B.3 (*YouTube Tutorials for Creating Blender Assets*). We also used images as references. Using Blender allows us to personalize the game by having full creative control over the appearance of specific objects. This also ensures a consistent style across all the assets used in the game.



Figure 7.1: 3D assets made in Blender

We used Blender to create the 3D models. The objects were made as low poly models with a realistic art style like in the game *Alan Wake* from section 3.7.4 (*Alan Wake*), textures and colors were applied to achieve a more realistic effect (Microsoft, 2024). The textures were found on the website *Polyhaven.com* B.1 and from images in appendix B.2 *Images Used as Materials/Textures*. The choose to design some of the main object which the player interacts in blender, to create a consistency in the game. Designing our own assets enabled

us to incorporate our creativity directly into the project and take ownership of the design process.

7.1.1 Pre-made Assets

It was not possible to create all the 3D assets in Blender so pre-made assets from *Polyhaven.com* B.4, *Sketchfab.com* B.5 and *UnityAssetsStore.com* B.6 were used. We matched the art style of the pre-made assets with our custom-designed ones to maintain a constant visual aesthetic and avoid creating an incoherent experience.

The same applies to the room inside the lighthouse, the objects are pre-made assets from either *Polyhaven.com*, *Sketchfab.com* and *UnityAssetsStore.com* with the same art style to maintain the connected look through the game.

Pre-made assets allowed us to use more of the time to work on gameplay, mechanics and design, rather than making everything from scratch as time was limited.

7.2 Unity

Unity is a platform for creating interactive real-time 3D content (Unity-Company, 2024). We therefore chose to use Unity to create the higher technical solution for the game and use the method seen in section 5.6.2 (*High Fidelity Prototype*). Another method used for creating the game was the horizontal prototyping method seen in section 5.6.3 (*Horizontal Prototyping*). This method allowed us to design a greater aspect of the game without going in to too much detail with every part.

7.3 Visual Computing

7.3.1 Shaders in Unity

As one of our technical requirements states, we must create environmental elements with the use of acquired knowledge of Visual Computing 4.1.1 (*The Requirements*). As we have chosen a realistic art style A.1 (*Design Document*) it was necessary for the visual appearance to reflect real-life. The setting of the game being on an island surrounded by an ocean, emphasizes the feeling of loneliness and isolation. Furthermore, the character will meet shadow monsters portrayed in a disconnected appearance. We will use Shader Graph 3.6.1 (*Shaders*) to create the ocean and shadow monster, and in the following sections we will explain how these were implemented.

7.3.2 Water Shader

The water shader is made with the help of a Gamedev.TV course called "Unity Shader Graph: Create Procedural Shaders & Dynamic FX" (Kurhan, 2024) and consists of some subgraphs called *Linear Wave*, *Scroll UV* and *Scrolling Voronoi Noise*, and will be talked

about in detail in later sections. Other than the subgraphs, the shader is made up of different parts. Each part divided into these sections: 7.3.2 (*Depth Sampling and Depth Color*), 7.3.2 (*Foam*), 7.3.2 (*Refraction*), 7.3.2 (*Transparency*) and 7.3.2 (*Waves*) and will be explained below in this order.

The shader is made up of both a fragment part and a vertex part. The fragment part of the shadergraph looks like this:

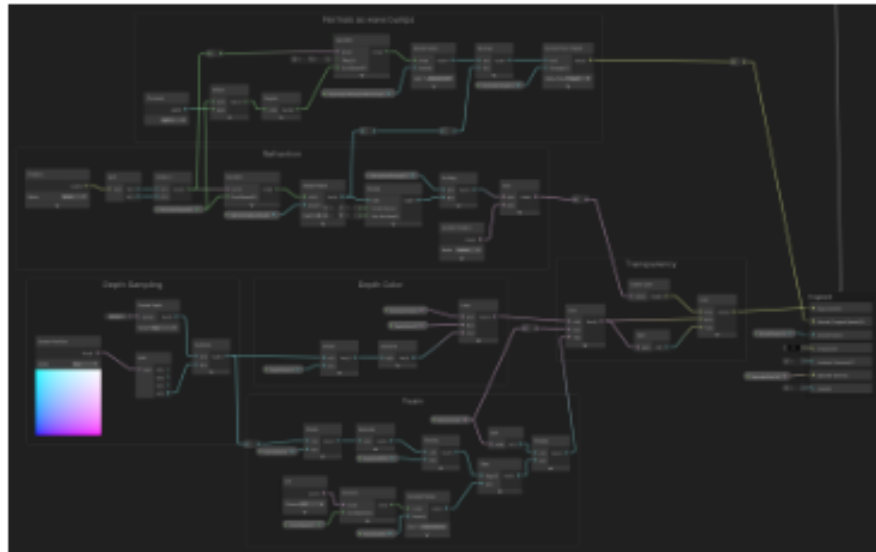


Figure 7.2: Fragment part of the Water Shader

And the vertex part looks like this:

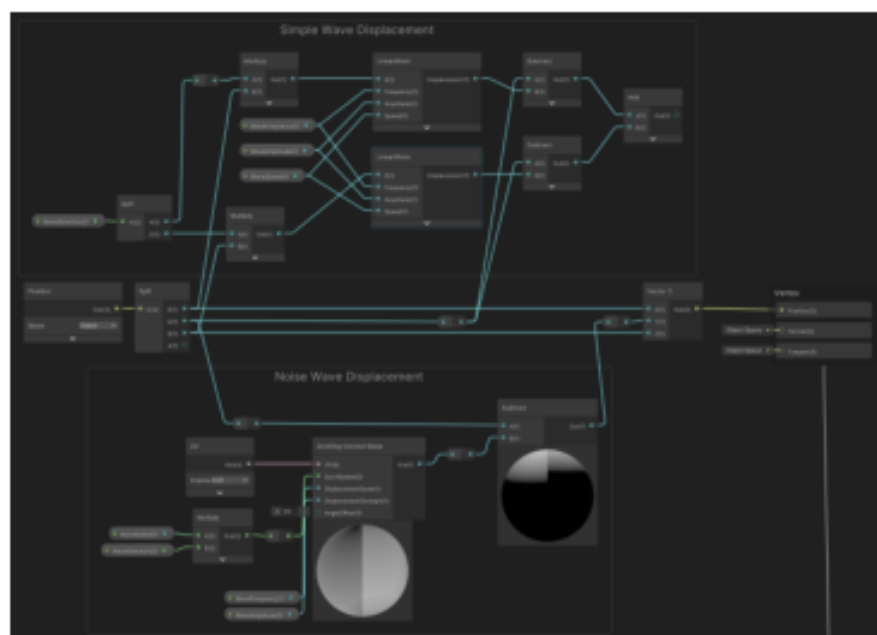


Figure 7.3: Vertex part of the Water Shader

In the Figure 7.2 (*Fragment part of the Water Shader*) most of the parts mentioned above is shown and the Figure 7.3 (*Vertex part of the Water Shader*) only has to do with the waves and the displacement on the y-axis. Only one part of the waves is connected to the fragment shader 7.2 (*Fragment part of the Water Shader*), and that is the one connected to the normals. Everything regarding the waves will be explained in more detail in the section 7.3.2 (*Waves*).

Depth Sampling and Depth Color

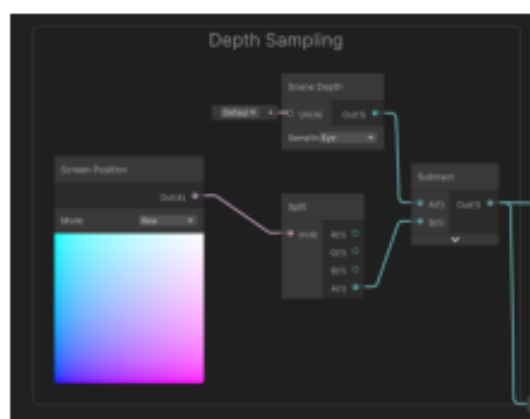


Figure 7.4: Depth Sampling



Figure 7.5: Depth Color

The depth sampling as seen on Figure 7.4 (*Depth Sampling*) is made by taking the raw screen position, to a split node, taking the Alpha channel from the split node and subtracting it with the Scene Depth node. To give the player the illusion of water-depth the shader also have two colors, that can be modified in the inspector inside Unity. There is one color for shallow water and one for deep water. In the Unity inspector, it looks like this:



Figure 7.6: Shallow and Deep Color in Unity Inspector

To make the depth color, as seen on the Figure 7.5 (*Depth Color*), the output from the Depth sampling 7.4 (*Depth Sampling*) goes into a divide node along with the Depth Fade variable. The output from that goes to a Saturate node, that "clamps" the value between 0 and 1 and then goes to a Lerp node that takes in the color variables ShallowColor and DeepColor and in the end gives the illusion of depth with the help of the DepthFade variable as well. The result ends up looking like this:



Figure 7.7: Water Depth with DepthFade = 2.



Figure 7.8: Water Depth with DepthFade = 8.

Foam

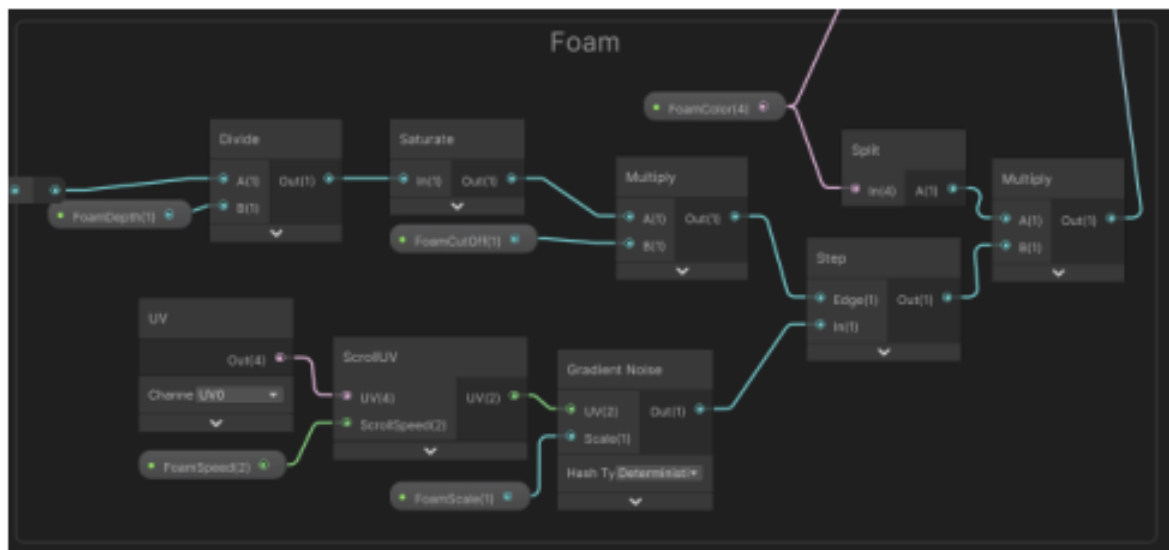


Figure 7.9: Foam part of the water

The foam as seen in Figure 7.9 (*Foam*) also starts by taking the output from the depth sampling, see Figure 7.3.2 (*Depth Sampling and Depth Color*) dividing it with the Foam Depth variable and goes to a Saturate node where the output of that gets multiplied by the FoamCutoff variable.

The output from the multiply node goes into the Edge input on a Step node that outputs 0 or 1 depending on the value of the Edge input. For the "In" input on the Step node, three nodes and two variables - a UV node and a FoamSpeed variable - goes into a ScrollUV node. The ScrollUV then outputs a Gradient Noise Node that takes in another FoamScale variable as the scale - and then, goes into the Step node. The output of the Step node goes to a Multiply node along with a Split node where the Alpha channel from the variable FoamColor is taken as input.

In the end, the result can be seen below on Figure 7.10 (*Foam seen in Unity*).



Figure 7.10: Foam seen in Unity

Refraction



Figure 7.11: Refraction part

Refraction, in this case, means the distortion of the objects seen through the water, because of waves and light reflected on the surface, see Figure 7.12 (*Refraction in Unity*). The refraction is made up of four variables, three floats called *RefractionStrength*, *RefractionWaveSize*, and *SecondaryRefractionWaveSize* and a *Vector2* variable called *RefractionSpeed*. The nodes used for the refraction is *Position*, *Split*, *Vector2*, *ScrollUV*, *Simple Noise*, *Remap*, *Multiply*, *Screen Position* and *Add*.

First the world *Position* is taken as output from the *Position* node into the *Split* node, here the *R* and *B* becomes the *X* and *Y* coordinates by converting them with the *Vector2* node. From there, the output from the *Vector2* goes into the *UV* input on the *Scroll UV* node along with the *RefractionSpeed* variable to the *ScrollSpeed* input on the *ScrollUV* node. That output then goes to the *Simple Noise* node with the *RefractionWaveSize* as its scale and from there into a *Remap* node. This is done so instead of the output from the simple noise goes from 0 to 1, it gets remapped to -1 to 1. From the *Remap* output it goes into a *Multiply* node and the *RefractionStrength* variable does as well. As the last step of the refraction the *Multiply* output and the *Screen Position* node goes into the *A* and *B* inputs on the *Add* node.

The result from the refraction can be seen below:



Figure 7.12: Refraction in Unity

Transparency

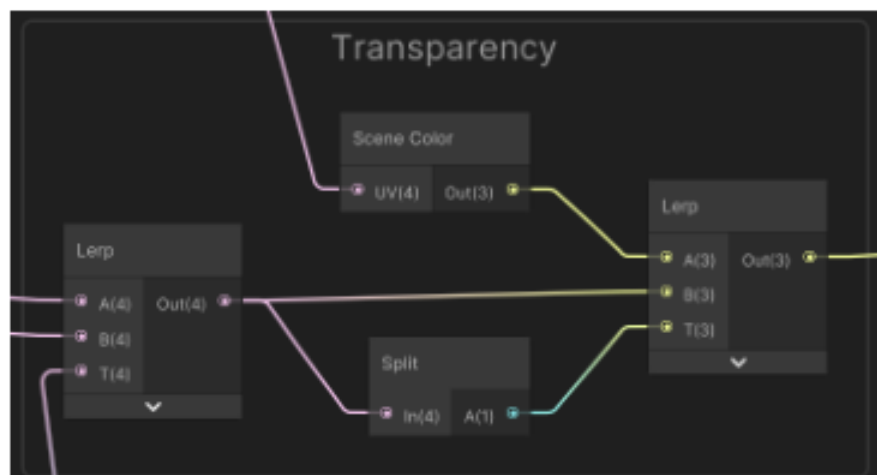


Figure 7.13: Transparency

For the transparency it starts with a Lerp node that takes in the output from the Depth Color as the A input, the FoamColor variable as it's B input and the output from the Foam section 7.3.2 (*Foam*) as the T input. The output of this is then input to both a Split node and the B input on a Lerp node. The Split nodes Alpha channel is taken as the T input on the Lerp node, and for the A input on the Lerp node it takes in a SceneColor node that takes the output from the refraction 7.3.2 (*Refraction*) as input. Lastly, this goes into the Base Color of the fragment part of the shader graph.

Waves

The waves was made in two ways, first with the use of the Linear Wave subgraph, as seen in section 7.3.3 (*Linear Wave*). Then later, with the use of the Scrolling Voronoi Noise subgraph explained in section 7.3.3 (*Scrolling Voronoi Noise*), instead. See Figure 7.14 (*Simple Wave*

Displacement) and 7.15 (*Noise Wave Displacement*) for how the subgraphs were used and implemented in the shader. On the figure 7.14 (*Simple Wave Displacement*) below, the output of the Add node is not connected. When in use, the output of the Add node would be attached to the Vector3 input Y, as the waves is created by moving the vertices on the plane up and down on the Y axis over time.

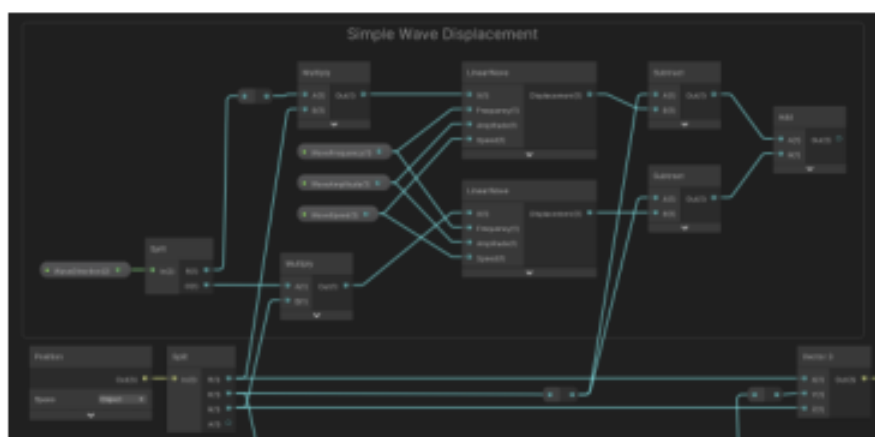


Figure 7.14: Simple Wave Displacement

The same goes for the Noise Waves, as seen on the Figure 7.15 (*Noise Wave Displacement*) below, the output of the Subtract node is the Y input on the Vector3 node that outputs to the Vertex Position. The Noise Wave Displacement also has four variables that can be modified in the inspector in Unity and create different waves with the WaveAmplitude, WaveFrequency, WaveSpeed and WaveDirection.

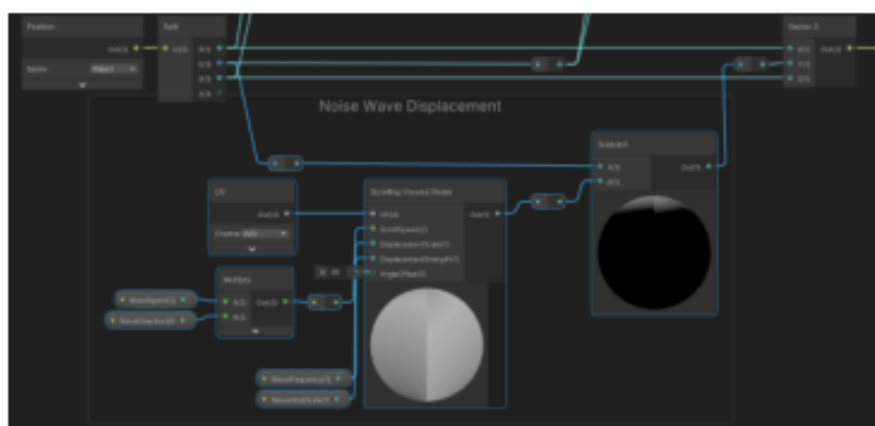


Figure 7.15: Noise Wave Displacement

Another part of the waves is creating a normal map to create wave "bumps", see Figure 7.16 (*Normal Wave Bumps*) for an example. Here the Noise Wave Displacement as seen on Figure 7.15 (*Noise Wave Displacement*) is also used.

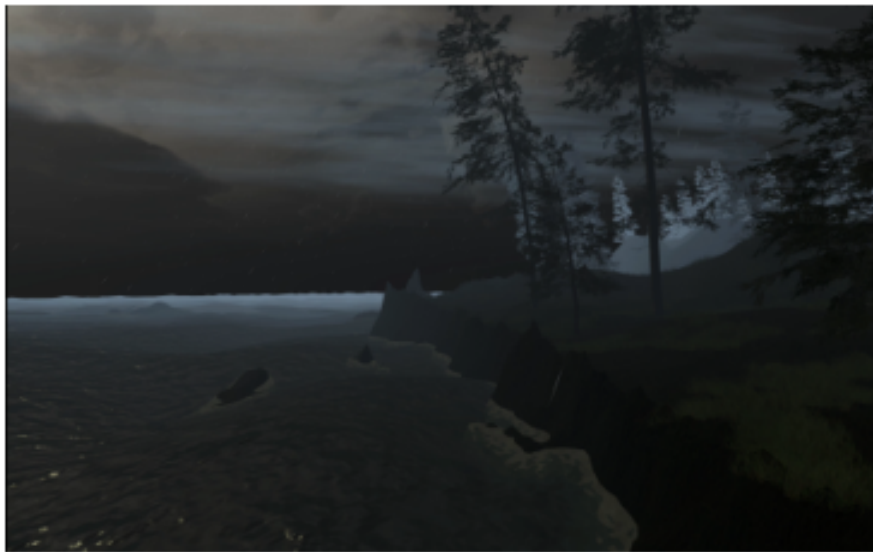


Figure 7.18: Finished Water Shader

7.3.3 Subgraphs

In this section a presentation of the subgraphs used in earlier sections 7.3.2 (*Waves*) and 7.3.2 (*Foam*) will be presented. The subgraphs presented below is 7.3.3 (*Linear Wave*), 7.3.3 (*Scroll UV*) and 7.3.3 (*Scrolling Voronoi Noise*).

