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Open World Navigation and the Effects of Diegetic Elements in Video Games

Master's thesis in Interaction Design

Supervisor: Mariusz Nowostawski

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Abstract

This project investigated the impact that diegetic elements in video games have on the player's level of immersion. In order to gain a better understanding of player habits, preferences and their perception of the term immersion, a questionnaire was created and distributed to 102 participants. Furthermore, a playtest experiment studying the effects of diegetic elements with and without onboarding was conducted. The results from the questionnaire showed a variety of different perceptions among participants with regards to immersion, along with motivational factors pertaining to engaging in side activities and voluntary exploration in video games. While the results of the playtest experiment can not be considered conclusive due to a low number of participants, there are indications that certain factors, such as clarity, efficiency and immersion, are affected by diegetic elements to various degrees. The data collected in the study and future data collected hold potential with regards to future studies within the field.

Sammen drag

Dette prosjektet undersøkte i hvilken grad diegetiske elementer påvirker en spiller's innlevelse (immersion). En spørreundersøkelse ble satt opp og distribuert til 102 deltakere for å bedre kunne forstå spilleres vaner, preferanser og deres oppfatning av innlevelse (immersion). I tillegg ble det utført et spilltest-eksperiment med et mål om å undersøke effektene av diegetiske elementer med og uten opplæring hos deltakerene. Resultatene fra spørreundersøkelsen viser en mengde forskjellige oppfatninger blant deltakerne med tanke på innlevelse (immersion), samt ved motivasjonsfaktorer knyttet til sekundæraktiviteter og frivilling utforskning i spill. Resultatene fra spilltest-eksperimentet kan ikke anses som konklusive grunnet et lavt antall deltakere. Likevel kan resultatene indikere at enkelte faktorer som innlevelse (immersion), klarhet og effektivitet blir påvirket i varierende grad diegetiske elementer. Dette kan potensielt være nyttige data ved valg av fremtidige studier innenfor dette feltet.

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Chapter 1

Introduction

Technology in game development is advancing at a rapid pace, which in turn affect the games themselves and all of the elements within them. Where at an earlier point in time, games were limited to levels of relatively small sizes, game developers are now able to create massive, rich, open world representations of ancient Greece, fictitious reimaginings of actual modern cities or futuristic, post-apocalyptic wastelands. Since the games and their mechanics, along with the game worlds we play in and explore explode in size and become more diverse, there is a need to communicate more information than previously to the player and the game worlds also become increasingly complex to navigate through. As such, more and more developers have looked to technologies such as the traditional destination plotting and GPS paths to make navigation less troublesome and more automated. HUDs in video games, however, have seen little development since the over the years other than in terms of visual fidelity. “Immersive experience” is a word that has become a common phrase in various showcases and presentations where upcoming games are revealed to the public. A question at this point would be how these relatively modern solutions affect the player when translated into a game and seen in the context of, for instance, a 19th century wild west epic. Do these elements, extraordinary to the game world in and of itself, have an effect on the players’ level of immersion in any way? Have they perhaps become so conventional within the realm of video games that we are able to separate them from the content of the game itself and think nothing of them? Are they so common at this point that we, as players, just choose to accept them? There are numerous different ways to approach HUDs in video games, and due to the reasons mentioned above, has become an increasingly important factor in game design and development. The purpose of this thesis is to study the effects of diegetic elements in video games. Do these types of elements affect the player’s experience, level of immersion and efficiency, and are the elements themselves perceived differently based on the player’s level of experience?

1.1 Diegetic Elements in Video Games

Diegesis is a term originating from ancient Greek stageplays and is used to describe a certain type of narrative approach. When we refer to diegetic elements in a video game, we speak of elements that are natural to the game world itself, belong in the world of the game's characters and do not break the fourth wall (Peacocke, Teather, Carette, MacKenzie and McArthur 2018). The purpose of diegetic elements is to improve the player's level of immersion by utilizing few or no elements that break the fourth wall while the player is playing the game. A particular space in video games where this has been attempted with relative success, but not necessarily seen widespread use, is within the design of the head-up display (or HUD). In most games, the user interface is a crucial mediator of information between the game's various systems and the player. A basic game loop may appear like this:

1. The player decides on an action they seek to perform in the game and executes the related input
2. The game takes the player's input and translates this into an action
3. The result of the action is given to the player as auditory, tactile and/or visual feedback
4. The player decides their next action.

The visual feedback given is often through animations and other visual effects seen on the player's screen, but say, for instance, that the player's action causes them to lose a portion of their health the game. This requires additional information to be communicated to the player, such as their total amount of health and their current amount of health. This is often represented by using two- or three-dimensional HUD elements such as health bars or the classic red hearts. Elements like these are referred to as "extra-diegetic", as they are not something that exists within the world of the game, but rather just to communicate certain types of information to the player. On the other hand, we have video games like *Dead Space*, where the player's health and ability meter is directly implemented as physical objects on the suit of the game's protagonist. In addition, the menus in the game are projections made by the protagonist's suit. As such, they are elements which exist in and belong to the protagonist character's world. These elements are therefore considered to be *intra-diegetic*, or simply *diegetic*.

1.2 Keywords

- Open world video games
- Diegesis
- Wayfinding
- Immersion
- Player efficiency

- User interface
- HUD
- Player preferences & values

1.3 Motivation, Justification and Benefits

Diegetic methods and elements can be applied in various ways in video games. In terms of wayfinding, one could, for instance, give the player clues through dialogue, make use of road signs that exist in the actual game world itself, or as seen in a more recent example like *Ghost of Tsushima*, use a wind effect to guide the player in the general direction of the objective. One must also take the game's themes and setting into consideration when developing such a system, with the goal of diegetic elements to create a more immersive experience. Additionally, as it is with all types of services that have an end-user, the user's level of skill is an important factor in deciding what types of information to display, as well as when to display it. An article on the removal of HUD elements from 2015 found that some HUD elements were useful to players of lower skill levels while being more distracting for players of higher levels, and that immersion could indeed be improved by creating a HUD with less information (Iacovides et al. 2015).

Some previous studies have been performed, specifically with regards to diegetic HUD elements and player performance, in relation to various approaches to displaying and communicating information to the player (Peacocke, Teather, Carette, MacKenzie and McArthur 2018). Other studies in recent years have focused on the effects of extra- and intra-diegetic HUDs in virtual reality (VR). This may be due to the fact that some VR guidelines urged developers not to apply HUD elements with constant positions in their applications, as this could be a cause of motion sickness. A recent study, however, states that VR headsets have improved to a point where this is not necessarily an issue anymore, but that their subjects showed an appreciation for intra-diegetic HUD elements (Salomoni et al. 2017). With regards to 2D platforming games, a study from 2018 attempted to measure whether intra- and extra-diegetic had any impact on level of immersion. It is important to note that the authors concluded that their results could not be applied to any other genre of games, the results showed that, in some cases, players experienced a higher level of immersion when playing with extra-diegetic HUD elements (Pfister and Ghellal 2018).

Studies with regards to HUDs in relation to level of immersion have, as stated, been performed, some with a focus on basic wayfinding and simple navigational tasks. The purpose of this thesis is, again, to explore various impacts that diegetic elements might have on players. Some players might value the efficiency and straightforwardness of a generated path, while others may enjoy more organic approaches which in turn lead to game world exploration and discovery. The aim is to provide the game designers and developers with

insights into how they can apply diegetic elements and in what context they can or should be used in order to best serve the players' needs.

1.4 Research Questions

1. Do players have different perceptions of a diegetic element based on their experience and familiarity with it?
2. Do diegetic elements have an effect on the player's level of immersion?
 - a. Does it lead to a higher or lower level of immersion?
3. What effect on the player's efficiency do diegetic elements have?

1.5 Project Contributions

Through testing the wayfinding system in *Ghost of Tsushima* on players with various levels of on-boarding and familiarity with the system I obtained data pointing how a diegetic element like this one is perceived by the different types of players. This would include each player's general experience with the system, their level of immersion and how important this is to the player as well as their efficiency in performing the navigational task. This data can then, in turn, be used as guidelines for game developers and designers in being aware of the effects that some diegetic elements may have on players, and how various levels of experience may have an impact on how the elements they are creating may be perceived by the players themselves.

Chapter 2

Background

Head-up displays (HUDs) in video games consist of user interface elements which communicate information to the player. These elements usually take the form of numbers, bars, shapes and text that are situated on the lens of the game's virtual camera. The purpose of the HUD in a video game is an important one. It is, after all, the main channel that the developers and designers use to relay information of varying importance to the player. In many video games, hectic gameplay situations are commonplace, and it is therefore that the HUD is designed in such a fashion that it is able to communicate with the player without causing distractions that might impact the player's performance. Many modern HUDs are also dynamic, which is to say that some information, while available, is not necessarily displayed at all times because there simply is no need for it to be. The information displayed will most often depend on the context of the current gameplay situation.

2.1 The Evolutions of HUDs in Video Games

Early video games were less complex in terms of gameplay, mechanics and visuals. They can be considered to be of a much more simple nature than most modern video games, and the quantity of information displayed to the player much lower. While the amount of information that needs to be displayed to the player has increased, the information is not necessarily critical at all times during gameplay. A study on the effects of the amount of HUD information has on players was performed in 2019. The researchers found that while players new to a certain game may benefit from having a larger amount of information available in the beginning, more experienced players found a large amount of information on the HUD to be detrimental to their overall gameplay experience (Agius and Daylamani-Zad 2019). In addition, modern video games tend to display various types of information through the HUD in order to make them more accessible and appealing to a larger base of players.

Initially, performance in most games were measured either through a score

represented by a numeric value, or by the player's progression through the levels of the game. Think, for instance, of the game *Pong* released as an arcade machine by Atari in 1972 and later on home consoles. It is essentially a digitized game of tennis between either two players or the player against the computer. The player is, in this case, able to see the entire game world on this one screen because the entire game world is a single 2D, digital representation of a tennis court seen from a top-down perspective. The goal of the game is to win against the opponent, and the only metric needed to measure this is each participant's score. As such, the only HUD elements present is the score at the top of the screen.

As the technology of games and home consoles evolved, the games became slightly more complex and other elements needed to be added to the HUD to keep the player sufficiently informed during gameplay. This can be seen in earlier games from, for instance, the *Mega Man* or *The Legend of Zelda* franchises. These, among other games, introduced the concepts of player health along with secondary items and weapons for the player to utilize in various situations throughout the games. Many of these types of games would still use a numeric value to display the player's score, but they also utilized the HUD to display the aforementioned elements. The player's health element was, and still is today, often represented by a colored bar or icons shaped like red hearts which would deplete as the player took damage in the game. Both of these franchises had their first entries released during the 1980s, and game technology has become increasingly advanced since then. Many of these types of HUD elements can still be seen within the most current games of these franchises as they have stood the test of time and are considered by many to be conventions at this point.

Today, the complexity of games have the potential to be limitless. As mentioned in the introduction, it is not only the systems and gameplay mechanics of modern games that have become increasingly complex, but their game worlds as well. The need to relay contextually important information to the player is more important than ever.

2.2 Common Elements of a modern Video Game HUD

HUDs in games today are being used in a plethora of ways to communicate all sorts of information as each game with its own unique design calls for different ways of communicating this to the player. While some games have been made more accessible to players, many games still require great skill and control accuracy to succeed. HUDs are therefore now more important than ever. A poorly designed HUD might bombard the player with an amount of information much larger in quantity than what is necessary. Games within the open world genre, for instance, usually have all the regular information displayed related to the player's character such as health, stamina and ammunition readily available on the HUD. These games tend to have a sizable amount of side activities in

the game's world as well, and it is common to utilize HUD elements in various ways to make the player aware of these. This could, for instance, be some type of notification pop-up when the player's character is within a certain range of an activity. The way that the information is displayed on the HUD often differs in terms of aesthetics in order for it to serve the game's theme and art style in a meaningful way. An analysis based on various computer games found that in order for the game world to feel natural to the player, even though it is inherently unnatural compared to our reality, the elements of the HUD is something that should adhere to the general theme of the game and is a contributing factor on the same level that music and other assets in creating a certain atmosphere (Schäbler 2015). The basic concepts of the HUD elements, however, often remain largely similar across games. Below are descriptions and examples of some of the most common HUD elements found in modern games, both diegetic and non-diegetic.

2.2.1 Player Health

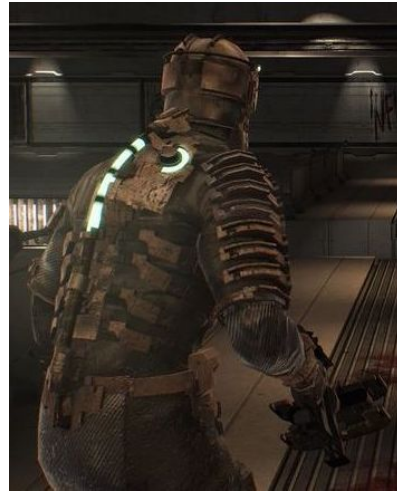
The player character's health is often the most important resource in a game where such an element exists. This resource is usually depleted through the player taking damage from external sources. When the player's health has been completely depleted, it usually means game over and that the player will have to start over from either a previous checkpoint or a save point. The fact that this resource means the difference of life and death, in the game, for the player is exactly what makes it so important. It is therefore that this resource and its status is communicated well to the player, and this is usually done through a HUD element. Like previously mentioned, the resource is often represented through a depletable bar or red hearts. The bars are often solid, but can also have a more segmented visual aesthetic. If there are multiple, visually similar bars used for additional resources such as energy, stamina or mana, these are usually differentiated by color, like in the remake of *Demon's Souls* (Figure 2.1a) released in 2020 for the Playstation 5. An example of a diegetic health bar can be seen in the *Dead Space* (Figure 2.1b) franchise, where the health bar is represented through a depletable tube on the back of the protagonist's suit of armor.

