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Storytelling through interaction

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Storytelling through interaction

Interactivity is the cornerstone that differentiates videogames from other medias, such as movies and books. The objective of this thesis was to examine the ways interaction has been implemented into a story driven video game, and how different styles of interaction affect the player’s experience.

The objective of the thesis was achieved by first studying the concept of interactivity and the methods for building interactivity into video games. This knowledge was then applied to an ongoing videogame project called Juuret provided by the commissioner of the thesis, a game company FoxFail Creations. During this thesis one level was built in the Juuret game focusing on interactivity. The goal was to create a playable level that can be played from start to finish, that uses interactivity to provide the story of the game to the player, and to enhance the experience.

At the end of the thesis the level was tested with a small group using heuristic methods. The goal of the test was to examine, whether the methods of interaction were successful in the level, and did they affect the experience of the story and the game world. The results showed that the interaction methods themselves were successful, but without a complete level and graphics, they did not deliver the full effect of the story for the player. The results from the test and the information gathered during this thesis will be used to further develop the commissioner’s project.

Keywords: video game, game industry, design, interaction

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Timi Pahlstén

Tarinankerronta vuorovaikutuksen välityksellä

Vuorovaikutus ja interaktiivisuus ovat videopelien kulmakivi, jotka erottavat ne muusta mediasta, kuten kirjoista ja elokuvista. Tämän opinnäytetyön tarkoituksena oli tutkia, mitä vuorovaikutuksen menetelmiä videopeleissä on ja kuinka vuorovaikutusta voidaan käyttää videopelin tarinan kertomiseen ja välittämiseen pelaajalle.

Opinnäytetyön teoriaosassa tutkittiin mitä vuorovaikutus tarkoittaa videopeleissä ja kuinka se näkyy käytännössä videopelejä pelatessa. Tässä työssä käsiteltiin myös tarkemmin erilaisia käytännön menetelmiä, miten vuorovaikutusta voidaan videopeleihin rakentaa, kuten pelihahmon liikuttaminen ja pelimaailmaan vaikuttaminen pelihahmon välityksellä. Lisäksi tutkittiin, miten nämä vuorovaikutuksen metodit vaikuttavat videopelin tarinaan ja kuinka niillä voi pelaajan pelikokemusta parantaa ja syventää.

Opinnäytetyössä sovellettiin käsiteltyjä metodeja käytännössä opinnäytetyön toimeksiantajan FoxFail Creations- videopeliyrityksen kehitteillä olevaan Juuret-videopeliprojektiin. Opinnäytetyön aikana projektiin rakennettiin yksi taso Unity-pelimoottorilla keskittyen vuorovaikutuksen implementointiin. Tavoitteena oli luoda alusta loppuun pelattava kenttä, joka vuovaikutusta hyödyntäen välittää pelaajalle tietoa ja tarinaa pelimaailmasta.

Käytännön osuuden lopuksi kyseinen luotu kenttä testattiin pienellä ryhmällä heuristista metodia käyttäen. Testin tavoitteena oli selvittää, oliko vuorovaikutuksen elementit onnistuneet kentässä ja oliko niillä vaikutusta pelaajan kokemukseen pelin tarinasta ja pelimaailmasta. Testin tuloksia ja opinnäytetyön aikana kerättyä tietoa tullaan käyttämään toimeksiantajan peliprojektin jatkokehitykseen.

Asiasanat: Videopeli, peliteollisuus, suunnittelu, vuorovaikutus

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Glossary

Asset	Graphics, music, animations, and anything that makes up a game
Avatar	Representation of the player
C#	A programming language
Mechanic	Rule that dictates how a game or a player behaves
Placeholder	Temporary asset, which is used before replaced by final assets
Puzzle	A problem designed to test ingenuity and knowledge of the player
Unity	A game engine developed by Unity Technologies

1 Introduction

Interaction is a fundamental part of a video game experience, and separates it from all other media, like movies and books. Throughout the history of game development, interaction in video games has been executed in many ways depending on the style and genre of the game. Interactive storytelling has been studied in literature and research before (Smed et al. 2021), but my focus in this thesis is the interaction of the player and the physical game environment even closer and discuss how the interaction of the props and objects in the virtual world itself expresses the story and evokes feelings and thoughts in the player. The idea of an object in a video game simply as a container for narrative and story has not been discussed in detail before, so I will study how a story can be delivered to the player via interaction within the physical world of a video game. Finding and testing different ways of telling stories inside an interactive video game is useful not only to industry professionals, but also to independent game developers, whose resources are limited, and as such enhancing the user experience with simple but effective ways will allow them to make better games with less time and technical resources.

The purpose of this thesis is to examine the ways interaction has been implemented into a story driven video game, and how different styles of interaction affect the player’s experience. The thesis will answer the question: How does the player's interaction with a game environment tell a story? This knowledge will be applied into the development of a story driven game project Juuret by FoxFail Creations, an independent video game company located in Turku, Finland.

Juuret is a first-person adventure game set in a closed environment where the player’s task is to progress through the levels and experience the story through the environment and interaction. The game has multiple levels, but for this thesis only one will be used. Within the one level methods of interactive storytelling will be applied and tested.

The first part of the thesis examines the history of interaction of video games and how different methods have been used in other games that are similar to the game Juuret. This part of the thesis will also go through the concept of environmental storytelling, and what it means in the context of video games.

The second part of the thesis introduces the process of implementing the theory of interaction into the storytelling in Juuret. More specifically this part will discuss how the theory can be turned into practical mechanics and features with Unity game engine. Methods and technologies used in the development will be presented, and how they are used in the context of interaction in storytelling. Additionally, this part will evaluate the user experience (UX) of the developed level of the game to evaluate the design and technical choices within the context of interactive storytelling.