Linear Wave

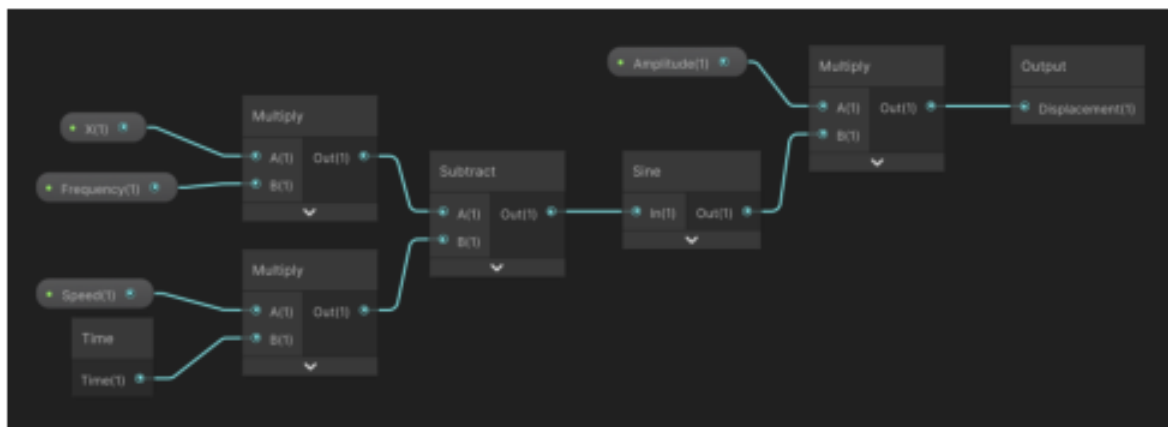


Figure 7.19: Linear Wave Subgraph

The subgraph seen in Figure 7.19 (*Linear Wave Subgraph*) is a lit shader that have four variables *frequency*, *amplitude*, *speed* and *X*. The amplitude specifies how tall the waves are, the frequency is how many waves there are and the speed is how fast they are. To make waves it is the vertex positions that gets manipulated or displaced, the equation used for

this is:

$$y = y - A \cdot \sin(Fx - P) \quad (7.1)$$

Where A is the amplitude, F is the frequency and P is the phase, meaning:

$$P = \text{speed} \cdot \text{time} \quad (7.2)$$

In shadergraph, to make this equation, we need to split it up. Lets take the sine part first as seen in Figure 7.20 (*Sine part of subgraph*):

$$\sin(Fx - P) \quad (7.3)$$

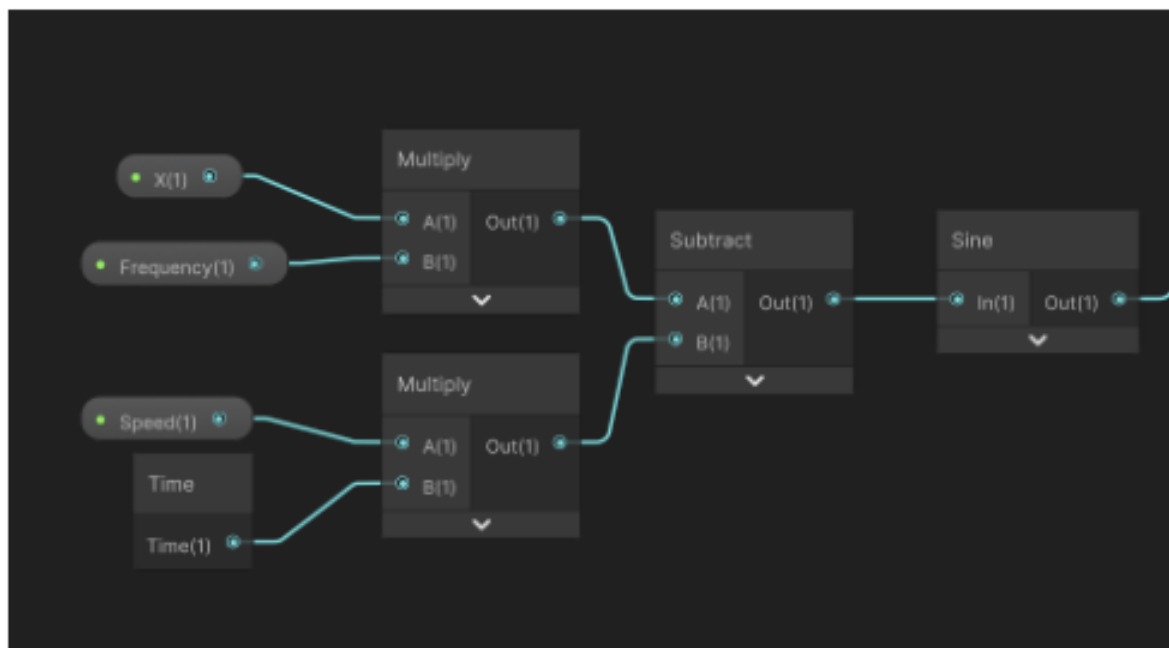


Figure 7.20: Sine part of subgraph

For the P , the Speed variable and Time node is going into a Multiply node. Fx is the X and Frequency variables going into a Multiply node. These two, like in the equation (7.3) above is subtracted with a Subtract node where the output then goes into a Sine node. Then, to tie it together with the Amplitude, the Sine node and the Amplitude node goes into a Multiply node and lastly, to the Displacement output. The subgraph when used, ends up looking like this:

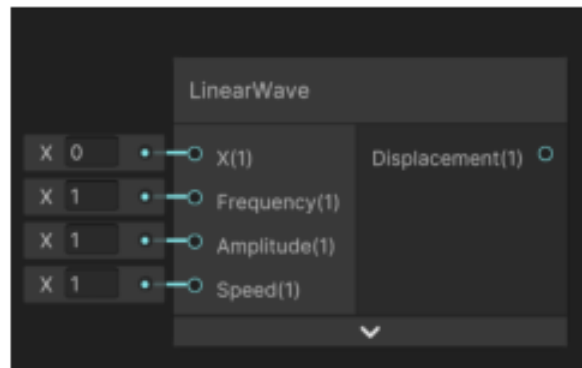


Figure 7.21: Linear Wave Node

The y part of the equation becomes relevant later on, when the subgraph Figure 7.19 (*Linear Wave Subgraph*) is used for the Water Shader in section 7.3.2 (*Water Shader*).

Scroll UV

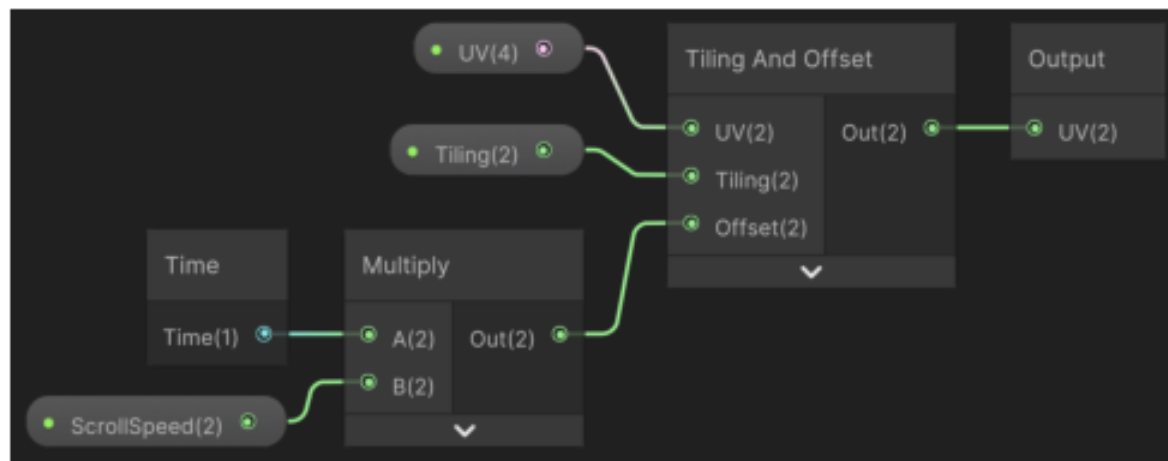


Figure 7.22: Scroll UV Subgraph

The subgraph as seen in Figure 7.22 (*Scroll UV Subgraph*) is, as the name states, used for scrolling the UVs on objects. The variables used in this subgraph are: a Vector2 variable called ScrollSpeed, another Vector2 variable called Tiling and a Vector4 variable called UV. Besides that, it consists of three nodes, a Time node, a Multiply node and a node for Tiling and Offset. The ScrollSpeed variable determines with which direction (the x or y axis) and speed the UVs scroll - and because it is multiplied by time, the UVs scroll by the speed of the variable ScrollSpeed over time. This, is then input to the offset on the Tiling and Offset node. Here the Tiling variable states how many times the UV map is placed on the object. Lastly, the UV variable is input to the Tiling and Offset node to make it possible to input a UV node when the subgraph is used in other shadergraphs. The node ends up looking like this:

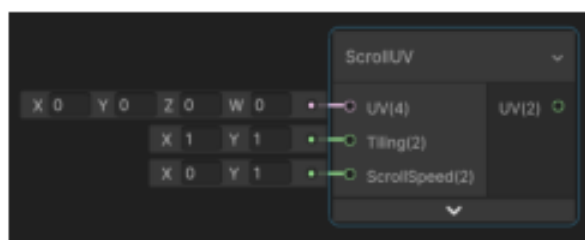


Figure 7.23: Scroll UV Node

Scrolling Voronoi Noise

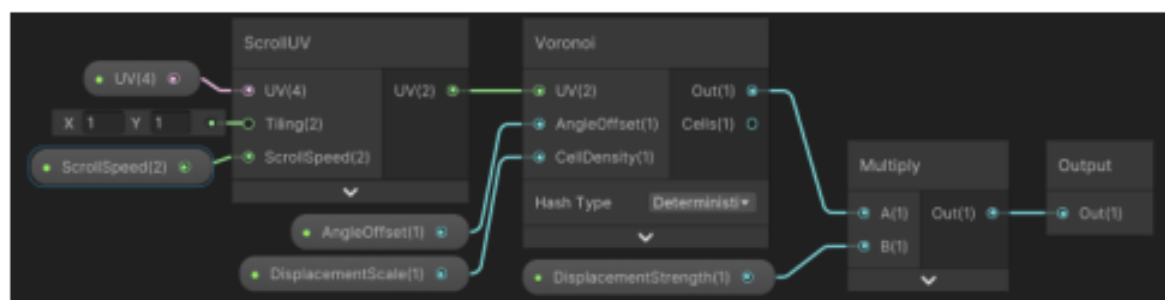


Figure 7.24: Scrolling Voronoi Noise Subgraph

This subgraph, seen on Figure 7.24 (*Scrolling Voronoi Noise Subgraph*) consists of a few nodes. One called ScrollUV, see section 7.3.3 (*Scroll UV*) above, a Voronoi node and a Multiply node along with some variables. The variables are a Vector4 called UV, a Vector2 called ScrollSpeed and three floats called DisplacementScale, DisplacementStrength and AngleOffset. The node ends up looking like seen in Figure 7.25 (*Scrolling Voronoi Noise Node*) below:

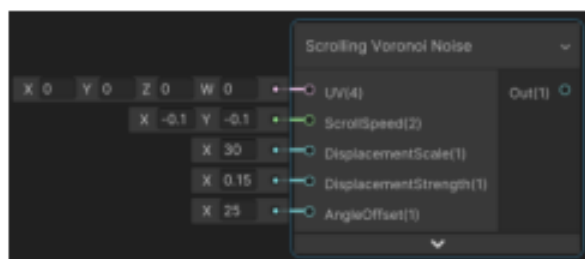


Figure 7.25: Scrolling Voronoi Noise Node

As seen on Figure 7.24 (*Scrolling Voronoi Noise Subgraph*), the variables in Figure 7.25 (*Scrolling Voronoi Noise Node*) are the inputs on the node it ends up as, and the default values of the variables stated in the subgraph. The only thing happening in this subgraph is taking a ScrollUV node, see Figure 7.23 (*Scroll UV Node*) as the UV input on the Voronoi Node, see Figure 7.25 (*Scrolling Voronoi Noise Node*) along with AngleOffset

and DisplacementScale and multiplying the result from the Voronoi node with the DisplacementStrength that ends up being the output of the subgraph as seen in Figure 7.24 (*Scrolling Voronoi Noise Subgraph*).

7.3.4 Shadow Shader

The design of the Shadows as mentioned in section 6.5.1 (*Design of the Shadow Monsters*) is inspired by *Alan Wake* in section 3.7.4 (*Alan Wake*) and the monsters from the game *Sea of Solitude* in section 3.7.1 (*Sea of Solitude*). The Shadow shader is in three parts. Dissolve, Transparency and World Space Cut Off as seen on Figure 7.26 (*Shadow Shader Graph*) and is made with the use of two videos from Daniel Ilett (Ilett, 2020) and (Ilett, 2024).

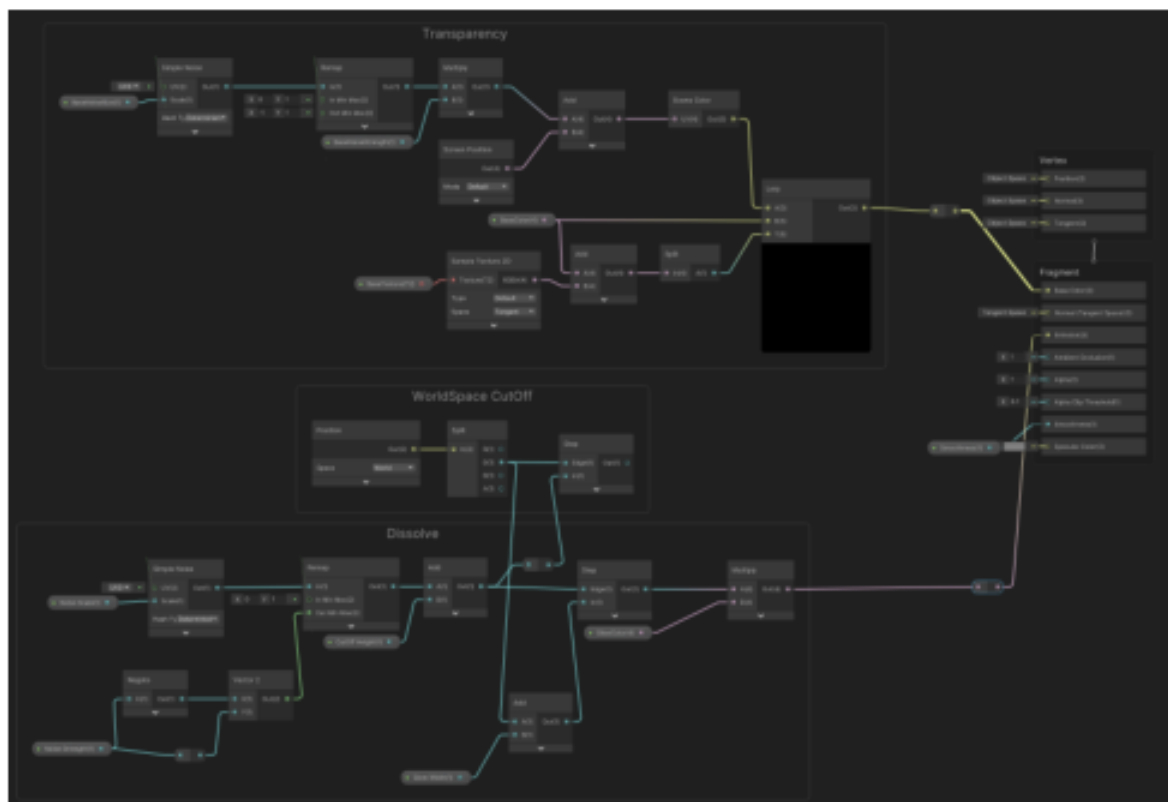


Figure 7.26: Shadow Shader Graph

First there is the transparency part, which makes use of a Simple Noise node with a Scale input of BaseNoiseSize that is remapped and multiplied with the BaseNoiseStrength and then added together with the Screen Position node and input to the Scene Color Node, that as a last thing is input to the A input in the Lerp node with the BaseColor variable as the B input. And a SampleTexture added with the BaseColor Variable and inputs to a Split node as the T input on the Lerp node and ends in the Base Color input on the Fragment part of the shader. Other than that there is the Dissolve part of the shader, which also uses the Simple Noise node for the dissolving and some variables making it possible to

modify it in the editor and in game. These are NoiseScale, NoiseStrength, CutOffHeight, GlowWidth and GlowColor and looks like this in the inspector:

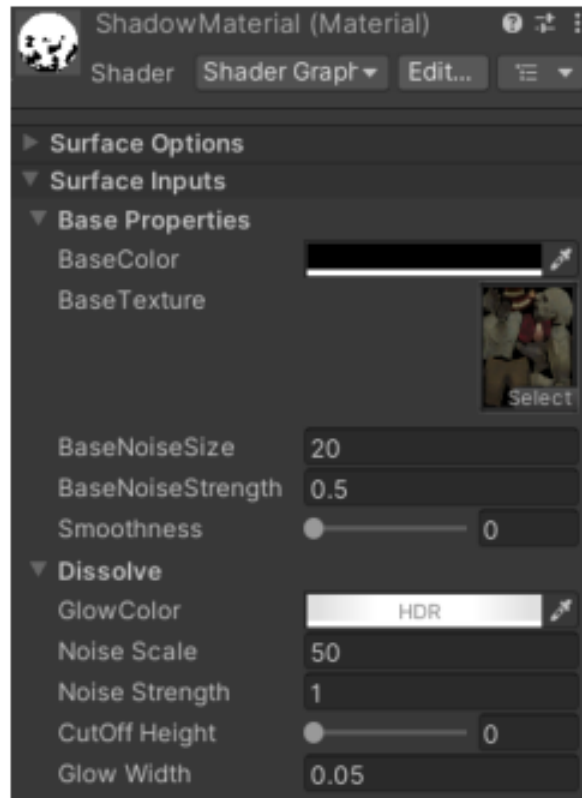


Figure 7.27: Shadow Shader in Inspector

The part called World Space Cut Off just states that it is on the Y axis the dissolving should occur.

