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Flow In Video Games

With a Focus on Multiplayer First-Person Shooters

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Author's Declaration

This thesis is my own work and it hasn't been submitted in the same form for the award of a higher degree elsewhere.

This thesis is 35956 words in length excluding sections listed as excusable in the regulations.

Abstract

Video games are a popular form of entertainment. Since games have grown in popularity and become commonplace, studies have been carried out attempting to understand this phenomenon and players more.

Many people may be familiar with the notion of "being in the zone" yet may be unaware of flow. They are fundamentally similar concepts. Since Csíkszentmihályi's work on flow people have aimed to further understand the idea. Flow is an aspect of positive psychology, understanding it may help people focus and perform better. Flow may be a useful idea to know of when understanding users. Video games are often a form of entertainment so enjoyment is key to players and designers.

Understanding flow can help creators of games create games with improved flow. Flow's close links to immersion means understanding flow could make games more immersive. Creating a game with flow in mind could improve the gameplay experience of a game, something which will benefit many games including multiplayer first-person shooters.

What follows is a master's thesis considering flow in video games, focusing on multiplayer first person shooters, specifically, the games in the Halo series of this type. The thesis chronicles an attempt to understand flow in video games. Relevant literature and themes are discussed in this work. The work contains information on an autoethnography study carried out by the author on their experiences with games, specifically, multiplayer first-person shooters in the Halo series. Other studies are included supplementary to this including a questionnaire study and a group play session and group interview. The findings of the study and data are analysed and discussed. This thesis contributes to the subjects of flow and designing video games.

Contents

Chapter 1: Introduction

Chapter Introduction

This chapter introduces some of the premises of my project.

Language

One of the studies in this thesis is an autoethnography study. Autoethnography studies follow the experiences of the researcher. The word "I" is used a lot because of this.

Motivation

Video games are a big part of my life, they have been for a long time. I have played and enjoyed them as I have grown up and I continue to enjoy them. Over the years I have played different genres on different platforms and I have played singleplayer and multiplayer games. Around a year before starting this research I got a laptop capable of playing games on it, as a fan of the Halo series, I bought Halo the Master Chief Collection[1]. Around two years later I have amassed 776.2 hours in the collection (Figure 1). During this time I played other games as well, including the multiplayer of one of the newer Halo games, Halo Infinite. I have spent most of my time in these games playing the multiplayer mode. I have mostly played the multiplayer mode by myself, I don't often play it with my friends and I don't use game chat, yet I have still enjoyed the game.

Figure 1. MCC and my play time.

I want to develop video games and I have an interest in users, user interfaces and user experiences. I wanted to research something related to these interests that I could use in the future. I decided to research flow in games. As this is a thesis for a year long masters course, this idea seemed very broad so I narrowed it down. As I play Halo I thought a study looking at Halo seemed like a good fit. As the study had me keep a kind of diary, data should be easy to collect because I enjoy the games so would be motivated to gather data.

I thought users and video games would be a good topic area. Flow narrows this broad area. I started my research looking at flow in video games and I thought I would refine my research to be more specific, coming up with more research questions as I went along. One research question was working out what gives people flow. I eventually came up with the question of is flow in multiplayer video games different?

Research Aims

The aim of this research is to consider the idea of flow video games, in particular, multiplayer first person shooters. What causes flow in these games? How does flow work in these games? The aim of this research is to play the games and consider them in regards to flow. Flow is an interesting topic and considering It in a scenario where other people are present could yield some interesting results. Hopefully the results from this thesis could grant useful insights for the design of video games. What features of multiplayer first person shooters effect a person's flow? What is the relationship between these games and flow?

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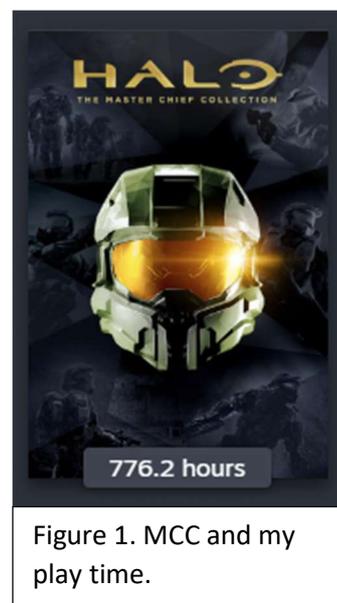
[1] Developer: 343 Industries. Publisher: Microsoft. Release date: 11/11/2014. Platforms: Xbox One, PC. (IGN – Halo: The Master Chief Collection, n.d.).

What are Video Games?

Video games are a form of entertainment where a person plays a game on a computer. These games have evolved over their history from simple pong games to open world 3D adventures.

I believe Csíkszentmihályi's idea of flow can be applied to video games and I think games creators are aware of this concept. Skill challenge balance, an aspect of flow, can apply to video games. Some games can have difficulty settings allowing players to adjust a game's difficulty to match their skill level. As a game goes on it can become more difficult to match a player's increased skill from playing or to ensure the game doesn't become too easy as a player acquires new items or gets stronger in the game. Flow can require immediate feedback (Cherry, n.d.). Games provide feedback to players in a variety of ways, through visual feedback, sound and even controller rumble. These can all be used to immerse players in the experiences.

The History of Video Games

Hennessey et al (2017) consider the Cathode-ray amusement device as the first video game. This was created by Thomas Goldsmith Jr. and Estle Ray Mann and at Dumont Laboratories and was released in 1947. Video games have come a long way since then. The Magnavox Odyssey was the first home video game console. It was released in 1972 and was manufactured by Magnavox. This early console used television overlays to help with graphics (Leigh, 2018). From this point on more consoles were released. In 1983 the video game industry eventually crashed due to people losing interest in the industry due to cheap titles (Hennessey et al, 2017). Nintendo's Famicom which was known as the Nintendo Entertainment System in some places outside of Japan released in the same year (Leigh, 2018). Arcade games had existed before the Magnavox Odyssey but took a blow with the rest of the industry in 1983 (Hennessey et al, 2017). Since the early origin of video games hardware has improved and video games have evolved. Arcade games briefly rose in popularity again thanks to fighting games (Hennessey et al, 2017). The Nintendo 64, released in 1996 and manufactured by Nintendo (Leigh, 2018), allowed us to play games like Super Mario 64[2] and The Legend of Zelda Ocarina of Time[3]. Notably, in regards to this thesis, Microsoft released the Xbox in 2001 which was the console that the first Halo game Halo Combat Evolved[4] released for (Leigh, 2018). Eventually the most prominent console platforms became Nintendo, Xbox and PlayStation. PC and mobile are popular platforms. Internet connectivity was gradually added to games allowing online games like multiplayer online first-person shooters.

Halo The Master Chief Collection

What is Halo The Master Chief Collection?