2 Interaction theory and methods

This thesis studies interactivity in a context of a video game that uses environmental storytelling. This chapter will present and discuss existing literature about the topic of interaction and interactive storytelling in order to better understand and utilize it in the practical part of this thesis.

2.1 Interaction

Smed et al. (2021, 8) define interaction as a reciprocal action, where entities' actions influence one another. In the context of video games, the player of the game can be seen as one entity, and the object of the player's action as another. Crawford (2013, 28) uses an example of conversation, where the user speaks to an entity that in return listens and responds. For example, a door in a virtual game world would be the object of the player's action, as the player turns the handle of the door, the door opens on its hinges in response, and the player passes through. Another example is a literal conversation between video game characters, where the player is able to choose between different dialogue options that their character then carries out.

In a video game interactivity means the players ability to interact with the game. In order for the player to interact in the game world, they have to assume a role inside the game. This role can either be avatar based or omnipresent. Avatar refers to a role inside the virtual game world, whilst omnipresent refers to the player being placed outside of the virtual game world. (Adams, 2013, 270)

The players' interaction can also be either exploratory or ontological. Exploratory meaning the player can navigate the virtual game world but cannot affect it. Ontological means the player can affect the events of the game inside the virtual world. (Ryan, 2006, pp. 107-116; Ryan, 2015, 162-164)

Crawford (2013, 37-41) also states three different degrees of interactivity. Speed determines the turnaround of the interaction. The faster the turnaround, the faster

and better the possibilities for interaction are, as the entities involved in the interaction can communicate faster with each other. Depth determines the human-likeness of the interaction. The more human-like, the deeper and less restrictive the interaction is, compared to a less human-like interaction. The third degree is choice, which has two-fold focus. The first is agency, which determines the functional significance of the interaction. The other is interactive range, which determines the perceived completeness, which refers to the number of choices with respect to the possibilities the interactor can imagine. Narrow interactive range means fewer interactive options to choose from, with the extreme case of there only being one choice. Wide interactive range means a wide variety of options, for example multiple different doors to choose one from to open and pass through.

2.2 The player

As stated in the earlier chapter, in order for the player to interact with a videogame, they need a role inside the game world in order to interact within it. This is usually an avatar, a character in the game world and a part of the game's story. It is possible for the player to control one or multiple characters depending on the game, but Adams (2013, pp.10-11) observes that avatar-based interaction is more common in an interactive digital storytelling system, whereas multi-present interaction not limited to one character is rare. The avatar-based interaction model is used for example in the game Prey (Arkane Studios, 2014). This chapter will focus on a single character, or avatar-based interaction, as the game Juuret only features one playable character and will discuss the game Juuret more in the practical part of the thesis.

Smed et al. (2021, 109-110) discuss the term onboarding, which means how the user of a software, in this case a video game, when starting out gets accustomed to using the software and learns its mechanics and underlying rules. In the context of storytelling this could be compared to learning to identify fictitious narratives and learning to understand the deeper meaning embedded in the story.

In order to immerse the player into the game, the player has to be familiar with the game world and their avatar character. The job of the game and the game designer is to introduce these elements to the player, as initially the player does not know anything about the game world, its rules or their character.

2.2.1 Agency

As previously mentioned, agency as part of interaction. Agency means the significance of the players choices and requires the choices available for the player to have observable and significant effect or outcome (Smed et al. 2021. 113). While it may be argued that agency requires multiple choices and an ability for the player to affect the story of the game, Murray (2004) states that agency can be achieved without the player having a direct ability to affect the story of the game. The player however still retains the sense of relevance and can be considered as a catalyst for the story. This is the case for many story-driven games, such as Thief: the dark project (Looking Glass Studios. 1998).

2.2.2 Experience of ownership

Ownership means the experience of the player taking responsibility for their actions in the game, thus creating the feeling of ownership over the choices they make as they are a direct result of their conscious actions, and the game acknowledges them. (Bernhaupt. 2015. 47).

This can mean anticipating the player’s actions they might do with the game mechanics and coming up with ways for the game to answer to these actions, so that the player feels that their independent choices and actions matter, even if it’s something small. It might be scripted and pre-designed by the game developer, but it feeds the experience of ownership of the player.

2.3 Environmental storytelling

Visual storytelling is the act of delivering a story or narrative through visual elements. Environmental storytelling is a more specific way of telling stories through the very environment the player is placed in. The information conveyed does not have to benefit the main character, though it should aim to echo the world at large (Smith & Worch. 2010).

In his article Game Design as Narrative Architecture, Henry Jenkins defines an enacted narrative. According to Jenkins (2004, 14) the concept of enacted narratives refers to how the “story itself may be structured around the character’s movement through space and the features of the environment may retard or accelerate that plot trajectory”. For example, in the game Dear Esther: Landmark edition (2017) the player simply moves through the game world as a narrator tells the story of the game to the player, while they are free to explore the world and make their own connections of the story to the world, they are seeing around them. Another example could be Portal (2007), which is technically a puzzle game, but a lot of the game's underlying story is told through the environment and by the player's exploration. In the game the levels are pristine and organized testing rooms, but from time to time the player is able to slip through the walls of the rooms into the crawl spaces of the facility, and discover writings of the “Ratman” about how the cake you were promised in the beginning of the game is a lie, there are whole areas behind the walls you might never see, and you might not be alone in the facility. The player is not required to go into the rooms but discovering them and making conclusions about the findings build the narrative of the game (Shepard, 2014).