This wraps up the shadow shader, that ends up looking like this on the shadows:

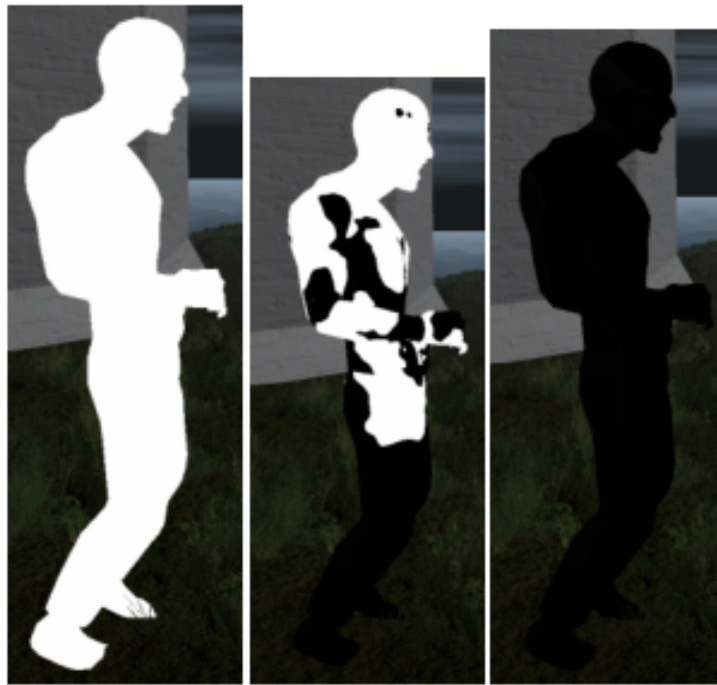
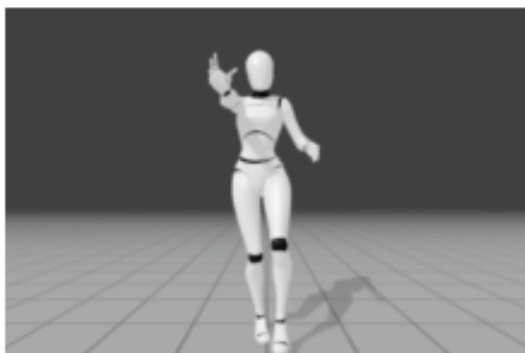


Figure 7.28: Shadow Shaders

7.3.5 Motion Capture in Unity

In section 3.6.2 (*Motion Capture*) we found research about how to use technology to rig 3D models efficiently with the markerless motion capture method. The shadow monsters in the game was rigged using this particularly method. This allowed us to make motion capture without suits, markers or any specialized hardware. The only equipment we needed was a phone to record the video. The website *DeepMotion.com* was used to rig the animation for the shadow model. This allowed us to create precise and time efficient animations for the shadows which can be seen here: B.8 (*Videos of the Motion and the Rigged Animation*).



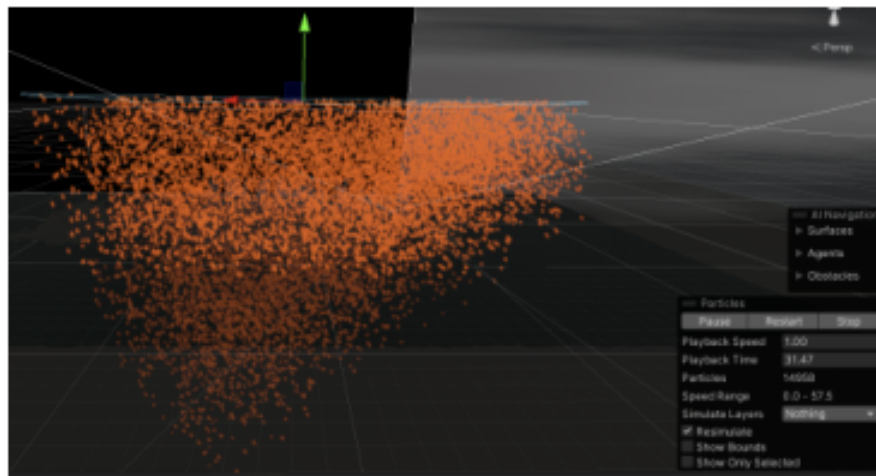


Figure 7.29: Rain Particle system

7.4 Environment

7.4.1 Particle system

In section 3.4.3 (*The Game Consist of Elements*) it became clear how important it was to design the environment as the player types for this project were explores and slayers who enjoy a creative environment to discover, therefore it was important to keep the aesthetics in mind when creating the experience of the game. When creating the weather, we made use of the particle system in Unity.

7.4.2 Rain

In the game we utilize the build in particle system to create rain and clouds that help give the aesthetics and feeling that we learned was important. For the rain effect we used the standard unity particle material that we emit with 3000 particles pr second from a box stretched over the island. We then set the 3D start size to 1 at the Y scale to go to a vector instead of a constant, and make them stretched for easier being able to spot them. We also made sure they didn't went through the lighthouse walls by giving a collision tag with the Lighthouse. The windsystem in the scene don't directly interfere with the particles, instead we gave them an orbital velocity over time in the direction of the wind which will rotate the particles around the center making them look like they are influenced by the wind.

7.4.3 Clouds

The clouds are like the rain also made in the particle system. We used a initial fog prefab from Etredal which can be found here [B.7.1 Youtube tutorials for Clouds and rain](#) we then tweaked it to get the cloud effect we wanted by stretching the 3D start size to fill an area above the island. Instead of creating a thousands of small particles a second as in the

rain system that descends on the Y-axis the clouds is created by chunks of big particles rendered from a fog material that emits 40 cloud particles a second with a lifetime of 15 seconds. They are emitted above the map moving in the same direction as the wind. The clouds are made semi transparent by turning the alpha channel down in the color over lifetime window.

7.4.4 Lightning

To further enhance the bad weather feeling experience we incorporated the effect of lightning. Practically we set up six lightning spawn locations each with a directional light around the island to mimic the effect of the lightning coming from different locations, casting shadows on the environment from new angels everytime. We then in code made a `LightningSequence` method with a `IEnumerator` in charge of creating a random number between 0 and 5, holding two empty gameobjects, and a switch statement with 5 cases of different lights to put in the empty gameobjects depending on the random number generated. The two chosen lights are then run through an if statement that makes each light flash once with a random range of time turned on between 0.05 and 0.1 seconds before turning off again. Then a small pause between 0.08 and 0.1 seconds before going on to the next flash from the second light source. We call the lightning in the game with a method named "CallLightning" that starts a coroutine with the `LightningSequence` method and invokeing a `CallThunder` method with a thunder sound afterwards with a delay of 0.4 seconds to mimic the difference in the speed of light and sound. Below is the script controlling the lightning mechanic.

```

1      public void CallLightning()
2      {
3          StartCoroutine(LightningSequence());
4          Invoke("CallThunder", 0.395f); // Call thunder sound with
delay after lightning
5      }
6
7      IEnumerator LightningSequence()
8
9      {
10         int r = Random.Range(0, 6); // Random number between 0 and 5
11         GameObject firstFlash = null;
12         GameObject secondFlash = null;
13
14         switch (r) // Randomly select two lightning flashes
15         {
16             case 0:
17                 firstFlash = lightningOne;
18                 secondFlash = lightningFour;
19                 break;
20             case 1:
21                 firstFlash = lightningTwo;
22                 secondFlash = lightningFive;

```

```

23         break;
24     case 2:
25         firstFlash = lightningThree;
26         secondFlash = lightningSix;
27         break;
28     case 3:
29         firstFlash = lightningFour;
30         secondFlash = lightningOne;
31         break;
32     case 4:
33         firstFlash = lightningFive;
34         secondFlash = lightningTwo;
35         break;
36     case 5:
37         firstFlash = lightningSix;
38         secondFlash = lightningThree;
39         break;
40     }
41
42     if (firstFlash != null && secondFlash != null)
43     {
44         for (int i = 0; i < 2; i++)// Flash twice
45         {
46             firstFlash.SetActive(true);// Turn on the first flash
47             yield return new WaitForSeconds(Random.Range(0.05f,
0.1f));
48             firstFlash.SetActive(false);// Turn off the first
flash
49             yield return new WaitForSeconds(Random.Range(0.05f,
0.1f));
50         }
51
52         yield return new WaitForSeconds(Random.Range(0.08f, 0.1f)
);// Wait for random time between 0.08 and 0.1 seconds
53
54         for (int i = 0; i < 2; i++)// Flash twice
55         {
56             secondFlash.SetActive(true);// Turn on the second
flash
57             yield return new WaitForSeconds(Random.Range(0.05f,
0.1f));
58             secondFlash.SetActive(false);// Turn off the second
flash
59             yield return new WaitForSeconds(Random.Range(0.05f,
0.1f));
60         }
61
62         Invoke("EndLightning", 0.5f);
63     }

```


64 }

7.5 Mechanics

The mechanics in the game is an important element, as seen in section 3.4.3 (*The Game Consist of Elements*). The mechanics are described as what gives the game a flow and describes how the player can and cannot achieve interactions. This section will go through the different mechanics used in the game. The mechanics of the game is the players actions which is controlled with Unitys' new Input System:

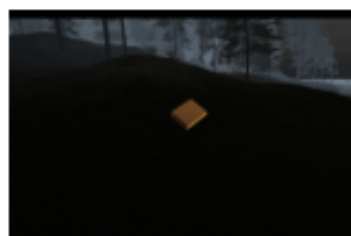
7.5.1 Movement

The movement of the character was inspired by the movement controls in the games from *State of the Art* in section 3.7 (*State of the Art*). The player can move the character in every direction by tapping the "WASD" keys on keyboard. The character can also look around in all directions by moving mouse.

The player movement is controlled by the method `Move()` which utilities the variable of movement input action from the method `OnMove()`.

7.5.2 Interaction

In the game you can interact with objects., the interacting control was inspired by the one in the game *The First Tree* from section 3.7.3 (*The First Tree*) where you interact with objects by pressing "E" on the keyboard. The interactive objects use a shader to indicate to the player that they are interactable. The player can interact with the objects when they enter the trigger of the objects. The code for interaction with the padlock can be seen in appendix B.9.1 (*Methods for Interaction*).



7.5.3 Flashlight

In game, you must destroy the shadow monsters by using the flashlight like in the game *Alan Wake* from section 3.7.4 (*Alan Wake*). To turn on and off the flashlight requires pressing "F" key on keyboard. This control was inspired by the flashlight control from the game *Firewatch* in section 3.7.2 (*Firewatch*). The flashlight consist of a unity spot-light with a round shadow applied by a "Cookie", and a ray-cast for interacting and hurting the "Shadow Monsters".

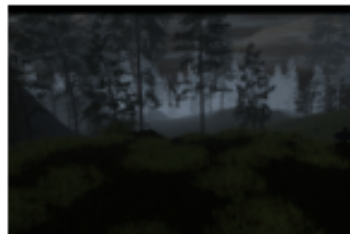
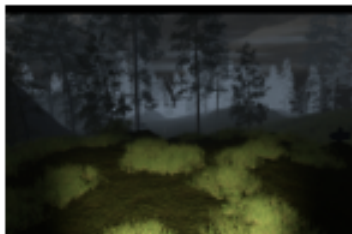
The flashlight is controlled via the input-action "Flashlight" and the ray-cast is created with the method `Flashlight()`:

```

1     void Flashlight()
2     {
3         RaycastHit hit;
4
5         //Burning shadowmonsters if raycast hits object with tag "
        Enemy"
6         if (Physics.Raycast(lightPoint.position, lightPoint.transform
            .forward, out hit, range) && hit.transform.tag == "Enemy")
7         {
8             EnemyHealth target = hit.transform.GetComponent<
                EnemyHealth>();
9             target.TakeDamage();
10            Debug.DrawLine(lightPoint.position, hit.point, Color.
                yellow); //Debug line for raycast
11            //AudioLibrary.PlaySound("Burn");
12        }
13    }

```

All code for the flashlight can be seen in appendix B.9.2 (*Methods for Flashlight*).



7.6 Shadows

The `EnemyHandler` script manage the shadow monsters we used shaders for as described in section 3.6.1 (*Shaders*) in the game. The script includes functionality for spawning shadow monsters, organizing their movement, and coordinating their behavior. The script can be seen in appendix B.9.3 (*Enemies*) The script contains a Singleton Pattern, to ensure only one instance of `EnemyHandler` exist at runtime. The method *private void MakeAgentsCircleTarget()*, arranges the enemies in a circular position around the target, by calculating the position of each shadow in the circle using trigonometric functions as seen below.

```

1     private void MakeAgentsCircleTarget()
2     {
3         for (int i = 0; i < Units.Count; i++)
4         {
5             Units[i].MoveTowardsTarget(new Vector3(
6                 Target.position.x + RadiusAroundTarget * Mathf.Cos(2
7                 * Mathf.PI * i / Units.Count),

```

```

7         Target.position.y,
8         Target.position.z + RadiusAroundTarget * Mathf.Sin(2
    * Mathf.PI * i / Units.Count));
9     }
10 }

```

7.7 Memories

Two canvases manage the memories when the glasses and book objects fall to the ground after the shadows are killed. All code for memories can be seen in appendix B.9.4 (*Memories*). This feature in the game was inspired by memories that was picked up from the game *The First tree* in section 3.7.3 (*The First Tree*). The *HandleItemInteraction()* method is used to handle interaction with an item in the game, in this case the book and glasses with the canvas attached.

```

1 private void HandleItemInteraction()
2 {
3     if (isInteractable && Input.GetKeyDown(KeyCode.E))
4     {
5         isRotating = true;
6         TurnOnVirtualCamera();
7         pushE.SetActive(false);
8         pushEsc.SetActive(true);
9
10        if (paperCanvas != null)
11        {
12            paperCanvas.SetActive(true);
13            StartCoroutine(DisplayTextAfterRotation());
14        }
15    }
16 }

```

A boolean is used to determines whether the item can be interacted with and checks if the E keyboard is being pressed. To active or deactivate the UI element, we use the *pushE.SetActive(false)*; and the *pushEsc.SetActive(true)*; to handle the canvas.

The method *IEnumerator DisplayTextAfterRotation()* are using a *IEnumerator* as the method contains a coroutine, for when the canvas is set active. The coroutine manage a delay to the item waiting for the virtual camera rotation to be completed before displaying the text. Based on the value of *itemName*, a message is assigned to *paperText.text*, where a message contain an emotional diary text that reflect feelings of loneliness, to strengthen the games narrative as explained in section 6.3.3(*The Memories*) this approach can help guide the narrative of the story.

7.8 Timeline Animation

As the sections 3.7.5 (*Takeaways from State of the Art*) and 4.1.1 (*The Requirements*) state, the game must use storytelling. Unity's Timeline is a tool to make, control, and edit different parts of video games such as storytelling through cutscenes, animations, audio, dialog, and more.

The animated cutscenes in the game are done through the Timeline. For each scene we made an empty GameObject, attached a Playable Director component and created a Timeline Asset. In the Timeline we then added the objects we needed for the scenes. In the start and end scene we recorded an Animation Track of the PlayerCharacter object's transform position and rotation. These animations had an impact on the Cinemachine Virtual Camera that is attached as a child object to the PlayerCharacter. For some of the dialog audio, dialog text, and other effects we were able to control the activation of and move these around to fit the play of the scene.

7.9 Sound

The game need to consist of sound, as seen in section 3.4.3 (*The Game Consist of Elements*), where the aesthetics is an important element to create relationship to the players experience. The sound in the game were created mostly by us and supplemented with free downloaded sound clips or packages we had a license to. The sound for the game can be found here B.10.1 (*FMOD Tutorial*).

FMOD

To be able to have as much control as possible over the sound in the game we decided to use FMOD as the sound engine. We used FMOD as the main audio system rather than the unity build-in, because we wanted a way to centralize our audio management. FMOD also gives us the opportunity to add effects and trigger multiple different sounds via the multi-instrument function in FMOD studio. This was a function that ended up being valuable when implementing the sounds of the shadows and the player footstep.

FMOD works by having a standalone FMOD Studio app, where all our sound control and manipulation is placed. In the FMOD app, we load in the sound we want to use, create events for them and apply them to a bus. We then in unity created a FMOD event script that would reference all the sound from FMOD studio to unity and then we could call the sounds in world space giving a spherical 3D feeling or at the point of the player depending of what part of the story we wanted to tell.

In the scriptsnippet below we store the FMOD event that are used in the game to play the ocean event sound thorough FMOD. We create a public static instance of the FmodEvents script so that we can access it from anywhere in the game. We also create a private set so that we can only set the instance in this script.

7.9.1 Scripts for sound

```

1 using FMODUnity;
2 public class FmodEvents : MonoBehaviour
3 {
4     [field: Header("Ocean sound")]
5     [field: SerializeField] public EventReference Ocean { get;
6     private set; }
7
8     public static FmodEvents Instance { get; private set; }
9
10 }

```

Below in the `EnemyCircleAroundPlayer` script we have the sound implementation that controls the spawning sound of the last shadow in the circle. It's set up with a multiinstrument in FMOD studio with different Sound files attached. Every time the event are called it iterates through the sounds in the instrument giving every spawn a new sound. In code we create a variable holding an `EventInstance` that we then call in the method of `PlayEnemyMulti()` where we create an Instance of the event from `FmodEvent`. We then get the 3D attributes because this sound is played from a different location than the player. Lastly we call the start method of the event making FMOD playing it.

The `PlayEnemyMulti()` is called in the part of the script that spawns the shadows.

The code example below is the general method we use to play all sound in the game the only changes are if it is a 2D sound (played from the perspective of the player) - Then we don't have the `set3DAttributes` part.

```

1 using FMODUnity;
2 using FMOD.Studio;
3
4 public class EnemyCircleAroundPlayer : MonoBehaviour
5 {
6     EventInstance _endenemymulti;
7
8     public void PlayEnemyMulti()
9     {
10         _endenemymulti = RuntimeManager.CreateInstance(FmodEvents.
11         Instance.EndEnemysMulti);
12         _endenemymulti.set3DAttributes(RuntimeUtils.To3DAttributes(
13         transform.position));
14         _endenemymulti.start();
15     }
16 }

```

7.9.2 Dialogue

The dialogue is chosen in the game to convey a narrative to the player, which contributes to findings from section 3.5 (*Storytelling in Video Games*). The dialogue is presented both

8. Evaluation

This chapter will go through how the different prototypes were tested and how it was evaluated after the test. The

8.1 Test of the Paper Prototype

The paper prototype was tested on three classmates as test participants. The song "*They Will Shade Us With Their Wings*" by Max Richter was played to set the mood for the test to use theory from the section 3.4.2 (*Essential Experience*) where sound is a crucial part. The test participants were asked to make use of the think aloud method from the section 5.9 (*The Think Aloud Method*). This allowed them to verbalize their thoughts while playing the game. The group assigned three specific roles for the testing process.

- **First group member**
Acted as the storyteller, setting the scene and guiding participants through tasks by describing the environment, mood, and actions.
- **Second group member**
Voiced the player's thoughts and dialogue to give insight to the character's emotions.
- **Third group member**
Provided a visual introduction to the story with the Figma start scene to emphasize the setting of the character. The Figma start scene can be found here A.4 (*Figma Start Scene*).

After the introduction, the third group member also observed. From this section, the non-participant and structured observation method. They observed the test by focusing on specific tasks, such as the flow through the game, particular mechanics, and puzzle completion, without actively participating in the test—only intervening if bugs occurred. In section 5.11 (*Semi-structured Interview*) we describe how a semi-structured interview can be used. For testing the paper prototype, the third group member noted the test participant reactions and the answers during this semi-structured interview. It was a semi-structured interview, because some of the questions were prepared, but other questions were allowed as well.



8.2 Results from Testing the Paper Prototype

8.2.1 Observations

When playing the prototype certain tendencies reoccurred for all test participants, and the experience was quite similar from an observing point.

Game play

Every participant seemed to feel a little confused for the first 3-5 seconds of game play, which is natural when exploring a new game. Once movement (moving a Lego figure) was set, the participants went on with the first task. When encountering the shadow monsters for the first time, every participant used the given flashlight per instinct, and quickly realized its effect on the monsters. This was clear for the rest of the game play.

The puzzles and tasks

The puzzles and tasks during the game were easily overcome, which might be because of over-explaining the tasks, yet it seemed intuitive for every participant give each task a go, and then wait for a response from the "game".

Exploring the environment

When walking from the lighthouse to the emergency house, there were two possible paths. The participants chose different paths to the emergency house, but they all went back to the lighthouse on the opposite path than chosen earlier, which shows tendency if wanting to explore the environment.

The end of the game

At the end of the game each participant was handed a keyboard with a text bar that said "I feel so ..." and the participants instinctively answered "Alone", "Helpless" and "Loneliness", which means they remembered the purpose of the game and understood

the final assignment.