2.2.2 Mini Map

The mini map (Figure 2.2) is a relatively small map that displays the player's position and their immediate surroundings. This map is a cutout of the larger main map found in the game's menu, if it possesses such a feature. The player's position is commonly represented by an arrow, or another similar icon, and the map scrolls as the player moves their character. The mini map itself is often placed within a circular or square frame, and some games apply markers on the mini map to display areas of interest to the player when they are within



(a) This image shows the health bar (red), stamina bar (green) and magic bar (blue) *Demon's Souls*.



(b) In *Dead Space*, the player's health and stasis (magic energy) is displayed as a tube and a meter on the protagonist's suit.

Figure 2.1: Non-diegetic and diegetic elements for health and status information.

close proximity. In some open world games with larger game worlds, the map will have an arrow pointing to the north, much like a compass, in order to give the player a better sense of direction while exploring and navigating the world. A common, player-enabled feature for mini maps in video games to either keep it locked in a north oriented position or to allow it to rotate along with the direction that the player is facing. The mini map is often heavily used with regards to wayfinding in games of the open world genre, where either a marker or a generated path leads the player to their destination.

2.2.3 Compass

The compass (Figure 2.3) is a HUD element in a video game that works similarly to its real world counterpart. In most games that utilize it as a wayfinding appliance, it is designed as a horizontal bar that scrolls in order to keep the compass' center point the same as the direction that the player is facing. The compass usually displays markers for the four cardinal directions, along with markers for various points of interest, such as the player's currently tracked mission objective(s). The compass HUD element is often found in games as an alternative to a mini map solution, and it is often accompanied by various other types of environmental clues which lead the player. These are defined in a taxonomy by researchers as "Go" cues and may take on a wide variety of visual presentation (Dillman et al. 2018). One such clue could, for instance, take the form of environmental lighting. A study on the effects of subtle lighting as nav-



Figure 2.2: The mini map as seen in *Red Dead Redemption 2*.

igational clue found that the element of light does have a significant impact on the player's navigation performance (Marples et al. 2020).



Figure 2.3: An example of a horizontal compass from *Assassin's Creed Valhalla*.

A taxonomy on the benefits and drawbacks of various wayfinding methods in video games lists the compass as an element that is usually permanently displayed on the HUD which in turn is something that may not only obscure the game world's visuals, but also cause a lower level of or break immersion (Moura and El-Nasr 2015). The game used in the experiment of this thesis, *Ghost of Tsushima*, has circumnavigated this permanency by converting the element of the compass from an extra-diegetic element to an intra-diegetic one.

2.2.4 Activity Tracker

Like mentioned previously, there are often a large amount of side activities to complete in certain games these days, especially within the open world genre. The player therefore may have a use for an accessible way to keep track of their main story-related objectives in a game, along with any potential side activities. Whenever a player chooses to track a certain objective, or multiple objectives at the same time if the game allows it, various information about the objective will appear in the activity tracker (Figure 2.4). The tracker itself often takes the form of a list with the titles of each mission tracked, along with any objectives

that mission holds in a bullet point list below their respective mission titles. It is usually displayed in the top left or top right part of the screen, and often in close proximity to a mini map if the game has one. Main and side activities are usually differentiated in an activity tracker either by applying a heavier font weight to the main objectives, or by applying different text colors to main and side activities.



Figure 2.4: An example of an activity tracker from *World of Warcraft*.

2.2.5 Textual Labels

Textual labels (Figure 2.5) are used in a wide variety of ways in HUDs in video games, and are simple labels of text that either contain textual information or a numeric value. Labels with numeric values are often used to accompany various resource bars such as player health or stamina, and are also widely used to inform the player of their ammunition count in games of the first person shooter (FPS) genre. Games such as *World of Warcraft* and *Diablo III* allow the player to enable or disable these labels at their own leisure, as well as allowing them to choose whether the label should display a number or a percentage value. Textual labels can in many instances accompany an iconic label (which is described below) in order to give the player further clues and context as to what the iconic label represents.

2.2.6 Iconic Labels

Iconic labels (Figure 2.6) are essentially visual icons used to describe certain elements in the game. This can, for instance, be red hearts used to represent player health or a green drop icon appearing near the player's health bar to inform them that they have been poisoned and are taking continuous damage until the effect is alleviated. *The Witcher 3: Wild Hunt* has an option to display iconic labels representing the face buttons of a controller (triangle, circle, cross

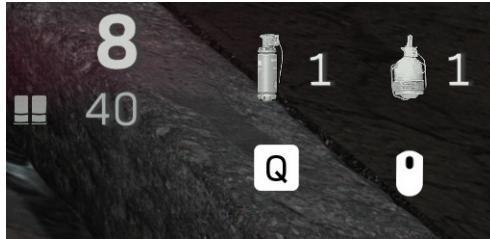


Figure 2.5: Amount of ammunition displayed to the player through a combination of textual and iconic labels in *Call of Duty Warzone*.

and square for Playstation and X, Y, A and B for Xbox), along with textual labels that changes dependent on the situation in order to remind the player of various contextual actions available to them throughout the game. Screen space real estate is a precious resource in most games and a cluttered HUD can cause confusion. Use of iconic labels is a way to use less screen space, while at the same time communicating information more effectively than with textual labels if the iconic labels used are logical and intuitive.



Figure 2.6: Iconic labels implemented to display various status effects in *The Witcher 3: Wild Hunt*.

2.2.7 Dynamic HUDs

In modern games, such as *Red Dead Redemption 2*, developers make use of a dynamic HUD in an attempt to increase immersion while allowing the player to see more of the game world itself without having any HUD elements blocking the view. With a dynamic HUD, as mentioned previously, certain elements fade out and become invisible whenever they are not important. This could, for instance, be the crosshair not showing unless the player is actively aiming a weapon, or the player's health bar disappearing whenever they are not in combat. In this case, the HUD elements have various criteria based on context of when to be displayed or not.

2.3 Previous Studies Related to HUDs and Immersion in Video Games

There has been a limited amount of studies done in the field of HUDs and immersion specifically relating to video games. One particular challenge is that many studies focus on virtual reality and aspects within it that are not directly transferable to traditional methods of playing video games. The keywords used in the searches were "diegetic", "video games", "HUD" and "immersion" and the searches included various combinations of these keywords. The databases used in the queries were Oria and ACM. An overview of search queries and applied filters can be found in Figure 2.7 and Figure 2.8.

2.3.1 Previous Studies on HUDs in Video Games

Findings have been made in terms of certain HUD characteristics. Evidence from a study performed in 2014 suggests that the design of the HUD itself affects the players' experience differently based on different genres and the player's level of skill, and that, within some genres, the HUD has a higher influence on experience when the player's level of skill is higher. The study also found that HUDs modified to adhere to certain ergonomic principles of information structuring were not preferred over the game's original HUD, although some elements were found to be preferred when redesigned (Caroux and Isbister 2016). This could potentially point to a fact that some players may prefer a HUD that does not apply ergonomic principles simply because of their experience and familiarity with it. Some studies have also been performed on HUDs in relation to diegetic methods of displaying information. One such study made such a comparison within the FPS genre. It was found that participants' performance increased with the diegetic display where the ammunition count was displayed as a numeric value in close proximity of the 3D model of the player's weapon. This method was also the one most preferred among the participants. The study does not suggest that a diegetic way of displaying information is empirically the better option, but rather that diegetic methods allow certain elements within the HUD to be placed in positions on the screen which are more ergonomic with regards to the player's main area of fixation, while still maintaining a natural blend of HUD and game world (Peacocke, Teather, Carette and MacKenzie 2015). While this study is limited to the first person shooters, there are still characteristic within this genre that are commonplace in other genres as well, which may make the findings more generally applicable across a wide variety of different video game genres.

2.3.2 Previous Studies on Immersion in Video Games

Immersion is, as mentioned previously, a widely used term within the video game industry and a core concept with regards to diegetic elements in video

Keywords	Initial results	Filters applied	Results after filtering	Overlap from previous search	Further reading	Used in project
"diegetic" & "video games" & "HUD"	40	english, last 10 years, peer reviewed	36	0	6	3
"video games" & "HUD"	601	english, last 10 years, subject areas: "computer & video games", "video games", peer reviewed	28	1	6	3
"immersion" & "video games"	10528	english, last 10 years, subject areas: "computer & video games", "video games", "immersion", peer reviewed, "subject must include"	51	0	6	4

Figure 2.7: Search queries made in Oria. Last search performed 06.05.2021.

Keywords	Initial results	Filters applied	Results after filtering	Overlap from previous search	Further reading	Used in project
"diegetic" & "video games" & "HUD"	9	last 10 years	9	0	2	1
"video games" & "HUD"	139	last 10 years, research articles	51	2	3	2
"immersion" & "video games"	1289	last 10 years, search terms within abstracts	27	0	4	1

Figure 2.8: Search queries made in ACM. Last search performed 06.05.2021.

games. Level of immersion is often used to describe to which extent the player is able to lose themselves in a game. At the same time, it can be a vague term that is hard to quantify into any sort of meaningful data. A study from 2004 sought to enhance the clarity of this term by interviewing various participants who had experience with video games. The researchers found that immersion did exist as a general concept for the participants involved, and that the concept for most describes the state to which they are involved with a video game. Whether total immersion was considered by the participants to be a positive or negative experience could not be concluded in any direction. The study also uncovered connections between the concept of immersion and Mihaly Csikszentmihalyi's concept of flow (Csikszentmihalyi 1991) within a task in the sense that they both require the user's and/or player's attention and that both feelings easily can be lost in a case where any distractions might occur (Brown and Cairns 2004). To those familiar with the concepts, flow and immersion can seem quite similar in nature. A study from 2018 found that there is not any significant evidence that separates these two on a conceptual level, and the researchers propose that these terms can be used interchangeably when referring to the specific mental state one can enter while playing a video game (Michailidis et al. 2018).

A literature review further attempting to more clearly define the term *immersion* suggests that the term itself consists of three different factors. They propose that immersion can be induced as a result of the system, as a result of a challenging task within the game or as a result of the level of engagement with the game's narrative, characters, game world and so on. In other words, immersion does not necessarily stem from one certain aspect of a game, but rather an amalgamation of various elements within any given game (Nilsson et al. 2016). Continuing with the theme of which aspects of a video game hold importance in terms of a player obtaining a state of immersion, one study sought to identify important factors pertaining to game character identification and obtaining said state. The researchers found that while the character being similar to the player does not necessarily have any impact, a player being able to identify with the character they are playing as certainly plays a role in increasing their level of immersion (Soutter and Hitchens 2016). Furthermore, a study on how the appeal of a certain game affects immersion has been performed. The researchers, in contrast to the recently mentioned studies, sought to clarify not which specific factors within a game are important, but whether or not the appeal of a game viewed in a holistic sense has any impact on immersion. The study found that the level of immersion does increase when the appeal of a game is stronger with the player in question (Christou 2014). Of course, a game is no more than the sum of its parts, and one could argue that the level of appeal is a result of all the various themes and content found in a given game. This would then be similar to Nilsson, Nordahl and Serafin's study where immersion was proposed as a multifaceted state of mind. Finally, investigating factors which may have an impact on immersion, a study from 2017 found

that it is not only factors within the game that are important. Certain personal factors, such as experience with video games and the game's relevance to the player personally, may also impact immersion (Ho 2017).

Chapter 3

Method

In this project I have explored the players' level of immersion and perception of diegetic elements based on their level of familiarity with said element. Most diegetic elements in video games are based on the same principles as the more common, extra-diegetic elements. Where they mainly differ is in their presentation to the player. The wayfinding system in *Ghost of Tsushima*, for instance, is no different in theory than a common, horizontally scrolling compass HUD element. Both of these systems will provide the player with a general direction to their next objective in the same way, but *Ghost of Tsushima* does so with an in-game wind and particle effect rather than an element on the HUD. Since it is part of the game world itself and not the HUD, the game element is considered to be diegetic. The purpose of applying diegetic elements is, as mentioned previously, to enhance the player's level of immersion. My goal is therefore to find out whether or not such a diegetic element has an effect on the player, whether or not the player's familiarity with the system is a factor in this effect and what the players' general attitude towards diegetic elements are.

This project focuses on the following questions of research:

1. Does a diegetic element, represented in the form of a wayfinding system, have an effect on the player's level of immersion?
 - a. Does it increase or decrease the level of immersion?
2. Is a diegetic element, represented in the form of a wayfinding system, perceived differently by players who are unfamiliar with it as opposed to players who are familiar with it?
3. Is it the player's opinion that the diegetic element, represented in the form of a wayfinding system, provides sufficient information in order to complete the task?

3.1 Mapping and categorizing player habits and motivations

In order to gain a better understanding of the players' preferences and opinions with regards player immersion and diegetic elements in video games, it was imperative to gain a better understanding of the players themselves. Like previously mentioned, large variations can exist within any form of player base. Therefore, there was a need to gather some initial data on player habits and to create categories for these different types of players.

3.1.1 Questionnaire 1 (Q1)

The purpose of the first questionnaire (Q1) (Appendix A) was to gather information on player's habits and preferences with regards to video games. The questionnaire itself contained questions regarding the participants' gender and age, general video game playing habits, preferred genres and platforms. A pilot test was performed before the main distribution of the questionnaire. The pilot test uncovered a weakness within a certain question regarding the participants' preferred video game genres. This question was redesigned to allow participants to rank genres from most preferred to least preferred since players often have more than one genre that they are particularly fond of.

The participants were asked questions with regards to their frequency of completing side activities in games along with whether or not they engage in voluntary exploration. With the questions regarding side activities and exploration in particular, the main purpose was to understand which factors were important to the participants when deciding whether or not to engage in these types of activities when playing video games. Some players may be motivated to engage in all side activities that a game has to offer simply by the thought of obtaining a 100% completion rating in any given game. These players are colloquially referred to as *completionists*. They complete activities for the sake of completion. Other players may find pleasure in performing side activities and exploring because of how much they enjoy the gameplay and game world and hence want to spend more time in it. While the activities these varying types of players are performing are identical, their motivations behind engaging with them are completely different from each other. As such the focus of the questions are not so much on the activities themselves, but rather why players choose to or choose not to engage in them.