Enacted narrative can also directly be translated to an interactive way a game tells a story. By requiring the player to move and navigate the game world, the game's story unravels by the player's interaction. By simply moving through an environment designed and constructed by the developer of the game, the player can experience a story told by the environment. These types of games have generated a term “walking simulator”, which refers to video games, of which a

most simple example is the player moving through the world of the game and experiencing the story, without interacting with the world in any more detail. Some walking simulators utilize interactable elements, like doors and items players can examine and collect. One of such games is Gone Home (Fullbright, 2013), where the player explores the main character's home, and experiences the story by collecting and reading notes, finding keys to locked doors for example. Jenkins in his article also calls for a wider view for a narrative, more specifically spatial exploration. Because of their spatial nature videogames can be narrative, as they allow the player to explore and act within the virtual, interactive game worlds that are able to evoke narratives and meaning by themselves.

Instead of simply guiding the player through a predefined story within the game, the player can themselves enrich the experience through interaction. By choosing to interact with their environment outside the obvious route offered to by the game, they can invoke deeper micro-narratives that tell the story of their own or add to the existing story of the game. For example, in a game Prey (Arkane Studios, 2014) the player is able to activate computers (Figure 1) in the game world and read the users emails that reveal more details about the game world, its characters and events. The player is not required to do so in every computer in the game world to advance the story, but the game gives this option to the player, and by their choice they can divert from the obvious narrative of the game to learn more about the story in the game.

This type of narrative is described as a “pull narrative” as the player pulls information from the game world themselves, instead of the game pushing the information onto them. (Pitzer, 2011)

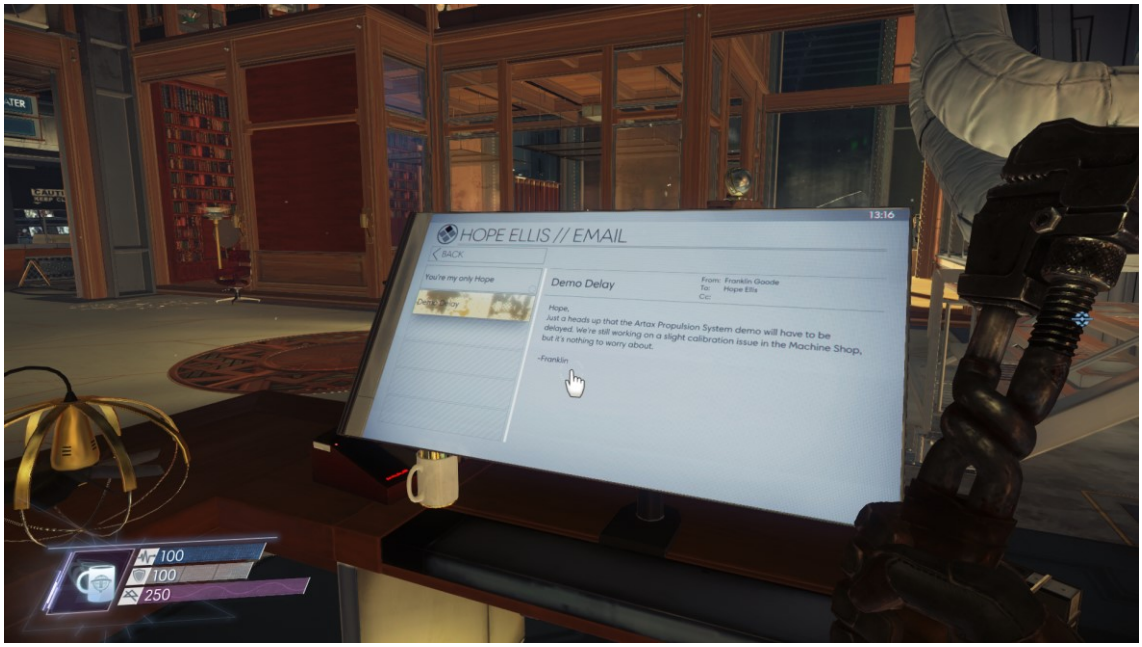

Figure 1. Prey computers (Arkane Studios, 2014).

2.3.1 Props

Regular objects, or props, are usable things that the player can use to advance the storyworld, and in traditional games, props usually have a specific purpose (Smed et al. 2021, 141). A prop can be a physical object the player interacts in one way or another. The player can pick the prop up and add it to their inventory or they can manipulate the prop by moving it around the game world, like a box they push to use as a step to reach higher areas. The prop can also be significant as itself for the story. This kind of object can be described as a Quest item (Smed et al. 2021, 143). It cannot be discarded by the player in any way, and it is required to advance the story of the game. For example, a locked door in a game could be opened by one unique, specific key.

Examinable props themselves tell a story within the game. By simply looking at the object, the player can create connections to put together a story in their own mind. For example, trying to answer what the object is, who it belongs to and why it can be found where it was found, the player can create a story for the object and deduct its significance in the game world. In a way this kind of object can be

considered as a Quest item, but it might not be necessary to interact with it to advance the story, and more reminiscent of the computers of the game Prey, that I discussed earlier. But compared to the computers, where more stories are revealed by reading the emails in the computer, in the case of the “examinable objects”, the story comes from the interaction and observation, rather than simply telling the story via text. This leaves room for the player's imagination and brings the player into the game world as an active investigator that creates the story in their mind as they go, instead of being a semi passive observer experiencing a straightforward story.

This kind of interpretation is much more compelling than exposition, because actively learning about the story and the world creates participation, which then creates investment. This way players create their own stories through interpretation, which makes the experience more personal for them. This also fuels the feeling of ownership. (Pitzer, 2011)

In order for the pieces of the story to be cohesive, the developer and designer of the game have to have a story of their own, that the game world and props tell. It is not enough to throw random things at the player and expect them to believe there is a story. The players need enough breadcrumbs to connect the dots.