8.2.2 The Interview

During the semi-structured interview the participants elaborated on their thoughts during the game. The participants had slightly different answers and experiences with the gameplay. One participant quickly recognized elements inspired from Firewatch which the person really liked playing and pointed out the similarities.

The interview showed that all three participants thought the tasks were straight forward and not too complicated. One participant felt that the tasks were too easy and missed some more challenging elements, which would grant a greater sense of accomplishment when completing the task. The same participant recognized environmental storytelling during the test and liked how it helped to set a more scary and uncomfortable mood.

8.3 The Test of the First Unity Prototype

The first Unity prototype was tested to evaluate the usability, game play, and flow. The goal was to ensure the mechanics created a straightforward and satisfying experience. Feedback from this test helped refine the game to better meet the expectations of our target group, but also to ensure that the tasks in the game functioned as intended.

The setup from the paper prototype test was adapted for this first Unity prototype, as it provided an effective structure for the testing process.

- The Figma start scene was used again, as the start scene was not fully implemented in the game yet. The Figma start scene can be found here [A.4 \(Figma Start Scene\)](#)
- The participants answered a system usability questionnaire, followed by a semi-structured interview.

In section 5.1 (*Qualitative and Quantitative Data*) we describe how to get a deeper and more nuanced understanding of the collected data by using complementary methods with qualitative and quantitative data. Some complementary methods are surveys/questionnaires combined with interviews and surveys/questionnaires combined with observations. This was the reason for combining these methods.

Each of the three group members had specific tasks during the test:

- **First group member**

Narrated the unfinished animation intended for the game's introduction.

- **Second group member**

Explained the dialogue, which was not yet implemented in this prototype.

- **Third group member**

Showcased the Figma prototype, previously used as the introduction in the paper prototype.

Introducing the game The test participants were given an introduction of how the test would be conducted.

Gameplay session The test participants were first introduced to the controls and then assigned tasks, which were provided by two group members during the gameplay session. They were told to think aloud during the game, to gather feedback on what they were thinking.

Feedback We gave the test participants with the SUS questionnaire, followed by an interview to gather feedback on their likes, dislikes, and any elements of the game they found distracting or confusing.

8.3.1 Results from the Observations of the First Unity Prototype

During each test observations were made and written down. It soon became obvious which problematic kept occurring in multiple test. With focus on the gameplay, and how well the participants were able to solve the given tasks, the observations in figure 8.1 (*Table of Observations for the First Unity Test*) were chosen to provide an overview of which parts of the game worked as intended and which did not.

The gameplay has been divided into four different categories of the observations, which is the player controls, navigation on island environment, interaction with shadows and interaction with memory artifacts. The observations alone tells that the basics of the gameplay

Topic of observation:	Observations:	Occurrences in the 10 tests
Controls	The participant understood the controls at the beginning of the game.	70%
	The participant immediately understood that the flashlight is a weapon against enemies	40%
	The participant spent more than 10 seconds before understanding that the flashlight is a weapon against enemies	60%
	The participant mentioned that the sensitivity of the mouse was too high	70%
	The participant remembers that "E" is the key for interacting when both finding the padlock and picking up fuel	100%
Navigation	The participant quickly locates the Generator House	100%
	The participant takes the middle road to Emergency House	70%
	The participant takes the bridge road to Emergency House	30%
	The participant takes the blocked road to Emergency House	0%
	The participant goes back to the lighthouse on a different road	50%
Enemy Interactions	The participant quickly discovers the first enemy	50%
	The participant does not discover the first enemy before it hits them	50%
	The participant quickly discovers the enemy by the Emergency House	100%
	The participant quickly discovers the end enemy	70%
Memory Interactions	The participant discovers the glasses	70%
	The participant quickly discovers the diary	100%
	The participant quickly finds the padlock code in the diary	70%

Figure 8.1: Table of Observations for the First Unity Test

is understandable and for most of the time can be figured out. Yet there are clear indi-

cations as to which parts of the gameplay needs more attention before testing the next iteration of the game.

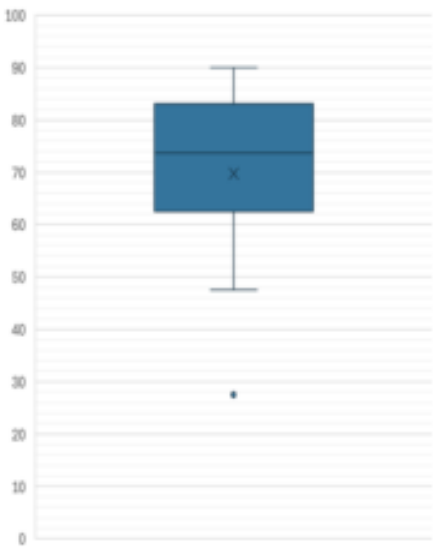
The mechanics that needs most attention according to the observations are the following:

- The use of the flashlight during the game, both as a tool and a weapon against shadows, needs to be more clear from the beginning of the game.
- Both the first- and last shadow interaction of the game needs to be more intuitive and obvious.
- The first memory object "The glasses" needs to be more visually noticeable.

8.3.2 Results from the System Usability Scale from the First Unity Prototype

From the findings in section 5.12 (*The System Usability Scale*) we found that a system usability questionnaire could be used to evaluate the usability of the game. The system usability questionnaire was used after the test participants played the game. It was important to know the game's usability because if it was too low, it could negatively affect the gameplay experience and how effectively loneliness was portrayed. This provided a SUS-score and gave some insight into usability. A box-plot of the data was created to visualize the data which can be found in appendix ?? (??).

The SUS-score of the current state of the product was 69.8, which means that the SUS-score is above the benchmark 68. In section 5.12.2 (*The SUS score Range*) we found that we can give the usability of the product a grade by using the SUS-score. The game got the SUS-score grade C on the SUS score Range. The data has been plotted into a box-plot to make the data more visual. This is the data from the first test with the System Usability Scale:



SUS-score		69.8
SUS-score Grade		C
Minimum		27.5
Lower Quartile		68.1
Median		73.8
Upper Quartile		81.9
Maximum		90
Standard Deviation		19.0

In the figure above we saw a potential outlier in the box plot. To see if it was really an outlier, we used the knowledge about detecting outliers from section 5.12.3 (*Detecting outliers with z-scores*). We calculated the z-score for each of the values to see if one was below -3 or above 3. In particular we were aware of the potential outlier 27.5, the calculation looked like this:

$$z = \frac{27.5 - 69.8}{19.0} = -2.23 \quad (8.1)$$

The z-score for the potential outlier was above -3. Based on this, we could not statistically justify removing this outlier from the sample. The rest of the z-scores for the values can be seen in appendix C.1 (*SUS Data from the First Unity Prototype*). We got a lot of feedback about the usability when using the system usability scale, which will be taking into consideration as well.

8.3.3 Results from Interview of the first Unity Prototype

A short semi-structured interview was conducted at the end of each test to get more data about what the test participants thought of the gameplay, mechanics and the game in general. The interview with questions and answers can be seen here C.2 (*Interview from the First Unity Prototype*)

When asked if the tasks during the game was clear 60% of the test participants, said the the tasks were pretty clear and the spoken narrator worked well, but 40% missed some written task in the game.

Overall the test participants liked the experience and 90% answered that they had fun while playing. Multiple participants also commented the environment and thought that the "Vibe" and "Atmosphere" of the game where very on point, and helped a lot to set a mood for the experience.

Some of the mechanics that were brought up under the question "What do you like/dislike about it?" were:

- "The difficulty of controlling the camera, as the mouse was to sensitive."
- "The end part was confusing".
- "The middle-path is a bit boring".
- "The naming of the different houses were confusing".

The feedback for the interview will be look upon and maybe changed for the final test.

8.4 The Final Test

The last Unity prototype was tested in the final test. The focus from the first prototype to the final prototype was on the environment and the aesthetic of the game, to improve the

experience. We implemented sound, made the environment worth exploring and added more storytelling and animations. We tested game play, usability and overall experience of the game through this final test. The tests were conducted with a sample size of 27, including individuals from the university as well as friends and fellow students. Participants who knew a group member were not tested by them.

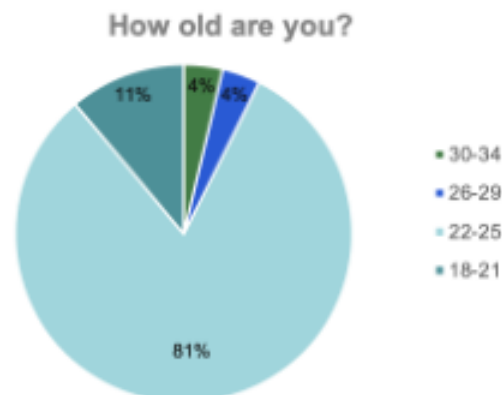
The tests were divided into 3 parts:

- The start: At the start of the test, the participants filled a consent form which can be found here C.3 (*Consent Form*). This allowed us to voice record the test. After this, they answered a pre-questionnaire which can be found here C.4 (*Pre-Questionnaire Final Test*). This included questions about gender, age, which player types best describe them and how often they play games. This was done to gather data about the test participants to determine whether they belong to the intended target group.
- Playing the game: The participants played the game with only few interruptions if bugs occurred, that could cause the game to break. The non-participant and structured observation was used seen in the section 5.10 (*Observations*). This method was used because the observation took place in a natural setting, focusing solely on specific behaviors while allowing participants to play without interruptions, except for notifying them of any bugs.
- The end: At the end of the test, the test participants answered a system usability questionnaire as seen in the section 5.12 (*The System Usability Scale*), which allowed us to get insight to the usability of the game. Lastly a semi-structured interview was used as seen in section 5.11 (*Semi-structured Interview*). A semi-structured interview was used to allow flexibility in exploring participants' thoughts and experiences while stilling having pre-made questions to ask.

In section 5.1 (*Qualitative and Quantitative Data*) we describe how to get a deeper and more nuanced understanding of the collected data by using complementary methods with qualitative and quantitative data. Some complementary methods are surveys/questionnaires combined with interviews and surveys/questionnaires combined with observations. This was the reason for combining these methods.

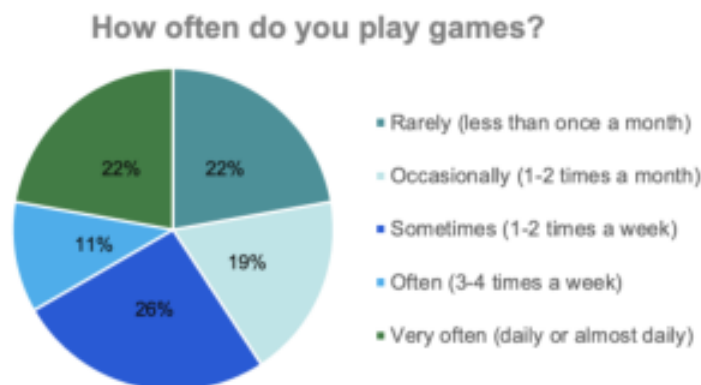
8.4.1 Result from Pre-Questionnaire of Final Test

From the 27 answered pre-questionnaires, we were able to determine the proportion of participants who fit within our target group. The age of our target group are 18-34 year old and by our pre-questionnaire, we could see that 81,5 % are in the age between 22-25 year old. Only a small amount of our participants fitted into the other age categories as shown in the figure below.



In terms of gender distributions in the final test, we aimed for an equal split, as research in section 3.2.2 (*Digital Games and Danes*) shows that men and women spend similar amounts of time on digital game. The pre-questionnaire shows that 51,9% of the test participants were women and 48,1% were men.

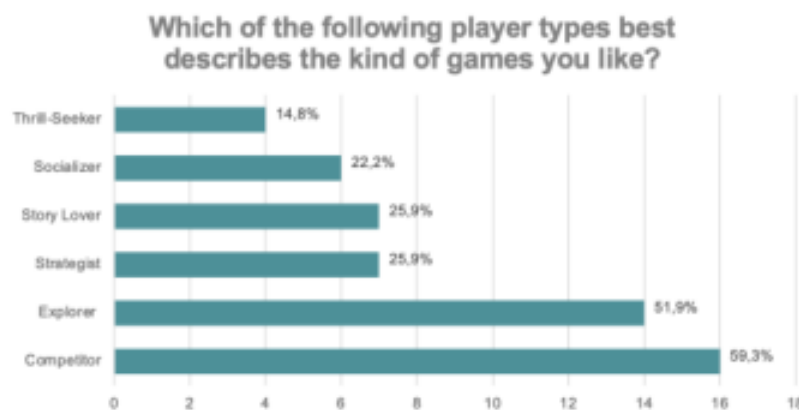
Another factor we wanted to know when testing our final test, was how often our test participants are playing games. The results show a fairly even distribution across different levels of gaming activity:



As research in section 3.2.3 (*Using Different Player Types*), reveals that a way to increase the engagement in a game, is to design around individuals preferences and certain player types are more or less approachable for certain game mechanics. Therefore the last question in the pre-questionnaire included six different player types, where our participant had the opportunity to check off two of them. The six different player types are a combination of both Bartle's Taxonomy player types from section 3.2.4 (*Bartle's Taxonomy of Player Types*) and the nine quantic player types from section 3.2.5 (*The Nine Quantic Gamer Types*). This combination provides a clearer understanding and descriptions, to make it easier to select the type that resonates with them. As the goal was to create a game for explores and slayers as researched in section 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine*

	Bartle's Taxonomy Player Types	The Nine Quantic Player Types
Competitor	Killers	Acrobat
Explorer	Explorer	Bounty Hunter, Gardener
Strategist	Achiever	Ninja, Skirmisher
Story Lover		Architect, Slayer
Socializer	Socializer	Bard
Thrill-Seeker	Killers	Gladiator

Quantic Gamer Types), we got the results of 51,9% of our participants being explorers who enjoys exploring stunning environments and 25.9% being story lover (slayers) who enjoy driven narrative and storytelling.



The quantitative data collected from the pre-questionnaire ensures that the participants align with the game's intended target group and allow us to know whether the participants' preference and motivations align with our intended player types we designed the game for.

8.4.2 Results from Think Aloud Results of Final Test

Before starting the game, participants were instructed to think aloud as they played. They were encouraged to verbalize every thought that came to mind, whether critical or complimentary.

For the atmosphere and story impact, there were a lot of phrases like:

- "It provides a creepy mood"
- "Wow the environment and visual are amazing"
- "I feel like he has a hard time"
- "I kinda feel sorry for him"
- "I hoped the game would end with the character finding others and receiving help, rather than ending alone"

Further on, a lot of the participants comments were about the sensitivity, controls and navigation around the island.

These phrases were repeated by a majority of the participants:

- *"The camera is very sensitive"*
- *"The mouse is annoying on the screen"*
- *"I am a little confused about where i am and what path to take"*
- *"A run function could be useful here"*
- *"I like all the rubberducks and want to see if there are more"*

Most of the participants also needed hints while playing and commented on the bugs in the game, that we were aware of.

The Think Aloud method offered real-time insight into the player's thoughts, emotions, and problem-solving process as they progressed through the game. It enabled us to gather immediate feedback on why they made specific choices or ran into difficulties with certain mechanics. This approach allows us to improve the game to align with user preferences, enhancing their overall experience.

8.4.3 Results from Observation of Final Test

Before the final test an observation sheet was prepared which can be found here C.5 (*Observation Sheet*). The observation sheet was used as seen in section 5.2 (*Deductive and Inductive Data Collection*). Using this method allowed us to work structured and efficiently when observing the test participants. The sheet was made to be filled out during each test, to check if the participant solves all the different tasks and what else they encounter during their test. Some of the observations has been timed and is divided into three different categories which varies from zero to infinite seconds.

After the final testing of the product, the observations were combined to a table, showing how all the participant played the game.

Time spent on a task									
0 - 15 Seconds			16 - 30 Seconds			More than 30 seconds			
Observations	Percentage of occurrence in the 27 tests			Observations	Percentage of occurrence in the 27 tests				
The participant understood the controls at the beginning of the game.	66.6%			The participant opened the lock-pad and typed a wrong code	96.3%				
The participant turns the light on using the socket (Time)	37%	11%	52%	The participant tries to interact with non-interactable objects	48%				
The participant picked up the radio (Time)	63%	33%	4%	The participant detected the second enemy	96.3%				
The participant detected the first enemy	100%			The participant picked up the book (Memory)	96.3%				
The participant understood that the flashlight was a weapon against enemies (Time)	63%	4%	33%	The participant wrote the wrong code again	22%				
				The participant wrote the right code (Time)	41%	7%	52%		
The participant picked up the glasses	92.6%			The participant picked up the fuel can	100%				
The Participant quickly discovered the Shed	92.6%			The participant takes the same road back to the lighthouse	48%				
The participant pulled the generator handle	85%			The participant takes different road back to the lighthouse	52%				
The participant took the road... to get to the Emergency Station:				The participant put the fuel can on the generator	100%				
By the harbour	52%			The participant pulls the generator handle again (Time)	74%	19%	7%		
In the middle	41%			The participant discovered 1-5 ducks (EasterEggs)	1: 18%	2: 4%	3: 5%	4: 7%	5: 0%
Over the bridge	7%			The participant discovered other environmental object settings	81%				

Figure 8.2: Table of Observations From Final Test

Written Answers in The End Scene

Of the written answers during the final test 87% were approved. The only words that were not approved were "Lost" and "Afraid". If a participant wrote a non-approved answer they got to try again, which meant that all participants wrote an approved answer in the end. Below in figure 8.3 (*Written Words in the Final Test*) and 8.4 (*Distribution of Written Answers in the Final Test*), all the written answers during the final test can be seen, along with a distribution of many times a word was written as an answer.



Figure 8.3: Written Words in the Final Test



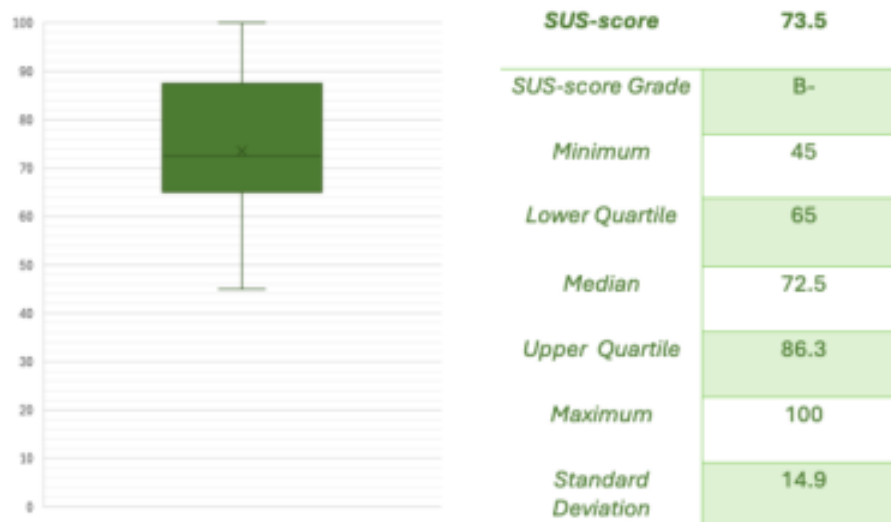
Figure 8.4: Distribution of Written Answers in the Final Test

87% of the written answers were accepted as correct answers, which shows that the participants understood the feelings the game is trying to portray, disregarded of how well they thought it succeed in this. On later speculation the answers "Lost" and "Afraid" which were not accepted, should have been in the list of accepted answers, as they are still a byproduct of loneliness. From the section 3.1 (*Loneliness*) we found that loneliness is a subjective feeling, which could be an answer to why people write different, but associated answers to the last interaction of the game. By adding more different types of loneliness from the section 3.1.1 (*Types of Loneliness*) the player might relate even more to the feeling

of loneliness as the game will capture a greater aspect of it. The participants who wrote a not accepted answer got a second and third try to write an accepted answer.