Lastly, the participants were asked questions with regards to the element of immersion in video games. As previously stated, the word *immersion* with regards to video games is more of a concept rather than a well defined term. Many players will hear the word being used as a marketing term during presentations at shows like the Electronic Entertainment Expo (E3) every year, and while many players think of it as a positive element, its exact impact on a game can still be somewhat esoteric. Participants were therefore asked whether or not

they knew what the concept of immersion means with regards to video games, and also to elaborate on what they perceive immersion to be in this context.

There was an attempt to use the questionnaire as a method of sampling participants for the play test experiment which was executed at a later date, but this yielded no results. The reason was mainly because the distribution method for the survey largely was based on sharing through social media and digital word of mouth. As such, very few of the participants were actually situated close to NTNU in Gjøvik. Because of the ongoing Covid-19 pandemic, I would not ask any participants to travel in order to take part in the experiment. I therefore decided to attempt to source participants at a later date in a manner that allowed for responsible participation in terms of infection control.

3.1.2 Categorizing Questionnaire (Q1) Responses

Some of the questions with regards to side activities, exploration and immersion allowed the participants to write free text answers. These answers were divided into responses based on the elements found within each answer and these responses were in turn placed into categories describing the elements of importance within the answers. As such, one answer could be placed in multiple categories if it held multiple responses. A few answers were left uncategorized due to their nature and specificity. These particular answers will be discussed in a more direct, individual manner in the section containing the results.

With regards to side activities, participants were asked what their general attitude towards such activities in the form of a radio button question with the answers:

- "I try to complete all side activities in a game in addition to the main objectives."
- "I usually complete some side activities, but not all."
- "I do not care about side activities in video games."

After answering this question, the participants were asked to explain their reasoning behind the answer in a free text format. The responses from the free text answers were divided into the following categories of motivational/demotivational factors:

Completionist: Wanting to complete all activities in a given game simply for the sake of completing it and receiving a completionist achievement/trophy.

Reward: Motivation or demotivation to do side activities based on their perceived value of the reward given for completing said activity.

Level of Quality (fun): A requirement that the side activity itself to be of a certain perceived level of quality or in and of itself fun to play.

Time Padding: Feeling enjoyment of a game to such an extent that one

simply wants to spend as much time as possible with it, regardless of the nature of the side activities themselves.

Time Consuming (too much content): The game feels too massive in terms of content to the point where it feels impossible to complete everything.

FOMO (fear of missing out): A feeling that one needs to complete side activities in order to not miss out on various game elements such as story points or other types of rewards.

Main Story Context: Being motivated to do side activities only if they add to the main storyline of the game, or are coherent with the rest of the game to a point where there is no ludonarrative dissonance.

World Building/Lore: An urge to do side activities in order to deepen one's understanding and familiarity of the game world itself and its lore.

Exploration: Using side activities as a means to further explore the game world.

Getting the Full Experience: Wanting to get one's money's worth out of a given game and experiencing every aspect that the game has to offer.

With regards to exploration, participants were asked whether or not they engage in voluntary exploration in games that allow it. The participants were then asked to elaborate upon their reasoning in the form of a free text answer. The responses from these answers were divided into the following categories of motivational and demotivational factors:

Completionist: Exploring the game world as a part of obtaining a 100% completion status of a given game.

Reward: Exploring the game world with the purpose of obtaining rewards such as experience points, useful items and/or currency.

Fun: Engaging in exploration simply because it is fun in various aspects.

Sense of Agency: Exploration resulting in a feeling of freedom and making the player feel like they are in control of what happens.

Traversal Gameplay: The gameplay elements of moving and travelling are so appealing to the point where it makes exploration fun.

Curiosity: A meta based motivational factor where players are aware that game developers often place secrets and easter eggs throughout the world, and the only way to find these are through exploration.

Immersion: Exploration leading to an increased level of immersion which

is perceived as a positive element by the player.

World Building/Lore: Using exploration as a means to become more familiar with the story of the game world and its expanded lore.

World Interest/Aesthetics: Exploration due to a genuine interest in the game world itself, especially in terms of aesthetics and art style.

Full Experience: Engaging in exploration simply because it is a part of the game, and the player wants to experience all aspects of it.

In the case of the questions regarding immersion, participants were first asked whether or not they knew what the word meant within the context of video games. If the participants answered “no”, they were asked no further questions regarding the topic. If they answered “yes”, they were presented with a follow-up question asking them to write in free text how they would define the word “immersion”. The responses from these answers were placed into the following categories:

Suspension of Disbelief: The game and its world is convincing to the point where it is accepted by the player as being “real”.

Being “in the Game”/“a Part of the Game”: A feeling of being mentally transported into the game world itself.

Similar to State of Flow: A feeling described very similar to the concept of the State of Flow defined by Mihály Csíkszentmihályi. A complete absorption of attention and full involvement.

State of Flow (Specifically Mentioned): Immersion being directly compared to a State of Flow.

No Ludonarrative Dissonance: The non-existence of any ludonarrative dissonance within a given game. All elements from gameplay to story and art are coherent and makes logical sense.

Player Investment/Engagement: A feeling of being so invested or engaged in a game that one forgets that it is a game and all you want to do is play more of it.

3.2 Playtesting Diegetic Wayfinding Systems

The primary aim for this particular playtest was to have players of various levels of familiarity with the game *Ghost of Tsushima* to perform a navigational task using the game’s diegetic wayfinding system. The participants were to be divided into two different groups based on their previous experience with the

game. The participants that had no previous experience with the game would be further divided into two groups. One of the groups with no experience would receive instructions on how the wayfinding system works and how to use it before starting the task. The other group with no prior experience would not receive any instructions with regards to the wayfinding system before their task was started. The third group would consist of participants that already had significant experience with the game and therefore would need no instructions other than that relating to the navigational task itself. However, due to potential infection control and travelling restrictions caused by the ongoing Covid-19 pandemic and the prerequisites in terms of experience with video games, a secondary experiment method, which is described in the few subsections, was put in place in case there was a shortage of participants.

3.2.1 Experiment Selection Questionnaire

While the task of the experiment itself might seem simple, navigating in a three dimensional digital space can be quite difficult for someone who is not used to doing it. It was therefore important to select participants with a certain degree of previous experience with video games in order to eliminate general inexperience with games as a potential problematic factor in completing the task itself. A questionnaire (Q2) (Appendix B), somewhat similar to Q1, was designed and distributed to potential participants. The distribution was kept local by contacting potential participants directly or through word of mouth, as asking participants to engage in unnecessary travel during a pandemic was not an option. The questionnaire contained questions related to video game playing habits, favorite genres, platforms and to which extent, if any, they had any previous experience with playing the game *Ghost of Tsushima*. The experiment also required the participants to have an idea of what immersion is, and specifically, means to them. After completing the selection questionnaire, appropriate participants were contacted with further details with regards to participating in the experiment

3.2.2 Playtest Experiment

The game was chosen based on the fact that its main wayfinding system is completely diegetic and unique in terms of presentation to the player, but the core principles of said system is very common in video games. The player must place a destination marker on the game's map and the wind serves as the player's guide. Once the marker has been placed on the map, a wind effect appears in-game which affects objects such as grass, plants, trees and various types of particle effects. The objects are affected in such a way that it is clear to the player in which direction the wind is blowing, and that is also the general direction of the destination marker that the player placed on their map. Since the wind effect is an element natural to the game's world and it exists in the

world of the game's protagonist, it is considered a diegetic element. With this approach to wayfinding, the player knows only the general direction, and is not given a direct path, which forces them to find their own path through the game world in order to reach their destination.

As this experiment required the participants' physical participation, a detailed protocol was created to bolster infection control (Appendix C.1) for the entirety of the experiment. In addition, a risk analysis with regards to infection control was created and approved by the Laboratorium for Universell Utforming (Accessibility Laboratory or UU-Lab) before the experiment phase started. Before starting the playtest experiments, a pilot test was performed which uncovered a weakness in one of the questions which prompted the participant to give a less than desired amount of detail on a free text answer regarding the mechanics of the game's wayfinding system. This question was subsequently changed in order to motivate participants to give more detailed explanations.

The playtest itself started the participants at a predetermined position in the game's world, and they had to perform two "point A-to-B" navigational tasks. While all participants met the requirements for participating in the experiment, none had previous experience with *Ghost of Tsushima*. Instead of dividing participants into groups like initially planned, they were now all placed equally in terms of the onboarding of the game's wayfinding system. Each participant was given bare minimum explanations regarding the navigational task as well as how to control the game's character and how to avoid enemies along with any other potential threats. Various steps, which will be described in section 3.2.6, were taken in order to minimize the risk of in-game death during the navigational task, in which case the task had to be reset and started over. At this point they would attempt to complete the first navigational task without any further onboarding with regards to the game's wayfinding system. An upper limit of 10 minutes was allotted for each participant to complete the navigational tasks as there was a possibility that they would not be able to reach their target destination, especially without any onboarding or tutorialization regarding the game's wayfinding system. All participants were instructed to use only the horse for traversal. In the case that combat occurred and the participant was knocked off the horse by enemy NPCs, the timer was paused until the participant was back on their horse and safe.

After either reaching their target destination or hitting the 10 minute mark on the timer, each participant was asked to answer a questionnaire (Playtest Experiment Questionnaire 1 - PTQ1) (Appendix C.3) related to the navigational task they had just performed. Here they were asked questions about whether or not they were familiar with the game prior to taking part in the experiment, and if so, how they came to know about it and to which extent they were familiar with it. They were also asked whether or not they understood how the wayfinding system worked, and then explain it if they believed they had understood it. Since there was a possibility that the participants thought they had understood the system while in reality they had not, it was important to ensure

that they had in fact understood it correctly. A subsequent question pertaining to the wind and particle effects was therefore asked, and whether or not these effects had been in any way useful to the participant during the navigational task. If the participant answered that they had indeed been useful, they would also be asked to explain exactly how they had been useful. Further into the questionnaire the participants were asked questions about the clarity and the efficacy of the wayfinding system and giving each of these aspects an individual rating on a Likert scale from one to four, where one was at the negative end of the spectrum and four at the positive end. They were also asked whether or not they believed that it increased their level of immersion and then to rate the level of immersion on a similar Likert scale from one to four, where one was a low level of immersion and four was a high level. Finally, they were asked if the wayfinding system in any way felt familiar or unfamiliar based on their previous experience with video games. If they answered that it felt familiar or somewhat familiar, they were asked to elaborate on which elements felt familiar and, if possible, to mention any specific games that came to mind which it felt similar to. If they answered that it felt completely unfamiliar, they were asked to explain what elements of the system made it feel unfamiliar.

After finishing the first questionnaire (PTQ1), each participant was given a detailed explanation of how the wayfinding system worked and how they as a player were able to influence the strength of the diegetic clues by utilizing the touchpad on the Playstation 4 game controller. This explanation was given to all participants, regardless of whether or not they believed they understood how the system worked. When the participant had received proper onboarding, they would repeat the same navigational task as they performed in the first playtest, but with the knowledge they now possessed. They were informed that the starting point (A) and destination (B) were identical to the previous playtest, but the path they chose to get there did not have to be identical in any way.

Having finished the second playtest, destination reached or not, they were presented with a second questionnaire (Playtest Experiment Questionnaire 2 - PTQ2) (Appendix C.4) which was similar to PTQ1 with regards some of the questions contained within. In PTQ2, when asked if they understood how the wayfinding system worked and to explain it, the system was called by its proper name "Guiding Wind". They were also asked whether or not they were familiar with the mechanics of the "Guiding Wind" system prior to participating in the experiment. Subsequently, they were again asked questions regarding the system's clarity, efficacy and level of immersion to rate these aspects on Likert scales identical to the ones found in PTQ1.

3.2.3 Experimental Hypotheses

Hypotheses (Efficiency):

H_0 : The wayfinding system, in the form of diegetic elements, will be per-

ceived as more effective than a wayfinding system with traditional HUD elements.

H_1 : The wayfinding system, in the form of diegetic elements, will be perceived as less effective than a wayfinding system with traditional HUD elements.

Hypotheses (Immersion):

H_0 : The diegetic element, represented in the form of a wayfinding system, does not increase the player's level of immersion.

H_0 : The diegetic element, represented in the form of a wayfinding system, increases the player's level of immersion.

3.2.4 Experimental Variables

Independent:

- Player's experience/familiarity with the game
- Non-player characters (NPCs)

Dependent:

- Immersion
- Efficiency
- Negative player experience
- Positive player experience

3.2.5 Room Setup

In order for the participants to be as relaxed and casual as possible in the experimental setting, the room was set up in a particular way, with a goal to reduce any stress and/or distractions such a situation may carry with it through emulating an at-home, living room experience. A gaming chair without wheels was placed at a distance of 2,11 meters from the television based on the manufacturer's (SONY) recommendation for a 55 inch screen, and the television itself was placed at a height which was comfortable for the participant so as to not create any unnecessary physical strain on their behalf. A table was placed between the television screen and the couch, upon which the participants had access to a cheat sheet with relevant controls should they forget some of them during the navigational task. The room used for the experiment was Sanselaboratoriet (Sense Laboratory) at the UU-Lab by NTNU in Gjøvik. This room is capable of producing a wide range of lighting environments, from complete darkness to near daylight through the use of specialized blue and yellow lighting tubes. In order to create a comfortable lighting similar to a living room, the staff at the laboratory recommended a setting of only yellow lights which produced between 2700-3000 kelvin and 200 Lux, which is common for at-home living rooms. These settings were put into place and measured before each

participant in order to ensure an equal experiment environment for every participant. The walls of the room feature a set of drapes in different shades from white to black. Gray drapes were used to cover the walls to create a neutral, but still comfortable setting. The walls behind the television screen were covered in black drapes in an attempt to direct the participants' attention towards the television screen when performing a navigational task.



Figure 3.1: The room as set up for use during the playtest experiment.

