

How UI design affects the gameplay experience in three third-person action-adventure games

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Through the years video games have come a long way, from coding experiments to commercialized products to part of pop culture and finally to the biggest entertainment industry to date. For the bigger part of the journey user interfaces have been an important element of games. The objective of this study is to analyze how the most active game user interfaces affect the gameplay experience, from both the eyes of an user interface designer as well as a player. This is achieved through a case study which includes three third-person action-adventure games that were released in the years 2018-2020. *Last of us part II* (Naughty Dog, 2020), *God of War* (Santa Monica Studio, 2018), *Red Dead Redemption II* (Rockstar Games, 2018). The case study is based on 25 hours of gameplay of each game. To deduct and describe the game user interface design elements and their phenomena accordingly, the study delves into game user interface terminology and encompasses different game user experience design principles.

The central findings include a thorough analysis on each case, dissection of each user interface element and how the interaction with said element affected the experience. The study separates what elements in the user interfaces had an impact in the gameplay experience into three lists: Designs that positively affected the experience, designs that neither positively nor negatively affected the experience and designs that negatively affected the experience.

The conclusion draws a parallel between the designer's intention for the purpose of the user interface and how the player experiences said interface.

Avainsanat Game design, user interface design, heads-up display, diegetic design, non-diegetic design, spatial UI, meta UI

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1 Introduction

The study is an empirical case study to define how user interface design affects the player experience in recent high budget video games.

The study revolves around deconstruction of central user interface and user experience elements in three third-person action-adventure games that were released in the years 2018-2020. Other studies on the area have mainly focused on psychology of play and the inclusion or exclusion of heads-up displays in gaming, many of which have encompassed either theory or studied big user groups. What this study aims to bring is a more in-depth view of a single user's experience on three cases, while applying an user interface designer's view to the analysis. The study aims to serve as a case study, based on design and game design principles, and review how they are included in the three games.

The focus of the study is on a singular user's experience for the purpose of retaining the user interface designer's viewpoint through the process of gameplay. This aims to reach a deeper insight to the user interface designer's choices. The study is conducted on a *Playstation 4* - console to retain a somewhat similar hardware through the different games. The aim of the study is not to review the games or the user interface principles, but to observe how they are implemented in the cases and how that affects the user's experience.

Video games have become a bigger and bigger industry in the past ten years, to the point where video games have become the most lucrative industry in entertainment. According to a *Global Games Market Report (Newzoo, 2020)*, the global revenue of game industry in the 2019 was 145.7 billion USD, followed by box office with 42.5 billion and the music industry with 20.2 billion in total revenue.

Video games are also a big industry for people with a background in art and design, such as myself. I have an extensive history of playing video games and even have made some, non-commercial games myself. My experiences with small scale video game development taught me that my passion in the industry is more on the side of designing the visuals and gameplay mechanics, than coding and developing the game myself. Through the years, my interest in games has stayed and I keep myself up to date on the industry's news daily. I have always had a good eye for aesthetics, but only lately, due to user interface design becoming an increasingly larger part of my studies, I've started to focus more (and more) on user interface design on games. I want to see the industry grow from inside and I view the game design as a highly

potential field of work in my future career. Thus, an additional goal for the study is for it to work as a basis for a future career.

2 Terminology

2.1 Terms and their meanings

User Interface, from now on referred to as UI, is any kind of a series of screens, boxes and buttons that is used to interact with a product or a service. The products and services can vary vastly from machines to softwares and in this case, mostly to virtual environments, such as video games. In short, user interface design is a practice of creating easily understandable and accessible interfaces, while maximizing usability. When referring to a UI element, the writer means a singular part of an interface that specializes on a described function.

User Experience, from now on referred to as UX, is how the user interacts with the said product, which in this case refers mostly to the UIs presented. Good UX design leaves the user with a positive experience on the service.

Heads-up display, from now on referred to as HUD, is a common user interface in games, which conveys a variety of information to the player while playing. HUDs can include player health, stamina, quest markers, miniature map, item shortcuts and more. There is very little statistics on game UI, but from personal experience, I would estimate that most video games on the market have some kind of a HUD. A common HUD is placed in the foreground of the game's visual interface, while most of the actions and interactions of the gameplay are visible behind it. A HUD serves as an interface for additional information of the player's situation.

3 Methodology

3.1 Multiple case study

The study is conducted as a multiple case study. A case study is a research method, in which the researcher picks a case, or cases and studies and analyzes it and its surrounding phenomena. According to *J. Seawright & J. Gerring (2008)* in their paper “*Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options*” there are seven ways to

choose the case itself, ranging from similarity to most extreme. The cases of this study are chosen by influence, which is also one of the seven case selection strategies. In this study, the influence of the cases is based solely on their commercial value. The three cases chosen represent the high-budget side of the action-adventure game genre, with *Last of us part II* (2020) selling 4 million copies during its release weekend (Lempel, 2020). *The God of War* (2018) had a similar release, selling 3.1 million copies during its opening weekend (Chapman, 2018) and the *Red Dead Redemption II* (2018) selling over 17 million copies in the weeks after its release (Dring, 2018).

All of the following cases have held somewhat similar records in sales, which can partly be credited to the game's high development and marketing budget. The high development budget of the chosen cases should, in theory, produce high quality results in the UI/UX department as well, which is the primary reason for their inclusion.

3.2 Design theory

Case studies are often supported by theory surrounding the cases context. The next part delves into the design theory, values and principles that support the case study.

3.2.1 UI/UX design values

There are many ways to approach designing a UI. Most rather complicated and word heavy. Radka Nacheva slims the central UI design principles to categories of aesthetics, consistency, feedback, efficiency, security, and prevention of errors (Nacheva, 2015). All of these are important from a game design viewpoint, but for the purpose of this study, we will concentrate on the first four.

3.2.2 UI/UX design theory & principles in games

Designing a video game UI has many similarities to any other user interface design job, it needs to look good, it needs to work. But video game user interfaces have a lot more into them than just the usual blocks and buttons. These elements and philosophies aim to blend the interfaces and user experience closer together.

The values of game design can vary greatly depending on what the wanted outcome is. The value categories can vary from player centric approach to designs that value commercial success, to artistic freedom. The central values that I will focus on, shall be usability and playability, accessibility and immersion, which all work towards a positive user, or in this case, player experience. (*Kultima, Sandovar, 2016*)

In recent years there has been lots of talk about intuitive design, as smartphones have started focusing on being more accessible to people without prior experience with touch screens, such as the elderly (*Polyuk, 2018*). Intuitive design means that when the user sees the design, the familiar design elements guide the user to gather instantly what to do. Intuitive design practices concentrate on ease of use by making possible interactions simple, familiar, and understandable and for the important functions to be reached with as small number of inputs as possible. Intuitive design creates engaging interfaces by removing excess distractions from the screen. As intuitive design removes a layer of conscious decision making, it helps the user to gather and receive information faster as well. In games this is especially important, as most of the interactions with the game world happen in real time. A good game user interface balance between being simple and giving enough information, without cluttering the screen with too much. A good game UI is achieved when a player can lose themselves in the game world, focusing only on the information presented and reacting with an according interaction. This gives way to cognitive flow state.