8.4.4 Results from System Usability Questionnaire of Final Test

The 27 test participants answered a system usability questionnaire as seen in section 5.12 (*The System Usability Scale*). They answered it right after playing the game. The reason for using the System Usability Scale again was to make sure the Usability was still above the benchmark, so it did not affect the experience of the game and how well loneliness was portrayed. The usability of the game had not been improved as much as wanted, because the focus was on improving the experience, environment and storytelling in the game. The system usability questionnaire was used to get feedback on the usability of the game and provide a SUS-score for the final Unity prototype. The answers from the questionnaire was calculated to get the final SUS-score. The SUS-score was 73.5. As seen in section 5.12.2 (*The SUS score Range*) we could give the products usability a grade. Using the SUS score range, the final Unity prototype got the SUS grade B-. A box-plot of the data was created to visualize it.



As written previously, the System Usability Scale was used again to make sure the SUS-score was still above the benchmark, which it has been proven to be. The final Unity prototype got a better SUS-score grade than the first Unity prototype. The method about detecting outliers from section 5.12.3 (*Detecting outliers with z-scores*) was used again. None of the values had z-scores below -3 or above 3, so we can statistically justify that there was no outliers in the sample. All the data and the z-scores for each value can be seen in appendix C.8 (*SUS Data from the Final Unity Prototype*).

8.4.5 Results from The Interview of Final Test

The interview was made as a Semi-Structured interview as seen in section 5.11 (*Semi-structured Interview*). The pre-constructed questions and answers can be seen in appendices C.6 (*Final Test Interview*) and C.7 (*Final Test Interview*). It was used for the final test to collect qualitative data on the experiences of test participants with the game, to gain insight into whether they felt immersed and understood the theme of the game. All interviews were recorded and later analyzed for collection of statements about the following topics:

- Environment
- Exploring
- Storytelling
- Memories
- Shadow monsters
- Atmosphere & Mood
- Bugs

The statements were then divided into either positive or negative statements in order turn them into quantitative data, and make a thematic analysis 5.8 (*Thematic Analysis*) as seen below in figure. 8.5 (*Positive & Negative statements from Interview in Final Test*). Some topics were more equally divided between positive and negative statements

Themes		Frequency	Quote Examples
Environment	Positive	43	<i>"I think the environment added really well to the game's story. It was raining, thundering, and dark. You got a sense of a rough climate and a harsh, tough place. The elements play a big role when you're isolated out on an island."</i>
	Negative	15	<i>"I didn't get the feeling of loneliness at any point. The weather was quite nice."</i>
Exploring	Positive	21	<i>"I was impressed by how large and beautiful the island was, and it was fun discovering the Easter eggs—it made me want to explore even more to see if there were additional hidden details."</i>
	Negative	8	<i>"There weren't enough landmarks; I could have used more. I felt like the ducks played a bigger role than they actually did."</i>
Storytelling	Positive	30	<i>"The concept and story were very well executed. There were a few bugs, but those are unavoidable; otherwise, it was great. It was great that there was both sound and text, allowing you to immerse yourself more in the story without just reading."</i>
	Negative	14	<i>"I had a bit of trouble understanding what the story was; the voice lines pulled me out of it. I would have preferred an internal dialogue with myself. I didn't really feel an emotional connection."</i>
Memories	Positive	20	<i>"The memories 100% helped evoke a feeling of loneliness, along with the radio trying to reach out to you"</i>
	Negative	9	<i>"I thought it was a bit difficult, especially when the text was running simultaneously with the audio. I can't remember what was written or said now."</i>
Enemies	Positive	10	<i>"The enemies are probably a symbol of feeling alone and under attack. The memories were good at helping to provide some story, but there was plenty of room for interpretation."</i>
	Negative	12	<i>"The enemies are buggy and give more of a depressed vibe than a feeling of loneliness."</i>
Atmosphere & Mood	Positive	25	<i>"It did something really well. It felt cold and dark. There was only contact with the emergency radio, which greatly contributed to the feeling of loneliness because there was no one else."</i>
	Negative	0	<i>"I didn't get the feeling of loneliness at any point."</i>
BUGS	Negative	8	<i>"Sometimes the text disappeared before the audio finished playing. Sometimes there was audio without text, and it was hard to understand what was being said."</i>

Figure 8.5: Positive & Negative statements from Interview in Final Test

After turning the qualitative answers from the test participants into a chart of positive and negative statements, it was clear that some themes were strongly and positively accepted by the participants and some themes were received more critically. Taking a look at figure 8.5 (*Positive & Negative statements from Interview in Final Test*) made it clear that the biggest themes "Environment" and "Storytelling" received a dominating amount of positive comments during the interviews, meaning that the majority of the participants understood the essence and settings of the game, which were convincingly stated when the participants talked about the "Atmosphere and Mood" of the game, which received 25 positive comments and not a single negative. A few of the participants still stated that the feeling of loneliness were not conveyed through the environment and storytelling, which could be data coming from the few participants who answered a different player type than the target group in the pre-questionnaire as seen in section 8.4.1 (*Result from Pre-Questionnaire of Final Test*).

The participants were also asked about exploring the game world, and whether or not they enjoyed it. The majority of the comments about "Exploring" were positive and people felt in general that the world was worth exploring. Most participants talk about the ducks that can be found in the game, which were happily collected during the game play. Even though the ducks stand out from the rest of the game, the participants saw it as an extra and fun task which could give a break from the story while not ruining the immersion. Some of the test participants thought they were supposed to collect the ducks, which gave insight into future development of the game. Although shaders were used to indicate whether objects were interactive, the ducks were different from the rest of the environment. This misunderstanding highlighted the need for more clear instructions to ensure that the players understand the different object. It also revealed an opportunity to expand the game by adding new mechanics, such as collectible objects, which could give a break from the main storyline while enhancing player engagement. The enjoyment from exploring the world, confirmed that most of the participants fulfilled this demand from the target group of being the "Explorer" player type, as stated in section 3.2 (*Target Group*).

The only theme receiving more negative than positive comments were "shadow monsters" which received almost evenly distributed comments. Some participants found the shadow monsters confusing and to be negatively impacting the story, while others felt that they enforced the feeling of loneliness. This means that the shadow monsters could still be an essential part of the story, but might need a pivoted implementation in order to add to the storyline more clearly.

9. Discussion

This chapter will discuss the testing and results from chapter 8 (*Evaluation*), which will provide insight to future development and testing of the game.

9.1 Usability of the Final Prototype

As previously mentioned, the system usability questionnaire was used to get a SUS-score to ensure that the usability met the benchmark. It was important to avoid any negative impact on the experience while playing the game.

The SUS-scores from the two tests showed only a minor difference with the usability of the product. The first Unity prototype got the SUS-score 69.8 and the final Unity prototype got the SUS-score 73.5. The SUS-score from the first test showed that the usability was already above the benchmark; 68, meaning it was above average. Because of the limited time, we had to decide if the usability or the experience of the game should be improved. The SUS-score from the first test was already above the benchmark 68, so we did not worry as much about the usability. It was more important to improve the experience of the game and fulfill the needs for the personas as the target group. We chose to focus on the experience of the game, because the final problem statement focused on creating a game experience and portraying the feeling of loneliness. The personas were explorers and slayers, so it was important to improve the environment in the game instead of the usability. We implemented sound, made the environment worth exploring and added more storytelling and animations. By doing this, we hoped to improve the experience of the game. The final test used the knowledge from 5.12 (*The System Usability Scale*) to ensure that the changes from the first to the final test did not affect the usability.

During the final test we discovered a lot of bugs, which we were worried would affect the usability of the game. While we still used the non-participant observation method from section 5.10 (*Observations*), but because of the bugs we had to use the structured observation method. This meant we sometimes had to help players get past tasks where bugs occurred, which might have affected how they evaluated the game's usability. We helped them through bugs around two times. The players might not have experienced the game as intended and they might have missed the chance to interact with the game more naturally. It might also have affected the flow state if the participants were "in the zone" as described in section 3.3.1 (*Flow Theory*). If the participants relied on help, it could have stopped the sense of control and independence, which are crucial when evaluating usability. This might have results in mixed feelings about the overall experience. The test participants might have focused on the assistance rather than evaluating the game itself. They might have rated the experience higher because they felt supported, even when bugs occurred. The bugs found during the final test leave room for improvement and offer opportunities for future iterations with more polished mechanics.

9.2 Sample Size of the Final Test

The chosen target group was 18-34 years old, but 81,5% of the participants we tested were between the ages of 22-25 years old. This meant that the testing feedback was heavily influenced by this specific segment of our target group and did not fully represent the experience of the broader target group. We only had two participants over 26, which might have indicate a gap in our testing group, especially in terms of connecting with the older segments demographic and understanding how the game appeals to the broader range of the target group. The age difference in the final test might impact the understanding of preferences, usability, and overall experience for older players within the 18-34 age group.

In the section 3.2.2 (*Digital Games and Danes*) the data showed that young people, particularly in the age range 16-24, are the most frequent players of digital games, with 72% engaging in gaming daily or weekly. This matches the age range for most of our test participants in the age between 22-25 years old, who are more familiar with gaming than older members of the target audience. Their familiarity with gaming may have influenced the feedback, which can cause the game's usability and might differ for less frequent gamers.

Furthermore, in the section 3.2.1 (*Loneliness in Denmark*), the two age groups experiencing the highest levels of loneliness are young adults aged 25-34 with 22% experiencing a sever level of loneliness. However, this focus on the younger group means that our feedback lacks significant input from those aged 25-34, who are the ones experiencing loneliness at high rates but may have different gaming habits and perspectives.

9.2.1 Representativeness and Randomness in Final Test

The sample size from the final test were both representative and random chosen. It was challenging to know which player types people perceived themselves as. We aimed for around 25-30 test participants for the final test, and it made sense to get test participants within the University, as there could be a abundance of possible test participants.

We collected participants both randomly by asking fellow student from our own class, but also student from other courses from Aalborg University without knowing which player types they were. However when we collected participants for the final Unity prototype, we asked if they enjoyed games focused on storytelling and exploring visually environments. Therefore the representative participants were selected as we knew they fitted into our intended target group in terms of the explorer and slayer player types. Before testing the final prototype, the participants got handed a pre-questionnaire answering questions about age, gender and what kind of games they liked to play. The results in section C.4 (*Pre-Questionnaire Final Test*) showed which types of player types the test participants perceived themselves as. The participants could choose two player types which were combined player types from the section 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*). 51,9% of the participants answered explorer as one of their

two choices. They aligned with the intended player types for the game as they enjoyed exploring a stunning visual environment as the player type explorer. 25,9% answered that they identify with the player type story lover, which also aligned with the intended player types for the game, as they are slayers who enjoy driven stories with narrative. Most of the participants answered they enjoy challenging and competitor games, which is not our intended target group.

In this case, we could have made the final test more directly in terms of achieving a more accurate understanding of how the game resonates with the target group. This might ensure the results reflect better to the preferences and behaviors of our target player types.

9.2.2 Bias with test participants

The three test conducted on the paper prototype, the first Unity prototype and the final Unity prototype included test participants from our own class. Testing with classmates limits valuable insights into first-time user experiences and can cause bias in terms of sharing similar knowledge, perspectives and are well known with us, therefore it could influence their feedback to be less critical. Additionally, their gaming preferences or habits may not represent the whole target group.

The test of the paper prototype in section 5.6.4 (*Paper Prototyping*) were tested on 3 three people from our own class to confirm that the mechanics flowed well and everything made sense, to make sure we were on the right path. Firstly, this introduces bias as the participants' familiarity with us may lead to less critical feedback. Additionally, testing with only three people does not provide enough representation of the target group to see if the game idea is truly successful. It is possible that these three participants happened to understand the concept, which may not be reflective of how others would perceive it.

Our first Unity prototype were only tested on 10 people from our own class as the test only included game play and flow. But this introduced a bias since the participants were familiar with the subject matter and the overall process, as they were working on similar projects.

The final Unity prototype included a broader perspective of the test participants, but there were still participants from our class, but also other fellow students from Aalborg University, well know participants outside of the University and friends.

While the testing process provided valuable insights into the mechanics, flow, and usability of the game, the reliance on classmates and familiar participants introduced significant bias. Although the final Unity prototype included a more diverse group of participants, their familiarity with us can still affect the feedback.

9.2.3 Testing Experience Gamers vs Testing Non-Experience Gamers

The pre-questionnaire from section 8.4.1 (*Result from Pre-Questionnaire of Final Test*) shows an even division between people who play games often, sometimes and rarely. The fre-

quent players bring a deep understanding of mechanics, controls and how fast they intercept with the intractable elements, which offer detailed feedback of the gameplay to help us improve the game for experienced players.

Testing non-gamers contributes us to make sure the game is accessible and intuitive for the broader audience. Their feedback contributed to highlight confusing mechanics and unclear objects or elements that might be overlooked. This is particularly important when the game aims to portray loneliness, to ensure controls are intuitive and clarity of interaction are essential to maintaining immersion and deliver our intended message.

By gathering feedback from both experienced gamers and non-gamers, can help us to optimize the usability and the experience to ensure it connects to a wide spectrum of different players. Especially evaluate whether the games difficulty achieve the right balance, not too hard for non-experience gamers, but also not too easy for the experienced gamers.

9.3 Interviews in the Final Test

After the testing phase, the interviews yielded valuable insights into how participants experienced the process, primarily focusing on the themes identified in advance. By selecting questions and topics beforehand, each participant had the opportunity to address all key points, ensuring a fair and equal platform for their input. However, because the interviews were semi-structured and conducted by multiple interviewers, the responses may still have been influenced by these variations in the interview process.

Using the thematic analysis^{5.8}(*Thematic Analysis*) to turn the interviews into quantitative data helped to create an easy visual understanding of the participants experience of trying the game. Some disadvantages of using this method could be qualitative data being lost in process. But seen as the chart of positive and negative statements has been developed with the inductive method from section 5.2 (*Deductive and Inductive Data Collection*), the most important themes and statements has been processed.

The number of positively or negatively charged comments can vary from interview to interview. Some participants provided more extensive feedback than others, making their contributions carry more weight compared to those who offered fewer or less detailed responses.

9.3.1 Combining the Pre-Questionnaire with the Interview

We were unable to link each participant's responses from the pre-questionnaire in section 8.4.1(*Result from Pre-Questionnaire of Final Test*) to their interview in section 8.4.5(*Results from The Interview of Final Test*), as we often tested two participants at the same time. This made it difficult to track which participant provided specific answers. The inability to link pre-questionnaire answers to interview responses makes it harder to understand the reasoning or motivation behind a participant's behavior or statements.

It could be interesting to look into if it allows clearer tracking of responses and interactions. As it was necessary to test two participants at the same time, we could have provided the test participants different colors or numbers, while recording the interview to distinguish between each participant. The interview questions could be adapted based on the pre-questionnaire responses to explore specific areas in depth. However, managing linked data requires more effort and organization.

9.3.2 Written Answers in the End Scene of the Final Test

Since the ending scene where the player gets to type in a feeling they think the character felt only accepts certain words and themes, it prevents the gathering of answers that people would write. Instead of denying a lot of feelings and words, it could have provided a greater insight to what feeling the game is conveying to different players, by accepting all answers.

As seen in 3.7.3 *The First Tree*, the players are given the opportunity to write one last message the fox wants to tell her children, allowing them to freely express whatever comes to mind without any limitations of accepted or denied answers. This is interesting to look into, to see how the users perceive and connect with the atmosphere of the game.

9.4 Observations from the Final Test

The observations from the final test were collected as deductive data by using an observation sheet, which can be found here C.5 (*Observation Sheet*). This method ensured that everyone observed the same things. This addressed the subjectivity of the method observation, where different people might look and focus on different aspects. All the group members should be able to observe and focus on the same aspects and that was the reason for using the findings from the section ?? (??). A potential bias of using this method was that it could lead us to focusing only on the aspects we were looking for and potentially overlooking other observations. To address this, we used the findings from section 5.9 (*The Think Aloud Method*). This method allowed the participants to verbalize their thoughts, which provided insight into unexpected behaviors and observations. By using both methods, we ensured a more nuanced data collection, where we made sure to gather both the things we were looking for and the unexpected ones.

The key points from the think aloud method were written down while the test participant played the game. However, a better way to capture everything might have been to record the entire test, like we recorded the interviews. Recording everything in the test would ensure we did not miss any important details and allow us to revisit it for a deeper analysis. It would be easier for us to identify patterns and improve the product further. If we recorded the tests, we could have done a thematic analysis of the data from think aloud and observations too.

The discussion has provided insight into the usability, experience and overall response of our final prototype.

The strength to take away from the discussion are the improvements from first Unity prototype to final Unity prototype, that indicated above-average usability. Along with the usability, the game experience align with the goal of portraying loneliness and meeting the needs of our player types: Explorer and slayer. Additionally, also offer a meaningful engagement for the player whether they are experience or non-experience players.

However, when testing we come across a few bugs, that disrupted the gameplay and could lead to affecting the evaluation of usability and the experience. A solution could be to extend the testing and ensure the game has no bugs during the final test. Furthermore, testing three different prototypes of fellow students, friends or well known people, gave us an understand of creating a bias that could effect the results, by them being familiar with the subject or does not want to give negative feedback.

These critical areas guide the future work, focusing on potential design, developments and testing approaches that could be pursued with more time or resources to create a refined game for our intended target group.

10. Conclusion

In this chapter a closer look will be taken at the Final Problem Statement to see if we fulfilled its expectations. The project will be reviewed to identify the most relevant findings. Based on the conducted research, different iterations of the game were developed and the final prototype was tested with 27 participants from the target group: danish citizens in the age group 18-34. The test results from the different iterations were analyzed and lastly, the findings and potential biases were discussed.

This is the Final Problem Statement:

How can we create a game experience for 18-34-year-old Danish citizens using visual computing, design theory, and storytelling to portray loneliness for the player types: explores and slayers.

We wanted to create a game which could portray the feeling of loneliness by using the knowledge from design theory in section 3.4 (*Design Theory*), where we found out that combining four elements from 3.4.3 (*The Game Consist of Elements*) to strengthen the player experience. We created requirements seen in chapter 4 (*Requirements*) and personas seen in section 6.2 (*Personas for the Project*). The knowledge from these guided the design process and ensured that the target group was always kept in mind when designing the game.

The focus were on the *aesthetic* element to satisfy the player types explores and slayers from section 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*). Using knowledge about visual computing in section 3.6 (*Visual Computing*) provided knowledge on how to visualize that only certain objects can be interacted limiting the players opportunities in the game. Shaders were also used to make the shadow monsters appear without physical appearance, to represent emptiness or mirroring how loneliness can leave people feeling disconnected. Motion capture was also a part of using visual computing. By using motion capture we were able to make efficient animations for the shadow monsters.

Using knowledge from storytelling in section 3.5 (*Storytelling in Video Games*), to immerse the player in a flow state as research in section 3.3.1 (*Flow Theory*) showed how important it is to get the players into the flow state. Therefore the reason for dialogue became a key aspect of the game, allowing to create a story the player could connect with.

The decision to develop the game in a first person perspective was a key factor in delivering the intended experience successfully. In section 3.2.7(*Playing Alone and Playing with Others*) we discovered that playing alone could create a deeper personal experience, allowing them to fully immerse in the environment which was an important element for the slayer types: explores and slayers. This was mentioned by some the test participants during their final test in section 8.4.2 (*Results from Think Aloud Results of Final Test*), that highlighted being alone in the world, made them feel a deeper connections and motivated to explorer further, as they were required to solve the problems by themselves.

Both qualitative and quantitative methods were used when testing the final prototype

as we found the importance of complementary methods in section 5.1 (*Qualitative and Quantitative Data*). Observation, semi-structured interviews and the think aloud method were used as qualitative methods, while the system usability scale was used as a quantitative methods. By using both qualitative and quantitative methods, we got data about the players experience with the game and the usability as well. The use of qualitative and quantitative methods provided insights into the player experience and usability at the same time.

The system usability scale was used for the final test. The game was tested with 27 test participants from the target group: danish citizens between 18-34 years. The SUS score of the final prototype was calculated to 73,5, which scored the grade B- on the SUS score Range. From the final SUS score, we can conclude that the game has room for improving the usability, but with a SUS-score above the benchmark it should not affect the game experience.