2.4 The game world

Linear storyworld is the most used approach in including a story into a narrative, where the story progresses linearly, but the player has freedom in gameplay (Smed et al. 2021, 83). This means that every player experiences the same story every time they play through the game, but by integrating the story into the game world and design, the players actions and choices in gameplay seem to have effect in the story.

2.5 Scene and layouts

A scene is the environment where the story of the game takes place and they form the physical space of the game (Smed et al. 2021, 144). The scenes can be resembled by levels, chapters, or maps in the game. Adams (2014, 445-449) defines six different layouts for the physical scenes: Open, linear, parallel, ring, network and hub-and-spoke.

The linear, parallel, and network layouts (Figure 2.) will be discussed, as they are more prominent for the game Juuret and I will use them in the practical section.

In the linear layout the player experiences the game areas in a specific order and can only go to the next or earlier areas. In the parallel layout the game areas divert into different paths, but ultimately lead to the same final area. In the networked layout the areas of the game are intertwined, and the player can access multiple areas from one area and the player can explore the areas freely.

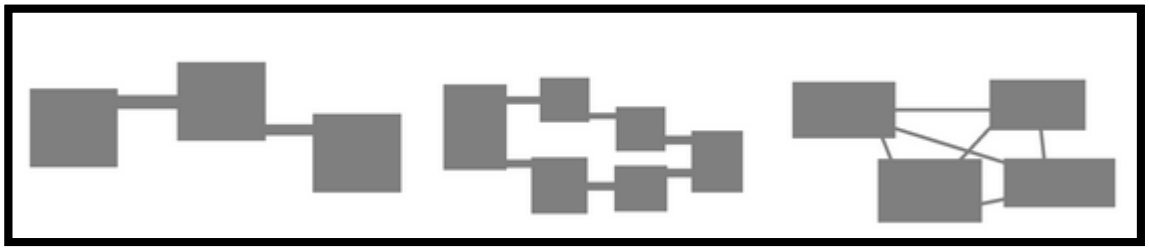

Figure 2. Linear layout, parallel layout and networked layout.

3 Execution in the game Juuret

This practical part will present the game Juuret and discuss the created level to be used in this thesis. It will explain and demonstrate the technologies used to create the level, as well as how previously discussed theory ties into the design and development of the level.

3.1 Juuret

3.1.1 Synopsis

Juuret is a walking simulator type game in development by FoxFail Creations. In the game the player explores an apartment building floor by floor climbing upwards, and by exploring and investigating unravels and experiences the story world around them.

3.1.2 Story

A predefined story exists for the Juuret game, which will unravel as the player proceeds through the game, but it is not directly told to the player, but instead told through the environment and players interaction as discussed in the theory section previously. In the story of the game, the world is being overwhelmed by natural disasters, and nature has taken over cities and infrastructure. The player is a scientist left behind in an unnamed city to find a solution for the problem as the other population has been evacuated out of the city. Ultimately interpreting the clues and environments to form a story is up to the player.

3.1.3 Gameplay

The gameplay of Juuret revolves around the player navigating the levels and proceeding to the next ones. In the levels there are light puzzles for the player to

solve, like finding a key to a locked door, but mostly the levels are built to tell the story of the game. The player is able to pick up items and examine more closely items that have narrative value.

3.1.4 The Game World

The complete game consists of four separate levels, but this thesis will focus on the first one. The level consists of five different rooms in a linear layout. Placeholder assets were used to fill out the room to more represent the final result. Placeholder assets were also used to represent interactable objects. (Figure 3, Figure 4).

The player starts from an underground tunnel and proceeds through the hallways and rooms to the laboratory room (Figure 5), where there are several interactable objects, and an examinable object with narrative value. In the second to last room, or the lounge room (Figure 6), there is a small puzzle for the player to solve. The door to the next area is locked, and the key is hidden in the lounge room, and the player needs to interact with the environment to find clues for the whereabouts of the key. When the player unlocks the door and proceeds to the next area, the level is finished.

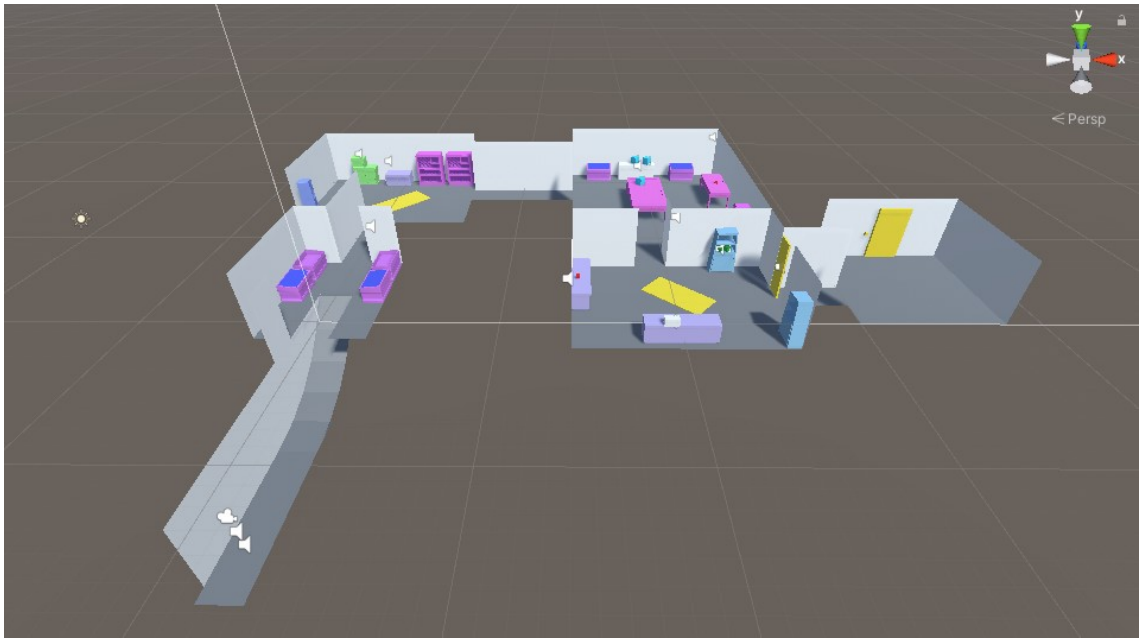

Figure 3. The level as seen in the Unity editor.