The concept of flow state tracks back to 1975, when its name was coined by psychologist Mihály Csíkszentmihályi. His book *Flow: The Psychology of optimal experience (1990)* talks about the subject: “During flow, attention is freely invested to achieve a person’s goals because there is no disorder to strengthen out or no threat for the self to defend against... The self becomes differentiated as the person after a flow experience feels more capable and skilled. Flow leads to integration because thoughts, intentions, feelings and the senses are focused on the same goal.”

Flow is a mental state where the person is completely immersed in their task. Other characteristics of a flow state is the heightened focus and enjoyment, even if the task is challenging. Negative experiences such as distractions, annoyances and surplus or lack of difficulty can prevent the subject from accessing a flow state. There is a lot of literature on how flow affects gameplay experiences positively, and as heightened enjoyment of the activity is a description of the flow state, leads us to believe that the game design should strive for the player

to reach this mental state. In the book Csíkszentmihályi also lists seven components of enjoyment that lead to the cognitive flow state (*Csíkszentmihályi, 1990*). Of the seven components, two guide UI design: Immediate feedback and sense of control over one's actions. Thus, the interaction with the UI should be responsive as well as informative, for it to support the acquisition of a flow state.

B. Cowley et al. goes deeper into the interaction and acquisition of flow state in relation to game design, in their paper *Towards an understanding of flow in video games*. In the paper they talk more about gameplay interactions and design, but their adapted user-system-experience (USE) model can be helpful to visualize optimal interactions between the player and the interface with the cognitive flow state as the goal (*Cowley et al., 2008*).

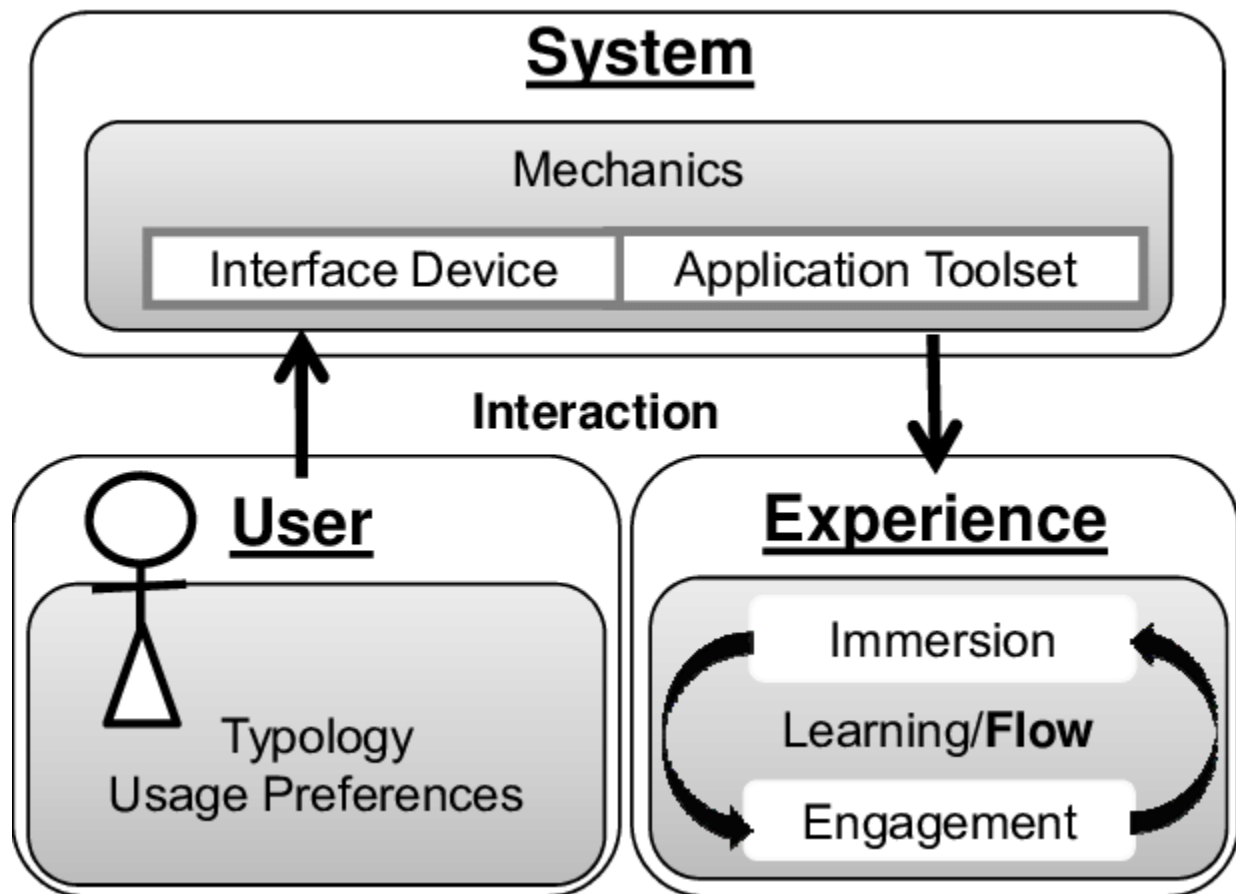


FIGURE 1: User-system-experience model. (*Cowley et al., 2008*)

The model shows the user's interaction with the interface as a crucial part of the user-system-experience towards the flow state, which in their model consists of a cycle of immersion and

engagement. To achieve flow, the interaction with the system needs to be seamless. From this we can also deduct that the immersion and engagement of a user are values that game design should pursue.

With an increasing focus on user engagement and immersion, the balance between too much and too little is not simple. If a game needs to convey more information to the player than the interface can fit, there is a solution for that as well.

There are many ways to give a player information, ranging from superimposed interfaces that exist for the information only and not in the game world, to their exact opposite, diegetic interfaces. The term refers to diegetic storytelling, which concentrates on telling the story from an “inside perspective”, revealing bits of the world through how the characters interact with the story. In video games, diegetic elements are anything that is part of the games world or story, something that the characters in the world could interact with. This is often done to increase the realism and immersion in the game (*Iacovides et al., 2015*). A great example of a diegetic interface can be found in *Dead Space* (*Visceral Games, 2008*), which was also coined as a very immersive and engaging experience, by many critics.



FIGURE 2: Diegetic UI in *Dead Space* shows health and stasis meters as part of the players armor, and ammo as part of the gun design. (*Dualshockers, 2008*)

The counterpart to diegetic UI design is the non-diegetic UI, which also more often than not, represents the traditional UI design. The non-diegetic UI design is everything that is not in the game world or story, nor interactable by the characters in it. Most menus and game displays consist of multiple non-diegetic UI elements such as health bars, helpful text pop ups, ammo and item displays and a map or a compass. Combination of said elements creates the Heads-up display UI. Most heads-up displays are non-diegetic, with some sci-fi and flight games being an exception. The choice and placement of the non-diegetic UI elements are game sensitive, and some games use this to their advantage to play against the common elements, but the ones in this study are all consistent to the genre.