The SUS score demonstrated that the usability of the game was above average, so the next big question was whether we could really portray the feeling of loneliness. We tried to portray this through the games' character, environment, storytelling, and narrative, using the findings about the four elements in section 3.4.3 (*The Game Consist of Elements* and the essential experience in section 3.4.2 (*Essential Experience*)). This tied into the emotional goal of portraying loneliness, which matched the preferences and motivations of slayer and explorer player types.

The semi-structured interviews from the final test in section 8.4.5 (*Results from The Interview of Final Test*) showed that elements of storytelling and memories along with the atmosphere and mood during the game was positively received and helped the overall portraying of loneliness, while other elements such as the shadow monsters were identified as an area in need of revision, suggesting that a more strategic approach or a re-imagined design could deepen engagement and heighten the intended emotional impact. The written answers in section 8.4.3 (*Observations from the Final Test*), provided valuable insight into whether we successfully portrayed the feeling of loneliness. With 87% of the test participants providing a correct answer, we can conclude that the game showed potential to portray the feeling of loneliness. However, as stated in section 3.1 (*Loneliness*), loneliness is a subjective feeling which opens up opportunities for future development of the game. The final written responses also highlighted the need to give players more freedom to express their connection to the game's themes, suggesting future versions could use a more open-ended approach for the end scene, and help to grant a more nuanced data collection of what feelings and thought the game conveyed to the player.

The Final Problem Statement was effectively addressed, demonstrating that a game experience portraying loneliness for 18-34 years old Danish citizens could be created with the use of shaders, design theory, and storytelling. Most elements in the game succeeded in conveying the wanted feeling, however a few elements could interrupt the storyline and perception of the feeling loneliness, and is therefore in need of revision in order to

clarify and enhance the portrayal of loneliness. The focus on designing the game for the chosen target group, as well as creating an optimal setting through the environment and atmosphere, proved successful. This approach effectively conveyed a sense of loneliness throughout the gameplay experience.

11. Future Work

This chapter will address our limitations of the current design and implementation. We will outline opportunities as to where our skills, knowledge and the project can be improved or grow in terms of target group, design, implementation, and testing for future development of the game.

11.1 Target group

Loneliness is not linked specifically to one age group or one nationality. It is a widespread feeling across the globe 2.1(*Loneliness in a Worldwide Perspective*. Our choosing of the FPS's target group helped the design choices, but everybody who is interested in experiencing a storytelling gameplay with an emotional portrayal should not be excluded from this game. In future work a global target group will be addressed to expand the game globally. It will be important to look at cultural diversity and language barriers to ensure future design is handled with care and respect. In the next section of this chapter, we will showcase how we can approach a global target group.

11.2 Design and Implementation

We met some limitations in our programming skills and knowledge, which had an impact on the implementation of the design choices. These limitations required us to prioritize the delivery of a functional prototype. Future development will focus on our own improvement and growth to meet our intended design choices. Additionally, we will suggest other development to improve the game.

- **Art style** will be more consistent. Implemented assets will be more refined to correspond to the chosen art style. All pre-made assets will be switched out with assets designed by the team.
- **Game Menu UI** will be improved and designed in the chosen art style to avoid any differing in the game design, keeping it coherent from the start till the end of the game.
- **Different language** selection could help reach a global target group as we in chapter 2 (*Pre-Analysis*) discovered that loneliness is an increasing world-wide problem.
- **Game Menu** options fully implemented to let the player set their own preferences for game experience. Some of the test participants had an experience of a very sensitive mouse and camera control as mentioned in section 8.4.2(*Results from Think Aloud Results of Final Test*. With general control settings these can be changed for the liking of the individual player.

- **Difficulty levels** in the game can attract a broad audience of player types from sections 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*). For the more advance player they can chose a more challenging gameplay, whereas the more exploring player can focus on the storytelling within the game. The different levels can differ in how many shadows will spawn, the flashlight battery being drained and needs to be switched out - the challenging level would feature the collection and switching out of batteries, more or less helping tips throughout the game, adding of player health and the possibility of taking damage from shadows.
- **Audio and text dialogue** has not fully been implemented in the game. For further implementation text should be present with every dialogue audio. Furthermore, professional voice acting could improve the capturing of emotions which can have an improved affect on the players game experience.
- **Input System** has not been utilized completely, as it was bit more advanced considering our skills and knowledge with the given time for implementation. Therefore we had to prioritize how we handled the input actions for a faster implementation. An example is the handle of the Interaction action. Here we have mostly used the old version Input Manager. This should be corrected and changed to the new Input System. With this implementation the game will be playable on any kind of input device. Some test participants expressed a need for a Run action during the final test in section 8.4.2 (*Results from Think Aloud Results of Final Test*), this could be implemented and improve the players experience of the game.
- **General refactoring** of the code, to improve it and make it more clear and readable, and avoid any overlapping code, too dependent code, errors, and bugs. This will make improvements and changes in the game effortless and more reliable.
- **Task dialogue** should be fully implemented to help guide the player with the state of flow in the game and limit frustrations or boredom as researched in section 3.3.1(*Flow Theory*). The task dialogue should only be visible for a couple of seconds, enough for the player to read and understand. A task panel should be implemented for the player to access the executable tasks at anytime with an input action.
- **The shader** shadows and water do not correspond to our intended design and art style. As mentioned in section 9.3 (*Interviews in the Final Test*) our prioritizing might have resulted in unclear characterization of the shadows. Correction of the shadows to intended design might ease the understanding of characterization. For intractable objects the shader should only be highlighted for the main story's next solvable task, to better navigate the player through the game.
- **Animation** which is already implemented will be improved and refined. Animations of a human body from a first person perspective will be implemented to make realistic mechanics, such as interaction and expression. As mentioned in the A.1(*Design Document*) the opening cutscene should include an animation of the first-person characters eyes opening to show the character awakening from a dream. The shader for

this animation has been implemented, as for the animation we reached a limitations in our programming knowledge with the time remaining for the project. For further development a better understanding and handling of shader animations will be achieved and accomplished. Other animations mentioned in the A.1(*Design Document*) will be implemented as well, as an animation filled game could potentially emphasize the storytelling, which needs to be researched.

- **Skip function** should be implemented with the increase of animations to meet the expectations of the different player types 3.2.4(*Understanding Player Types*).
- **The loneliness** feeling could be improved by implementing more confrontations which target different aspects of the loneliness types as well as health issues and social support as 3.1 (*Loneliness*) further states about. Moreover, research on how loneliness is experienced across different cultures should be analyzed to the understand the feasibility of a universal design or its potential limitations. These implementations can enhance the connection between player and game.
- **Memories** could be expanded with more collections and tasks of such, making the gameplay longer and the possibility for the player to connect with the character more profound. We could use the knowledge about different types of loneliness from section 3.1.1 (*Types of Loneliness*) to create more memories with these types and make the player relate even more to the story and character.
- **The Easter eggs** received a lot of attention during the finale test as mentioned in section 8.4.2(*Results from Think Aloud Results of Final Test*) and was an aspect of exploration the test participants found great value in. The purpose of the Easter eggs should be redesigned to emphasize loneliness. They will be collectable items which will be stored in an inventory the player can access anytime with an input action. Small text about the collectable items can be used to tell informative information about the character and the theme to give a better understanding of the game's intention. Another approach could be to have character dialogue implemented when interacting with the Easter eggs. Here the character could give informative information about themselves and express loneliness.
- **Other collectable items** could improve the players problem solving and exploration of the game and story. Items such as puzzle pieces to unlock a mission, hidden place, hidden memory, or other information about the player or theme which would not have been achieved otherwise. In 8.4.2(*Results from Think Aloud Results of Final Test*) some test participants mentioned encountering other players. An encounter with or connection to other players could be acquired by implementing a "message in a bottle" object. The object can be found at a random spot along the coast. When the player interacts with the object a paper will be displayed containing a message from another player. After reading the message, the player will as a task be encourage to send the bottle back into the ocean containing a new message from the player themselves.

- **Achievements** could be implemented to encourage and motivate the players exploration and problem solving, and making the player challenge themselves to reach multiple goals apart from completing the main story. Motivations supported by the personas 6.2(*Personas for the Project*).
- **The island** should be improved and refined to completely meet the expectations of a realistic island. The island could further be expanded for more room to exploration, item collection and task completion to further motivate the personas and their player type: explorer and slayer 6.2 (*Personas for the Project*).
- **Map** could be implemented with the expansion of a bigger island to help navigate the player. Moreover, the finale test showed confusions of the navigation in the game 8.4.2(*Results from Think Aloud Results of Final Test*). The signage should be improved with better design to handle a better flow in the game to create a better experience for the player and limit their frustrations and confusion as research pointed in 3.3.1(*Flow Theory*). More signage could be by split roads, and signs on houses.
- **End scene** should be changed to not exclude any word written by the player. As formerly written in section 3.1 (*Loneliness*), the feeling loneliness is subjective, so should the finale word, allowing for greater personal connection of the players experience of the game as discussed in section 9.3.2 (*Written Answers in the End Scene of the Final Test*).
- **General bugs** in the finale prototype must be resolved to prevent potential negative effect on the usability and risk of possibly leading to a negative overall experience of the game.

The game allow much potential as to where it can be improved or grow in future development. The above points are merely some approaches that can improve the game with more immersive storytelling handling loneliness through a strong connection between the player and character.

11.3 Tests

- **Implemented** parts could be tested separately to quickly test different designs, find bugs, match player type preferences, and understand interaction and behavior with such. This could be helpful in a project with a short deadline to get quick results to further improve the product.
- **The iterative process** would be further emphasized with many tests to develop a final solution of the product 5.3 (*The Iterative Process*).
- **Voice recording** of the Think Aloud method, to improve the accuracy of the collected data as written in 8.4.2 *Results from Think Aloud Results of Final Test*.

- **To link** the test participants pre-questionnaire and the interview we could assign the participants numbers at the start of test. This would help us evaluate the participants in-game behavior and their given feedback.
- **A diverse representation** of the target group's age should be present in the sample size to fully understand their needs. The discussion highlighted a limitation of the age distribution 9.2 (*Sample Size*). To address these gaps, future iterations will focus on achieving a more balanced representation across the target age range.
- **The difficulty levels** could be tested as different designs by the fitting player types of Bartle's Taxonomy and The Nine Quantic Game Types in sections 3.2.4 (*Bartle's Taxonomy of Player Types*) and 3.2.5 (*The Nine Quantic Gamer Types*).

With further development, the testing method might change. This should be adapted for proper collection and handling of data, as these data provides valuable insights for further improvement and growth of the game and the teams skill development.

A. Design

A.1 Design Document

[Click here to view the Design Document](#)

A.2 Personas for the project

Sophia

The Creative Slayer Explorer

About

Age	34
Status	Single
Gender	Woman
Occupation	Graphic Designer
Location	Europe

Sophia is a highly creative person, who has a strong sense of aesthetics and enjoys incorporating her love for crafts and design into both her professional and personal life.

Outside of work she loves to spend time with her loved ones, watch movies and TV-series, travel, play video games, sew and crafts, watch Formula 1, and stay active with Zumba classes.

Game background

Sophia is an explored gamer and has been gaming for around 20 years. She has played a lot of different game genres, but has found single player games with a rich storytelling and exploratory world, quest solving and creative game play most enjoyable.

She uses games as a form of mental escape and personal challenge, and can spend hours immersing into the game.

Player type

Bartle's Player Type	Explorer
9 Quantic Player Type	Slayer

Goals

- To unwind and de-stress after a busy workday.
- To play solo and uncover every corner of the game.
- To experience a rich storytelling and to explore the game at her own pace.

Motivations

- Solve challenging quest.
- Drawn to creative exploration and solving of quest.
- Immersive game.

Frustrations

- Games that are too linear or restrict exploration.
- Overly competitive games.
- Emphasize multiplayer over story and exploration.



Oliver

The Creative Slayer Explorer

About

Age 39
Status In a relationship
Gender Man
Occupation Warehouse worker
Location Europe

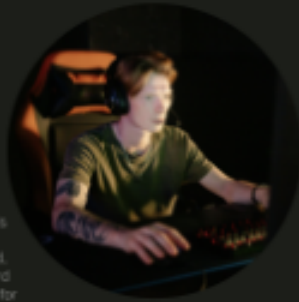
Oliver is taking a gap year to explore different work experiences before he pursues further education. He wishes to delve into a more creative field, something related to design or hands-on crafts. Oliver is an outgoing (extroverted) person, who enjoys spending time with his friends and go friend, whether it is online gaming, organizing board game nights, or cooking vegetarian dinners for them to enjoy.

Game background

Oliver was introduced to gaming in a young age by his older brother. He enjoys the thrill of being the main character in action-driven games. Important aspects for Oliver is engaging narratives and strong characters. He enjoys some form of mental engagement like the challenge of combat, puzzles or creative strategy. He plays both singleplayer and multiplayer games, and especially enjoys games that allow him to immerse himself into a powerful story or compete against others in team-based environments.

Player type

Bartle's Player Type Explorer
9 Quintic Player Type Slayer



Goals

- To use gaming as a form of relaxation after work.
- To play with friends either competition or team-based puzzles.
- To immerse himself in rich narratives.
- To get a sense of achievement after completing challenges.

Motivations

- Overcoming challenges.
- Defeating difficult opponents.
- Feeling like a hero.
- Creative gameplay, problem solving, puzzles or strategies.
- Powerful story.

Frustrations

- Too heavily reliant on grind mechanics.
- Lack of story depth.
- Competitive multiplayer: Individual contribution ≠ team success.
- Competitive multiplayer: Too much focus on mechanics over fun.

Alex

The Analytical Slayer

About

Age 29
Status Single
Gender Man
Occupation Psychology Student
Location Europe

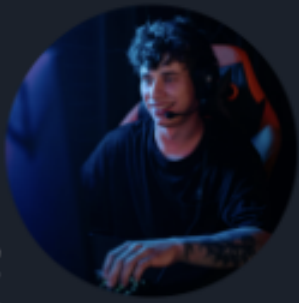
Alex is studying psychology and has a deep interest in understanding human behavior and motivations. His academic background provides him with a unique perspective on life, which also influences how he approaches challenges in gaming. It is important for Alex to spend a lot of time with his family. Moreover he enjoys reading books, watch movies, express his creative side through drawing sketches, and likes to keep his mind and body sharp with running and training.

Game background

Alex started to get interested in gaming around his teen years. He enjoys the mental stimulation and challenge games provide, especially those with a rich narrative or intellectual depth. He enjoys analyzing characters and plot twists. He does not mind a steep learning curve as long as the payoff is rewarding. For Alex gaming is more than just entertainment - it is an extension of his intellectual curiosity. He prefers singleplayer games where he can move at his own pace.

Player type

Bartle's Player Type Explorer
9 Quintic Player Type Slayer



Goals

- To immerse himself in narrative-driven games.
- To unwind and be stimulated.
- To apply his interest in psychology to understand the motivations and behaviors of characters.
- To engage with games which offer a combination of mental challenges and emotional depth.

Motivations

- Determined to overcome difficult challenges. Combat or intricate puzzles.
- Well developed characters, world and story.
- Challenges of intellect.
- Thrill of achieving difficult tasks.

Frustrations

- Too much focus on grinding or repetitive mechanics.
- Overly simplistic narratives or shallow character development.
- Games that fail to engage him intellectually.
- Competitive multiplayer games with little depth or focus on strategy.

Lucia

The Focused Slayer

About

Age 23
Status In a relationship
Gender Woman
Occupation Biotechnology Student
Location Europe

Lucia is a dedicated biotechnology student who works part-time as a lab assistant at the National Hospitality. Her academic and professional life requires focus and precision, traits that carries over into her personal life and hobbies. She is very dedicated at everything she does. Lucia enjoys spending time by herself or with her close group of friends. She is a big movie nerd and often host movie nights for her friends where they discuss and analyze intricate plots. She enjoys baking treats for them as well. Despite her introversion, she is highly social with those closest to her and loves the comfort of familiar company.

Game background

Lucia is a passionate gamer, who enjoys and prefers story-driven games that allow her to immerse herself in compelling narratives, challenging gameplay and exploration. Games are a way for her to escape and recharge from the pressures of her study and work life while still keeping her mind engaged. She enjoys games which provide her with a sense of personal achievement. She prefers singleplayer games.



Player type

Bartle's Player Type Explorer
9 Quantic Player Type Slayer

Goals

- To enjoy immersive, story-driven games.
- To feel like the hero while experiencing a satisfying narrative.
- To relax and unwind after studying and working.
- To be challenged and sense the feeling of achievement from completing complicated missions or puzzles.

Motivations

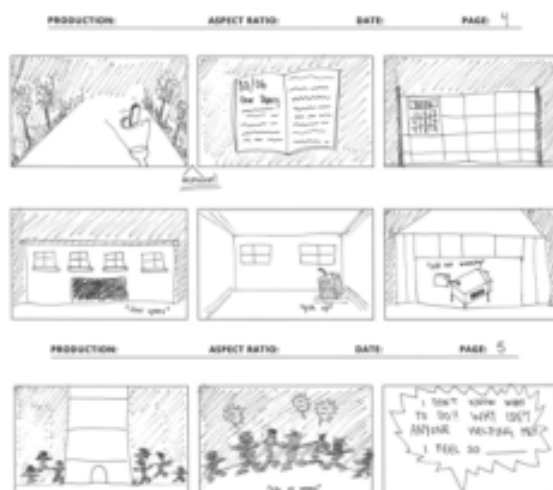
- Finds fulfillment in overcoming challenges.
- Deep narrative.
- Improve skills and achieve mastery over difficult tasks.

Frustrations

- Games that are too fast-paced.
- Too much focus on combat.
- A non-strong story.
- Multiplayer games that require constant social interaction or competition with others.
- Overly repetitive mechanics.
- Not feeling intellectual engaged.