3.2.6 Game Setup

The choice of the game was made based on two main factors: a) based on the uniqueness of its wayfinding system, and b) maintaining relatively common gameplay elements which should be familiar to a large group of players. The game allows the player to control the game character with a joystick on the controller. The main mode of transportation in the game is horseback riding with various options for speed. Simply moving the joystick will cause the horse to walk, while additional input allows for gallop.

A starting point (point A) and a destination point (point B) was set up by the researcher in the game's map menu before the experiment started. Various routes were explored and tested prior to the experiment in order to ensure that the areas between point A and B were not too complicated for the inexperienced players while at the same time allowing for variance in terms of environment and limiting the population of hostile and neutral non-player characters (NPCs). A manual save state was created before each route test, which allowed the researcher to easily access that particular game state should it be chosen as a final route for the playtest itself. Creating these types of manual save states

further reduced the risk of different, random occurrences within the game for each of the participants in the final playtests by being able to access the exact same initial state for the game. It did not, however, entirely eliminate the possibility as some participants potentially could choose alternative routes based on the nature of the wayfinding system.

Like mentioned previously, there are hostile NPCs of various forms present in the game that may attempt to attack the player. This is essentially based on an “aggro radius” which is a zone that envelops the NPC groups. If the player is seen by a hostile NPC and stays within the aggro radius for a certain amount of time, the NPCs will attempt to attack the player. Various steps were taken in order to minimize the risk of this occurring. First of all, the game has a difficulty setting. This setting adjusts, among other things, how much damage the player takes from various types of enemy attacks. The difficulty was set to the lowest available option labeled as “Easy” in order to make hostile NPCs less threatening to the experiment. Additionally, there is an option to adjust the game’s “Intensity”. This setting was especially useful with regards to this particular experiment in the sense that it can be used to adjust the time it takes from an enemy NPC to see the player until they become aggressive and attack. As such, the intensity was set to “Low” to further minimize the risk of hostile NPCs disturbing the process of the navigational tasks.

3.2.7 Equipment

A Sony Playstation 4 Slim 500GB was the console used to run the selected games for the playtest experiment. The console is capable of running the game *Ghost of Tsushima* at 30 frames per second (fps) with a resolution output of 1920x1080 (1080p).

In order to control the in-game character, the participants used a white Playstation Dualshock 4 controller which is the standard controller for the Playstation 4. In terms of input methods for this particular playtest, the controller itself has two joysticks which allows the participant to control the movement of the game character as well as the movement of the camera by tilting said joysticks. In *Ghost of Tsushima*, the participant must press the left joystick (for game character movement) to make the horse gallop. The participants can swipe upwards the touchpad on the middle section of the controller in order to activate a gust of wind to be reminded of the general direction of their destination. The directional buttons (d-pad) on the left side of the controller is not of any relevance to this particular playtest. Should any of the participants encounter combat situations during the playtest, they were encouraged to attempt to run away and resume the navigational task. A cheat sheet (Appendix C.2) was given to each participant with only the controls relevant to the task denoted.

In terms of audio, the initial plan was to use a wireless headset in order to further minimize distractions while performing the playtests. A decision was later made to not use any type of headset in order to further minimize the risk

of Covid-19 spread, and instead use the speaker built into the television screen for audio.

The television screen used for the playtesting was a SONY KDL55HX753 with a screen size of 55 inches and a resolution of up to 1920x1080. As such, the screen was able to take advantage of the PS4's hardware in terms of frame rate and visual fidelity. The television screen was provided by the UU-Lab.

To measure the temperature of the lighting, a CHROMA METER CL-200A was wired to a desktop computer in the Sense Laboratory which, when activated, output measurements in degrees Kelvin in an Excel spreadsheet. For measuring Lux, a Hagner Model EC1 was used.

Chapter 4

Results

In this chapter we will present and summarize the results from the experimental parts of the study. We will begin by presenting the results from the first questionnaire with regards to player habits and preferences, and then move on to the playtest experiment participants selection questionnaire. Finally, the results from the playtest experiment itself will be presented.

4.1 Questionnaire 1 (Q1): Player Habits and Preferences

The purpose of this questionnaire was to explore players' habits and preferences with regards to video games, along with the participants' perception of the term *immersion*. The questionnaire was distributed and finished in February of 2021, it is described in detail in section 3.1 and can also be found in the appendix. A total of 102 participants took part in the first questionnaire regarding habits and preferences in with regards to video games. 77.5% of the participants were male, while 21.6% were female and 1% other. In terms of ages, 23.5% of the participants were in the range of 18-24 years old, 71.6% were in between ages 25-35, 0% were in the range of 30-40 and 4.9% were over the age of 40.

4.1.1 Player Habits and Genre Preferences

In terms of general video game playing habits 55.9% stated that they play video games every day, 36.3% play video games every week and 7.8% play only every two weeks. On days where participants actually play video games 81.4% reported that they play around 1-4 hours. 9.8% play more than 5 hours on days where they play video games and 8.8% said they play less than one hour.

The participants were, during the questionnaire, asked to rate 9 common video game genres from most favorite (1) to least favorite (9) (Figure 4.1). In terms of favorite genres, MMO rated highest with a score of 23 participants selecting it as their number one favorite genre. This was closely followed by

Table 4.1: Participants favorite genres ranked.

Favorite genre	Score
1. MMO	23
2. Racing Games	19
3. Simulation games	17
4. Open world action/role playing games	15
5. Role playing games	13
6. First person shooters	12
7. Puzzle games	11
8. Strategy games	6
9. Linear action games	5

racing games which 19 participants reported as their favorite along with simulation games which was the preferred genre of 17 participants. These genres were followed by open world action/role playing games, role playing games, first person shooters and puzzle games with 15, 13, 12 and 11 participants respectively selecting these as their favorite genres. Finally, strategy games and linear action games had 6 and 5 participants reporting the genres as their favorites, respectively.

Genre Ratings	1	2	3	4	5	6	7	8	9
Linear action games	5	6	14	19	16	15	12	9	5
Role playing games	13	5	10	13	5	11	14	20	11
Open world action/role playing games	15	15	5	4	10	3	15	15	20
First person shooters	12	11	10	15	7	7	18	10	12
Puzzle games	11	7	16	13	18	12	15	7	3
Strategy games	6	12	8	11	14	13	18	10	9
Racing games	19	10	12	10	9	15	9	12	5
Simulation games	17	11	10	15	11	12	10	9	6
MMO	23	5	11	2	10	2	17	9	23

Figure 4.1: Common video game genres rated by participants from most favorite (1) to least favorite (9).

In terms of least favorite genres, MMO received the highest score here as well with, once again, 23 participants reporting it as their least favorite genre. Following MMO as the participant's least favorite genre were open world action/role playing games with a score of 20, first person shooters with a score of 12 and role playing games with a score of 11. The participant's most favorite and least favorite genres can be seen ranked in Table 4.1 and Table 4.2 respectively.

Participants were also asked about which platforms they utilized for playing games and were instructed to choose all platforms that applied to their video game playing habits. The most popular platform among participants was Windows (PC) with 79.4% of participants using it for video game purposes. The second most popular platform was mobile with 46.1%, closely followed by

Table 4.2: Participants least favorite genres ranked.

Least favorite genre	Score
1. MMO	23
2. Open world action/role playing games	20
3. First person shooters	12
4. Role playing games	11
5. Strategy games	9
6. Simulation games	6
7. Linear action games/Racing games	5
8. Linear action games/Racing games	5
9. Puzzle games	3

Table 4.3: Video game platforms ranked by popularity among participants.

Platform	Utilized by % of participants
1. Windows (PC)	79.4%
2. Mobile	46.1%
3. Playstation 4	44.1%
4. Nintendo Switch	43.1%
5. Xbox One	10.8%
6. MacOS/Playstation 5	8.8%
7. MacOS/Playstation 5	8.8%
8. Xbox Series X and/or S	4.9%
9. Linux (PC)	2.9%

Playstation 4 and Nintendo Switch with 44.1% and 43.1% respectively. Subsequently, 10.8% of participants reported to be using Xbox One while Playstation 5 and MacOS had an equal number of participants utilizing them for video games at 8.8% each. Finally, 4.9% of users answered that they play video games on Xbox Series X and/or S, and Linux (PC) had the lowest number of users with a total of 2.9% of the participants playing video games on the platform. A ranked display can be seen in Table 4.3.

4.1.2 Side Activity Completion & Motivational Factors

When asked to what extent the participants complete side activities in video games, 37.3% answered that they try to complete all side activities in any given game, 54.9% answered that they usually complete some side activities, but not all. Finally, 7.8% of participants stated that they do not care about side activities in video games. Like mentioned previously, they were also asked to provide a free text answer with reasoning behind their answer so that the answers could be split in to responses and divided into categories of motivational factors.

The most important factor in order for the participants in the survey to

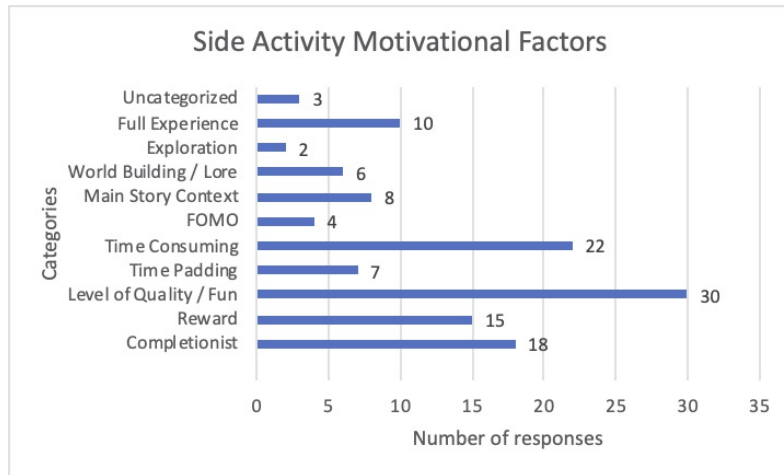


Figure 4.2: The number of responses received within each category related to completing side activities.

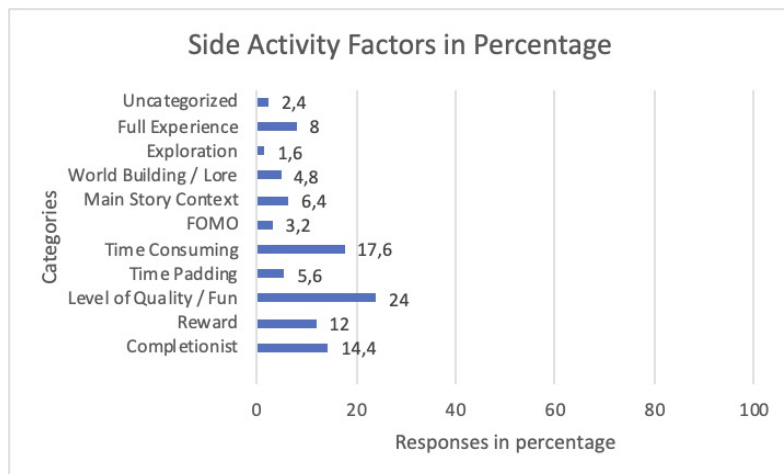


Figure 4.3: The number of responses in percentage values received within each category related to completing side activities.

complete side activities is that the activities themselves need to be of a certain level of quality and as such be fun to complete. Next in line is the factor of time consuming side activities. 17,6% of the participants' responses reported that if a participant perceived the side activities in question to be too time consuming, they would rather not engage with them in any manner at all. A significant number, 14,4% to be exact, mentioned the concept of completionism to be a strong motivational factor for completing side activities. The reward one is given for completing any given side activity in a video game is also included as a factor in a 12% of the responses. Some responses were left uncategorized and these are addressed in the discussion, see Section 5.1.1. A few questions did not hold sufficient data to be categorized and as such were removed from the data set. Please see Figure 4.2 and Figure 4.3 for a complete count and percentage of the responses within each category with regards to the questions related to engaging in side activities.

4.1.3 Voluntary Exploration & Motivational Factors

Participants were asked, with regards to video games that allow it, whether or not they choose to engage in exploration of their own volition. 89.2% of the participants stated that they do indeed explore in games voluntarily if the game allows for it, while 10.8% of the participants do not. Similar to the question regarding side activities, participants were also asked to provide a reasoning behind their answer in the form of a free text answer. These answers were once again divided into responses and placed into appropriate categories of motivational factors.

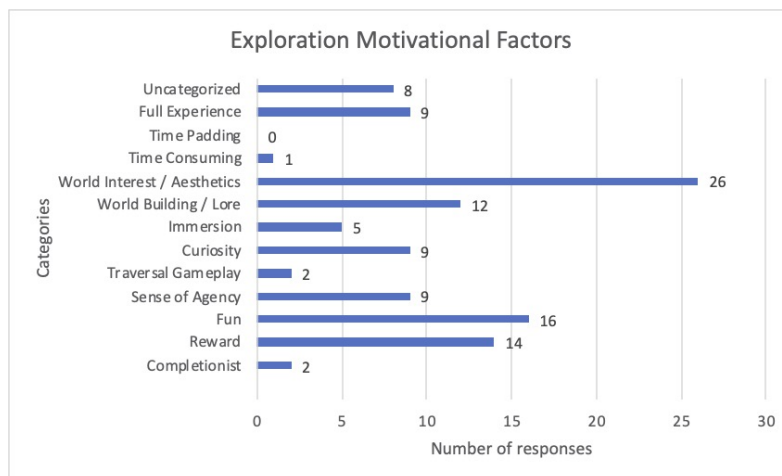


Figure 4.4: The number of responses received within each category related to voluntary exploration.