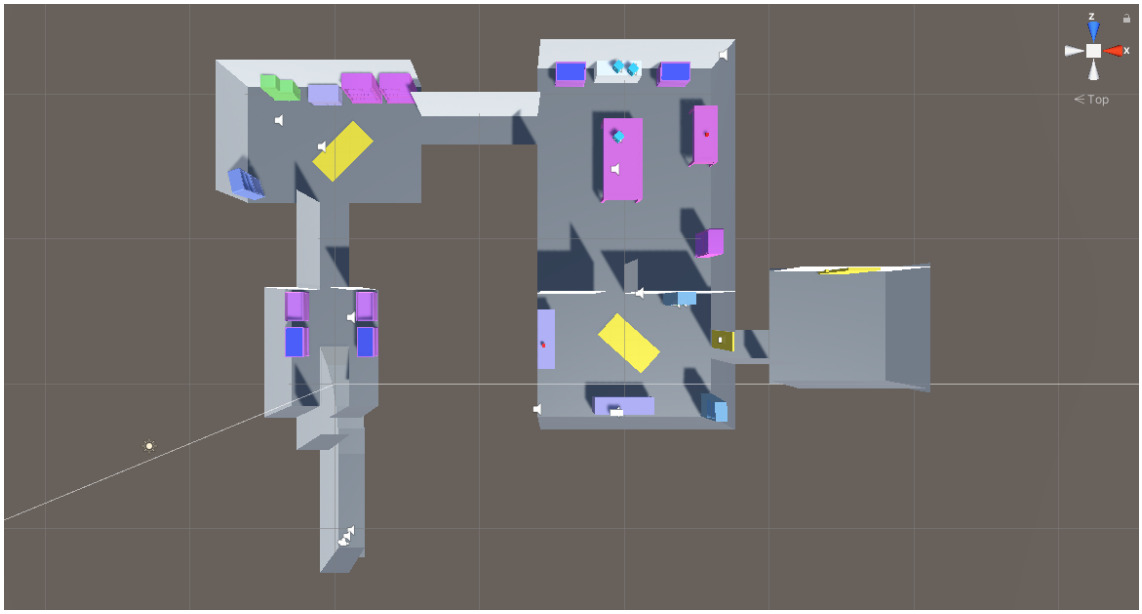

Figure 4. Top view of the level.

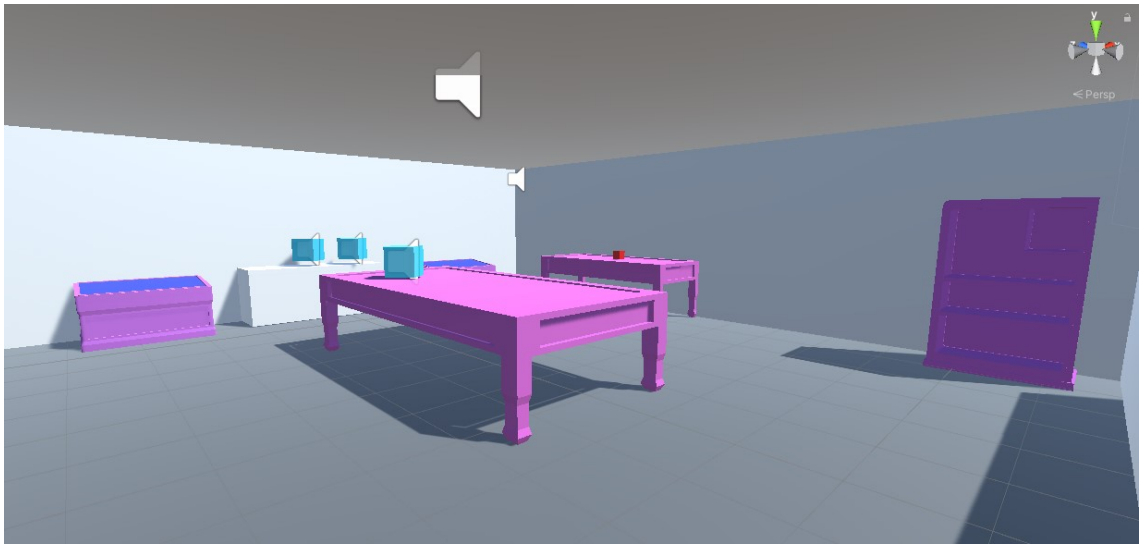

Figure 5. Laboratory.