A.3 Storyboard





A.4 Figma Start Scene

[Click here to view the Figma start scene](#)

B. Implementation

B.1 Textures from Poly Haven textures

Texture for the lighthouse and the generator house
Texture for the railing on the top of the lighthouse
Texture for the emergency house
Texture for the key box
Texture for the diary
Texture for floor Generator Shed

B.2 Images Used as Materials/Textures

The book pages of the diary

B.3 YouTube Tutorials for Creating Blender Assets

The Flashlight
The Diary
The Key Box
The Lighthouse

B.4 Pre-made Assets from PolyHaven

Rubber Duck
Treasure Chest
Wooden Axe
Folding Chair
Painted Chair
Wine Bottles
Cardboard Box
Concrete Road Barrier
Picnic Basket
Wooden Ship
Wooden Pier
Apple
Avocado
Kiwi
Plunger

Spade
Cassette
Screwdriver
Bench Vice
Metal Barrel
Hammer
Metal Tool Chest

B.5 Pre-made Assets from SketchFab

The Power Lever
The picnic table
Wooden Bridge
Generator
Wooden Window
Ladder
Wooden Railing
Wilson Volleyball
Graveyard Fence
Tombstone
Wooden Sign
Light Switch
Ceiling Lamp
Desk Lamp
Bed
Wooden Table
Wooden Table With Drawer
Bed Table
Wooden Chest
Painted Wooden Chair
Wooder Drawer Cabinet
Radio
Wood Plate
Wooden Bowl
Shallot Onion
Red Apple
Potato
Bread

B.6 Pre-made Assets from Unity Asset Store

Fire

B.7 Unity Terrain Tool and Environment

Trees and Windzone

Grass and textures on terrain

Texture on Paths

B.7.1 Youtube tutorials for Clouds and rain

Clouds

Clouds

Volumetric Fog in unity Etredal

Fog prefab and mat Etredal

Rain

B.8 Videos of the Motion and the Rigged Animation

Click [here](#) to view the videos of the motion and the rigged animation using DeepMotion.com

B.9 Scripts

B.9.1 Methods for Interaction

```
1 public class PlayerInputHandler : MonoBehaviour
2 {
3     //Input Actions
4     InputAction interactAction;
5
6     private void Awake()
7     {
8         controller = GetComponent<CharacterController>();
9         playerInput = GetComponent<PlayerInput>();
10        interactAction = playerInput.actions["interact"];
11    }
12 }
```

```
1 public class PadlockInteraction : MonoBehaviour
2 {}
3 private void Update()
4 {
5     if (isInRange && playerInputHandler.actions["interact"].
    triggered)
6     {
7         padlockCanvas.SetActive(true);
8     }
9
10    if (playerInputHandler.actions["interact"].triggered &&
    padlockCanvas.activeSelf)
11    {
12        padlockCanvas.SetActive(false);
13    }
14 }
15 }
```

B.9.2 Methods for Flashlight

```

1 public class PlayerInputHandler : MonoBehaviour
2 {
3     //Flashlight
4     bool flashlightOnOff = false;
5     Light lightSource;
6     [SerializeField] float range = 100f; // Adjust the radius as
needed
7     public Transform lightPoint;
8
9     private void Awake()
10    {
11        flashlightAction = playerInput.actions["flashlight"];
12        lightSource = this.gameObject.GetComponentInChildren<Light>()
;
13        lightSource.enabled = false;
14    }
15
16    private void Start()
17    {
18        _flashlightOn = RuntimeManager.CreateInstance(FmodEvents.
Instance.FlashlightOn);
19        _flashlightOff = RuntimeManager.CreateInstance(FmodEvents.
Instance.FlashlightOff);
20    }
21
22    private void Update()
23    {
24        HandleFlashlight(flashlightOnOff);
25    }
26
27    private void HandleFlashlight(bool flashlightOnOff)
28    {
29        if (flashlightOnOff)
30        {
31            lightSource.enabled = true;
32            Debug.Log("Flashlight is on");
33            Flashlight();
34        }
35        else if (!flashlightOnOff)
36        {
37            lightSource.enabled = false;
38            Debug.Log("Flashlight is off");
39        }
40    }
41 }
42
43

```

```

44     void Flashlight()
45     {
46         RaycastHit hit;
47
48         //Burning shadowmonsters if raycast hits object with tag "
Enemy"
49         if (Physics.Raycast(lightPoint.position, lightPoint.transform
.forward, out hit, range) && hit.transform.tag == "Enemy")
50         {
51             EnemyHealth target = hit.transform.GetComponent<
EnemyHealth>();
52             target.TakeDamage();
53             Debug.DrawLine(lightPoint.position, hit.point, Color.
yellow); //Debug line for raycast
54             //AudioLibrary.PlaySound("Burn");
55         }
56     }
57 }

```

B.9.3 Enemies

```

1 public class EnemyHandler : MonoBehaviour
2 {
3     private static EnemyHandler _instance;
4     public static EnemyHandler Instance
5     {
6         get
7         {
8             return _instance;
9         }
10        private set
11        {
12            _instance = value;
13        }
14    }
15
16    GameObject EnemyPrefab = new GameObject();
17    Transform Target;
18    float RadiusAroundTarget = 0.5f;
19    public List<EnemyAI> Units = new List<EnemyAI>();
20
21    private void Awake()
22    {
23        if (Instance == null)
24        {
25            Instance = this;
26            return;
27        }

```



```

28         Destroy(gameObject);
29     }
30
31     private void OnGUI()
32     {
33         if (GUI.Button(new Rect(20, 20, 200, 50), "SpawnEnemies"))
34         {
35             //SpawnEnemy();
36         }
37     }
38
39     /public void SpawnEnemy()
40     {
41         Instantiate(EnemyPrefab, this.transform);
42     }/
43
44     private void MakeAgentsCircleTarget()
45     {
46         for (int i = 0; i < Units.Count; i++)
47         {
48             Units[i].MoveTowardsTarget(new Vector3(
49                 Target.position.x + RadiusAroundTarget * Mathf.Cos(2
50 *   Mathf.PI * i / Units.Count),
51                 Target.position.y,
52                 Target.position.z + RadiusAroundTarget * Mathf.Sin(2
53 *   Mathf.PI * i / Units.Count)));
54         }
55     }

```

B.9.4 Memories

```

1 public class ItemPickup : MonoBehaviour
2 {
3     private void HandleItemInteraction()
4     {
5         if (isInteractable && Input.GetKeyDown(KeyCode.E))
6         {
7             isRotating = true;
8             TurnOnVirtualCamera();
9             pushE.SetActive(false);
10            pushEsc.SetActive(true);
11
12            if (paperCanvas != null)
13            {
14                paperCanvas.SetActive(true);
15                StartCoroutine(DisplayTextAfterRotation());

```

```

16         }
17     }
18 }
19
20 private IEnumerator DisplayTextAfterRotation()
21 {
22     // Wait for a brief moment to simulate camera settling
23     yield return new WaitForSeconds(1f); // Adjust this delay as
needed
24
25     // Determine which message to display based on the item name
26     if (itemName == "Book")
27     {
28         paperText.text = "Date: 30/06\nDear diary\n I m sitting
alone in my room after a long day. It was my grandmoms funeral. I
already miss every moment with her. She was the one holding me
together after the other kids bullied me. She was the only person
who understood me. I really miss her and I feel so lost without
her.";
29     }
30     else if (itemName == "Glasses")
31     {
32         paperText.text = "Today was the worst. At lunch, they
kept staring and laughing, whispering like I couldnt tell it
was about me. In the hall after, one of them shoved me, and my
glasses flew off. I barely had time to pick them up before someone
stepped on them. They just laughed, calling me a nerd. I don't
have any friends and I'm always by myself. I wish I had someone to
talk to.";
33     }
34
35     // Start typing out the message
36     StartCoroutine(TypeText(paperText.text));
37 }
38 }

```

B.10 Sound Implementation

B.10.1 FMOD Tutorial

How to make an Audio System in Unity | Unity + FMOD Tutorial

B.10.2 SoundEffects's used

Ocean Sound

Forest sound

Footsteps Wood
Footsteps Forest
Forest Sound background
Thunder and rain
Thunder 1
Thunder 2
Thunder 3
Thunder 4
Thunder 5
Enginefail

C. Evaluation

C.1 SUS Data from the First Unity Prototype

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Raw SUS	Final SUS	z-score
4	1	4	1	5	1	5	2	5	2	36	90	1.06881615
4	2	3	1	3	3	5	2	3	1	29	72.5	0.145147872
2	2	4	1	3	2	4	2	4	2	28	70	0.013195261
3	2	5	4	4	1	4	4	4	2	27	67.5	-0.11875735
3	1	4	2	5	2	4	2	4	3	30	75	0.277100483
4	2	4	1	3	1	4	3	5	1	32	80	0.541005706
5	2	4	1	4	2	5	2	4	1	34	85	0.804910925
1	3	1	4	2	3	1	5	3	2	11	27.5	-2.229999128
2	4	2	1	3	2	4	5	2	2	19	47.5	-1.174378239
4	1	4	1	4	3	4	2	5	1	33	82.5	0.672958317
3.2	2	3.5	1.7	3.6	2	4	2.9	3.9	1.7	27.9	69.75	

C.2 Interview from the First Unity Prototype

Interview

- How clear were the tasks you were asked to complete?
 - Rimelig klare, okay let at finde hen hvor man skulle. Var forvirret ved fyrtårnet ved den sidste enemy. #1
 - Pretty clear, and the narrator worked well #2, 5, 6, 9, 10
 - The feeling and understading of the game is a bit difficult, because sound effect and other things is not implemented #2
 - Svært at finde e-house ellers var det nemt #3
 - Opgaver var nemme, men kunne hurtigt blive glemt, da de ikke stod på skærmen #4
 - Navn på huse var lidt forvirrende #7
- Were there any tasks that felt confusing or frustrating? If so, which ones?
 - Den sidste opgave var lidt svær at svare på #3
 - Glemte formål med opgaver undervejs #4
 - Forvirrende at finde kode til E-house, da man ikke var klar over at det var gåde #7, 10
 - Nope #5, 6
 - Svært at finde emergencyhouse #9, 10
- What is your impression of the game?
 - Blev opslugt og indlevet i fortællingen. #1, 7
 - Liked the story #2, 7
 - Interesteing take on loneliness as an issue #2
 - The extra paths seemed a bit unnecesary, becaue i did not find a reward for trying different paths #2
 - Meget atmosfærisk #3
 - Kunne godt lide environment med regn, vind, tåge, og flot terrain #9, 10
 - Sætter en melankolsk vibe #4, 7
 - Verden og vibe var gennemført #5
 - Gennemført tematik, og virkelig fedt med minder #6
 - Minder var virkelig godt skrevet, som folk der har følt sig ensomme kan reletare til #6
 - Looked smooth #10
- What do you like/dislike about it?
 - Kamera var lidt for sensitiv #1, 7, 8
 - Fedt med alle opgaver der skulle løses #1
 - Kunne godt lide environment og opgaver #3
 - Svært ved at styre kamera med mus #4, 8, 10 (everyone basiccaly said that)
 - Mousecursor burde være locked # 6
 - Stien kunne godt blive lidt kedelig#7
 - Synes at E ikke er tydeligt nok #9, 10
- Did you have fun playing?
 - Ja #1, 2, 3, 4, 5, 6, 7, 9, 10
 - Nej #8

- How did you find the pacing of the gameplay? Were there moments that felt too rushed or too slow?
 - God balance i fortælling og opgaver, og fedt med håndtag i G-house som "Ikke fungerede" #1
 - The pacing was good both as tasks, and the memeory text #2
 - No #3, 6
 - God balance #4, 5, 10
 - Passende længde fra lighthouse til e-house #6
 - Der virker som om der er plads til at opdage verden og samtidig løse opgaver undervejs. #7, 8
- How did you find the difficulty? Too hard/too easy?
 - Niveauet var passende #1, 3, 5
 - Pretty easy difficulty #2, 4, 6
 - Svært at sige tidligt i processen #7, 8
 - Kun lidt svært pga. Controls #9
 - The last parts wasn't very clear #10
- What did you find hard?
 - flashlight skulle lige regnes ud #1, 10
 - Entering E-house #2
 - Walking up the stairs to Lighthouse #2
 - Finding the code for E-house #8
 - Ens karakter virkede lidt for stor ift. Til resten af verden #9
 - Historien er en smule corny, og derfor lidt for stereotypisk #9
- Were there any elements that you found distracting or that you felt needed improvement?
 - Rain droplets hitting the ground seemed weird and unlike the rest of the realistic environment #2
 - The enemy seemed a little pointless to the story #8
- Is there anything you would change about the tasks or challenges?
 - Nope #1, 5, 7, 10
 - It would be nice if there were something to do on the different paths, or if the task were more spread out on the island #2
 - Hints til hvis man sidder fast i en opgave eller lignende #3
 - Følte sig i tvivl og en smule overvældet over antal stie #4
 - Fedt at opgaver kommer naturligt i historien #6
- Anything else you feel could be changed to make it a better experience?
 - Ikke umiddelbart #1, 2, 3, 5, 10
 - Gør det mere tydeligt at flashlight er våben og skal bruges på enemy #4
 - Mangler tydelighed på E funktion #6
 - Mangler introduktion til flashligt som våben #9, 10

C.3 Consent Form

Consent Form for Game Testing

Thank you for participating in the testing of our game prototype. As part of our semester project, we are developing a first-person exploration game that focuses on emphasizing a specific feeling with storytelling and visual computing techniques. So, we are testing the gameplay, flow and overall experience of the game, to portray a specific feeling. Your feedback is crucial in helping us improve the game. The purpose of this test is to evaluate the gameplay experience, story elements, and overall design of the prototype.

What to expect:

- The test session will take approximately 30 minutes.
- You will be asked to talk about your thoughts while playing.
- You will be asked to provide feedback through a questionnaire and interview after the session.

Privacy and Data collection:

- Your participation is entirely your choice, and you're free to stop at any time.
- Your feedback will be anonymized and used only for the purpose of improving the game.
- We will not collect any personal data beyond your feedback.
- Any recorded data (gameplay footage, audio feedback) will be stored securely and used solely for the purposes of this project.

By signing this form, you acknowledge that you have read and understood the information provided and agree to participate in the testing of our game prototype:

Participant Name: _____

Signature: _____

Date: _____

C.4 Pre-Questionnaire Final Test

Click [here](#) to view the Pre-Questionnaire from the final test

C.6 Final Test Interview

- How did the game make you feel as you progressed through the story and world?
 - Did you want to explore the world more than you did?
 - Did you think the world was worth exploring?
- How well do you think the theme “loneliness” was portrayed in the game?
 - Did you have any thoughts about the text memories you encountered during the game or the enemies?
- How did the environment add to the overall mood and storytelling?
 - Is there anything about the environment that you thought helped or hindered the theme or the overall experience?
- Lastly, is there anything you would like to add about the game or the test itself?

C.7 Final Test Interview Answers

The interview:

• Did you enjoy playing?

- Ja, det var spændende at udforske ting
- Ja, synes det var sjovt at spille og ville gerne vide hvad der kom til at ske
- Ja, det var meget sjovt – man blev meget hurtigt intrigued og gerne vil vide hvad der sker
- Ja jeg syntes det var meget hyggeligt, mærkeligt at shadowpeople ikke gav skade. Der skete ikke noget når man lyste på dem. Fik lidt a la hyggelige vibes
- Jeg syntes det var spændende jeg var underholdt
- Sjovt ville ikke være det første adjektiv jeg ville beskrive med, jeg var immersed
- Ja, det var flot og entertaining
- Sjovt, pga sjove elementer, ænder, hoppe ud i vandet, måden man bevæger sig rundt på og enemies. Ville gerne kunne gøre flere ting som at give en high five til enemy eller tage flere ting op
- Ja, en fed måde det hele var sat på. Musikken hjalp til at man ikke kedet sig
- Ja, det kunne jeg, det var ret spændende. Meget pirrende at man vågner og ikke ved hvor man er.
- Ja, altså det jo sjovt at udforske, men det jo ikke et sjovt spil fordi man får en melankolsk følelse. Sjovt at opgaveløse.
- Jeg kunne godt lide. Fedt at gå rundt og udforske ting og at der er flere forskellige poster man skal hen til.
- Ja, jeg synes det var meget godt lavet – tydeligt med hvilken stemning vi ville ramme.
- Ja, det synes jeg. Jeg kunne godt lide at man skulle dræbe monstre med lommelygte, men det blev lidt simpelt, og ikke særligt udfordrende. Til gengæld var det ekstra fedt med kode i diary, som var lidt svært, og generelt at navigere i verden.
- Ja, det var et mega fedt spil, lidt uhyggelig men også meget depressing.
- Ja, det var sjovt jeg kan godt lide exploration games
- Ja, det var virkelig flot jeg kunne godt lide spillet.
- Ja det syntes jeg.
- Ja.
- Ja, man skal lige vide hvad man laver først, men det var meget sjovt. Jeg spiller typisk ikke puzzle spil, men meget medrivende
- Der var dele af det hvor man tænkte at man var en lille smule lost. Kunne godt lide ænderne da det gav lidt mere grundlag til at gå rundt. Talte ænderne og troede at det var koden til panelet.
- Ja, det var virkelig fedt. Elsker alle de små ænder. Især dem der brænder et skib.
- Ja, det synes jeg. Det synes jeg faktisk at det var. Jeg skulle lige ind i det.
- Ja, jeg syntes faktisk det var meget godt, det hele virkede når man trykkede på det.
- Ja det syntes jeg, jeg spiller normalt ikke computerspil.

• How did the game make you feel as you progressed through the story and world?

- Creepy stemning. Jeg var lidt bange for at gå i skoven og følte der var nogle omkring mig
- I starten var det gyser agtigt, især zombierne eller skyggerne. Var forvirret hvad man skulle og hvor man skulle gå hen. Især koden var svært. Men budskab rammer til sidst.
- Dyster - Næsten jumpscare til sidst

- Jeg havde lidt svært ved at forstå hvad historien var, voicelines trak mig ud af det, havde foretrukket en indre dialog med mig selv. Havde ikke rigtig en emotionel connection. Ham på radioen spillede ikke rigtig nogen rolle overhovedet. Følte mig glemsom.
 - Jeg følte jeg blev suget ind, især på farverne og musikken samt lydende. Stemningen af ensomhed var nemt at komme ind i.
 - Jeg blev skæmt af mostrene, det var effektivt med talebeskederne til at få en følelse af hvad man skal.
 - Man kunne godt fornemme temaet og jeg følte mig alene i verden
 - Gode til at bygge verdenen op – slenderman
 - Jeg blev mere og mere trist gennem spillet. Det var meget et mysterie i starten, hvad der var sket. Den gule regnjakke var et clue. Man relaterer til modningen og
 - Lille smule trist, jo mere jeg fik af vide synes jeg det var mere synd for karakteren
 - Lidt bange. Dunkel og nedtrykt følelse jeg fik, man bliver lidt trist. Hvis man spillede det alene så ville jeg blive mere trist.
 - Jeg kunne godt gætte mig til at man var alene til sidst.
 - Meget dystert
 - Jeg blev nysgerrig på hvad der var sket, når man har nu har snakket med radio. Nu hvor jeg tænker over det, så jeg regnjakke, som blev nævnt i radioen.
 - Jeg følte jeg havde brug for at hjælpe karakteren, jeg følte ikke selv jeg var karakteren. (Omtaler spilleren som hun)
 - Det var sjovt at prøve at regne ud hvilke følelser personen havde og historien bag personen. Jeg ved ikke om jeg følte det samme som personen følte, men jeg kunne godt mærke der blev lagt op til en følelse af ensomhed
 - Man kunne godt mærke man var alene og at det var det som var meningen
 - Jeg syntes det var ret uhyggeligt.
 - Startede mere som nu har jeg en opgave jeg skal løse og nu kan jeg udforske det mere til nu er der en mere personlig historie i det her.
 - Første følelse var lost, hvor er jeg og hvad laver jeg. Bagefter var jeg sådan, det meget isoleret. Man er meget alene, selvom der kommer monstre uden personlighed.
 - Der er jo lidt horrorgame over det, og man føler sig jo meget alene. Der er ikke nogen NPC'er at interagere med så det ret horroragtigt.
 - Man blev meget rørt af stemmen der var der, især i begyndelse at alting var lidt hårdt. Musikken hjalp til at styrke fornemmelsen
 - Lidt uhyggeligt til at starte med. Jeg kunne godt føle mig lidt alene, fordi man ikke ved hvor man er. Men synes menneskene ikke helt gav mening.
 - Jeg syntes man faldt meget hurtigt ind i verden når man begyndte
 - Jeg var meget spændt på om der ville komme et jump scare.
 - Det var fedt med at lyse på fjenderne. Fin metafor
- **Did you want to explore the world more than you did?**
 - Ja, jeg fortryder lidt at jeg ikke gik nogle andre veje
 - Ja ville gerne gå mere ned til ship og tjekke harbour ud
 - Ja, jeg så nogle skilte og fik lyst til at gå rundt se hvad der lå der. Jeg fik lyst til at se om der var noget i kisten inde i emergency house.
 - Gad godt have set hvad skibet var og hvad der var i det.
 - Ja syntes badeænderne var nice.
 - Ja det gjorde jeg, fik lyst til at gå ned til bålet og ænderne for at se hvad der skete.
 - Ja helt klart, jeg synes det var virkelig en flot verden. Trænerne var fede i vinden

- Ja
- Ja helt klart, jeg ville gerne gå ned til harbor.
- Var interesseret i alt omkring specielt skibet og picnic kurvene ville jeg gerne have interageret med. Mere guidance i spillet til hvor man skal hen
- Ja, det gjorde jeg faktisk. Det var fedt man skulle hen forskellige skilte så man vidste der var flere steder
- Gad vide hvad det ender med, om personen bliver hjulpet
- Ja, jeg ville gerne have været ovre ved bålet og se det forliste skib.
- Nej, synes jeg udforskede det meget
- Ja, det gjorde jeg, jeg var meget rundt og kigge og det var fedt.
- Ja, jeg ville gerne have længere tid til at kigge rundt
- Ja det gjorde jeg.
- Det ved jeg ikke. Det kan godt være at jeg gik glip af noget jeg ikke fandt? Jeg vidste ikke hvor meget tid jeg havde. Det kan godt være jeg kunne have fundet noget mere som ville have givet noget mere til historien. Der var et eller andet med de ænder.
- Det kunne have været fedt at go flere steder hen, fx harbour
- Jeg havde da lyst til at se hvad der skete, efter man nu havde fået benzin på. Hvad der så ellers skete
- Ja det syntes jeg.
- Ja det syntes jeg, det var fedt med ænderne og bålet og at man kan få offroad op på bjerg.
- **Did you think the world was worth exploring?**
- Ja, noget af det skete der ikke så meget ved men jeg havde lyst til at kigge rundt. Fedt med broen der var andre ting
- Der manglede nogle ting, stien var til at følge efter
- Ja, Kiste han fik lyst til at åbne
- Ja, der var ikke nok landmarks kunne godt have brugt flere. Følte at ænderne spillede en større rolle end de egentlig havde. Evil feelings.
- Ja det syntes jeg flere ting man kan interagere med.
- Ja det syntes jeg, især med lyden og blæsten
- Hvis jeg havde siddet med det alene var jeg nok gået mere rundt
- **Ja, jeg men jeg kender den ikke, det var nødvendigt for at finde ud af hvad spillet gik ud på**
- I forhold til objekterne gav det mening. Ja, i forhold til naturen. Jeg kunne godt lide det relaterede til at han var ensom med at han var alene i et light house. Naturen gav mening fordi den også var trist og ikke så glad.
- Ja det synes jeg. Bestemt, både delen med historien, men specielt radioen kunne man godt have brugt mere.
- Ja, fordi der var ting at finde. Alt har ikke et formål så jeg kunne finde små gems som jeg måske havde misset.
- Ja det synes jeg!
- Ja, det synes jeg. Nu var der behov for hints til en enkel ting. Det kunne have været nice, hvis hints lå andre steder i verden, så man blev tvunget rundt, for at finde svar.
- Meget fedt der også var andre ting at kigge på og peakede ens interesse
- Ja jeg havde håbet og tænkt der var mere at finde og udforske. Det var sjovt med ænder. Det var sjovt der var random ting, fed reward at få når man opdager dem.