The Halo series has existed for almost 20 years, with its first release – Halo Combat Evolved – releasing November 15th 2001 for the original Xbox console (IGN – Halo, n.d.). The Master Chief Collection – MCC for short – is a collection of 7 mainline Halo games available for the Xbox One, PC and Xbox Series X. The included games are:

- Halo Reach[5]

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[2] Developers: Nintendo EAD, Nintendo. Publisher: Nintendo. Release date: 23/06/1996. Platforms: Nintendo 64, iQue, Wii, Wii U. (IGN – Super Mario 64, n.d.).

[3] Developers: Nintendo EAD, Nintendo. Publisher: Nintendo. Release date: 21/11/1998. Platforms: Nintendo 64, iQue, Wii, Wii U. (IGN – The Legend of Zelda: Ocarina of Time, n.d.).

[4] Developers: Bungie, Gearbox. Publisher: Microsoft. Release date: 15/11/2001. Platforms: Xbox, Xbox 360, Mac, PC. (IGN – Halo, n.d.).

[5] Developer: Bungie. Publisher: Microsoft. Release date: 14/09/2010. Platforms: Xbox 360, Xbox One, PC. (IGN - Halo Reach, n.d.).

- Halo: Combat Evolved Anniversary[6]
- Halo 2[7]
- Halo 2: Anniversary
- Halo 3[8]
- Halo 3: ODST[9]
- Halo 4[10]

Two of the games in the collection are anniversary rereleases of the original games featuring new content alongside most of the original content. More information on Halo can be found in Appendix C.

What Does It Mean To Play Online Games?

Online games can come in many forms. There are many different genres of video game and multiplayer may take a different form in each.

There are many types of multiplayer games. One of these is shooters, these can be first person or third person, co-operative and/or competitive, have different settings and modes and more. There are some games where the online multiplayer component isn't direct, the player can effectively be playing the game by themselves in singleplayer but actions they and other players take in their game world can appear in another player's game world, for example, in Death Stranding[11] where players can build structures in the game which may appear in other people's games. The focus of my research is the Halo games. The mainline Halo games are primarily first-person shooters. The multiplayer can be co-operative and competitive. Players can play the game's campaign together, this is co-operative with some optional competitive elements like scoring to see which player can get the highest score in the levels. Some of the Halo games have Firefight modes where players can fight the in-game enemies on a map, this can be co-operative or competitive, players can fight enemies on a team co-operatively but still compete for the highest score. Halo 4 also has Spartan Ops, another co-operative mode. Halo also has online player versus player multiplayer modes where players fight each other on maps. This can be team-based or a free-for-all. The team-based player versus player gameplay is competitive as players fight each other but it is also co-operative as you are on a team. The team based PVP gameplay can have a variety of modes, some of these have different objectives.

Another factor in online games is how their online system works. Online games could be free with in-app purchases, these purchases could be cosmetic, some free games may have a paid battle-pass, a progression system that unlocks content for the player as they play, this content could be cosmetics

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[6] Developers: 343 Industries, Saber Interactive. Publisher: Microsoft. Release date: 15/11/2011. Platform: Xbox 360. (IGN – Halo: Combat Evolved Anniversary, n.d.).
[7] Developers: Bungie, Hired Gun. Publisher: Microsoft. Release date: 9/11/2004. Platforms: Xbox, PC. (IGN – Halo 2, n.d.).
[8] Developer: Bungie. Publisher: Microsoft. Release date: 25/09/2007. Platforms: Xbox 360. (IGN – Halo 3, n.d.).
[9] Developer: Bungie. Publisher: Microsoft. Release date: 22/09/2009. Platforms: Xbox 360, Xbox One. (IGN – Halo 3: ODST, n.d.).
[10] Developer: 343 Industries. Publisher: Microsoft. Release date: 6/11/2012. Platforms: Xbox 360, PC. (IGN – Halo 4, n.d.).
[11] Developer: Kojima Productions. Release date: 7/11/19. Platform: PS4 (IGN – Death Stranding, n.d.).

or even characters. Live service games are often free with paid extras. Free games may also have subscription services which allow players to access more content. Some games may be subscription based, players will buy a subscription to a game to be able to play it. Some games will be games you buy regularly, sometimes these games will allow you to play online with no additional purchases while others may require additional purchases. Consoles can often have subscription based online services that players need to be subscribed too to play the online modes of games they have purchased.

Different games may also give players different senses of immersion as well. In a fantasy MMO a player may immerse themselves by roleplaying as their character, forming relationships with other players also roleplaying as their characters or with non-player characters. In Halo you have a Spartan, ODST or an Elite that is your playable character (Figure 2). The different Halo games allow you to customise your character to varying degrees. In Halo you play as your character in some campaigns, the multiplayer and other modes.
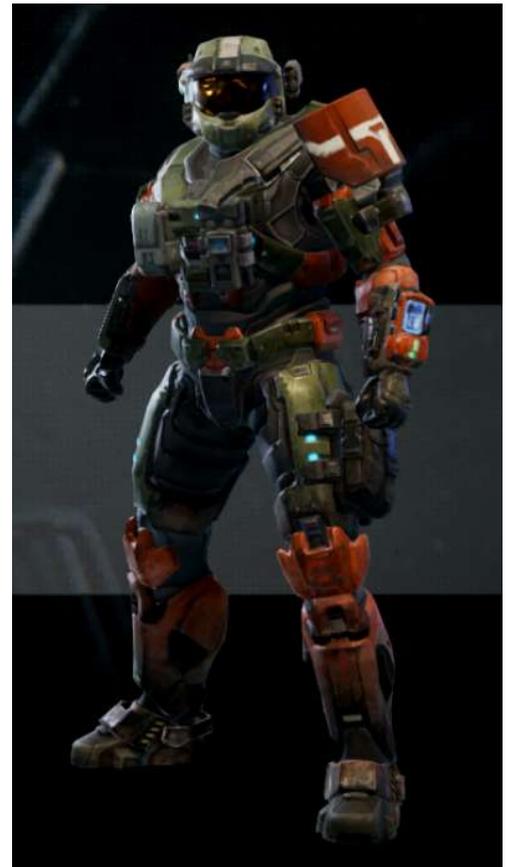
Figure 2. My current Halo Reach spartan in the MCC. Copyright owned by Microsoft.

Gaming As A Social Experience

Multiplayer games can come in many different genres and can be very different from one another, because of this, they can offer different social experiences. There are a variety of different ways players can communicate while playing a game as well and how players communicate may vary depending on platform as well. Players may also communicate with each other without using a game's social communication features and could use something else instead, they could also use a mixture of these. Discord is a popular communication tool for players (Discord, n.d.). Gamers may use this application to talk to their friends or other players while they play a game. Discord is very useful for PC gaming as there is a computer app so you can simply have it running in the background while you play your game. You can use Discord on a PC or mobile phone while playing on a console. Consoles usually have their own social features. Some consoles have online services that allows users to add each other as friends and send each other messages and talk in voice chat, these features may also allow players to invite people to their games to play with them online. Some of these features may require a paid subscription to be used in some situations, however, there are also situations where a paid subscription may not be required.