Interest in the game world along with its aesthetics stands out as the most important element in terms of motivating a player among the participants to

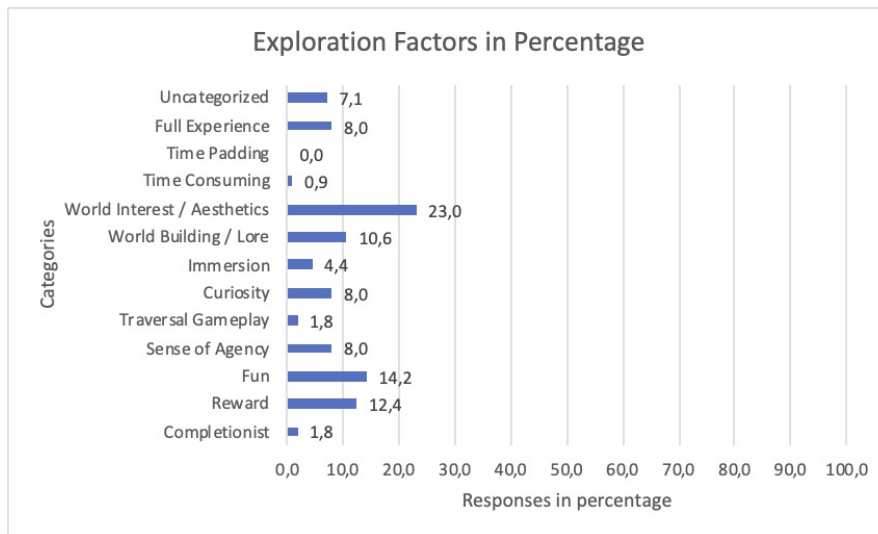


Figure 4.5: The number of responses in percentage values received within each category related to voluntary exploration.

explore the world voluntarily with a total of 23,01% of the responses mentioning this factor. The second most important factor is that the activity of exploring the world is fun in and of itself, with 14,2% of the responses citing this as an important source of motivation. Below the element of fun, reward was reported by participants to be an almost equally important motivational factor by being mentioned in 12,4% of the responses. A second factor relating to the game world itself, specifically world building / lore, stands out as the fourth most important factor in relation to motivation of exploration with 10,6% of the participants' responses pointing towards this aspect. Similarly to the answers relating to side activities, some responses were left uncategorized to be addressed in a more direct manner in the discussion, see Section 5.1.2. A few questions did not hold sufficient data to be categorized and as such were removed from the data set. Please see Figure 4.4 and Figure 4.5 for a complete count and percentage of the responses within each category with regards to the questions pertaining to voluntary exploration.

4.1.4 Perception of Immersion

As mentioned in previous chapters, immersion is a concept that is at times vague in terms of a standard definition. It is also a term that is not necessarily common knowledge amongst video game players. When participants were asked whether or not they were familiar with the term immersion, 77.2% answered that they were familiar with it while 22.8% answered that they were not. The 77.2% who had answered that they were indeed familiar with the term were given another question asking them to specify what the term means to them. In similar fashion to the previous questions, the answers were divided

into responses and placed into appropriate categories.

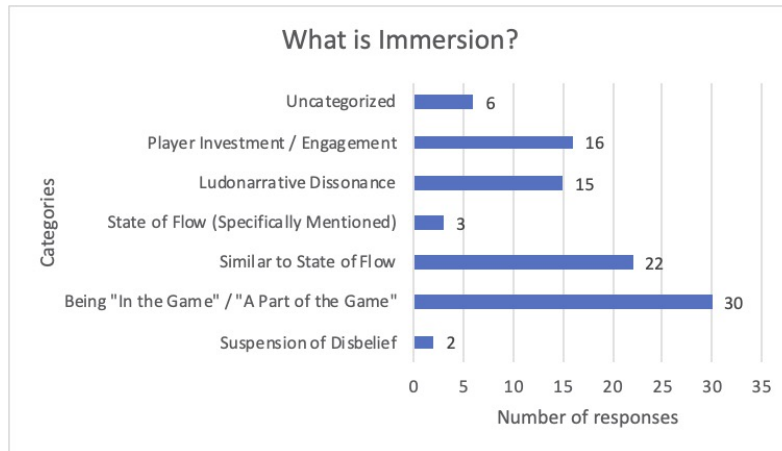


Figure 4.6: The distribution of responses received within each category related to the concept of immersion.

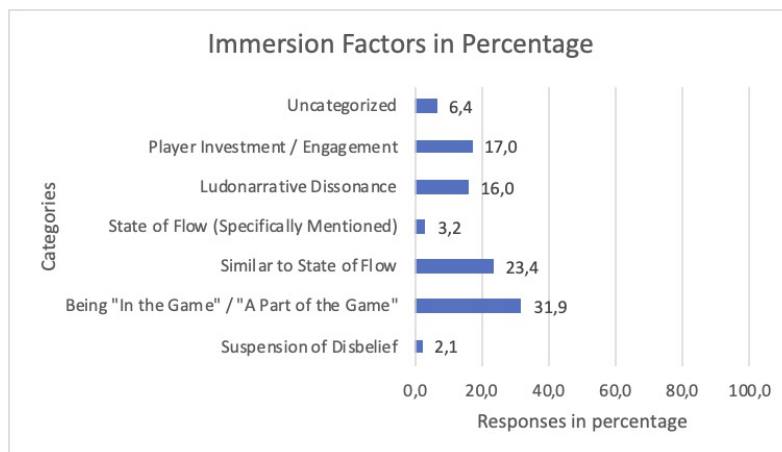


Figure 4.7: The distribution of responses in percentage values received within each category related to the concept of immersion.

A total of 31,9% of the participants' responses described the term immersion as being either "in the game" or as being "a part of the game". The category with the second highest amount of responses was a state similar to that of flow with a total of 23,4%. These are responses where the participant's simply describe a state which is similar to flow without actually mentioning it specifically. Next is player investment/engagement, in which the responses describe the state of immersion as being highly invested in/engaged with the game, with 17%. Additionally, a significant number of responses described immersion as the absence of ludonarrative dissonance with a total of 16% within the responses. As with the previous elements of side activities and exploration,

some responses have been left uncategorized for later discussion in the next section, see Section 5.1.3. Please see Figure 4.6 and Figure 4.7 for a complete count and percentage of the responses within each category with regards to the questions regarding immersion.

4.2 Participant Selection Questionnaire

As mentioned in the Method section, a participant selection questionnaire was distributed in order to gauge the video game experience, playing habits and any prior experience with the game *Ghost of Tsushima*. A total of 9 participants took part in this questionnaire. It was also an important factor that the participants had an idea of what the term immersion means, at least to them personally, which 77,8% answered that they did. 44,4% reported to play video games every day, while 55,6% play at least once every week. In terms of time spent playing on days of play, 88,9% said that they play between 1-4 hours and 11,1% play more than 5 hours. Similarly to in Questionnaire 1 (Q1), participants were asked questions regarding their favorite genres as well as which platforms they utilize to play games. These questions were asked both for the purposes of gauging general video game experience, but also the participants' potential experience with a gamepad controller. The platforms utilized by the participants included Windows (PC), Playstation 4, Nintendo Switch, MacOS, Linux (PC) and mobile.

4.3 Playtest Experiment

The experiment itself consisted of six activities.

1. Introduction to the experiment.
2. Attempt first navigational task.
3. Answer post playtest questionnaire 1.
4. Onboarding on how to use the game's diegetic wayfinding system.
5. Attempt first navigational task again.
6. Answer post playtest questionnaire 2.

A total of five participants took part in the experiment. Each of these participants were given a unique ID and the list is as follows:

- P1
- P3
- P4
- P5
- P13

Table 4.4: The wayfinding system's level of clarity as rated by the participants after the first navigational task.

Level of clarity	1 (Not clear)	2	3	4 (Very clear)
	40%	20%	40%	0%

4.3.1 Playtest 1 (PT1)

Most participants started out by following the roads in the game world, while other attempted to memorize and follow the direction they were shown on the map before starting the playtest. Two participants attempted to navigate based on landmarks they had noticed on the map screen such as the sea being on their east side and that they at one point would have to cross a river. Two separate participants noted that they felt lost during the first playtest, but did not want to give up. Both of these participants eventually reach the destination before the 10 minute time limit. One particular participant managed to understand exactly how the wayfinding system worked during the first playtest by stopping after a while and observing whether or not the wind and particle effects changed direction, which they do not once a destination has been set.

4.3.2 Post Playtest 1 Questionnaire (PTQ1)

Out of all the participants, 60% had heard of the game before while 40% had never heard of the game before. All of the participants who had heard of the game prior to participating in the experiment had heard about it through word of mouth. None of these participants reported to have any extensive knowledge of the game and its mechanics. 60% of the participants reached the target destination within the first navigational task while the remaining 40% either did not reach it before the time limit of 10 minutes had passed or said they were lost and gave up. 60% of the participants stated that they understood how the wayfinding system worked during the first playtest while 40% stated that they did not. Those who claimed to understand how it worked were asked to elaborate in the form of a free text answer. All these participants explained that they followed the wind or particle effects. One participant reported that they had heard that the wind was an important element prior to participating, but they did not know in what way it was important. 60% also answered that the wind and particle effects were helpful to them in reaching their destination.

Furthermore, the participants were asked question about the level of clarity, level of efficiency and effect on immersion the wayfinding system had. They were also asked to rate these aspects of the system. 40% of the participants answered that the wayfinding system clearly communicated the direction of their destination while 60% answered that it did not. The participants' ratings on the system's clarity can be seen in Table 4.4.

In terms of the wayfinding's system level of effectiveness, 60% saw the system as effective in its task while 40% said that it was not effective. The parti-

Table 4.5: The wayfinding system's level of efficiency as rated by the participants after the first navigational task.

Level of efficiency	1 (Not effective)	2	3	4 (Very effective)
	40%	0%	60%	0%

Table 4.6: The wayfinding system's level of immersion as rated by the participants after the first navigational task.

Level of immersion	1 (Low level)	2	3	4 (High level)
	20%	0%	20%	60%

participants' ratings on the system's efficiency can be seen in Table 4.5.

With regards to immersion, 60% of the participants stated that the wayfinding system enhanced their level of immersion and 40% said that it did not. The participants' ratings on the system's impact on immersion can be seen in Table 4.6.

Finally, participants were asked question regarding whether or not the wayfinding system in *Ghost of Tsushima* felt familiar or unfamiliar to the based on their previous experience with video games. 0% of the participants answered that it felt familiar, 40% stated that it felt somewhat familiar and 60% said it was completely unfamiliar. One participant who saw the wayfinding system as somewhat familiar mentioned that the diegetic aspect was familiar from a game they had previously played titled *Sea of Thieves*. They had, however, never seen it applied to the extent that *Ghost of Tsushima's* system does. Another participant reported it to be familiar by being able to find the way without having to open av map screen during travel. This participant also mentioned never having seen it done with environmental effects previously.

The participants that said the wayfinding system felt completely unfamiliar included noted the lack of any extra-diegetic elements with regards to displaying the destination. One participant had no perception of how the system worked after the first playtest and as such had nothing to reference in terms of familiarity. Other participants mentioned that the diegetic nature of the wayfinding system did was interesting in the sense that it didn't feel out of place and that it forced them to take in the game world's environment to a higher degree than normal.

4.3.3 Playtest 2 (PT2)

After the participants had completed the first post playtest questionnaire, they were properly instructed on how to use the wayfinding system before starting the second navigational task. After a brief period of navigating, all participants started to ignore the roads and followed the direction of the wind and particle effects like one would the needle of a compass or riding "as the crow flies". The frequency at which the participants activated the wind varied. The lowest re-

Table 4.7: The wayfinding system's level of clarity as rated by the participants after the second navigational task.

Level of clarity	1 (Not clear)	2	3	4 (Very clear)
	0%	40%	40%	20%

recorded number of "Guiding Wind" uses among the participants was 12 times during the entire second navigational task, while the highest number recorded was 74 uses. One common occurrence among participants was that they always activated the wind after having to circumvent a part of the environment or a group of enemies. Two participants still had some issues with regards to interpreting the winds direction. One of these participants often stopped when activating "Guiding Wind" to closely observe the direction. The other participant had issues with interpreting in which direction on the axis the wind and particle effects were flowing. There was a third participant that stopped to observe the wind, but they only on one of their wind uses. There is an additional, extra-diegetic HUD element present on screen which appears every time the player activates "Guiding Wind". This element is a combination of iconic and textual labels which tells the player how far away they are from their target destination either in units of kilometers or meters based on their current distance from their destination. Only one participant noticed this element during the second playtest. All participants reached their target destination in the second playtest.

4.3.4 Post Playtest 2 Questionnaire (PTQ2)

All participants stated that they understood how the wayfinding system worked in the questionnaire taken after the second playtest. It was clear to the participants that the wind and particle effects flew in the direction of their destination. However, two participants noted having issues with understanding which direction, along its axis, these effects were flowing. This was also noted during the second playtest itself, both stated orally by the participants in question and through observation. When asked whether or not the participants had learned about the "Guiding Wind" wayfinding system prior to taking part the in the experiment, 40% answered yes while 60% answered no.

Once again, the participants were given question regarding the wayfinding system's clarity, efficiency and effect on immersion. When asked whether or not the system clearly communicated the direction of their destination, 80% of the participants answered yes while 20% answered that it did not. The participants' ratings on the system's clarity after the second navigational task can be seen in Table 4.7.

As for efficiency, 100% of the participants answered that the game's wayfinding system was efficient helping them reach their target destination. The participants' ratings on the system's efficiency after the second navigational

Table 4.8: The wayfinding system's level of efficiency as rated by the participants after the second navigational task.

Level of efficiency	1 (Not effective)	2	3	4 (Very effective)
	0%	20%	60%	20%

Table 4.9: The wayfinding system's level of immersion as rated by the participants after the second navigational task.

Level of immersion	1 (Low level)	2	3	4 (High level)
	20%	20%	20%	40%

task can be seen in Table 4.8.

With regards to the system's impact on the participants' level of immersion, 80% of the participants stated that the wayfinding system enhanced their level of immersion while 20% said that it did not enhance it. The participants' ratings on the system's impact on immersion can be seen in Table 4.9.