- Det var sjovt med eastereggs, det gjorde jeg ville mere rundt og se om der var flere ting.
 - Ja det gjorde jeg
 - Jeg var imponeret over hvor stor en ø I havde fået lavet. Det var flot.
 - Fedt at udforske verden, fedt at andre ting på vejen
 - Måske lidt hvis der havde været flere ting man kunne se i horisonten og pejlemærker så havde det givet inticement til det. Man ville gerne finde ud af hvem det var der snakkede i radien.
 - Helt klart, det synes jeg
 - Jeg synes at jeg kom lidt omkring. Jeg synes verdenen var ret stor, men måske jeg ikke kan finde rundt.
 - Ja det syntes jeg, man får ikke helt et perspektiv af hvor stor den er.
- **How well do you think the theme "loneliness" was portrayed in the game?**
- I starten kunne jeg godt mærke jeg var helt alene men da der kom flere enemies blev jeg ikke ligeså ensom
 - Rigtig godt i forhold til stemmerne og radioen der prøver at hjælpe
 - Godt, En eller anden form for ide om at man ikke er alene
 - Fra en skala fra 1-10 så 3. Der var en gut som talte til en men som bare prøvede at give comfort.
 - En bedre måde at gøre det på havde været at ikke have en gut i radioen og hvis der ikke havde været andre i spillet (shadowpeople)
 - Jeg syntes det var portrayed godt, jeg havde svært ved at følge at de var en drøm, men det gik hurtigt op for mig at det var loniness og det var godt at man skulle skrive ordet til sidst.
 - Jeg syntes musikken gjorde meget for at få den følelse frem
 - Jeg kunne bestemt se det, fordi man var alene og man skulle selv klare det. Du føler dig alene med det du strøgler med. Det var mennesker uden ansigter så ikke dine venner
 - Bedste ved hele spillet er slutningen, ville gerne have kunne være mere med i den røde tråd hele vejen igennem storylinen
 - Naturen og monstrene viser det godt. Det er fedt at monstrene ikke har ansigter, fordi man ikke ligger mærke til nogle andre fordi man er så meget i sin egen bobbel.
 - Virkeligt godt, det gik hurtigt for mig at tappe ind i den følelse. Atmosfæren med vejret og environment gav meget til at det var den følelse man fik
 - Ja helt klart. Man hører ingen andre lyde en sine egne fodtrin så man føler sig helt alene. Det sætter virkelig fokus på at jeg er alene. Det at de er så kraftige sætter fokus på at jeg er helt alene på øen. De små historier undervejs gav også en ensom følelse.
 - Godt med hints til at vise det fx med minderne der kommer frem med at han bliver mobbet.
 - Portrætterte det godt at det var ude på en ø.
 - Det er lidt svært at svare på, specielt med længden af spillet. Det tager lidt længere tid at få en fornemmelse for karakteren og ensomhed. Men minder og spillet klarede det rigtig godt, på den tid det havde.
 - Det blev belyst okay, at hun var alene og at hun er helt alene i lighthouse - så på den måde forstod jeg det godt. Det virkede til at der havde været andre men der var kun hende og shadow monsters
 - Det blev portrayed ret godt, selvom det var som om det blev gjort tydeligt hvad personen følte, men det var ikke sådan at jeg også skulle føle det samme.
 - Helt fra start, man var alene, det var mørkt og det var trist

- Jeg syntes det var fedt at det ikke bare var en der sad alene inde på et værelse og at det var mere indirekte. Især i slutningen når man læser om det.
- Godt i forhold til at være alene og der er noget kontakt til nogle som bliver afbrudt og de der mønstre, så man føler sig lidt fucked. Det med at gå rundt og udforske synes jeg var mere hyggeligt og ikke noget jeg tænkte var fordi jeg var ensom. Det tog nok lidt fra temaet, fordi så gik jeg jo bare rundt og fucked omkring.
- Godt, lost og loneliness går hånd i hånd, så det gav den følelse og temaet giver det meget.
- Jeg kunne godt lide det, til at starte med tror jeg ikke at jeg forstod det. Men da spørgsmålet kom, gav det lidt mere mening da man jo igennem spillet var den følelse man kom nærmest.
- Med det samme man kom ind i spillet fik man fornemmelsen. Det med at man er alene om at finde alle tingene, det kan godt være der er en på radioen. Men de svarer ikke og man kan ikke komme i kontakt med folk.
- Det var ikke min første indskydelse, men jeg kunne godt se det bagefter. Jeg synes til at starte med at det bare var lidt uhyggeligt.
- Det faldt meget hurtigt til, også meget naturligt hvordan man bliver hintet til.
- Jeg syntes det var på en god måde, for der var ikke nogle andre. Det gav en følelse af at man var alene og det med lommelygten var godt så man følte ensomhed.
- **Did you have any thoughts about the text memories you encountered during the game or the enemies?**
 - Minderne var 100% med til at fremkalde følelse af ensomhed og med radioen som prøver at reach out til ham.
 - De var sørgelige og ændringer kunne være at teksten forsvandt mens han talte videre. Der var overlap i lyd, fordi han måtte spille spillet 2 gange og overlappede første del.
 - Enemies er buggy og giver en mere depressed vibe end loneliness.
 - Jeg syntes det var lidt svært især når teksten kørte samtidig med lyden. Kan ikke huske hvad der stod eller blev sagt nu.
 - Det var godt, det var noget af det hvor man får en følelse og kan fornemme det tunge. Det var ikke overgjort, det var ret godt ramt.
 - Jeg kunne godt lide storyline og at man kunne følge med i det på den måde.
 - Tydelige objekter, meget tydeligt man skulle noget med memories.
 - Det gav god mening med historien, men havde været godt med at teksten passede til lydens hastighed.
 - Fjenderne forvirrede lidt i starten, sidste scene forvirrende (opslugt af ensomheden eller hjælp på vej?).
 - Det forstærkede følelsen og man vidste der var baggrundshistorie. Det forstærkede ideen om den følelse man skulle have. Radioen indikerede der var nogle som prøvede at reach out til en.
 - Det var visuelt flot og dejligt der var text og at det blev sagt imens.
 - Forstod ikke det med bogen men ellers var det godt.
 - Det kunne have været nice at gemme minder, så man kunne tilgå dem senere og andre steder i verden.
 - Det gav helt klart et depressing element i historien og byggede helt klart på den atmosfære der var i spillet og memories (skizofren).
 - Enemies er nok et symbol på at føle sig alene og angrebet. Minderne var gode til at hjælpe til at give noget historie men der var massere af plads til at man skulle tænke

selv. Man fik kun contexts af hans følelser og ikke hvem han var som hellere ikke var vigtigt.

- Jeg kunne godt lide budskabet i de små tekster, det gav en følelse af at jeg var mere alene. Tænkte ikke over fjender.
- Det var rart at det både var tekst og lyd da jeg var lidt forvirret
- Det gav noget historie. Det blev mere refleksivt. Jeg tænkte mere på karakteren end omgivelserne. Monstrene var lidt "argh" dør jeg nu eller? Passede de ind: både og. Jeg tror ikke helt at jeg forstod hvad de var. Om de var ensomheden eller mobningen? Måske de var de dårlige følelser - på den måde følte jeg at de passede meget godt ind. De gjorde det lidt mere skræmmende at være der.
- Ik sådan rigtigt, det var lidt irriterende at den spillede flere audio clip af gangen. Kan godt lide enemies ikke har en identitet, for at vise loneliness. Fedt at flashlight fik dem til at forsvinde
- Bogen virkede meget som en dagbog, brillerne tænker jeg var brillen der var blevet tabt. Skyggerne giver bedre mening efter man har spillet det og har fået temaet at vide. Men syntes det er fedt at de ikke bliver introduceret til at starte med, de kunne dog godt bruge en death animation
- Nogle gange forsvandt teksten, inden lyden var færdig med at spille. Nogle gange lyd uden tekst og det var svært at fornemme hvad de sagde.
- Jeg så ikke brillerne. Dem trampede jeg bare lidt over, men bogen gav mere mening. Jeg hørte/læste dog ikke rigtig hvad der stod jeg var mere koncentreret om omverdenen.
- Jeg syntes de var meget gode, også enemies der var hverken for meget eller for lidt
- Jeg kunne ikke helt finde ud af om det var noget der skulle til for at forstå spillet eller om det var karakteren.

• **How did the environment add to the overall mood and storytelling?**

- Tilpas dystert, vejret var dårligt og den mørke skov gav stemningen af at man var alene
- Passede perfekt til loneliness og skabe dysters og mørkt
- Regnen gjorde meget nævner også skov
- Virkelig godt, regnen var med til at gøre det virkelig moody
- Regn var hyggeligt. Det triste vejr tilføjer mere til depression end loneliness.
- Fik ikke følelsen af loneliness på noget tidspunkt. Vejret var meget fint.
- Syntes det var vildt stilet, og det var fedt at det var så tomt at der ikke var så mange andre informationer, der var et hus også gik jeg derhen.
- Meget effektivt, virkelig spot on
- Det var meget trist, det hjalp til følelsen af ensomhed og isolation
- Rigtigt godt, jeg kunne godt lide det, det stemte overens undtagen ændringerne, men de var vildt fede, og graven var med til at have det var gennemført
- I nailede den!! Hvis man er trist en dag så regner det altid den dag. Det var virkelig med til at sætte et mood.
- Vildt effektivt, både inde i fyrtårnet og at man kunne mærke at det regnede og blæste.
- Det at man er på en ø = man er midt ude i ingenting alene. Det hele føles forladt, man er faret vild i en skov. Det hele er en total isolation. Tanken om at man kan komme i nærheden af nogle strejfer ikke en. Man kan ikke komme hen til nogle og ingen kan komme hen til dig.
- Det gjorde noget rigtig godt. Det virkede koldt og mørkt. Der var kun kontakt med nødradioen, det gav også meget til at man var ensom, fordi der ikke var nogle andre.

- Ængstelig følelse, men meget sammensat. Meget godt! Også fordi det var ret ujævnt terræn som gjorde det spændende at udforske.
- Det tænkte jeg ikke så meget over men det var passende at det var nederen vejr som passer godt til det hele. Mørket og regnen var godt. En tættere skov kunne gøre det mere dystert.
- Vejret var meget deprimerende så man føler sig mere alene og trist.
- Jeg syntes det gad meget, og at man skulle bruge sin lommelygte og at det ikke bar var solskin.
- Ja, det synes jeg. Det med at det regnede og tordnede, var mørkt. Fik fornemmelse af et rough klima, barsk sted, hårdt sted. Elementerne fylder meget. Man er isoleret ude på en ø. Bidrog meget til at være isoleret. Det var mere fucket i forhold til kontakten til omverdenen. Havde man og drikke? Det blev lidt mere overlevelse.
- Virkelig godt, en form for norm med regn symboliserer at være alene. Det var godt man er alene på en ø og fremhævede følelsen af ensomhed.
- Det var fedt at det regnede. Og det var også fedt at der ikke var så meget andet, så det ikke blev uoverskueligt. Jeg kunne meget godt lide at det føles mørkt og passede gode ind i temaet.
- Mørke, skov og alene, det understøtter den fornemmelse og følelse
- Lidt mørk, men det tænker jeg er meningen? Lidt mørk og dystert. Lidt mere gyser agtig – de var lidt zombie agtigt.
- Passer perfekt til, ude på en lille ø det var godt.
- Jeg syntes det hjalp ret meget, også med farverne og musikken. En følelse af at man er ude i noget blæst, ikke et scary område. Men mere mysterie.
- **Is there anything about the environment that you thought helped or hindered the theme or the overall experience?**
 - Stemningen af hele skoven er dystert
 - Helt klart det mørke og at være alene hjalp. Intet forhindrede
 - Nej der er ikke noget der hindre
 - Det er dog et er en Ø hjalp en smule. Måske hvis der var en form for skib der ikke var sunket på horisonten som man kunne signalere til som ikke svare havde givet mere loneliness.
 - Jeg syntes det var godt at der var skilte og veje, selvom at det ikke bidrager til stemningen, men det gav mening og ødelagde ikke følelsen af stemningen.
 - Monstrene forhindrede, regnen var fedt.
 - Hele environment var medvirkende til oplevelsen. Især himlen, regnen og at man kunne explore rundt på øen.
 - Nej ikke umiddelbart.
 - Naturen.
 - Det var ikke noget der modarbejdede det synes de ikke.
 - I starten tænkte jeg "er det et gyserspil". Men så da jeg så dem anden gang så tænkte jeg at mine egne dæmoner kommer efter mig. Det at de er faceless gør at jeg tænker de bare er silhouter og at de ikke er farlige.
 - Igen det var koldt og mørkt hvilket gav en stærk følelse af at man var helt alene.
 - Nej jeg synes det passede meget godt. Jeg synes ikke der var noget der forhindrede, og det var fedt at ting så gamle og slidte ud. Jeg tænkte at bålet måtte jo være tændt af nogen, så det kunne være der var en anden weird karakter.
 - Det samme som før. Det er mørkt og dystert.

- Skiltet skulle vende mere så man fulgte stien til emency house.
- Jeg syntes det gav meget at der var dialog. Så det var fedt.
- Nej det tror jeg faktisk ikke. Andet end de der tekniske ting, som hvis jeg ikke lige hørte hvad der blev sagt eller jeg ikke vidste om jeg kunne klikke på noget. Men ellers ikke udover det, som jeg tænker er meningen (det vi selv godt ved ikke fungerer)
- Ikke umiddelbart, men med easter egg ville jeg gøre sværere at finde eller sætte dem længere væk. Man vidste ikke om ænderne havde en relevans for spillet.
- Jeg tror ikke jeg syntes at der var noget der forhindrede mig, det ene skilt mod emergencyHouse kunne godt pege mere mod emergencyhouse men det var godt de var der.
- Jeg synes det spillede meget godt med hinanden. Der var ikke noget som skilte sig ud.
- Umiddelbart passede de fleste ting til hinanden der var ikke umiddelbart noget jeg syntes ikke passede.
- Jeg syntes skiltene var gode til at guide mig frem og var på vej i den forkerte retning da et skilt redde mig. Men der var to skilte der pegede den samme vej (Habour og emergency house)
-
- **Lastly, is there anything you would like to add about the game or the test itself?**
- Konceptet og historien var meget veludført. Der var et par bugs, men det undgår man ikke ellers var det fedt. Fedt der både er lyd og tekst så man kan leve sig mere ind i historien og ikke læse.
- Cursor og skrive koden på kodeboks og hint til at man skal hen til skyggerne for at aktivere bog og briller. Troede man kunne interagere med generator stativet. Kan ikke se brillerne
- Flere koder ind inden det crasher – har spillet meget assassins creed og kan godt lide at gå
- I starten af spillet skal der være mere kontekst, forvirret omkring starten. En anden introprologue.
- Jeg tror det første jeg ville gøre, var at ændre musen og at det var meget sensitivt. Og det gjorde det lidt akavet.
- Skiltene pegede den forkerte vej, Fangede heller ikke at jeg var the missing person, havde været fedt hvis det var mere forståeligt.
- Nej, jeg var bare vild med storytelling og environment.
- Ville klikke på musen for at interagere, lommelygten fungerede også - lidt forvirring over funktionen
- Kunne være fedt at have oplevet mere på øen.
- Sensitivitet af kameraet var besværlig - måske fordi ikke pc spiller normalt, men bevægelsen var ellers nem. Spiller selv på switch mest. Easter-egg!!
- Picnickurvene teori er at der er noget med at der har været andre mennesker og måske kunne der være noget mere der var sket, noget romantisk eller lignende. Er det zombies, de vil føles meget malplaceret? Men længere inde tænkte hun at det var nogen der prøvede reach out
- Man kunne godt gøre øen større så man følte mere at man forladt i en skov på en øde ø. I har virkelig naillet at give følelsen af ensomhed i et spil. Vildt!!
- Det var sjovt at sidde og løse opgaver og sjovt selv at sidde og explore.
- Kommer an på målgruppen, flere vejvisere – kunne godt glemme hvor man var. Mere tydelighed i skiltning.

- Jeg savnede lidt feedback på håndtag i skuret, og synes det var lidt weird at jeg ikke kunne bruge radioen i emergency
- Nej det tænker jeg ikke.
- Glad for jeg kom ned og testede – ville faktisk ikke men er glad for jeg gjorde det. (Den her skal lige høres igennem)
- Fedt spil og det var nemt. Usability var nemt fordi det kun var 6 taster, men musen var en bug, men sådan var det. Når man har skrevet den rigtige kode burde kodeboksen gik væk.
- Nej ikke rigtig. Jeg tror det er for folk der kan finde ud af at spille.
- Hm. Nej. Måske sådan.. Lidt nysgerrig på de der relationer. Måske nogle flere clues på dem og til bedstemoren, som vist også havde boet på øen. Sjovt at optrevle en historie lidt for lidt.
- Jeg synes det var lidt svært at gennemskue koden til døren, selvom jeg fandt ud af det hurtigt. Men undrer mig over om andre ville kunne finde den hurtigt.
- Nej det syntes jeg ikke, jeg syntes det er et fedt spil og kan godt lide budskabet, jeg gad godt have at det fortsatte, det stoppede lidt pludseligt. Som spiller completer man en ny task og her forsøgte man en task også virkede det nogle gange ikke.
- Jeg synes det var meget fedt.
- Jeg kan måske godt tænkte "hvad skal jeg nu?" måske flere hint om hvad man skal. Men jeg vader også bare lidt rundt.
- Nej det har jeg ikke.
- Jeg syntes radioen begyndte at sige noget med en regnjække men kunne ikke tage den. Det jeg syntes er vigtig for jer at vide er at jeg ikke spiller computer så jeg er meget styret af hvad der står og hvad jeg får at vide så når jeg får at vide at jeg skal finde diesel, så styrer jeg hårdt efter det.

C.8 SUS Data from the Final Unity Prototype

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