Ionanna Iacovides et al. talk about the non-diegetic game elements relation to player immersion in their paper *Removing the HUD: The impact of non-diegetic game elements and expertise on player involvement*: “Clearly, some non-diegetic components, such as music, can add to an experience by increasing excitement and tension. However, it could be argued that monitoring additional visual elements on the interface might distract from the narrative of the game and therefore have a negative impact on the experience of playing. Further, while novices are probably more reliant on non-diegetic elements, experts might actually have a better experience without them.” (Iacovides et al., 2015)



FIGURE 3: Non-diegetic HUD in *Doom Eternal* (id Software, 2020), with elements such as quest markers, ammo, abilities, health, crosshair and much more.

Spatial and Meta UI design elements are less major, but still often found in games. Like diegetic and non-diegetic design philosophies, their design philosophy is grounded to the game narrative as well.

Spatial UI is something that is in the game space, but not in the game story, for example a hovering interaction pop up, or a visual pathfinding line. These can streamline the gameplay a lot, especially for more inexperienced players that may not have the “game-sense” to know what they can interact with, or where they should go. The spatial UI designs can give a lot of gameplay specific, or story information in the 3D plane of the game. Spatial UI:s weakness is that it being a more of a game-like UI element, the players immersion might not be achieved as easily. The overuse of helpful spatial UI elements may create backlash from the more experienced gamers, for the design holding the players hand too much. For the same reason, the game designers have started including options to turn certain HUD or UI elements off in the recent years.

Meta UI on the other hand is the counter to spatial, being part of the game story, while not the game space itself. Meta UIs can often be found in first person shooters, as a primary or a secondary way of visualizing the players health, with the Meta UI appearing as blood splatter on the screens 2D plane. Meta UIs strength is the clear indication of the information as part of the game screen. Meta UI can fill the screen with information, whether it’s a see-through overlay, or a muddled screen border, or a virtual phone screen.

4 Case study

With the values and the principles as a basis to the analysis we can make deductions on what the designer wanted to achieve with each UI element. Theoretical knowledge of the intention of the designer, gives us the possibility to determine how well the design serves its purpose. With this, we can not only evaluate the gameplay value of each UI element, but also the elements potential as well. The purpose of this case study is to serve as an expert review of such, evaluating usability problems in the design. For the review to be more rounded, the often-used Heuristic Evaluation guidelines will be substituted by the values and the principles of both traditional and game UI/UX design. On top of this I will also give my input on the UI elements, through my experience with them as an user, further analyzing the user experience with the background as an UI/UX designer.

4.1 Anatomy of a common action-adventure HUD

Different game genres lean towards different UI elements due to different needs. In most of the cases, the UI for an action game differs completely, for example, from a more tactic-focused games UI. For the purposes of this analysis, I compiled a diagram of common elements in action-adventure genres heads-up displays. The diagram is purely based on my own personal experience, as most of the case studies observations are as well. None of the action-adventure games are required to have these elements in their HUD to be recognized as action-adventure games, but the combination of certain UI elements may sometimes affect the games genre as well.

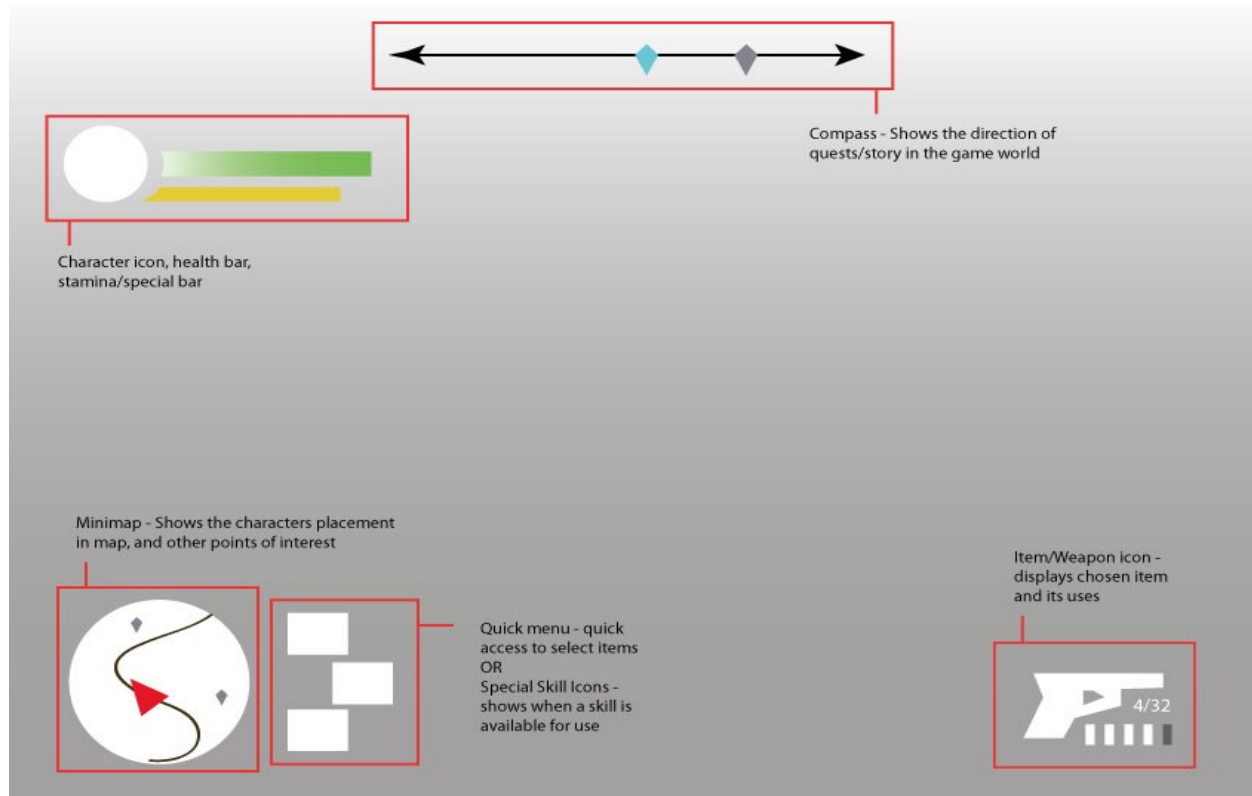


FIGURE 4: A diagram visualizing the anatomy of common Heads-up display elements in action-adventure games

4.2 Pre word

Hardware used was a *Playstation 4* -console, which narrows the games down, but game design elements as well, as all the games were designed to be used with a controller.