In terms of the wayfinding system's level of familiarity, the participants' opinions remained unchanged with 0% saying it felt familiar, 40% saying it felt somewhat familiar and 60% saying it felt completely unfamiliar. The participants that reported the system as being somewhat familiar pointed to the environmental effects and diegetic nature of the system to be the main factors of unfamiliarity. One participant felt like they had encountered a similar system previously, but could not recall in which specific game.

The participants who stated that the system felt completely unfamiliar mostly reiterated their points from the same question in PTQ1, but two of them pointed out that the action of swiping on the PS4 controller's touch pad was not something they were used to in terms of controller conventions.

Chapter 5

Discussion

5.1 Questionnaire 1 (Q1)

5.1.1 Side Activities

There is a wide variety of motivational factors in terms of engaging in side activities. As seen in the results, the level of quality and fun factor is the most important element among participants in order to motivate them. Open world game franchises like *Assassin's Creed* have been accused by players of including what they deem as menial, repetitive side activities as a quick method of padding the game's amount of content. These side activities can range from as simple as picking up a collectible item to completing a series of missions while going through a subplot that in some cases may even tie into the main story of the game. The former is the more common case as the latter involves more complex work and is more time consuming to implement. It has become somewhat of a joke in the video game industry to open up the game's map only to see it contain such a large amount of side activity and collectible item icons that one is almost unable to see the map itself. This is tied to the "time consuming" category, where seeing a map screen like this is enough for some players to simply decide that they do not have the spare time to complete them all. Even though this has been the case for years in many open world games, it seems that some developers have chosen to scale back the amount of side activities based on player feedback. The latest installment in the *Assassin's Creed* series, *Assassin's Creed Valhalla*, places more emphasis on fewer side activities with more unique and robust stories rather than a high quantity of very similar side activities. This is a similar approach to that of *The Witcher 3: Wild Hunt* which has received much praise for the unique stories found in its side activities. *Ghost of Tsushima* is also more subdued in terms of the amount of side activities, although many of the activities are similar in nature. As such, one may infer that the saying "quality over quantity" still rings true for players in open world video games.

The side activities in any given game are generally based on the general

mechanics of the gameplay. If a player does not find the basic gameplay loop of the game fun, they are unlikely to engage in side activities based on said gameplay loop. What a player deems to be of a certain level of quality or fun is highly subjective. There is therefore no definitive answer, but a general idea would be that if a player finds the gameplay itself fun and the side activities is based on this gameplay in some form, they are more likely to engage in the side activity.

Furthermore, there are participants who do not care about the content of the side activity itself, but rather if and how they are rewarded for completing them. It is interesting to note here that the types of rewards mentioned by the participants vary. Some participants mention in-game monetary rewards, while others mentioned items like armor and weapons or experience points. What all these rewards have in common is that they either are or can be used as a means to strengthen one's own character in a game. As such, it is important for participants who mostly care about rewards that the side activity itself offers some positive effect for the player's character upon completion.

While some players are motivated by tangible rewards within a game, others are motivated by simply ticking off boxes on a list of items to achieve. Completionists are one such group of players. Completionism was the third most important motivational factor for participants in the questionnaire and it was mentioned as a factor by a higher number of participants than those who mentioned rewards. Modern games incentivize players to complete various tasks within a game through achievement systems. Achievements, or "trophies" as they are called on the Playstation platforms, are essentially a list of tasks that the player can perform. On Xbox platforms, each achievement holds a "Gamer Score" value which is added to the player's total "Gamer Score" upon completion of an achievement. Similarly, Playstation platforms has "trophies" which are tiered at bronze, silver, gold and platinum. The bronze, silver or gold properties are decided by the developers and is often based on the difficulty of obtaining the trophy. Additionally, a percentage statistic and a rarity rating is displayed with each trophy to tell the player how many other players of that specific game have managed to obtain the trophy. If a player obtains every trophy available in the list of a given game, they are awarded the platinum trophy for that specific game. Instead of giving each trophy a score which is then added to a total, the trophies on the Playstation platform are simply sorted by tier (bronze, silver, gold and platinum) and then tallied to display a total number of trophies gathered within each tier. These methods of extrinsic motivation were specifically mentioned as valuable by only three of the responses within the category. The rest of the responses with regards to completionism cited intrinsic motivation in the form of obsessive tendencies or finding enjoyment as the main driver for wanting to engage in side activity. The content of the side activity itself does not necessarily matter to these types of players, only the satisfaction gained from checking boxes.

The categories of main story context, world building/lore and full experi-

ence are all categories that pertain to a narrative aspect rather than gameplay. These players are similar to completionists in the sense that the gameplay portion of the side activity content is not the most important factor of motivation. The reward for these players is the additional exposure and context they obtain about the game world, its history and people. While other more gameplay oriented categories received a higher number of responses and as such is of a higher importance to the participants, the narrative aspect definitely plays a role as a motivational factor for a number of players. The FOMO category contains overlap between both the gameplay and narrative aspects. The responses within this category stated both fears of missing out on both rewards as well as contextual information about a game's story.

The three uncategorized answers held responses that in this instance were edge cases which could not be accurately placed into any of the categorized. One of participants responded that they do not complete side activities because they are streaming their gameplay to an audience which only wants to see the main story lines. To this participant, the most important factor is to give their audience what it wants. With video game streaming having become as popular as it is today players who stream their games might also have to consider not only what games they themselves think would be fun to play, but also what types of games would be fun for their viewers to watch. Another participant stated that they only play competitive games or attempt to make the game as challenging as possible for themselves. Competitive games rarely contain any form of significant side activities to complete. If there are any side activities, they often give rewards which make the game easier and as such work in the opposite direction of what this participant wants out of their games. The third and final uncategorized answer cited genre as an important factor when deciding whether or not to engage in side activities. For instance, they would do them in a game within the MMO genre, but not in a single player. However, if the game has content gated behind character level they would potentially engage in them to reach the minimum requirements.

5.1.2 Exploration

In terms of engaging in voluntary exploration, becoming genuinely interested in the game world and its aesthetics is by far the most important motivational factor for the participants. This is not entirely unsurprising as the activity of exploration in a game mainly involves observing the world and moving through it. It is, however, interesting to note that the factor of reward places at a thirds in terms of importance with regards to number of responses. This indicates that a large number of the participants are willing to explore simply to experience the world and its content even if there are no rewards waiting for them at the end of the road.

The category of curiosity is an interesting one in that it relates to aspects of game design that are tied to player expectations and video game conven-

tions. Multiple responses within this category mentioned "easter eggs" and secrets specifically. Easter eggs, in relation to video games, are elements that developers often place throughout a game world with the intent of bringing a nice surprise to players who go the extra mile in terms of exploration. These elements are often hidden in various ways or require the player to perform a sequence of actions in order to be activated. Easter eggs can vary from being a reference to other pop culture properties to items the player may use in the game. Placing easter eggs in a game world has become somewhat of a tradition in game development throughout the years. As such, the participants whose responses included this element will have certain expectations when engaging in exploration. While the player will not know if there are easter eggs to be found when they first set out, the possibility related to conventions in game development along with their own expectation is enough to create motivation.

A significant number of responses reported to engage in exploration simply because they find enjoyment in discovering elements within the game world. The category of fun, in the instance of exploration, is tied to a few other factors such as world building/lore, traversal gameplay and sense of agency in terms of where participants find enjoyment. Traversal gameplay was specifically mentioned in multiple responses and while the number is low, it is interesting to note that whether or not riding a horse in a given game feels good is a factor that carries weight in terms of motivating the player to explore the game world. Other participants find enjoyment not through the gameplay that exploration entails, but rather through what they find while exploring. World building/lore is similar to world interest/aesthetics but it is focused on narrative aspects instead of visual ones. Environmental storytelling is a concept within games in which the players themselves piece together a story based on what they can see in the environment of the game world. Games like *Dark Souls* does this through creating environments that are coherent with short pieces of information found in item description. The player is told very little about the story through traditional means such as NPC dialogue, but are able to understand the setting and context by observing the world and reading short snippets of lore. It is worth noting that this was the fourth most important motivational factor for exploration within the responses. Environmental storytelling works well within video games because the player is in control of their character and generally the camera as well. Sense of agency is an important concept within video games because even though they are playing in a world and by its rules, they should feel like they are in control of what happens. The responses pertaining to this category stated that it is for that exact reason they engage in exploration. The joy of encountering hidden easter eggs, items and/or little pieces of environmental storytelling outside of the game's scripted, linear progression bolsters their feeling of being in control and making an impact on the game world.

Completionism is also present in terms of exploration. Some games will only reveal parts of its map once the player has discovered the related area in

the game. Completionist responses within the area of exploration reported that revealing the map in this way is an important part of getting the satisfaction from 100% completing a game.

There were 8 answers left uncategorized with regards to motivational factors and voluntary exploration. A few of these pointed to more game development, meta oriented perspectives as motivational factors for exploration. Some of these are related to conventions, like certain areas of a game often having an "appropriate level" and as such the player is blocked by entering that area. This is common in many open world games but some games, such as *The Legend of Zelda: Breath of the Wild*, are taking more dynamic approaches by not implementing a level system and allowing the player to tackle the world in any order they like. However, the prospect of exploring for a long period of time and potentially losing this progress due to unknowingly entering a high level area, getting killed and losing progress is enough to demotivate some participants from engaging in exploration. Other responses explore in order to truly observe what the developers have created from a technical point of view. These are perhaps players that are themselves engaged professionally in game development and might therefore be appreciative of the technical achievements on a disciplinary level. The participant that streams games for their audience engage in exploration because they want their viewers to see the art and depth of the world and in turn appreciate the game to a larger degree. Again, this is stating the importance for video game streamers that the video game needs to be fun to watch as a spectator, not only for the person playing the game. The remaining uncategorized responses stated limited interest as being the main factor for not exploring a game world. These participants would rather spend their time with the game's main story and always making progression in that area.

5.1.3 Immersion

Although the majority of the participants stated that they knew what the term immersion meant, there was variety in terms of how it was described in the responses. The most frequent perception is that immersion describes a feeling or state of being either "in the game" or "a part of the game". The responses here describe a state where the participants feel like they are actually a part of the game rather than watching their actions unfold on a television screen or computer monitor. Participants also state that once this state has been obtained, they become more engaged with the characters and stories on an emotional level. This indicates that the state of immersion enhances a player's enjoyment of the narrative aspects of a game.

A segment of the answers including responses reporting a feeling of being "in the game" also describe a state very similar to that of flow. While a state similar to that of flow was described, it is interesting to note that none of the responses mentioned the term specifically. The reason for this may be that

the concept of flow is a more foreign concept compared to that of immersion among people within various video game communities. Immersion is after all the term being used in video game marketing, not flow. Nevertheless, the responses within this category describe immersion as entering a state in which one loses their sense of time and forgets about their real life surroundings. They become completely engrossed in the game's activities and narrative. How they achieve this state varies in the individual responses. Important factors being mentioned in the responses include gameplay, challenging gameplay, narrative elements and NPC interaction. This displays the subjective nature of player preferences within video games. Elements that trigger an immersive state for one particular player may have no effect on another player with different preferences and prior experiences. While none of the aforementioned responses mentioned the state of flow specifically, it is interesting to note that three participants did in fact mention it by name along with its description. This may indicate that those who are familiar with both states view them as either very similar or identical in nature as proposed by Michailidis et. al. in their 2018 study.

The category of player investment/engagement is interesting in the sense that the responses included does not only describe the state of immersion itself, but also how it is reached. The responses in the player investment/engagement describe how participants reach a state of immersion through becoming engaged with the game's gameplay or narrative to the extent where they feel a high level of investment. This feeling of being invested in the game is what they describe as the state of immersion. In this way, the category is similar to that of being "in the game" or "a part of the game". However, responses elaborate on investment as a feeling that has an effect on their daily life outside of playing the game in that they spend more time playing the game along with thoughts of wanting to play the game whenever they are not playing it.

Ludonarrative dissonance is similar to the player engagement/investment category in the sense that the responses within it describes a certain criterion for how participants reach a state of immersion. This criterion is described as a coherence among all of the various elements within a game. This includes visuals, gameplay mechanics, sound, music, narrative and so on. A game which saw criticism for its ludonarrative dissonance is *Watch Dogs 2*. While the narrative elements of the game centers around a group of hackers in their twenties fighting for social justice, the gameplay involves gunfighting with high powered automatic rifles, shotguns, handguns and gadgets. The gadgets made sense with regards to the hacker theme of the game, but the guns did not to many players. For these participants it is not any one aspect of the game that matters in particular, but rather all of these different aspects making logical sense within the theme of the game and working in tandem and to create an experience that is that feels logical to the player even though its elements are unnatural to the real world, as found by Schäbler in his 2015 analysis of unnatural elements in video games.

A total of six answers were left uncategorized with regards to immersion. Two of these answers are particularly interesting in the sense that they don't believe in the term immersion as a state one may obtain when playing a game. These participants state that the term is overused and almost exclusively applicable in a context of marketing. One of these participants even states that it is simply a term that has replaced presence or the state of flow. This could indicate a certain degree of cynicism towards the term caused by its widespread use in video game reveals and presentations at various trade shows in the industry. Other answers describe immersion as a state that one obtains based on the various aspects of a given game and genre. One participant states that immersion occurs when elements such as narrative, graphics, gameplay enriches them on a personal level. Immersion is, to them, whenever a game manages to make a positive impact on their life in a general manner and not simply a state that one reaches while playing a video game. It is somewhat similar to the player engagement/investment in the sense that it impacts the player outside of playing the game, but rather than the player being invested in the game, it is the game enriching the player. Another participant states that immersion, for them, is highly dependent on the genre. In linear story driven games, the quality of the storytelling is what pulls them into the game. With games of a more competitive nature, the participant's ability to improve their skills and affect the outcomes of the games is the factors that affect their level of immersion. This may indicate that, in addition to the various elements found within a game, the player's prior experience with certain genres may have an impact on their ability to reach a state of immersion.