Games can also have their own communication features as well. Many PC games will have a text chat option that users can send messages to for others to see. Games can also have voice chat options as well like Overwatch[12] for example. Some games also let you add friends as well while

others may use services like Xbox Live or Steam which have their own friends systems. Overwatch is a good example of a game with communication features. It has an in-game social section that you can add players to which functions like a friends list. The game allows players to create and join

Figure 3. This screenshot shows the text chat on the left as well as the character waving. The character's appearance is customised.

groups that allow players to play with each other and play modes with each other. A group has a leader which chooses what the group play. The game has a text chat feature with multiple channels: there is the group channel that allows players to send messages to other group members, the team channel allows players to send messages to their teammates in the same game as they are, the match channel allows players to send messages to everyone in their game, the general channel is a more public channel where players can send messages to a large group of players in and whisper, a channel where a player can talk to another player (Figure 3).

Overwatch also has voice chat. Players can join a voice chat channel to talk to one another. There are three main voice channels in Overwatch, one to talk to your group, another for your team and another for your match (Figure 4). The game also has a variety of other communication features. There is a quick chat option where a player can hold down an input and select an option from a set which will go into the game's chat and their character will also say out loud. It also allows

Figure 4. The groups menu in Overwatch 2. Here you can join and manage voice chats.

players to move to a voice line menu to choose a voice line for their character to say out loud (Figure 5). Players can also get to an emote menu from the quick chat menu that allows them to choose an

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[12] Developers: Blizzard, Iron Galaxy Studios. Publisher: Activision Blizzard. Release date: 24/05/2016. Platforms: Nintendo Switch, Xbox One, Playstation 4, PC.

action for their character to perform, for example, a dance (Figure 6). The quick chat menu is quick and easy to use and has options like "Thanks" for players to use.

There is also a sprays menu, similar to the quick chat menu, a player holds an input to open it and they can then choose an option, once selected, if there is a close enough in-game surface, the spray will be sprayed onto the surface (Figure 7)

Figure 5. The voice line wheel in Overwatch 2.

(Figure 8). This is an example of a game with many communication features. The quick chat wheel is a useful communication tool for games.

Figure 6. A character emoting in Overwatch 2.

Figure 7. The spray wheel in Overwatch 2.

Figure 8. A spray sprayed on a wall in Overwatch 2.

Chapter 2: Literature Review

Chapter Introduction

This chapter reviews the literature on some of the aspects related to this project. In this section there is a summary of literature on gaming, information on serious leisure, an explanation of flow and discussion of flow in gaming and in Halo.

Literature and Studies on Gaming

There are various studies exploring if video games make people violent, even one including autoethnography (Borchard, 2015). Borchard's work focuses on the Grand Theft Auto series. The aim of this paper is not to look at the negative effect of video games, my intention for this paper is for it to look at flow, an aspect of positive psychology (Snyder et al, 2005), in video games. There are papers that claim that exposure to violent video games increases aggressive thoughts (Carnagey et al, 2007), although, this paper won't be primarily exploring this. There are plenty of studies looking at video games, after all, it's a large industry with the UK video games market being worth £7.16 billion at the end of March 2022 (Powell, 2022). In fact, in 2019 it was reported that gaming was worth more than video and music combined (BBC, 2019). Video games are such a broad topic that there are many studies in many different areas of it. There are studies into: augmented reality games (Kosa et al, 2021), social interaction, communication and culture (Fox et al, 2018) (Crenshaw et al, 2017) (Schiano et al, n.d.) (Chen, 2009), heuristics (Desurvire et al, 2004) (Brown, n.d.), flow (Jin, 2012) (Cowley et al, 2008) (Weibel et al, 2011), video games in general (Reeves et al, 2016), skill competition and performance (Reeves et al, 2009) (Fox et al, 2018) and immersion (Stavropoulos et al, 2020). Jin's (2012) flow research is very interesting, the research used the Wii and followed singleplayer experiences. It confirms some of Csíkszentmihályi's ideas for video games like performance, confidence and skill challenge balance. It also discusses the idea of a person's playfulness being relevant to flow, an interesting idea.

Serious Leisure

"The systematic pursuit of an amateur, hobbyist, or volunteer activity that participants find so substantial and interesting that, in the typical case, they launch themselves on a career centred on acquiring and expressing its special skills, knowledge, and experience" (Silverman, 2006). Amateurs can be found in many different disciplines and usually follow a system. The system, referred to as the Professional-Amateur-Public (P-A-P) system, shows the effect professionals and the public have on an amateur (Silverman, 2006). Professionals set a high standard which the public then compare amateurs to (Silverman, 2006). There are also many categories of hobbyist (Silverman, 2006). These include "collectors, makers and tinkerers, activity participants …, players of sports and games …, and enthusiasts of the liberal arts…" (Silverman, 2006). Silverman (2006) also mentions the "sports enthusiast" category as well.

A person can have a career in serious leisure, although, this type of career isn't a job (Silverman, 2006). A serious leisure career can be considered as being the changes and progress someone makes in a certain leisure activity (Silverman, 2006). In terms of games though, with the rise of eSports and streaming, one could also have what could be considered a professional working career in games too. Some games will even track a player's career, for example, Halo the Master Chief Collection will let you view your own or another player's career which will tell you stats about the player. These stats could be the medals collected by the player or just regular play stats. Other services like Steam, a storefront-turned social media for purchasing digital PC games, will track the games and achievements of a profile among other things and display it to the profile's owner and possibly others. The idea of career is often present in video games showing that they fit the serious leisure

model well. The latest Halo game – Halo Infinite[13] – currently lacks a broad career section of the game. People can gradually come to be experts in their serious leisure activity (Silverman, 2006). This can be seen in fan communities where you may have people running a group or giving advice to others. A subreddit for a game could be an example of one of these fan communities. People who participate in the eSports competitive side of a game could be said to be experts. An area of gaming you could find experts in is speedrunning. Speedrunning is an activity where a person tries to complete a game as quickly as possible. You could be said to be an expert if you show considerable skill as this task. Often games will have fan communities which will allow people who are fans of a game to communicate with each other. Serious leisure activities are meant to have communities for participants to socialise with each other in (Silverman, 2006), this shows that games and serious leisure are a good fit for each other. People tend to avoid inconsistency in serious leisure (Silverman, 2006).