Arguably the games differ from each other greatly, if viewed from a gameplay or a story perspective. Still, all the games fall under the broad hybrid-genre of action-adventure, which combine elements of exploration and action, latter often referring to combat.

It is also important to note that the majority of the control schemes in the chosen games overlap, with some minor exceptions such as the main interaction button and the inventory button. The chosen games share the third-person perspective which means that the default camera is placed behind or over the shoulder of the player character. All of the games are single player games.

All of the games have one or more earlier installations, so the UI:s that you see has been polished from before. Although analyzing the UI:s that led to these ones would be insightful for the purpose of determining the UI designs growth, we will not delve into the earlier installations and will observe each UI as an isolated design. The primary focus is the UI:s that are actively

used during gameplay, thus affecting the experience more than interfaces that are activated once or twice during play time, such as a main menu or a pause menu.

4.3 Last of Us Part II

4.3.1 Introduction and Basics - central gameplay elements, mechanics, genre

The Last of Us Part II (2020) is a sequel to the critically acclaimed third-person action-adventure game *The Last of Us (2013)*. The game is set in a post-apocalyptic United States, which was plunged into chaos by a zombie virus. You play as two characters on opposite sides of a conflict, their story intertwining.

The gameplay consists of exploration, looting, stealth, and combat. There are also semi-interactive elements such as interactive cutscenes called quick time events. The central gameplay element is the combination of stealth and combat. The combat mechanics consist of traps and throwable weapons, melee weapons and ranged weapons, some loud and some quiet. While the quiet ones, like a bow, are more suitable for stealth, they are often harder to use as well. This creates a dynamic difficulty in the game, depending on the player's chosen playstyle. The enemies vary from different types of zombies, which most focus on dealing damage to the player by melee, to humans that employ more tactics and have a variety of ranged weapons in their arsenal. Although how the gameplay looks, depends on the player's approach, the game has a clear emphasis on ranged weapon combat, making it a third-person shooter.

The game level design is linear, which means that the player does not have access to every area they see. This can affect the immersion, but if done well, the game only feels more polished and the world more intricate and alive.

The following observations were made during eight play sessions, totaling to 25 hours game time.

4.3.2 Diegetic UI design

Many of the UI interactions are both non-diegetic as well as diegetic. When the player interacts with the UI, so does the in-game character with the corresponding diegetic element. For example, when you access your non-diegetic inventory, either for crafting or for equipment

changes, the character interacts with the corresponding diegetic inventory, the backpack. While not interacting with the UI, the backpack works as a diegetic HUD for the character's equipment for things such as: what primary and secondary weapons are equipped, arrow ammo, as well as the melee weapon, if the character is carrying one.

Last of us part II, henceforth referred to as *LOU2*, focuses on immersion, which can be seen from the fact that most of the non-diegetic UI elements have a corresponding diegetic element. This is present even if the non-diegetic UI elements would be the main way of conveying information. One such element is the character's health. When the player character is damaged by an entity, the health bar not only decreases, but the player model is damaged as well. This can be seen as bruises and cuts and bleeding through parts of clothes and when the player uses a health item, the character patches themselves up as well by stopping the bleeding with gauze strips. Although visual, the diegetic part of the health system is rarely more viable information wise than the health bar, especially in combat, so it is there more for the purpose of immersion.

4.3.3 Non-diegetic UI design

The game's non-diegetic HUD is very minimalistic, the default view showing only the equipped weapon, its ammo and crosshair and the player's health. Some elements such as weapon inventory are part of the HUD as well, but only become visible upon activation. This saves space, while giving the player only the information that they need. The UI elements consist of simple shapes and white colours, most of which have a dark background to be viable in both dark and light environments. Aesthetically and functionally speaking the UI design is great, as it is simple, but beautiful. Its strengths are the simple symbols for the weapons and ammo. In short, it conveys the information without taking the concentration off of the main visuals. Its placement is another thing. The placement of the neutral HUD forces the player to check a far away corner of the screen, which rarely is where all the action happens. This may affect the player's awareness of certain situational elements, that may result in the loss of concentration and even immersion.



FIGURE 5: On the right can be seen the neutral mode of *LOU2*'s HUD, with the ranged and melee weapon, ammo, and health.

4.3.4 Inventory design

On the other hand, the weapon inventory is aesthetically, functionally and placement wise good, and it utilizes the minimalistic UI's strengths, the item symbols. The only negative on these directional menus is the multiple inputs required for certain interactions, which is rather slow for an inventory that should have the items available as quickly as possible. Especially as accessing the weapon inventory does not pause or slow the game world down, the 3-6 inputs can leave the player vulnerable due to the slow UI design. The hindering aspect of the design itself may be intentional, as the game tends to focus on partial realism in its gameplay mechanics, but as the controller has many possibilities for varied commands, the design is starting to be a bit outdated. The strength of the diagonal menu is that the first items of the 4 direction can be accessed with just a single press. The UI could still be improved by balancing the inputs with a ring menu, which at its simplest requires only two inputs for any interaction.



FIGURE 6: On the left can be seen the backpack, working as a diegetic UI. On the right can be seen the weapon inventory, the lightest color representing the chosen weapon.

4.3.5 Spatial UI design

The game has multiple cases of spatial UI design, which all serve their purpose well. The game has many interaction markers that benefit the gameplay, as the world is highly detailed it informs the player of what elements they can interact with. Visually the markers are clear, showing the interaction button that corresponds to the one on the controller. Another small case of spatial UI in *LOU2* is the item throwing crosshair, which activates when the player is aiming with a throwable item. The element is a simple curve that shows the items flying path from the players hand and where it will land, taking the possible obstructions into account. It gives the player greater control of the game, over the normal weapon crosshair as one does not need to guess if the assumed path of flight is correct.

The most important bit of spatial UI design in the game is its “Listening mode”, which can be activated at any time during the game. The listening mode visualizes what the character in the world can hear, by highlighting noisy enemies in the 3D-space with white ghost-like, white elements. The mechanic has been stable in most of the stealth-oriented games for a while, but the enemies being more shapeless and subtle is a clear decision from the designer’s part to focus

on the immersion, as the common method shows the whole model through walls, being a very game-like element. This continues the rest of the UIs aesthetic by keeping the colours white (and grey), which helps with the distinction between the information given by the UI and the gameplay. The listening mode has also additional quality of life features, like finding the character's boat, which even though is a small feature, it really polishes the user's experience.

4.3.6 Meta UI design

For the hectic combat situations where the enemies may come from any side, whether they are in the players field of view or not, the designers have added a subtle meta UI element. The UI resembles visually the listening modes ghostly aesthetic, but instead of being in the 3D plane the elements are part of the HUD. This element, which appears in the corners of the screen, serves as a directional arrow or arrows that indicate hostile enemies near the player character, but out of the camera view. The fact that the visuals are more faded and ghostly than the main HUD, makes sure that the elements, even though they are the same colour, do not disturb the information flow from the HUD itself.