5.1.4 Summary

In general, the participants' responses in terms of exploration and side activities come down to their level of enjoyment with the game. That being said, the nature of video games as a form of entertainment means that a player's opinion and preferences are highly subjective. There is a plethora of aspects within a video game ranging all the way from sound design, to narrative, gameplay mechanics and visual art style. What one player values in a certain game might be completely uninteresting to another player. There are, however, certain aspects that distinguishes themselves with higher frequencies of mention within the responses. In terms of side activities, the most important motivational factors are:

- The level of quality with which they are built and the fun factor.
- The total amount of side activities and how time consuming they are to complete.
- The player's habits in terms of having a completionist mindset.
- The reward promised and given to the player upon completing a side activity.

With regards to exploration, the four motivational factors that stand out as

most important among the participants' responses are:

- The game's ability to build a legitimate interest of the game world within the player, along with the game world's aesthetics.
- The fun factor of exploring the world in terms of discoveries and game-play.
- The rewards found organically by the player through voluntary exploration.
- The amount of world building/lore experienced by the player while exploring.

Pertaining to the state of immersion, these are the four perceptions with the highest frequency among the responses:

- The player entering a state where they feel like they are "in" the game and not watching it unfold on a screen.
- A state which is very similar to that of flow in that the player becomes completely engrossed with the game and loses their sense of time.
- A game's ability to engage a player to the extent where they feel a high level of investment and a desire to play more, even when they are not playing.
- A complete coherence of all elements within a game in order to avoid ludonarrative dissonance, thus making unnatural elements feel logical to the player.

5.2 Playtest Experiment

5.2.1 Playtest 1 and Post Playtest Questionnaire 1 (PTQ1)

It is noteworthy that three (P1, P3 and P13) out of the five participants managed to reach their target destination during the first playtest with no onboarding in terms of *Ghost of Tsushima's* wayfinding system whatsoever. Participant P3 had prior knowledge about the wind being an important element in the game, which might have been helpful for them in reaching their destination. The same three participants were also all correct in stating that they understood how the system worked after the first playtest as well as giving correct descriptions with regards to how it functions. Participant P1 did understand how the system worked during the navigational task itself without any prior knowledge of the game. P1, P3 and P13 also stated that they found the particle effects to be helpful in reaching their destination. Interestingly, participant P1 stated that these effects showed the way in absence of more direct markers. While the wayfinding system in its essence functions as a compass and is very direct in its display of direction, P1 did not perceive the system as such. This may be due to the unconventional nature of the system and how its direction is displayed using no traditional 2D/3D HUD elements. P3 and P13 rated the system at a three in terms of clarity while P1 rated it at a two, stating it was

not clear in communicating its destination. This may further indicate the above statement of the system's diegetic nature being a hurdle for some participants. This is further reinforced by the results of participants P5 and P4, none of whom reached their destination in the first playtest. Both of these participants rated the clarity and efficiency of the system at one which is unsurprising considering that they did not understand the system itself. P1, P3 and P13 all rated the effectiveness of the system at a 3. This may indicate that, while the system is not necessarily the most efficient one they have encountered, it is still above average in directing them to their destination despite of its diegetic nature. It could also be an indication of how a diegetic element might impact the various aspect of a system to different extents. In this case, the differences from a compass element on the HUD is purely in visual presentation. Based on the participants rating, there may be a suggestion that the system's clarity of communication suffers from these changes to a larger degree than, for instance, efficiency.

In terms of the wayfinding system's impact on level of immersion, P3, P4 and P13 rated it at a four which is the highest level. P4's rating in this instance should be ignored as they did not understand how the system worked at this point in the experiment and as such would not be able to rate it properly. P5, who also did not reach their destination, rated the immersion at a one, which is to be expected when the system itself is completely unclear to them. P1 rated the system at a three in addition to stating that they believed in increased their level of immersion. To summarize, the participants who understood the system gave it either an above average rating at either three or four and stated that they believed it had a positive influence on their level of immersion.

With regards to the question about familiarity, one goal was to see whether or not the participants who understood the system found it to be of a similar nature to any systems they had experienced prior to taking part in the experiment. However, none of the participants were able to make the connection between *Ghost of Tsushima's* wayfinding system and any horizontal compass system. This can be an indication that the visual presentation of a wayfinding system has a significant impact on the player's perception of said system to the extent where it feels completely new and unfamiliar.

5.2.2 Playtest 2 and Post Playtest Questionnaire 2 (PTQ2)

In the second playtest, all participants successfully reached the target destination within the navigational task. At this point, all participants had received thorough instructions on how to use the "Guiding Wind" system in that the player can swipe upwards on the controller's touchpad in order to activate a strong gust of wind. In general, there was a pattern of participants following the wind directly rather than relying on roads as they did to a larger extent in the first playtest. All participants were correct in stating that they understood how it worked and how to use it. Participants P4 and P5, who were the participants

that did not complete the first navigational task within the time limit, did still have issues with the system after the onboarding. While they understood how the system itself worked, they had difficulties perceiving the direction of the wind and particle effects along the axis towards their destination. It is difficult to state any cause for this without any further data. It could potentially be related to the visual effect itself or issues related to vision impairment as both these participants wore glasses. However, participant P13 also wore glasses and reported no issues in this regard.

Common for all participants was the fact that they completed the second playtest in a shorter amount of time than they did in the first, if they managed to reach their destination during the first playtest. While participants activated "Guiding Wind" on various occasions throughout the second playtest, all of them used it specifically as a tool to reorient themselves after having to circumvent either an environmental obstacle or a group of enemies. These facts may indicate that the use of "Guiding Wind" not only increases the player's efficiency in reaching their destination, but also that it serves as a necessary tool of reassurance in terms of confirming the player's current direction relative to their destination.

In terms of ratings, there is a general increase in terms of level of clarity and efficiency. None of the participants gave the wayfinding system a rating of one in terms of clarity or efficiency after the second playtest. Out of the two participants P4 and P5 who had perception issues during the second playtest, only P5 rated the system at a lower end of the spectrum at a two while P4 rated it as a three. It could be that P5 experienced these issues to a higher degree than P4. P1 stated that the system did not clearly communicate the direction of the destination after the first playtest, but that it did so after the second playtest. However, their rating remained unchanged at a two. For P1, while the "Guiding Wind" effect made the system clearer, it did not create a large enough impact on the gameplay to warrant a change in the clarity rating. P13, however, did change increase their rating from the first playtest to the second playtest, giving it a four instead of a three. For P13, in this case, the extra utility of activating "Guiding Wind" may have enhanced their experience to a larger extent than in the case of P1.

The instructions seem to have had a similar effect on P13's rating in terms of efficiency, as this was also increased from a three after the first playtest to a four after the second playtest. The most significant change in rating in terms of efficiency came from participant P5 who gave it a one after the first playtest and a three after the second playtest. While this is not too surprising considering that the participant did not understand the system until after the onboarding, it is worth noting that it had such a significant impact on their rating even though the participant experience issues in terms of clarity. P1, who also gave the system a clarity rating of two, scored it as a three in terms of efficiency. This could potentially indicate that a system such as this one can be perceived as being effective by the player even though it is not necessarily completely clear

in its visual communication.

With regards to immersion, all participants, except for P5 stated that the wayfinding system enhanced their level of immersion after the second playtest. P1 initially answered that the system did not enhance their level of immersion after the first playtest but still gave it a rating of three. After the second playtest, P1 stated that it did in fact enhance their level of immersion but lowered their score to two. This could perhaps indicate that the onboarding gave P1 a context and understanding of the system which made their perception of it more positive in terms of immersion, but the fact that they themselves could control the wind felt unnatural causing them to give it a lower score. P3 may have had a similar effect in that while they stated that the system did enhance their level of immersion after both playtests, they lowered their score from a four to a three. This could potentially point to tutorialization having a negative effect on a player's level of immersion.

The participant's feeling of familiarity with the system did not change from the first to the second playtest which, once again, may suggest that the presentation of the wayfinding system is so unique in its nature to the extent where it completely obscures its underlying functionalities.

5.3 Research Limitations

The results found in the playtest experiment can not be viewed as conclusive due to a low number of participants. The nature of the experiment did require the participants to meet certain criteria (such as a base level of video game experience and knowledge of the term *immersion* which limited the number somewhat, but the main reason was only being able to use local participants due to travel restrictions during the Covid-19 pandemic. In addition, the original method designed for the experiment would have been stronger in terms of the onboarding process in order to ensure that certain groups of participants had absolutely no prior knowledge of the game *Ghost of Tsushima* as opposed to having briefly heard of it or having more extensive knowledge of it. Another challenge is the limited amount of diegetic elements to test available in modern video games. It is not yet a widespread phenomena, especially outside of virtual reality platforms. Creating and testing game prototypes where various traditional gameplay aspects are replaced by custom diegetic elements may yield more flexibility in terms of focusing the research, but it will also be more time consuming.

The questionnaire relied on the participants self-reporting which may not always reflect reality, but rather the participant perception at a certain point in time. There may be a need for additional cross-validation by, for instance, measuring the participants' perception of immersion from a predefined set of definitions as opposed to asking the participants directly with a free text answer. Additionally, one could directly ask questions with regards to immersion and flow and whether or not the participants see these as identical or as two

separate concepts and/or states.

5.4 Conclusion

In this project, we have explored the preferences, habits and motivational factors among video game players with regards to voluntary exploration, side activities and immersion. Video games remain a field of subjective opinions. However, there are certain aspects, like the level of quality within a side activity or the game world aesthetics with regards to voluntary exploration, that stand out in terms of importance to the player. The term *immersion*, still not clearly defined, is shown to vary based on subjective opinion. Here too, however, there are descriptions that stand out with a higher frequency in the responses, such as immersion's similarities to the state of flow.

The data obtained from the playtest experiment, while not conclusive in its results, contain indicators to potential factors such as a diegetic element's impact on a gameplay system's clarity versus its efficiency. With a larger amount of participants, one may be able to clearly define the compromises made by game developers when implementing such a system. These factors may hold value in terms of which directions to further study this area of research.

5.5 Future Work

As seen in the results from Questionnaire 1 (Q1) a significant number of participants describe the state of immersion as something that is similar, if not identical, to the concept and state of flow. Further research could include the continuation of creating a differentiation between the concepts of immersion and flow, and whether or not there is a significant enough difference to warrant separate definitions. Another direction to take further studies could be to continue to the work of attempting to more clearly define the term immersion itself. It is evident from the results of Q1 that, while some definitions received a higher number of responses, there is no clear definition among participants.

While the results from the playtest experiment cannot be viewed as conclusive, there may be certain indications present. For instance, future studies could investigate if and what effects diegetic elements have on the various aspects of a system. The level of clarity has a lower score in general than the level of efficiency among participants in the experiment. Whether or not the visual presentation of a diegetic element is something that potentially affects the level of clarity to a larger degree than the effect it has on the level of efficiency is, as previously stated, inconclusive. However, it is a study that could yield useful data in terms of the trade offs one makes as a developer when designing a system of diegetic elements. If one decides to implement a diegetic system, perhaps it may suffer in clarity while leaving efficiency unaffected and immersion enhanced. One could then make an educated decision in terms of what

qualities to prioritize.

Furthermore, to reach a conclusive result with regards to the research questions the project poses, the experiment would need to be conducted with a larger amount of participants. In general, a diegetic system such as the wayfinding in *Ghost of Tsushima* or the health and stasis bars in *Dead Space* are larger in scope than traditional HUD elements in terms of development time and cost. As such, there can be value in reaching a conclusive result here in the sense that developers will gain a better understanding of how diegetic elements affects various aspect of a game, if it is having a desirable effect and if it is worth implementing.

Finally, the issue of perception that participants P4 and P5 had with *Ghost of Tsushima*'s wayfinding system is an interesting case because the system itself is so unique in its way of communicating directional information to the player. The reason for these issues are not clear. While both participants reached their destinations, it could be a potentially game breaking problem as the player is absolutely reliant on the wayfinding system to be able to progress in the game. Whether the cause may be a factor related to the effect itself, the camera angle or of the player's specific type of visual impairment, it could be important to document with further research in terms of ensuring accessibility among different types of players.

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Appendix A

Questionnaire 1

Purpose

This questionnaire is one part of a larger master study pertaining to diegetic elements in video games. The aim of this questionnaire is to gather data on your general preferences and habits with regards to playing video games. You will be asked various questions with regards to video games, genres and play styles. The data gathered is completely anonymous and can not be traced back to you as a participant, in any way. The questionnaire should take around 5–10 minutes to complete.

Who is responsible for the study?

This master study is being conducted by Jakob Solheim, a student of Master in Interaction Design at NTNU in Gjøvik, and supervised by Mariusz Nowostawski, Associate Professor.

What is required from you as a participant?

Most of the questions in this questionnaire have multiple choice answers, in which you can choose the one that best suits your habits, preferences or opinions. Some questions have text answers where you may write your answers in a free form format. The answers to the text questions may be as brief or as detailed as you prefer.

Participating in this study is voluntary?

Participating in this study is completely voluntary, and you may cancel your participation at any time during the survey. In the case that you choose to cancel your participation in the study, your answers will not be stored or used in any way.

Your privacy - how we store and use your data

The data collected will become part of an anonymized data set and are completely unidentifiable.

What happens to your data when the study is finished?

Once the study is completed, the data will be deleted. The estimated date of completion is 01.06.2021

Where can I find out more?

If you have any additional questions with regards to this questionnaire or the

study in general, please do not hesitate to contact me. You can reach me at jakobso@stud.ntnu.no. You may also contact my supervisor in this project, Mariusz Nowostawski, at mariusz.nowostawski@ntnu.no.