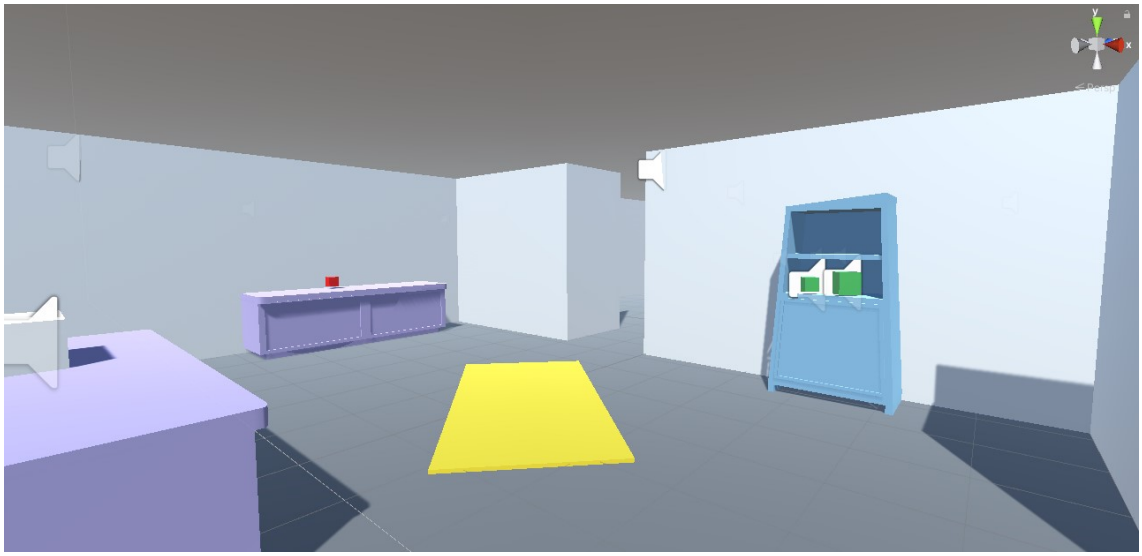

Figure 6. Lounge room.

The level has objects the player can pick up and move around. They don’t have purpose for the progression of the game, but they do make the environment feel more alive, as it responds to the player's input, by allowing them to move objects, thus creating a feeling of ownership over the character and the environment.

Some objects the player needs to move in order to proceed. For example, in the very beginning, the player needs to move objects out of their way to climb out of

the tunnel, creating a feeling that the player character has maybe been stuck underground, or they have been buried there. The point is to create a feeling of isolation and make the player work in order to escape.

3.2 Technologies

Unity game engine was used to develop the level. Only primitive assets and some placeholder assets were used that were already being used for the project. The level wasn't made too complete with final assets to keep the focus mainly on the interactivity and how it affects game experience.

The Unity game engine uses C# programming language. Some of the code used will be presented in this thesis to thoroughly show how the interaction system works.

3.3 Environmental storytelling in Juuret

The focus of the thesis was on the interaction and storytelling, but in order for the interaction to tell a story, the object of interaction has to have a meaning that the player associated with something already existing, like the game world for them to actually form some kind of story around it. This is where environmental storytelling comes to play. This thesis won't discuss too deeply about the practical creation of the visual environment in the game, but will instead discuss the objects of interaction and how by interacting with them the player creates a story around them. For example, one of the first interactions in the level happens when the player moves rocks out of their way. By themselves they are just rocks, but by allowing the player to move them, they gain meaning." Why are they here and why do I have to move them?". The same applies to all interactable objects in the level. Some are there just to make the world more believable and immersive, but some have great narrative significance. In the laboratory room there is a syringe that the player can pick up and rotate. This way the player can examine it more closely, and at the same time the game tells the player that the syringe is

somehow meaningful for the story, but the question how it is, is left to the player. In the final room of the level there are several interactable objects, but the meaningful ones are the objects related to the puzzle that the player has to solve in order to proceed. The locked door has a note stuck to it with a hint to the location of the key, but the note is turned around and the hint is only visible when the note is examined and rotated by the player. This again tells the player that the information is relevant for them, but it also opens possible narrative questions about why the player is locked in a laboratory behind a locked door, and why and who has left the note for them to find.

By telling less and showing more the game essentially asks the player what they think about what they are seeing, and in sense this way gives more to the player than just outright telling what is happening around them

3.4 Implementing interaction

As stated in the theory part, the player needs an avatar in order to interact with the environment (Adams, 2013, 270), so I started by creating a simple first-person character controller (Program 2). First-person perspective was chosen, in which the player experiences the game through their avatar's eyes, as it is more immersive than a third person perspective, in which the player sees their avatar from behind (Denisova, 2015). This is important, because the game is otherwise very simplistic, and the main way of interaction for the player happens through their avatar, so experiencing everything through first person perspective is a natural choice to immerse the player into the game world. The player can move the character with keyboard buttons and rotate the camera with the mouse (Program 1). This is the conversation between player and the game, the player interacts with the game via controls, and the game responds by moving the character accordingly.

This is the base for the interaction in the game and the bare minimum for the player to be immersed in the world and take a role in it. Now the player is able to interact with the game and simply with these controls they could explore the level

and experience the story, but to take the immersion and interaction further, a script for a grabbing system was created. With it the player can pick up and carry objects in the game world. This way the player can interact with the game world through their character and affect the environment around them, as one could do in the real world.