Video games can be considered serious leisure. Silverman's (2006) paper "Beyond Fun in Games: The Serious Leisure of the Power Gamer" (Silverman, 2006) looks into video games and serious leisure (Silverman, 2006). Silverman (2006) discusses the position of power gamers in serious leisure and provides an example of the careers power gamers can have.
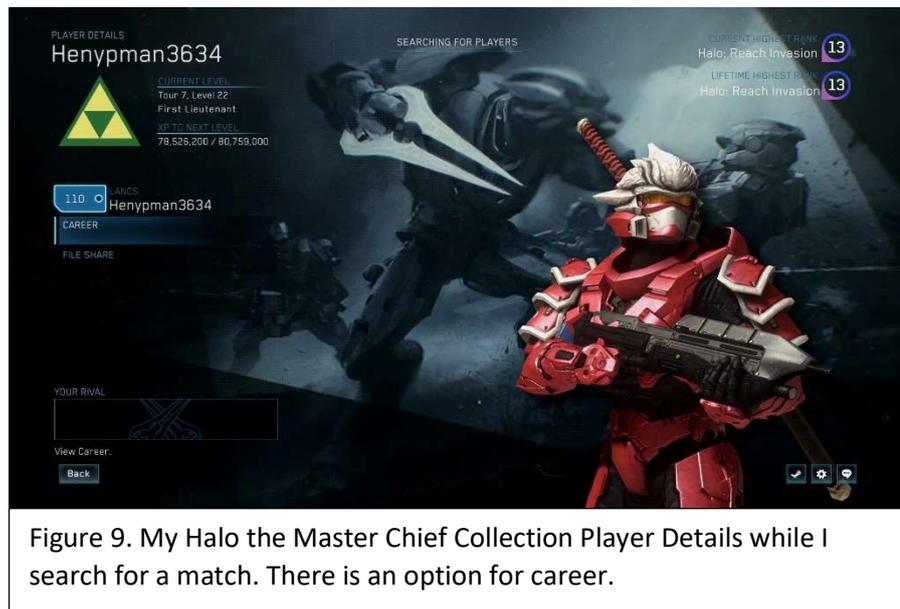
Figure 9. My Halo the Master Chief Collection Player Details while I search for a match. There is an option for career.

People can have careers in individual games (Figure 9), for example, in Halo Reach for the Xbox 360 where players can level up and earn new armour for their Spartan character. Players can also have broader careers in games, for example, achievement systems can allow people to earn achievements on their accounts, these achievements can be on different games. Steam allows people to level up their accounts and it tracks your game play time. People who game can have their own careers in gaming, playing many games and possibly increasing their skills. Another examples of a serious leisure career in games is Overwatch 2's competitive mode. Other careers in games are closer to the more conventional working career someone would have. As mentioned previously people like to speedrun games, people can stream their speedruns and can earn money from their streams. People can stream other things as well like regular gameplay.

Immersion and Flow

Csíkszentmihályi gives a good general description of flow in the preface of his book "Flow The Psychology of Optimal Experience", he states "This book summarizes, for a general audience, decades of research on the positive aspects of human experience-joy, creativity, the process of total

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[13] Developer: 343 Industries. Publisher: Microsoft. Release date: 8/12/2021. Platforms: Xbox One, Xbox Series X/S, PC. (IGN – Halo Infinite, n.d.).

involvement with life I call flow" (Csíkszentmihályi, 1990). Flow is a difficult thing to provide a definition for as it is subjective (Snyder et al, 2005). I found a more traditional definition on positivepsychology.com: "Psychological Flow captures the positive mental state of being completely absorbed, focused, and involved in your activities at a certain point in time, as well as deriving enjoyment from being engaged in that activity" (Moore, 2019). Another example of what flow is comes from an interview response one of Csíkszentmihályi's participants gave: "My mind isn't wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don't seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems" (Moore, 2019). Csíkszentmihályi himself has also provided a definition of flow: "…being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably for the previous one, like playing jazz. Your whole being is involved, and you're using your skills to the utmost" (Moore, 2019).

Flow is closely linked to intrinsic motivation and the autotelic experience where an activity is itself rewarding to complete (Snyder et al, 2005). In the "Handbook of Positive Psychology" the flow section is written by Csíkszentmihályi and Nakamura, in the section some conditions and characteristics of flow are listed. There are two listed conditions (Snyder et al, 2005):

- "Perceived challenges, or opportunities for action, that stretch (neither overmatching nor underutilizing) existing skills; a sense that one is engaging challenges at a level appropriate to one's capacities" (Snyder et al, 2005).
- "Clear proximal goals and immediate feedback about the progress that is being made" (Snyder et al, 2005).

The characteristics of flow are:

- "Intense and focused concentration on what one is doing in the present moment" (Snyder et al, 2005).
- "Merging of action and awareness" (Snyder et al, 2005).
- "Loss of reflective self-consciousness (i.e., loss of awareness of oneself as a social actor)" (Snyder et al, 2005).
- "A sense that one can control one's actions; that is, a sense that one can in principle deal with the situation because one knows how to respond to whatever happens next" (Snyder et al, 2005).
- "Distortion of temporal experience (typically, a sense that time has passed faster than normal)" (Snyder et al, 2005).
- "Experience of the activity as intrinsically rewarding, such that often the end goal is just an excuse for the process" (Snyder et al, 2005).

Cherry (n.d.) mentions these characteristics of flow:

- "Immediate feedback" (Cherry, n.d.).
- "Knowing that the task is doable; a balance between skill level and the challenge presented" (Cherry, n.d.). This is similar to one of the points above.
- "Lack of awareness of physical needs" (Cherry, n.d.).
- "Clear goals that, while challenging, are still attainable" (Cherry, n.d.).

In order to be in a state of flow you have to have these characteristics, the handbook states that the flow state is subjective (Snyder et al, 2005).

Social flow and solitary flow can be experienced. Social flow is flow in a group. Solitary flow is flow when someone is by themselves. However, these ideas aren't very explored. (Liu et al, 2020).