The game also has the classic meta UI element, the blood splatter on the screen. Compared to its common counterpart in first-person shooters, *LOU2* handles it more subtly. When a character gets hurt, the sides of the screens blur a bit and it adds just a few bits of splatter to the screen, which take much less of the screen than the usual splatter, leaving more room for information. While the splatter is more subtle, the same cannot be said for the blur. Even if the blur may be rather slight, it stays on the screen a bit too long and takes a bit too much area, at times obstructing important information, for example, an enemy on the corner of the screen.

4.3.7 Other comments on the experience

One of the greatest things about the UI design in *LOU2* is their range of options. The designers have added a lot of accessibility options for visually impaired players. All of the UI elements can be resized to fit the user's needs. The game has settings for visual, hearing and motor accessibility, which is much more than many other high-budget games have. This kind of inclusive design is slowly becoming more common in games, but there is still a lot to do in the department of accessibility, even in high-budget games.

Each element in *LOU2* is well thought out. The UI serves its purpose well and even the negatives of each element seem intentional. The relation between many non-diegetic interfaces and diegetic interfaces really makes the player character and the world that she inhabits seem alive. On top of this, the UI has a clear visual that does not clash with the aesthetic of the game, and part of this can be merited on the clean white color coding that only applies on the UI elements. The UI really seems to be designed for both user experience and immersion in mind, which it does well. The game balances all of the UI design principles well, which itself enhances the gameplay experience greatly.

4.4 God of War

4.4.1 Basics - central gameplay elements, mechanics, genre

God of War (2018) is an action-adventure game with hack and slash elements and is the eight installment of the *God of War* -franchise. The game follows a retired Greek god and his son as they venture to scatter the late mother's ashes in the highest peak of the Nordic god's realm. The game has more fantasy elements than the other two, consisting of many supernatural elements, such as gods, monsters, and giants.

The gameplay consists of adventure and combat, focusing on the latter. The combat mechanics of *God of War* consist of reaction-based melee combat, with some ranged attacks. The player controls the father *Kratos* but can give the son *Atreus* simple commands to shoot an enemy with a bow, or unleash a special attack.

The following observations were made during eight play sessions, totaling to 25 hours game time.

4.4.2 Non-diegetic UI design

Most of the UI design in *God of War*, henceforth referred to as *GOW*, is very strictly non-diegetic. While the HUD consists mainly of non-diegetic interfaces, it adds an element of immersion by splitting the HUD into two modes, which I refer to as the cinematic HUD and the combat HUD.

The game uses cinematic HUD in all of the game's sections that do not include cutscenes and combat. Cinematic HUD is very minimalistic and consists only of a quest compass as well as occasional spatial interface elements, such as interaction markers. The HUD also displays some other UI elements upon interaction with a corresponding in-game element. For example, if the player picks up currency, the HUD displays the amount picked up and the player's total currency, for a few seconds after the interaction. The addition of the cinematic HUD seemed to help the immersion in the game world, as the exclusion of the combat HUD delivered a sense of peace.



FIGURE 7: Cinematic HUD displaying the compass on top and the temporary elements for acquired XP and a quest completion screen.

The combat HUD activates when a weapon is equipped, or a combat encounter starts. Combat HUD consists of a health bar, rage meter, special skill icons as well as the compass. Like the Cinematic HUD, its combat variant has case dependent UI elements that appear only on certain occasions. These consist of boss health bars, runic blessing timers, quick time event and enemy attack prompts and the spatial lock-on symbols. All of this, is a lot of information to take in and as most of the combat information is presented in the HUD, player needs to concentrate on both what is happening in game, in the middle of the screen, as well as in the HUD located in the furthest corners of the screens center. This is a common game design problem as there are not many non-diegetic ways to move the UI closer to the center of the screen, without it obstructing the player's vision. The divide between the UI elements and gameplay elements can split the players focus between the two areas and disrupt the cognitive flow.

A recurring problem I noticed during my study is a perfect example of this. At the point I had already mastered all the combat mechanics which lead to the gameplay being fluid and enjoyable. Fight after fight, the only thing that kept interrupting my game flow (and cognitive flow as well) was having to constantly look off the enemies, to the corner of the screen where the special skill icons were, just to see if my skill was ready. More often than not, this also led to an enemy surprising me, even if they were in the center of the screen. Some games are designed to punish players from losing focus, but in this case, the game keeps punishing the player for trying to utilize its UI for its intended purpose. The issue could be fixed in multiple ways, starting with changing the icons placement or size. Or even better, with a diegetic design choice. The character saying a simple voice line, indicating that a skill is ready, or even adding a glimmer to the characters axe, or a short visual effect to its body. All of these would keep the players concentration on the gameplay, without interruption to the game flow or the immersion itself.



FIGURE 8: The combat HUD displays UI elements such as health bar, rage meter, special skill icons, as well as the compass.

The problem seems to lie in the small, but overly defined UI. The designers have clearly focused on the aesthetics of the UI and the HUD, as all of the special skills have their own symbols, and the elements often have small details that one may not notice without inspecting the UI closer. Some of the elements could even be said to have some inspiration from Nordic aesthetics. An aesthetically pleasing UI is important, but how *GOW* handles its HUD leaves the polish useless. The only reason for the elements to be as small as they are, may be that the game was designed to be played on big screens, but as most of the players probably do not own screens the size of a home theater, this seems like a rather confusing oversight. Not only does this render the details in the HUD almost pointless, but it also worsens the aforementioned problem of crucial information being placed in the corners of the screen. This could be fixed with the UI either adjusting its size to the TV:s screen size, or just making the elements larger by default.

4.4.3 Spatial UI design

Regarding spatial UI design, the game keeps things very traditional with its interface elements. This is a safe choice but leaves a little to be said about them. These UI elements include the

interaction prompts, which are visually very similar to the design in *LOU2*, as well as enemy health bars, that hover above the enemy model's head. The latter is well designed, as you can clearly see the enemy's health even when far away. As an addition to the traditional enemy health, the game has a stun meter that fills up under the said health meter, which when filled opens up a chance for a special take down. As *GOW* is more close-combat focused, it also utilizes the lock-on function. This allows the camera to lock on a certain enemy, so the player can focus its attention to it better. The lock-on is indicated with a simple spatial symbol, that is centered on the enemy model.

In addition, *GOW* has directional arrow designs to indicate enemies that are not on the screen. The arrow color changes to red to indicate that an enemy that is on the screen is going to attack the player. This is a simple way to make sure that the player is not affected by information that is not given to them, which can lead to a negative gameplay experience. The placement of the spatial arrow design is on the player characters hips, which helps to keep the concentration in the center of the screen during action. The arrows may be difficult to focus on the more there is happening on the screen, which can decrease their effectiveness.

As said, all of the game's spatial UI elements fulfill their purpose and are visually pleasing, but nothing more can really be said about them.