1. Declaration of consent
 - a. By ticking this box, I agree to having read and understood the purpose, data handling and my rights as a participant with regards to this questionnaire. I agree to take part in the questionnaire as a participant in accordance with the above informed consent form. I still have the option to cancel my participation at any time.
2. What is your gender?
 - a. Female
 - b. Male
 - c. Other
 - d. I prefer not to say
3. What is your age?
 - a. 18 - 24
 - b. 25 - 35
 - c. 36 - 40
 - d. > 40
4. How often do you play video games?
 - a. Every day
 - b. Every week
 - c. Every two weeks
5. On days where you play, how much time do you spend playing video games?
 - a. Less than one hour each day
 - b. 1 - 4 hour(s) each day
 - c. More than 5 hours each day
6. Please rate these from your favorite (1) to least favorite (9) video games genre
 - a. Linear action games
 - b. Role playing games
 - c. Open world action/role playing games
 - d. First person shooters
 - e. Puzzle games
 - f. Strategy games
 - g. Racing Games
 - h. Simulation games
 - i. MMO

7. Which platform(s) do you play video games on?
 - a. Playstation 4
 - b. Playstation 5
 - c. Xbox One (Standard and/or X)
 - d. Xbox Series X/S
 - e. Nintendo Switch
 - f. Windows
 - g. MacOS
 - h. Linux
 - i. Mobile
8. Games often offer various side activities to complete, such as side quests not necessarily related to the main objective or story. What is your attitude towards such activities?
 - a. I try to complete all side activities in a game in addition to the main objectives.
 - b. I usually complete some side activities, but not all.
 - c. I do not care about side activities in video games.
9. Can you briefly explain your reasoning behind the answer you gave on the last question (Question 4, related to side activities)?
 - a. Free text
10. Some games allow you to explore the game's world at your own leisure. Do you engage in voluntary exploration when you play video games?
 - a. Yes
 - b. No
11. Why do you/do you not engage in exploration in video games?
 - a. Free text
12. Are you familiar with the term "immersion" with regards to video games?
 - a. Yes
 - b. No
13. Can you briefly explain what the term "immersion" means to you with regards to video games?
 - a. Free text

Appendix B

Participant Selection Questionnaire

Purpose

This questionnaire is one part of a larger master study pertaining to diegetic elements in video games. The aim of this questionnaire is to gauge your knowledge and experience with regards to video games. The data will be used to select participants for a future, in-person play test experiment which will take place at Mustad Næringspark in Gjøvik. If you are selected to participate, you will be contacted by me with further information.

Who is responsible for the study?

This master study is being conducted by Jakob Solheim, a student of Master in Interaction Design at NTNU in Gjøvik, and supervised by Mariusz Nowostawski, Associate Professor.

What is required from you as a participant?

Most of the questions in this questionnaire have multiple choice answers, in which you can choose the one that best suits your habits, preferences or opinions. Some questions have text answers where you may write your answers in a free form format. The answers to the text questions may be as brief or as detailed as you prefer.

Participating in this study is voluntary

Participating in this study is completely voluntary, and you may cancel your participation at any time during the survey. In the case that you choose to cancel your participation in the study, your answers will not be stored or used in any way.

Your privacy - how we store and use your data

The data collected will become part of an anonymized data set and are completely unidentifiable.

What happens to your data when the study is finished?

Once the study is completed, the data will be deleted. The estimated date of completion is 01.06.2021

Where can I find out more?

If you have any additional questions with regards to this questionnaire or the study in general, please do not hesitate to contact me. You can reach me at jakobso@stud.ntnu.no. You may also contact my supervisor in this project, Mariusz Nowostawski, at mariusz.nowostawski@ntnu.no.

1. Declaration of consent
2. Please input the ID number you were given by Jakob.
 - a. Free text
 - a. By ticking this box, I agree to having read and understood the purpose, data handling and my rights as a participant with regards to this questionnaire. I agree to take part in the questionnaire as a participant in accordance with the above informed consent form. I still have the option to cancel my participation at any time.
3. What is your gender?
 - a. Female
 - b. Male
 - c. Other
 - d. I prefer not to say
4. What is your age?
 - a. 18 - 24
 - b. 25 - 35
 - c. 36 - 40
 - d. > 40
5. How often do you play video games?
 - a. Every day
 - b. Every week
 - c. Every two weeks
6. On days where you play, how much time do you spend playing video games?
 - a. Less than one hour each day
 - b. 1 - 4 hour(s) each day
 - c. More than 5 hours each day
7. Can you list your top three favorite video game genres?
 - a. Free text
8. Which platform(s) do you play video games on?
 - a. Playstation 4
 - b. Playstation 5
 - c. Xbox One (Standard and/or X)
 - d. Xbox Series X/S
 - e. Nintendo Switch

- f. Windows
 - g. MacOS
 - h. Linux
 - i. Mobile
9. Are you familiar with the term “immersion” with regards to video games?
- a. Yes
 - b. No
10. Can you briefly explain what the term “immersion” means to you with regards to video games?
- a. Free text
11. Do you have experience with the game *Ghost of Tsushima*?
- a. No, I have never played it
 - b. Yes, I have played it for 1-4 hour(s)
 - c. Yes, I have played it for 5-10 hours
 - d. Yes, I have played it for more than 10 hours

Appendix C

Playtest Experiment Materials

C.1 Playtest Experiment Protocol

Before participant arrives

1. Remotely contact participants and ask whether or not they have any symptoms related to Covid-19.
2. Disinfect all equipment and furniture that the participant will come in contact with.
3. Check room lighting temperature for deviations.
4. Load appropriate save state for beginning of playtest.

Participant arrives

1. Meet and greet
 - a. Hand out sanitizer and facemask.
 - b. Brief them on steps taken to avoid spread of Covid-19.
2. Briefly explain the experiment
 - a. Explain bare minimum basics (controls and enemy indicator).
 - b. Playtests - We will not communicate during the tests, but I may take some notes. The gameplay will be recorded. Stay on the horse for traversal, and you are not allowed to use the map. Please tell me if you feel completely lost and want to give up the playtest.
 - c. You will be asked to complete the first of two questionnaires. The first one is based on the first playtest.
 - d. You will be given instructions on how to use the wayfinding system.
 - e. Second playtest - same task as in the first playtest.
 - f. You will then complete a second questionnaire based on the second playtest
3. Participant reads consent form and agrees to take part in the experiment.
4. Explain bare minimum controls and present controller cheat sheet.
 - a. **Control horse:** Left stick

- b. **Gallop:** Press left stick
 - c. The horse jumps automatically, you do not need to press any button for that purpose.
 - d. **Control camera:** Right stick
 - e. **Call horse:** Left button on directional pad
 - f. **Mount horse:** R2 (right trigger)
 - g. Explain detection indicator with image and how to avoid combat.
5. Participants performs first playtest, navigating from a preset point A to a preset point B. They either succeed or reach the 10 minute time limit.
 6. The Participant completes first questionnaire while I save and edit the footage from the first playtest.
 7. A talk with instructions on how to properly utilize the "Guiding Wind" wayfinding system.
 8. Second playtest - same navigational task as in the first playtest.
 9. The participants completes the second questionnaire while I save and edit the footage from the second playtest.

Participant leaves

1. Disinfect all equipment and furniture that the participant has been in contact with.
2. Export playtest footage from Playstation 4 to external drive.

C.2 Controller Cheat Sheet

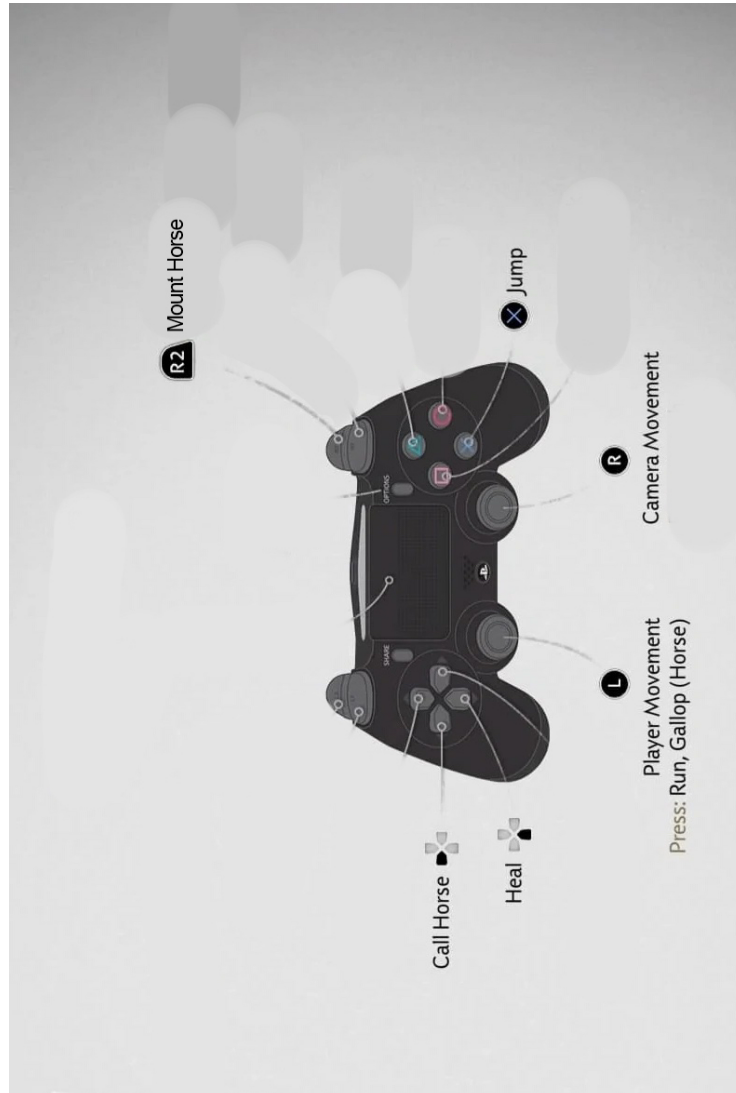


Figure C.1: A cheat sheet given to participants with controls relevant to the playtest experiment.

C.3 Post Playtest Questionnaire 1 (PTQ1)

1. Please input the ID number you were given by Jakob
2. Had you heard of the game *Ghost of Tsushima* prior to participating in this experiment? (Had you heard about it, watched it on Youtube, played it?)
 - a. Yes
 - b. No
3. **(If "Yes" on question 2)** How did you learn about the game? (Please check all the answers that apply to you)
 - a. I have read about it.
 - b. I have watched gameplay.
 - c. I have heard about it through word of mouth
4. **(If "Yes" on question 2)** Can you briefly explain to what extent you were familiar with the game, and if there were any channels you used other than those mentioned in question 2? (For example: Have you watched an entire playthrough or only seen a trailer? What about alternative channels of information, did you use any other than those listed in question 2 to gain insight about the game?)
5. Did you reach your destination in the navigational task?
 - a. Yes
 - b. No
6. Did you understand how the wayfinding system worked?
 - a. Yes
 - b. No
7. **(If "Yes" on question 6)** Can you briefly explain and specify how the wayfinding system works?
 - a. Free text
8. Were the environmental particle or wind effects in any way helpful to you?
 - a. Yes
 - b. No
9. **(If "Yes" on question 8)** In what way were they useful?
 - a. Free text
10. Did the wayfinding system clearly communicate the direction of your destination?
 - a. Yes
 - b. No

11. Please rate the clarity of the wayfinding system. (On a scale from 1 (not clear) to 4 (very clear), how would you rate the wayfinding system's level of clarity?)
 - a. Likert scale 1 - 4
12. Did you find the wayfinding system effective?
 - a. Yes
 - b. No
13. Please rate the effectiveness of the wayfinding system. (On a scale from 1 (not effective) to 4 (very effective), how would you rate the effectiveness of the wayfinding system?)
 - a. Likert scale 1 - 4
14. Did the wayfinding system enhance your level of immersion?
 - a. Yes
 - b. No
15. Please rate your level of immersion based on the wayfinding system. (On a scale from 1 (low level) to 4 (high level), how would you rate your level of immersion based on the wayfinding system itself?)
 - a. Likert scale 1 - 4
16. Did the wayfinding system itself seem familiar/unfamiliar to you based on your previous experience with video games?
 - a. It was familiar
 - b. It was somewhat familiar
 - c. it was completely unfamiliar
17. **(If "It was familiar" or "It was somewhat familiar" on question 16)** Which elements of the wayfinding system felt familiar, and which games did it feel similar to?
 - a. Free text
18. **(If "It was completely unfamiliar" on question 16)** Which elements of the wayfinding system felt unfamiliar?
 - a. Free text

C.4 Post Playtest Questionnaire 2 (PTQ2)

1. Please input the ID number you were given by Jakob
 - a. Free text
2. Did you reach your destination in the navigational task?
 - a. Yes
 - b. No
3. Did you understand how the "Guiding Wind" wayfinding system worked?
 - a. Yes
 - b. No
4. **(If "Yes" on question 3)** Can you briefly explain and specify how the "Guiding Wind" wayfinding system works?
 - a. Free text
5. Had you learned about the "Guiding Wind" wayfinding system mechanics prior to participating in this experiment?
 - a. Yes
 - b. No
6. Did the wayfinding system clearly communicate the direction of your destination?
 - a. Yes
 - b. No
7. Please rate the clarity of the wayfinding system. (On a scale from 1 (not clear) to 4 (very clear), how would you rate the wayfinding system's level of clarity?)
 - a. Likert scale 1 - 4
8. Did you find the wayfinding system effective?
 - a. Yes
 - b. No
9. Please rate the effectiveness of the wayfinding system. (On a scale from 1 (not effective) to 4 (very effective), how would you rate the effectiveness of the wayfinding system?)
 - a. Likert scale 1 - 4
10. Did the wayfinding system enhance your level of immersion?
 - a. Yes
 - b. No
11. Please rate your level of immersion based on the wayfinding system. (On a scale from 1 (low level) to 4 (high level), how would you rate your level

of immersion based on the wayfinding system itself?)

- a. Likert scale 1 - 4
12. Did the wayfinding system itself seem familiar/unfamiliar to you based on your previous experience with video games?
 - a. It was familiar
 - b. It was somewhat familiar
 - c. it was completely unfamiliar
 13. **(If "It was familiar" or "It was somewhat familiar" on question 12)** Which elements of the wayfinding system felt familiar, and which games did it feel similar to?
 - a. Free text
 14. **(If "It was completely unfamiliar" on question 12)** Which elements of the wayfinding system felt unfamiliar?
 - a. Free text