Flow in The Games Industry and in Halo

Flow is not an alien concept to games designers, in fact, it seems to have influenced Halo's design. An ex-Halo developer named Jaime Griesemer, a gameplay designer who appeared to tune and balance the games, gave two talks on creating the Halo games at the Games Developer's Conference, (Griesemer, 2010) and (Griesemer, 2011). In these talks he talked about a variety of things including flow which was mentioned in both, but, was more focused on in the first (Griesemer, 2010). In the second talk he mentions topics related to action and awareness and briefly mentions flow and how it gives great insight into games (Griesemer, 2011). He also mentions the autotelic experience. However, it is the first talk which has more information on flow and how it was used to create Halo 3. The talk specifically is about tuning the Halo 3 sniper rifle. We learn a lot about the sniper's plans and story from concept to release, throughout this process flow appears to be a key focus. The initial design for sniper rifle talks of feedback (Griesemer, 2010), an important flow component. Challenge-skill balance also appears to be a theme. Griesemer talks of cadence, the rhythm and pacing of the game, and how it leads to flow (Griesemer, 2010). He states that if the game is too slow, the player gets bored, if it is too fast, flow can also be harmed. He thinks that cadence leads to flow. An interesting point he raises is that the finger movements of pressing the buttons and interacting with the controller should resemble their in-game actions, for example, pulling the trigger fires the gun. He mentions some actions like clicking the stick don't resemble in-game actions, stating that players would need to get used to it (Griesemer, 2010). Griesemer believes that comfort with the control scheme is good for flow. Griesemer also mentions how he thinks spectacle keeps players in the flow state highlighting how the sniper rifle's bullet trajectory is a lasting effect after a shot to show players what has happened (Griesemer, 2010). He isn't alone in highlighting that spectacle and lingering effects are important. Masahiro Sakurai, creator of Kirby and developer on the Super Smash Bros series, has recently started releasing videos focused on creating games. In one video he talks about stopping for big moments, for example, when you hit an opponent or defeat a boss (Sakurai, 2022). Griesemer also gives advice on how to design for flow, telling the audience to lower their flow barrier. This may be advice for designers who are testing their game early in development where the game may have issues and may be incomplete. He tells the audience to ignore frame issues as well as bugs and glitches when thinking about initial balance settings. He tells the audience to create their own flow by making mouth noises for example to entertain themselves (Griesemer, 2010). He tells the audience to train themselves to be easy to entertain. Another piece of advice he gives is just to enjoy a game, mentioning he has previously played what sounds like a tie-in game (Griesemer, 2010). After telling us to lower our flow barrier he then tells people to raise your flow barrier. He informs people they should nit-pick and point out every flaw to understand what prevents them from reaching a flow state. While discussing this he mentions that flow with the sniper rifle is fragile and then sniping can really get you into flow. Griesemer claims that control over flow is the essential design skill. He talks of flow knobs which designers should use to create flow. Griesemer describes his feeling of finding flow as a "click". He explains that you want things to be tight and impactful if you want people to experience flow but if you're too strict with the requirements then not as many people will experience flow, however, if something feels to loose then any strictness becomes noticeable, stopping the flow. He talks about strength knobs as well, once he has designed for these, he then removes complexity by removing the unimportant parts and aspects, the unimportant "knobs". It seems that the sniper in Halo 3 was balanced for multiplayer. At points in the talk Griesemer talks about making things powerful, he later addresses what happens if something is too powerful. He doesn't seem to want to alter the

strengths of the sniper rifle so recommends tweaking the flow, he mentions that one player's flow is another player's disruption. To nerf the weapon, he increases the time between shots slightly which affects the cadence (Griesemer, 2010).

As mentioned before, Masahiro Sakurai, has recently started releasing YouTube videos on topics related to the game industry. He has covered a range of topics, some of which seem related to flow. Sakurai has his own idea of what goes into games that he calls "Game Essence" (Sakurai, 2022). Sakurai has covered topics related to feedback (Sakurai - Stop for Big Moments! [Design Specifics], 2022), risk and reward (Sakurai - Risk and Reward [Game Essence], 2022) and stressing the player and then relieving tension (Sakurai - Squeeze and Release [Game Essence], 2022). Risk and reward and stressing the player and relieving tension could be related in some ways to challenge-skill balance.

User Experience in Games

There are plenty of studies looking at user experience in video games. Sánchez et al's (2012) study considers what they call the player experience (PX) and playability in video games and provides a framework for evaluating user experience in video games. Similarly to this thesis, Sánchez et al's paper is related to positive experiences with video games. The paper mentions that the authors intend to provide guidelines for designers, which is something this thesis does. The "facets of playability" (Sánchez et al, 2012) outlined in the study could be useful for identifying elements important for flow. Koeffel et al's (2009) research discusses user-centred game design and proposes a framework to detect critical issues in video games. Flow is mentioned in this paper. The research finds that the heuristics outlined in the paper can lead to good user experience. The framework provided could be used to detect critical issues with flow in video games. McAllister et al's (2015) research documents development processes and practices for video games of four games development studios. McAllister et al state that testing is happening too late in the game development life cycle when considering their case studies. This could be important when considering flow as earlier testing could lead to issues with flow being identified earlier. McAllister et al mention a new approach to testing which could be well suited to tweaking a game's flow.

Chapter 3: Methodology

Chapter Introduction

This chapter contains information on my methodology.

Methodology

My research is concerned with flow in video games, specifically, player experiences of flow. This means I will want information on a person's experiences with flow. Not only this but finding people to take part in my study in such an important role may be risky as they may have other commitments or they may leave the study. It may also be difficult to do a long term study with someone as it could be possible to misunderstand their experiences of flow. If this happens in a long term study without either party realising until near the end then the data acquired could not be adequate for the study.

Therefore, an autoethnography study seemed appropriate. Autoethnography is similar to ethnography except instead of observing other people, the researcher observes themselves. A large part of autoethnography is self-observation (Anderson, 2006). Autoethnography allows me to use my own experiences of something as qualitative data for my research (Mendez, 2013). Autoethnography studies can be a rich source of data on an experience due to the volume of data and feedback it creates. The autoethnography I will be doing is analytic autoethnography,

specifically Anderson's (2006) definition of analytic autoethnography. Anderson (2006) lists five features he believes key to analytic autoethnography. The first is complete member researcher status, where the researcher must be a member of the group they are studying. For this autoethnography I will be playing Halo, I have been an avid player of the Halo games from before I started this research, meaning I am a member of the community I am researching. The second is "analytic reflexivity". The third is "narrative visibility of the researcher's self", I will be very visible in my research as the primary source of data. The fourth is "dialogue with informants beyond the self", as my focus is on flow in video games, these informants can be focused on flow or video games. The fifth and final feature is "commitment to theoretical analysis".

I feel I created a strong bed of data for this thesis. For my autoethnography I kept track of my experiences playing the Halo games. Before playing Halo I would note down what I was doing, for example, if I was playing the PvP multiplayer I would note down what games and modes I was queuing into. I would maybe make notes while waiting for a match, perhaps writing down that it was taking a while to find a match. Once a match was found I would note down the information about the match I was playing, this would include the game, map and mode. After a match I would make notes on areas of interest in the match. Two write-ups of my experiences can be found in Appendix B. Another way I kept track of my experiences playing games like Halo was streaming my gameplay to Twitch. This allowed me to watch my gameplay back and save it if necessary. It could be argued that this could affect my flow, when making notes after a match I would sometimes queue into another match and the match would begin while I was still making notes, my flow in the next match could be affected by this. Streaming to Twitch as well also came with issues as well, as streaming could lead to performance issues in the game which may affect flow. I didn't stream too often so this isn't too much of an issue. The fact I was studying flow as well may also have impacted my flow, it could be argued that recognising one is in flow could lead a person to no longer be in a flow state. The notes I took and streams provided data. Streaming allowed others to comment if people came to watch.