4.4.4 Meta UI design

The meta elements stay simple as well. The far corners of the screen flash with a black and red vignette, when the player receives damage to their health. The same vignette stays on the screen, pulsating in the same rhythm as a muffled audio of a heartbeat, when the player's health is low. This was a surprising design choice from my perspective, as many of the game's mechanics revolve around the world being brutal and almost barbaric. A gruesome blood splatter on the screen seems like a design choice perfectly fit for the game. It's not uncommon to have such games add blood splatter even when the player is not damaged, but when they kill an enemy up close or in an otherwise messy way, to bring the brutality of the action across. Both of these sound perfect for a game where the main character quite literally can rip a guy in half.

4.4.5 Inventory UI design

Inventory screen shows the aesthetic a bit better but is still cluttered. The menu is clearly focused on aesthetics, as a big part of the screen is just the character or characters. The inventory is made to be accessed any time and pauses the rest of the game completely. The gameplay itself does not require constant use of the inventory in combat, so the design can accommodate this into it as well. The logic of how to use the menus takes a bit to learn, even for the more experienced player, as many of the interactions are not that well highlighted. If viewed from a user flow perspective, the inventory menu is not the fastest and the most common actions, such as armor or skill swapping, takes quite many inputs to make. When one learns where to look and how to use the UI it is fine, but suboptimal.

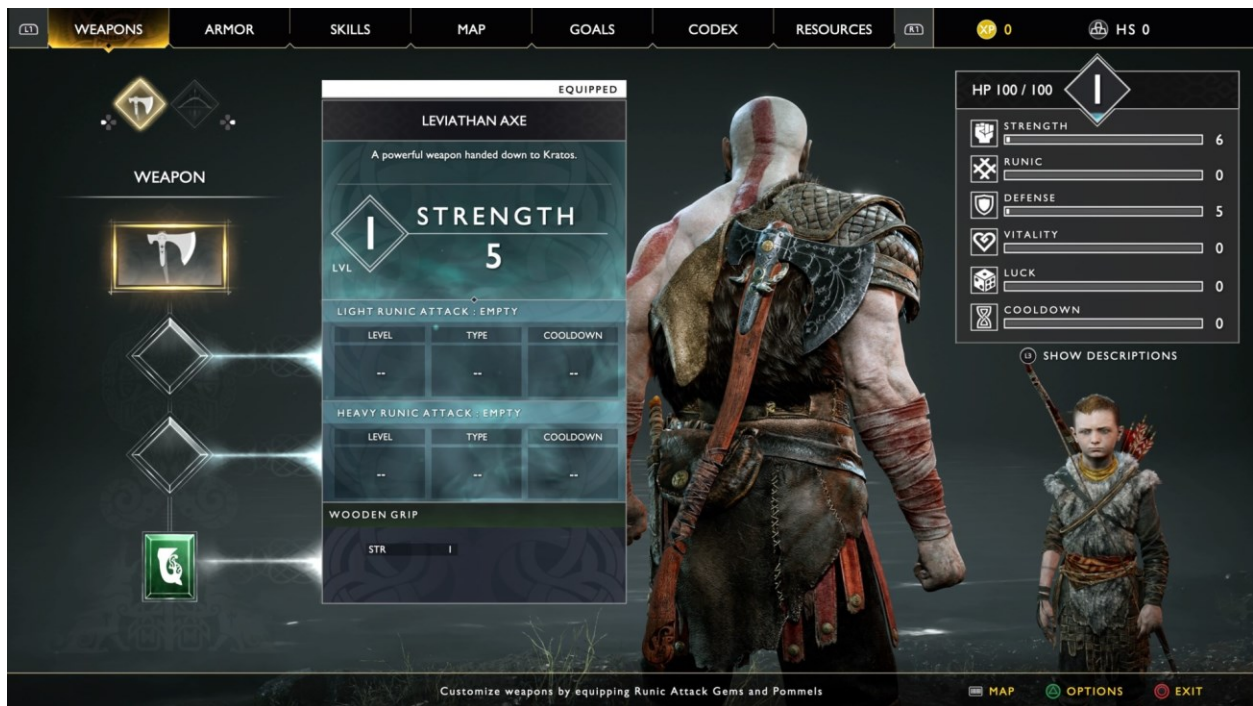


FIGURE 9: The weapon inventory in GOW

4.4.6 Other comments on the experience

The *GOW* seems like it would greatly benefit from including some diegetic design elements. The relation between the fast-paced close combat gameplay does not match the UI design well, as the latter keeps hindering the primary focus of the game. Many of the HUD elements are either way too small or misplaced forcing the player to focus on two, completely different areas of the screen. The meta designs balance the problem just slightly, but their visuals stay bland and waste a good opportunity to enhance the gameplay itself. All of this leads to the UI and the HUD especially, to seem more of an afterthought to an otherwise well-designed game, hindering the game flow in its most important area of gameplay.

4.5 Red dead redemption II

4.5.1 Basics - central gameplay elements, mechanics, genre

Red Dead Redemption II (2018) is a third-person, open world, action-adventure shooter game, third game in the *Red Dead* -franchise and is the prequel to its predecessor *Red Dead Redemption* (2010). The western-themed game is set in a fictional representation of the United States in 1899. For most of the game, the player controls Arthur Morgan, who is part of a gang of outlaws. The game consists of many secondary mechanics such as fishing, hunting, gambling etc. But the main mechanic of the game centers around gunfights, which includes many of the genre's common gameplay elements, such as covers, explosives and even bullet-time.

Most of the game enemies are other gunslingers, but it also includes other hostile entities than just humans. The game includes a big variety of animals that are either evasive, passive until aggravated or hostile. The game establishes hunting as an important way to gather provisions and other materials for mechanics such as crafting.

The following observations were made during eight play sessions, totaling to 25 hours game time.

4.5.2 Diegetic UI design

Red Dead Redemption 2, henceforth referred to as *RDR2*, focuses on immersion even more so than *LOU2*, using similar combinations of non-diegetic and diegetic interface relations as last of us. Through non-diegetic interfaces you get access to other interfaces with both diegetic and non-diegetic elements. Many of the diegetic elements are even harder to spot than in *LOU2*, stripping them of their main purpose of conveying information and leaving them more as immersive detail elements. One of which is a weapon condition screen, which displays both the statistics of chosen weapon by non-diegetic interface, but which also shows the weapon and its condition by diegetic means through grit and rust. When the player applies condition improving items, the character is seen visually cleaning the weapon as well. In normal gameplay, the weapons are too small to really notice the grit in them, which is a wasted opportunity and leaves the diegetic elements unused to their fullest potential.



FIGURE 10: Weapon condition screen with a clean weapon in *RDR2*.

RDR2 is full of these diegetic design choices e.g., players horse and clothes getting dirty, which are arguably more visible than the weapon condition. If ignored some even affect the in-game dialogue.