Program 1. Script used for the camera controls

```
public class MouseLook : MonoBehaviour
{

    public float mouseSpeed = 100f;

    public Transform playerBody;
    float xRotation = 0f;


    void Start()
    {
        Cursor.lockState = CursorLockMode.Locked;
    }

    void Update()
    {

        float mouseX = Input.GetAxisRaw("Mouse X") * mouseSpeed * Time.deltaTime;
        float mouseY = Input.GetAxisRaw("Mouse Y") * mouseSpeed * Time.deltaTime;

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

        transform.localRotation = Quaternion.Euler(xRotation, 0f, 0f);
        playerBody.Rotate(Vector3.up * mouseX);
    }

    public void AdjustMouseSpeed(float newmouseSpeed)
    {
        mouseSpeed = newmouseSpeed;
    }
}
```

Program 2. Script for the character movement controls

```
public class Movement : MonoBehaviour
{
     //variables
     public CharacterController controller;

    public float runSpeed;
    public float speed;
    public float gravity = -9.81f;

    public Transform groundCheck;
    public float groundDistance = 0.4f;
    public LayerMask groundMask;

    Vector3 velocity;
    bool isGrounded;

    void Start()
    {
        controller = GetComponent<CharacterController>();
    }

    void Update()
    {
        //Determine when player us touching ground
        isGrounded = Physics.CheckSphere(groundCheck.position, groundDistance,
groundMask);
        // apply gravity
        if (isGrounded && velocity.y < 0)
        {
            velocity.y = -2f;
        }
        //apply movement
        float x = Input.GetAxis("Horizontal");
        float z = Input.GetAxis("Vertical");

        Vector3 move = transform.right * x + transform.forward * z;

        controller.Move(move * speed * Time.deltaTime);

        velocity.y += gravity * Time.deltaTime;

        controller.Move(velocity * Time.deltaTime);

        //Running
        if (Input.GetKey(KeyCode.W))
        {
            if (Input.GetKey(KeyCode.LeftShift))
            {
                speed = 3;
            }
            else
            {
                speed = 2;
            }
        }
    }
}
```

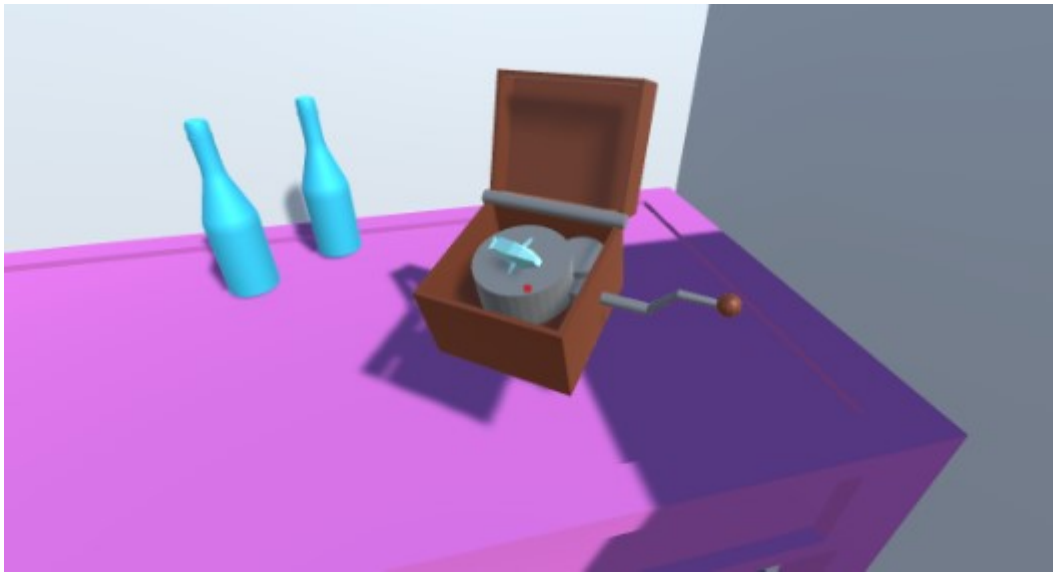

Figure 7. Player holding up and examining a music box

In addition to the basic movement mechanics, an examination mechanic was created. With this the player can hold up and rotate various objects to examine them more closely (Figure 7).

Finally, a simple script was created to change the crosshair color when the player is aiming at an interactive object to tell them that said object is in fact interactable. This one of the few UI elements in the game, as the focus is on the environment and pure interaction. The player doesn't have any statistics like health that would be displayed as an UI element. The crosshair element is a non-diegetic element, as it doesn't exist in the game story nor in the game space (Bowers). The only purpose of this crosshair is to help the player aim at objects they want to interact with and tell them whether they actually can interact with it.

With the basic movement the player can traverse the game world and with the interaction and examination mechanics they can explore the world in more detail. Combined with the environment itself, the player can now experience the story and immerse themselves in the world.

3.5 Testing

Now that the level has all the elements in it and is playable from start to finish with set mechanics, the user experience will be tested. More accurately it will be tested whether the interaction mechanics have been successful to allow the player to explore the level. The goal of the test was to determine whether the interaction enhances the experience and the immersion. Heuristic methods will be used to evaluate the level.

3.5.1 Setup for testing

Heuristic Framework for Evaluating User Experience in Games from Bernhaupts (2015) book was used to create a small evaluating table (Table 1) to test the user experience of the player after they have finished the level. The table from the book consists of 12 different categories each with multiple elements of a video game, but only the ones that are related to the interaction and story of the game were used.

For the test, a small group of people was chosen to test the game. The testers had either none or minimal prior knowledge about the Juuret game project. The group was kept small to keep the testing easy and quick but also to have manageable data that would be easy to process in this thesis within reasonable time. Also, as the story and the puzzles are key to this test, it wasn’t viable for any of the testers to have too much knowledge about the story or how to solve the level beforehand.