Like other research methods, autoethnography has its benefits and drawbacks. One benefit of autoethnography is that it provides researchers with easy access to data as the researcher's experiences can be used as data (Méndez, 2013). If a researcher does an autoethnographic study on an activity they enjoy, it incentivises the researcher to spend more time doing this activity and simultaneously, incentivises them to spend more time doing research and collecting data (Anderson, 2006). Anderson (2006) also notes that if someone can incorporate their other needs or interests into their autoethnography it allows them to use their time wisely, in saying this, Anderson talks of immersion. This made me think about how doing an autoethnographic study on an interest or need can allow even richer data to be collected as if the study is done on something important to the researcher then they may find themselves becoming more easily immersed, better allowing themselves to become familiar with people's experiences of the activity. This methodology also seems apt for a study on flow where immersion is important. I am an avid fan of Halo and an avid gamer so this research fits with my leisure interests. Anderson mentions that researchers should still pursue the knowledge of others as well (Anderson, 2006), something that shouldn't be an issue for me with Halo as there are many vocal members of the community. Anderson also mentions a strange advantage as well, performing an autoethnography study on something of interest to the researcher can grant extra information in the form of musings, daydreams or the kind of thought process that can come from fascination with a subject that people may have about their interests. Some of these ideas Anderson lists seem like worries, he performed a study on skydiving, that someone could have if they died doing their interest. Anderson (2006) also mentions that autoethnography can help us study the relationship between biography, society and scholarly

interests. He mentions that it can help us with our self-understandings. Anderson (2006) mentions in his work the notion of evocative autoethnography. Méndez's (2013) paper on autoethnography seems to talk of autoethnography as a whole, but, seems to focus on evocative autoethnography. Despite the differences of these two papers they both come to the same conclusion about one of autoethnography's benefits: that the feelings and experiences we have as an individual can stem from and contribute to society and culture (Anderson, 2006) (Méndez, 2013). Méndez (2013) references this conclusion from a 1996 paper by Bochner and Ellis. Méndez (2013) also mentions that autoethnography can be a way for people to get their story and ideas out without being hindered by others. This means that if someone has a particular idea based on a field, they can show – using their own experiences as reference – what they mean. Doing a study with other people may make it difficult to get this across, feelings are subjective and two people may describe the same feeling or experience in a different way, it may also be hard to design a study to try and illicit the required information from people or participants may not realise what the study is trying to gather information on if it is a new idea. An autoethnography study allows a researcher to highlight their ideas and why they think this in more detail. This makes it appropriate for a masters study as it allows me to use my own experiences to formulate new ideas to be considered which can be taken into account in future pieces of research that have a larger scope.

Autoethnography also has its disadvantages as well. Before mentioning the relation between the self and society and culture, Méndez (2013), proposes that as autoethnography is quite a personal form of research, the conclusions drawn from it may be limited. An issue with autoethnographic studies and accounts is the importance for researchers to be honest and confident in their accounts (Méndez, 2013). It could be argued that there is an issue of ethics in autoethnography, even though a person writes about themselves and their own experiences, other people may be mentioned or have an effect on the notes being taken, it is a grey area if these people's consent are needed and it is difficult to work out how much and what to what level experiences involving these other people should be anonymised (Méndez, 2013). In my case, I had a supervisor for my research, ethical considerations were discussed with them and approval was granted by them meaning I have a guiding figure for these considerations. In my work, particularly in screenshots, some player information will be removed, for example, other player's nicknames and in-game identifiers will be removed and replaced with anonymous information. Autoethnography does have the issue that sometimes our research interests and general interests and daily lives may not be as connected as autoethnography requires (Anderson, 2006). There are some topics it would be near impossible for autoethnography to cover such as the experiences of bigots and racist hate groups (Anderson, 2006), many would find joining these groups to study them abhorrent whereas people already in them would probably be unable to write unbiased accounts and their accounts could border on hate speech. It has been remarked that autoethnography is narcissistic and that the author is too close to what they are researching and needs to be more distant (Méndez, 2013).

Autoethnography has been used in video game studies before, for example, Nardi's (2010) study on World Of Warcraft[14] titled "My Life as a Night Elf Priest". While not explicitly stating her research is autoethnography, she performs a study with many features of an autoethnography study. She talks of participant-observation where a person observes but also participates in a culture and how she "tilted toward the participant and of participant-observation" (Nardi, 2010). She also mentions "It would be impossible to penetrate the game without becoming engaged as a player" (Nardi, 2010). She mentions other things that you would expect from an autoethnography study: "Anthropologists

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[14] Developer: Blizzard. Publishers: Vivendi Games, Blizzard Entertainment. Release date: 22/11/2004. (IGN – World Of Warcraft).

take time to sink into a culture" (Nardi, 2010), "For many practical purposes, I was just another player" (Nardi, 2010) and "… I was a full participant in game activities" (Nardi, 2010). Nardi (2010) even uses a different name for autoethnography, calling it "participant-engagement" and mentioning how the researcher is "deeply immersed in native practices" (Nardi, 2010). This use of the word immersion and the other pieces of information I have listed here portray the work as an autoethnography study in all but name. Nardi does a study looking at World Of Warcraft, playing with other players and experiencing the world and culture of the game. Chen (2009) also describes an ethnographic study in which they are very involved, again, in World Of Warcraft where they play with a group of players. Again, Chen (2009) doesn't specifically mention autoethnography like Nardi (2010) but does explain his study as an ethnography study where he is a participant, similar to an autoethnography study. Both of these studies are on World Of Warcraft and neither mention autoethnography by name. There are other autoethnography studies and many of these are recent. For example there is Beck's (2021) thesis which briefly considers flow in video games. Borchard's (2015) autoethnography study focused on the negative effects of games. Kout's (2019) autoethnography study critical of video games focusing on education. There is also Cenci's (2017) PhD thesis that focuses on first person shooters. Three of these mentioned works were PhD theses, (Kout, 2019), (Cenci, 2017) and (Beck, 2021), this shows that autoethnography is a suitable research method for a postgraduate student study. Furthermore, this should show that autoethnography is an appropriate research method for video games research.