4.5.3 Non-diegetic UI design

Without exception, all of the games diegetic interface elements are accompanied by a non-diegetic user interface, regardless of the diegetic element's visibility. The game does a good job of showing the information via in-universe means, but it also conveys the same information by text pop ups as part of the HUD. While this makes sure that the player gets the relation of the UI elements and game elements across, it could be argued that constant, blinking UI elements can take away from the immersion in the game world, and even be the crucial element blocking the player from achieving a cognitive flow state. Aesthetically the UI fits the game well, having some nods, like the font of the text, to the western setting. As immersion seems to be an important part of the games design philosophy, it is surprising that the HUD is designed to be so game-like and somewhat minimalistic. This may be a way of keeping the focus on the gameplay itself, which was part of how *LOU2* made their HUD work. Still, the HUD has the same problem of the health bar being in a corner of the screen, which forces the player to look away from the action to see their vitality.



FIGURE 11: *RDR2*: s HUD during horse riding. On the upper left corner shows a pop-up, lower left corner shows mini-map and health, stamina, and dead-eye meters & upper right shows ammo and current wanted-level.

4.5.4 Spatial UI design

RDR2 is surprisingly pretty much completely devoid of spatial UI elements. This seems to be a conscious design choice, as the game continues to strive for immersion. Instead of spatial interaction prompt design that both *LOU2* and *GOW* shared, the game has small pop-ups in the HUD that tell the player to press the set button to interact with said game world element. With the combination of the map markers and the gameplay examples that the game gives the player, this design works surprisingly well, even if it adds another pop-up to the HUD.

4.5.5 Meta UI design

The game puts more emphasis on the meta-aspect of UI than the other two, which might be partly due to it being a shooter game. The meta designs of the UI include the game getting a momentary red hue when the player character receives damage. If the player keeps receiving damage and their health bar gets critically low, the red hue stays on the screen and the noises muffle, until the character's health rises back up. This balances the small size of the health bar, as the player can focus on the gameplay and not check the health bar each time they are hurt. Still, the purpose of such a small non-diegetic UI element for an important gameplay element begs the question; why is the health bar even there? The importance of a visual health bar is debatable if the game has another element that serves its purpose better. Of course, the elements can be seen as supporting each other, but as one of the game's intrinsic values is being immersive, the argument of discarding the element is not out of the question.

4.5.6 Inventory UI design

One of the strongest parts of *RDR2*'s UI is its use of item wheels aka. ring menus. The ring menu design is arguably one of the fastest to use inventory/menu UI, requiring only two to three inputs, while leaving a lot of room for different options. From a user flow standpoint, ring menu design is one of the strongest interfaces, as it fulfills its purpose with simple actions and with close to the least number of steps possible. This also fixes the problem with the slower inventory design that *LOU2* suffered from. Still, the game does not use this as in all of the menus and for this reason, many of the shopping related menus are much worse input wise.



FIGURE 12: Ring menu in *RDR2*. The white line indicates the currently equipped weapon, and the red line indicates the “cursor”

4.5.7 Other comments on the experience

RDR2 makes a good effort to have the game be as immersive as possible. The UI serves this as well, and the UI's relation to the game world is enhanced by implementing some diegetic design elements to non-diegetic interfaces as well. The usefulness of many of the UI elements are debatable, as there are many occasions where some part of the design does not go all the way, leaving two elements dependent, instead of supporting, of each other. The design leaves out most of the common spatial UI elements, substituting them with non-diegetic UI elements. This works surprisingly well and somewhat enhances the immersion. But as most of the information is conveyed via non-diegetic means, the UI can become a bit crowded at times, straining the player, thus working against the game's goal of immersion.

5 Findings

5.1 Diegetic UI design

Diegetic UI has a lot of design and gameplay potential, as the diegetic UI elements in the case samples varied a lot. It seems to suffer of implementation that does not take advantage of the possibilities of the diegetic UI being the primary source of information. Instead of this, based on the case study, the current situation of diegetic UI design in the industry seems to be more about of showing polish and detail. Its primary objective is to immerse, which the designs focus on, but its other purposes are easily discarded. Third-person games have the player character or part of the player character visible on the screen most of the time, so diegetic UI can be designed to convey vital situational information without the player needing to look away from the center of the screen. How easily and creatively such UI can be implemented depends on the games setting, as a game with magical or scientific elements can be more creative in their designs and its implementation, than the games that mirror reality or history in some way.

5.2 Non-diegetic UI design

Non-diegetic UI does not need to match the visual aesthetic of the in-game elements, as long as it has a clear style separate from the in-game visuals. If done well, this makes the UI easily understandable and the player can instantly figure out when they are interacting with the UI. And as stated earlier, when a user can instantly figure out how to interact with the UI, the UI becomes intuitive. A clear difference between the UI visuals and the game visuals aids both the player to recognize the difference of gameplay and UI, thus the interaction with the UI can convey information more clearly.

The corner centric HUD design, apparent in all of the cases, has the universal problem of the design forcing the player to focus their attention to a place where the central gameplay does not happen. This leads the player to not having the information when required or getting punished by the gameplay when trying to access the information. Experiences like these leave the player with a feeling of frustration and loss of control over the subject. This can create dissonance of information and interaction, which greatly decreases the reaction time, immersion and engagement of the player. This could be potentially fixed with a design that places the most vital UI elements to the lower center of the screen, where the information is closer to the gameplay information. Alternatively, an adjustment of the size of the UI elements may help.

Even high-budget games seem to have problems with a correct size and placement for each element. This does not make such designs acceptable, as the game industry has numerous examples of good non-diegetic UI design practices. In the three cases, there was not a single UI element that was too big. On the other hand, elements being too small was a common occurrence and continued to detract from the experience.

5.3 Spatial UI design

Spatial UI design is often highly useful for gameplay purposes and can be applied to bypass some possible negative reactions caused by a shortage of information. Their inclusion can help new players to recognize what elements they can interact with, or which way to go. The use of the UI may be introduced even as a central gameplay element. Even in the case where the UI was included as an important gameplay element, the problem of so called “player hand holding”, as stated earlier in the text, did not occur in the designs.

Non-diegetic UI can be used to substitute some spatial UI elements in exchange of additional non-diegetic elements. This can at times even enhance the immersion, as there is a clear divide between what is in the game world and what is in the UI. Still, the inclusion of an additional non-diegetic element that only activates in certain situations, requires the user to be taught to look for one. If not taught the user might ignore the function completely. As the user perceives the world as a 3D plane as well, a parallel could be made that the user is more used to gathering information in games 3D plane as well, thus making the spatial UI design more familiar and more intuitive.

The 3D plane of spatial UI design gives the designer a lot of potential for conveying information, guiding the player, storytelling, gameplay etc. The creative potential for visual styles and aesthetics is vast. Regarding spatial UI design, the cases studied did not include enough variety of its uses, to learn deeper insight on the potential of the subject.

5.4 Meta UI design

Meta UI can be a strong secondary visual method of storytelling, by bringing the effects closer to the player. This can be either used to visualize a character’s condition or an effect that is affecting the character or its surroundings.