Table 1. Evaluating table

O1	*Interaction*	Score
1.1	Input methods are easy to manage and have an appropriate level of sensitivity and responsiveness	
1.2	The first player action is obvious and results in immediate positive feedback	
02	*Story*	
2.1	The meaningful game story supports the game play and is discovered as part of the game play	
2.2	The game emotionally transports the player into a level of personal involvement (e.g. scare, threat, thrill, reward, punishment)	
03	*Control*	
3.1	The player feels that she is in control. That includes the control over the character as well as the impact onto the game world. It is clear what's happening in the game	
3.2	The player can impact the game world and make changes	
3.3	he game mechanics feel natural and have correct weight and momentum. Furthermore, they are appropriate for the situation the player is facing	
04	*Feedback*	
4.1	The acoustic and visual effects arouse interest and provide meaningful feedback at the right time	
4.2	Feedback creates a challenging and exciting interaction and involves the player by creating emotions	
4.3	The feedback is given immediately to the player's action	
4.4	The player is able to identify game elements such as avatars, enemies, obstacles, power ups, threats or opportunities (orthogonal unit differentiation)	
05	Visual appearance	
5.1	The objects look like what they are for (affordance)	
06	*Menu and interface elements (HUD)*	
6.1	Relevant information is displayed, and the critical information stands out. Irrelevant information is left out. The user is provided enough information to recognize her status and to make proper decisions	

The playable level was sent to the testers along with the evaluating table. The testers were instructed to play the level on their own time, and immediately fill in the table according to their experience with the level. After the testers played the level and filled in the table, they sent the table back for evaluation.

Additionally, the testers were asked outside of the heuristic test how they interpreted the story of the game to be about to see if the intractable objects, clues and the environments are adequate to deliver the story of the game.

3.5.2 Results of the test

After all the answers were received from the testers, the results were gathered in one Excel document (Table 2) and calculated the average points for each tested element.

Table 2. Results from testing with average score.

	Tester 1	Tester 2	Tester 3	Avg.
1.1	3	4	4	3,666666667
1.2	5	4	5	4,666666667
2.1	1	2	1	1,333333333
2.2	1	2	2	1,666666667
3.1	5	4	5	4,666666667
3.2	5	3	2	3,333333333
3.3	4	4	3	3,666666667
4.1	5	3	2	3,333333333
4.2	1	3	3	2,333333333
4.3	5	4	5	4,666666667
5.1	1	4	5	3,333333333
6.1	5	3	4	4

The results were quite mediocre across the board, but the highest scores in average were given to the elements 1.2, 3.1 and 4.3 which were all scored above 4 out of 5 in average. The lowest scores were given to 2.1 and 2.2, which both were scored in average below 2 out of 5.

The answers to the open question about the story of the game were mostly in line with the designed story for the level.

4 Discussion

This thesis examined interaction in videogames and how it can be used to tell a story. The thesis discussed the role of the player and the design of the video game itself while presenting existing methods of interaction and how they have been used in already existing games. By researching and examining the element of interaction, this thesis aimed to answer how interaction tells a story while using the Juuret video game as template to exercise the interaction methods in practice and ultimately test them with a human player test.

The test results showed that the interaction elements themselves worked well in the Juuret game test level, and that they were immersive and easy to use. However, the testers scored the story elements poorly. This might be due to the development state of the level, and as such couldn't deliver the best possible experience in terms of the story. While the interaction element of the level worked well, it still requires the audiovisual elements to support the immersion and the world around the player to fully deliver the experience. Interaction in itself is not capable of telling a story and requires something that the player can associate the interaction with. Also, the level was quite short, and only part of the story of the game and the full experience. In itself the level couldn't deliver the story, but perhaps with the rest of the levels providing enough context, the story elements could have been received better.

Despite the story elements receiving poor scores, the testers more or less understood the basic premise of the level and their objective. The answers to the question about the story of the level were mostly in line with the official scripted story of the level. So even though the quality of the story elements was not too great, they did their job, and the testers understood the basic idea of the story. According to the test results, however, the quality of the different story elements, like items the player can examine, could be designed better to support the story and the premise.

The testing group was quite small, only three people, so the results are not as reliable as they would be if tested with a larger group. It is possible that three

people won’t represent all player types as everyone plays games a bit differently and sees the games differently. It is possible that the testing group might miss or disregard some elements in the game, or their subjective experiences and opinions might affect how they score the elements of the game. However, the results from the test conducted during this thesis are directive towards the bigger problems of the tested game. The results of this test can be used to create a more effective test to be conducted in the future with a larger group.

The results of the test can be used for further testing in later stages of the development of the Juuret game. As the interaction elements were scored well, the later test of the effects of interaction could be done with more finished level with final assets and audiovisual elements. Also, an A/B test could be done with two variations of the final version of the level. An A/B test is used to test two different versions of a single variant, in this case the game level, and determine which version is better. The tester wouldn’t be aware of the other version. The other version of the level would have the interaction elements, and the other would have none or limited interaction elements, and it could be tested whether the interaction elements enhance the experience.

The results of the test were that interaction methods can be immersive and positively affect the game experience, but only with proper context and support from audiovisual elements they can enhance the story of the game.

5 Conclusion

The goal of this thesis was to examine the ways of interaction video games, and how they affect the player experience. Additionally, an objective in thesis was to apply knowledge about interaction to the video game project Juuret provided by the commissioner and test the methods of interaction in the Juuret game.

The goals of the thesis were achieved by examining earlier literature about interaction and investigating how existing video games utilize interaction. The information discussed was useful for the development of the Juuret game, as they provided new methods of enhancing and developing the interaction elements in videogames, and how they contribute to the story.

While the final test with the Juuret game was not as successful as hoped, it was a great starting point for further testing and was helpful for the development of the Juuret game. During the testing, it came clear, that frequent and detailed testing is crucial for the player experience. This way the intention of interaction and the story stays consistent and is conveyed properly to the player.

The thesis and the test provided useful data and information for the commissioner to further develop Juuret, while giving them a good foundation for further, more detailed testing.

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