As I was already doing an autoethnography study I thought something similar to a small ethnography study may be appropriate. I eventually decided on a diary and questionnaire study. It could be argued people's experiences of flow may be subjective. I obtained ethical clearance for this study. I provided two documents to my participants to be used in the study which can be found in Appendix A. One of them is a sheet of questions created from previous studies and my own questions for them to fill out after a gaming session. The questionnaires from previous studies in this document are: the flow short scale (Engeser, 2012), two questions from an immersive tendency questionnaire which I edited (Witmer et al, 2004) and a presence questionnaire (Kim and Biocca, 1997). The immersive tendency questionnaire was edited to be more relevant to video games. I thought these questionnaires would be appropriate for my study. As well as these, the document asks how motivated they were to play the game and also some questions to work out what they did in the gaming session. I also asked some of my participants to write about their play sessions as well to gather data from them similar to my autoethnographic diary. The other document was an immersive tendency questionnaire (Witmer et al, 2004) to be filled in by the participant once, I did not anticipate the responses changing per play session for most questions in the questionnaire. I thought the immersive tendency questionnaire would be useful to work out how easily my participants can become immersed in an experience. A participant's responses can be reviewed and questions tailored to them can be created to work out what immerses them and draws them into the game world or a fictional world. There are some questions in it where the responses for a single participant could vary so I included these in the document participants were asked to fill out after every gaming session. Some of the questions in these documents collect answers on a scale. My intention for this research was not to have vast amounts of quantitative data to analyse. As it could be argued flow is subjective, these scales help to compare the results. The aim is to understand flow experiences through the information I collect. I also planned to do at least two interviews with each participant, one after getting them to sign the ethics forms, this was more of an introduction to the research and one after the research was over to ask them about their experiences and perhaps gather some more information. As my research is focusing on the Halo series and looking into flow in multiplayer games, I specified the interest in Halo when looking for participants. However, it was

also possible that not enough people would be interested if I only used Halo. As a result of this I allowed participants to use other games and mentioned this in my advertisements.

I had a few places to advertise my study, these included: LUGES (The Lancaster University Gaming and eSports society), SENET (the university's card and board game society), Pokesoc (the university's Pokémon society), SW Lancs (an unofficial Star Wars society at Lancaster university) and a Discord group I am in.

I also did a group play session and interview on Left 4 Dead 2[15]. The study consisted of playing two of the game's campaigns as a group of four, interviewing the group after and getting the participants other than myself to send me some writing on the session. Left 4 Dead 2 is a multiplayer co-op game and the group consisted of myself and three other people. I allowed my participants to use mods that can change the game cosmetically, I wanted the session to feel like a regular play session while playing. This was a sort of focus group activity. The interview was unstructured, I wanted to talk about the play session and my topic with the group and get their responses and feedback.

I also had another type of participant, people who are knowledgeable on subjects related to gaming and flow who I wanted to interview. These interviews were semi-structured.

Method Section

I completed a reflective inductive analysis by considering my field notes and identifying different themes related to flow as outlined by Csíkszentmihályi. I then further explored the themes I identified. As my own experiences are important to the research this is appropriate.

For my autoethnography, I would play Halo and would then create notes capturing details about the match after I had finished it. I noted down which Halo game I was playing, the map and the mode. After the match I would note down a summary, details of interest and parts of the match where there was an element of flow. Examples of these parts could be things that went well in the match or things that I noticed that could be related to flow. During the matches I would sometimes notice things related to flow or have musings about flow, I would wait until the end of the match and then note these down. I would also note down other details like what game modes I had queued for, as well as other details like if a match had been found quickly. Formal summary write-ups of some autoethnography notes are included in Appendix B. After I had finished writing the notes for a session the written notes were not edited, however, some screenshots were edited to remove information that could be used to identify other players. The example notes in appendix B are edited. Sometimes when doing autoethnography I wouldn't make notes, this was often when I was recording gameplay or streaming as I could watch the footage back later. These recordings and streams could be especially helpful as, instead of waiting until after the match to take notes, I could think out loud. I could also contemplate my own experiences. Through thinking while playing, making notes, contemplating my experiences and thinking about flow I identified aspects related to flow in these games. Examples of these ideas include: frame issues affecting flow and flow in multiplayer games being different, in this situation a vehicle spawned in front of me and I thought about how this wasn't very realistic, however, it is understandable due to the type of game, things like this could help with flow. I would then play more Halo while aware of these new ideas and try and identify if there was weight to these ideas or not. In playing more I may identify new ideas. The ideas I had could then also be checked against the results of the other studies I completed and these ideas could then be used in my other studies. For example, in the Left 4 Dead 2 group play session

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[15] Developer: Valve. Publisher: Valve. Release date: 17/11/2009. Platform: Xbox 360, Linux, Mac, PC. (IGN – Left 4 Dead 2).

and interview I try to ascertain if the experiences had by my participants lined up with my ideas. I could ask them about their experiences and if they lined up with my ideas in the group interview. The ideas that had weight to them went on to form the data discussed in my data and analysis chapter and went on to form my conclusions.

For my questionnaire study I performed entry interviews with participants when they started the study, informing them about flow and the study and trying to answer questions they may have. After receiving all the responses from my participants I went through their questionnaire responses. I would often consider their responses and try and identify if they were in flow and how the play session went. These results could be checked against ideas about flow and video games.

For the Left 4 Dead 2 group session I played two campaigns with participants. I tried to have these play sessions take the form of regular play sessions a group of people would have. Instead of taking notes while playing I recorded the play sessions. After the play session we began the group discussion. We discussed what happened and I would ask questions about the experience. Some of these questions were ideas from my autoethnography and from contemplating flow and video games. Other questions came from the play session itself and others from what was being discussed. I had some questions that I knew I wanted to ask them but others came up during the discussion. After the discussion I asked my participants for a written response summarising the group play session and discussion. I later wrote up a summary of the play session explaining what was happening while watching back the footage. I made notes on the discussion and tried to find patterns and similarities. The data from the group play session and group discussion could be used to provide evidence for or against the ideas I had identified as well as allow me to identify new ideas that could be considered.

In my interviews with knowledgeable people I could ask them about the ideas I had identified. The discussion could also provide me with new ideas to investigate. The interviews were semi-structured. I recorded these interviews and then played them back later and wrote summaries of them.

Data was sometimes edited to remove identifying information of people other than myself.

Chapter 4: Data and Analysis

Chapter Introduction

This chapter covers the data gathered in my project. There are sections on flow in multiplayer games, my autoethnography study, Halo's relationship with the component states of flow, the Left 4 Dead 2 group play session and interview I did, interviews, my diary and questionnaire study and toxicity. There is a summary of my findings.

Flow in Multiplayer Games

The concept of flow as described by Csíkszentmihályi seems to be a mostly singleplayer experience, with a person getting so distracted by an activity they begin to stop thinking about the world around them. From this, you would assume someone would also lose focus of others around them as well. I have been playing the multiplayer of the Halo series for a while and have experienced flow. There are games such as Left 4 Dead 2 which seem to thrive in multiplayer noticeably. Sometimes these multiplayer experiences are improved by the use of voice chat, allowing players to talk to each other while playing. Voice chat itself can also improve the experience of playing a game by allowing you to talk to friends and others while doing so. You would think voice chat would bring someone out of the game by causing them to interact with others in the world around them which would cause

them to exit the flow state. However, I don't think this is always the case. If we take a co-operative game as an example like Left 4 Dead 2 we can begin to understand why. You play as one of four survivors and in co-op the other players each play as one of the other survivors. Voice chat can allow players to communicate with each other while playing, you can call out your location to others, tell your friends if you find any useful items or tell others when you are in danger for example.