Meta UI design seems to be less cognitively demanding than many of the diegetic and non-diegetic counterparts. This may be due to the design areas simple nature, the 2D plane, which

also limits its possibilities and application methods. For example, the use of dark or red vignettes upon the player taking damage is a good additional way to inform the player of harm being received but can end up feeling more game-like than immersive. This could be improved with addition of other visual elements, such as blood splatter or grit.

The use of blur as a meta element can be visually pleasant and bring familiar cinematographic effects to the gameplay but should be used with caution as blurring parts of the players screen can block important information. This can lead to the design restricting important information from the player, further leading to the player character getting hurt or even result to a game over. The lack of information about situations that can hurt the player character leads to a feeling of not being in control, resulting in a negative experience and even frustration towards the game itself. This applies to any other meta UI element as well, but from these case samples the only meta element that dampened the gameplay was one with blur attached to it.

In only one case meta UI design was used to support fast decision making in combat situations to prevent harm, while all of the other designs were made to indicate when the harm was received. This design has spatial UI counterparts, so further comparative study could determine which serves its function better.

5.5 Inventory UI design

The design choices greatly depend on if the inventory is supposed to be accessible during scenes which the player character can be harmed. If the inventory completely stops the flow of time in the game world, the designer can take more artistic and visual freedom on how the inventory looks. In the case in which had a UI design like this, the inventory design suffered of high input counts to reach important gameplay items. This should be avoided, as unless the inventory includes engaging gameplay elements, it should serve the values of efficiency and consistency, so not to break the user's cognitive flow. Visual consistency is also important in these cases. This can be achieved with familiar elements from the other UI and by placing the corresponding items and status information into the area where the elements are in the game HUD. By this way the eye is conditioned to look for the information in the places presented. This also makes the UI more intuitive, as the user is already familiar with the elements, thus erasing a conscious step from the cognitive process.

Depending on how many items the game wants to the player to access during any time, the diagonal menu and the ring menu need the least amount of inputs. The first accessing instantly

four different items but needing to press the same button repeatedly to reach some items, if the inventory is designed to fit more than four. Mostly used and known as the weapon wheel, the ring menu should be used more often as the primary item menu, especially in games that want the player to have quick access to their full item arsenal. In the cases which were presented in the study, the two menu types were used similarly. If compared, the ring menu can have a larger access of items with an average of two simultaneous inputs, while each row of items added to the directional menu adds another input to reach the row.

5.6 Other

Many weaknesses and blind spots of conveying information in each philosophy can be fixed by a supporting secondary UI design. The balance of the four game UI philosophies may be the best way to include multiple types of information in the game, without the player getting too strained, or compromising useful UI or gameplay mechanics. More concentration can be put on a single element, as long as information is divided between the other elements.

Out of the four philosophies the meta design, the spatial design and the diegetic design seem to be less cognitively demanding. From the comparison thus far, it is not clear which element achieves this best, as each has their strengths and weaknesses that often come from the UI designs implementation.

6 Conclusion

At the start of the study is set out to find out *how does user interface design affect the gameplay experience in three recent high budget video games?* Based on my findings, user interface design has a direct effect on the game's enjoyability. As a result, I have compiled the user interfaces into a list, described by their primary characteristics: Designs that positively affected the experience, designs that neither positively nor negatively affected the experience and designs that negatively affected the experience. It should be said that based on the gameplay values introduced earlier, game design and game UI design should aim for the whole experience to be positive, so designs that neither positively nor negatively affected the experiences are designs that should be improved.

UI design that positively affected the experience

- Designs that were visually more simplistic outperformed the detailed ones. This can be due to the erasure of extra distractions from the player, which then supported decision making.
- Designs that placed the most important information closer to the player character.
- Designs that had minimal inputs needed to achieve the most common interactions.
- Designs that added an element of immersion, while functioned as a source of information.
- Designs that warned the player about danger that was off-screen.
- Designs that conveyed their intention clearly in analysis.
- Designs that had UI elements hidden that became visible when needed or upon activation.
- Designs that supported the players focus on an activity.

UI design that neither positively nor negatively affected the experience

- Designs that used multiple principles to convey the same information.
- Designs that served their purpose but lacked polish or intention.
- Designs that had unnecessary information, as long as the information was presented by non-diegetic means.

UI design that negatively affected the experience

- Designs that forced the player to focus somewhere else than the center of the screen
- Designs that broke immersion or caused frustration.
- Designs that were not responsive or slow.
- Designs with elements experienced too small or too detailed.
- Designs with interactable elements that required over three inputs to access, especially if the interaction was required often.
- Designs that obstructed important information, whether the information was in game or in UI.
- Designs that included a pop-up element each time an interaction was made.
- Designs that were visually complicated.
- Designs that did not convey the information clearly, especially if presented by non-diegetic means.

If the UI designer's intention with the design could not be stated through the comparison of the design principles to its function, the design rarely affected the gameplay experience in a positive way. Even if the gameplay is very polished, a bad UI can hinder the gameplay greatly. This could be avoided by including the UI from an earlier stage of development, but as we do not know the exact process in which each element in each case was applied, the optimal stage in which the UI is included cannot be stated. Regardless, it is apparent that the UI designer should have a clear view of what each UI element is going to support and how, so they can employ more effective design choices for the purpose of heightening the gameplay experience.

7 Discussion

At the start of the study, I had some experience in the field of user interface design and a lot of knowledge and experience about video games. Through familiarizing myself with game UI design and gameplay values, as well as a bit of psychology, I bridged the gap between my pre-existent UI design experience and game knowledge. With the UI design principles in mind, how I viewed the gameplay in the case study, changed to a more educational or professional perspective. I believe I reached what I set out to achieve with the study, as I feel that my findings were very insightful for myself and perhaps even for the industry. Moreover, through my research and findings, I learned a lot about how to approach UI, HUD and game UI design. Next step for my learning, could be contacting an experienced game UI designer to hear feedback on their thoughts on the study.

As can be concluded, UI design affects the game, its visual style and how the gameplay is experienced as well, regardless of whether the negative or positive experience was originated from the gameplay itself. UI can break or make the game immersion and be a part of making or breaking an important gameplay or story experience. From the results it is apparent that UI designer's intention and what principles they decide to achieve said intention affect how the game is experienced.

If a follow-up to the study would be, I would introduce more variables to the cases, such as games without a non-diegetic interface, or a game with a completely spatial interface. Maybe even games where the interface is the whole game.

As a deeper insight to variety in spatial UI design was not achieved, the follow-up studies should concentrate on including cases in which spatial UI design has a bigger role.

A deeper insight to how the experiences could vary could be also achieved with the inclusion of multitude of subjects to test the different game UI:s.

On top of this, a possible follow-up research should include modified UI:s or an existing action-adventure game with a HUD design guided by the importance of information, e.g. the more important the information is, the closer it is to the player character.

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