Everyday Gaming

In this section I aim to explain my gaming habits over the period of time of my study.

During the study I was a student at Lancaster University so lived a fairly unorganised student life. I went to many societies. My week would generally consist of society events most evenings with a free day on Friday. In the week I would go to events themed around gaming most Tuesdays, Wednesdays and Thursdays.

These events would happen nearly every week for the regular undergraduate term time. During the holidays these events would not happen in person. I would also usually go home for the holidays apart from the summer holidays. As I was a postgraduate student, my degree continued after most undergraduates had finished for the year, as I had accommodation I stayed at the university instead of going home. My gaming habits would be different during this time as there were less opportunities to socialise with people at university which meant there was more time to play games in my university accommodation. For parts of the study I was also at home, again, my gaming habits were different at home as I would play video games less.

While at university gaming often happened mostly in the afternoon and evening. I would play some games between an online afternoon meeting and a society event in the evening.

After society events I would then usually get back to my accommodation and turn my computer on. I would play a variety of games including Halo and Overwatch.

I would also sometimes game in the morning as well.

While at home I still played a lot of Halo and Overwatch, but, I also played more singleplayer games as well. I would sometimes game in the morning but not often, instead I would game in the afternoon and evening. When gaming in the evening I wouldn't regularly stay up late.

Throughout the study period I would soften speedrun various modes on the Nintendo Switch video game Cadence of Hyrule[16]. These speedruns can usually be finished in under or around an hour.

My gaming habits changed towards the end of the study. For most of the study I would play online first person shooters like Halo and Overwatch with the occasional not overly taxing singleplayer game. Later into the study I played Mass Effect Legendary Edition[17] (Figure 10).

One game that I would have liked to have covered more on in this work is Mass Effect Legendary Edition, this game really got me into a flow state.

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[16] Developer: Brace Yourself Games. Publisher: Nintendo. Release date: 13/06/2019. Platform: Nintendo Switch. (IGN – Cadence of Hyrule, n.d.).

[17] Developer: BioWare. Publisher: Electronic Arts. Release date: 14/05/2021. Platforms: Xbox One, Playstation 4, PC. (IGN – Mass Effect: Legendary Edition, n.d.).

Figure 10. A screenshot from Mass Effect Legendary Edition.

My Experiences

As I did an autoethnography study, including all my data would be too much, instead I will discuss things I have noticed.

Frames Per Second and Performance Issues

When the number of frames per second drops or becomes inconsistent, it really pulled me out of the experience (Figure 11). Others also understand that lower frame rates can impact the experience of playing video games (Vicente, 2021).
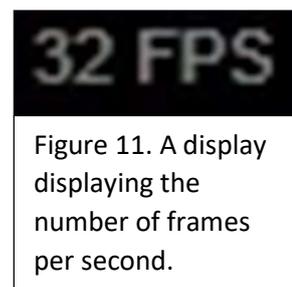

Figure 11. A display displaying the number of frames per second.

The computer I play Halo on is a few years old at this point and can no longer run Halo as consistently as it used to. Halo 2 Anniversary is a sometimes unplayable experience with frame drops and audio tearing. This can cause significant issues for each game. Halo 3, Reach and 4 are all games that were on the Xbox 360, I have been able to run them on my computer without too many issues, however, these issues are becoming more common. When I experienced frame drops I would often wonder why this was happening and they might prompt me to minimise the game in order to try and close other things on my computer. Frame drops also put me at a disadvantage to other players as their game was running more smoothly. The frame drops harmed my flow state. This is particularly an issue in Halo Infinite, in order to run Halo Infinite well on my laptop I try and limit the background processes on my computer and the game is on low graphical settings. The frames can still sometimes be choppy, I enjoy Halo Infinite when I get stable frames and I find I can perform well when playing it, however, the game doesn't run well so I can often get frame drops. These are especially frustrating when taking into account Halo Infinite's other faults. The game was released across essentially three platforms: PC, Xbox One and Xbox Series X/S. The Xbox Series X/S is the successor to the Xbox One, optimising a game across these three platforms would be difficult and it seems PCs have taken the hit in regards to performance. People have also had other complaints about Halo Infinite: the in-game prices, the lack of content, the cancellation of advertised features, its matchmaking and its customisation. People are vocal of their grievances of Halo Infinite and as a Halo fan I learn of these grievances. This means when I play Halo Infinite and encounter issues with the game I become more irritated with it than I think I would do if there wasn't as much bad press about the game. Due to Halo Infinite's performance issues, frame drops and bad press I am less interested in playing the game. When playing and the game has issues it annoys me that the game won't run well.

Drops in frame rate seem to impact aiming which is important in a first person shooter, if you can't smoothly aim your shots then you may end up correcting your aim too much or too little before or after taking a shot, a missed shot could be the difference between a won or lost encounter with an enemy. This is especially an issue when using the sniper rifle. The sniper has a small reticle in many Halo games so your shots need to be precise. You become a target when using the sniper rifle, people will want to kill you in order to stop you from using a powerful weapon or to take the weapon off you. As I mentioned in my literature review, the flow state of the sniper rifle is fragile and frame drops shatter the sniper's flow. With the frame drops it usually ends up with me missing shots with another viable but boring alternative being waiting aimed at a spot and firing when someone lines up with the reticle which is not very good for flow and can be quite slow. There are many times playing Halo 4 where I have had frame drops that have affected aiming, I have lost fights due to aiming issues and struggled with the game's sniper as well. This is particularly an issue when flicking, where you move your reticle quickly to aim. It nice when Halo Infinite runs properly, but, the performance issues do reduce my flow over time.

Bad Press

Bad press related to a game can impact my experiences playing a game receiving bad press and other games in the series. Halo Infinite has had quite a bit of controversy: features were cancelled, the release of content is slow, there is not a lot of content in the game, players have disagreed with design decisions, staples of the Halo series have been removed or changed, store prices and more. As a result of this 343 Industries who develop Halo Infinite have not been too popular. In fact, the criticisms of Halo Infinite also affect Halo the Master Chief Collection as well due to the 343 Industries connection. This means that when I have issues with the game I may become more irritated because of some of the things I've heard about the game online. As well as this, there was an update to Halo the Master Chief Collection during the course of this research, I'm not sure on everything the update has done, however, the game isn't running as well as it used to on my computer which doesn't win 343 Industries many favours. It makes players more vocal on their issues or perhaps inflate otherwise smaller issues as there are already other issues which try the patience of players. This can inflate smaller issues and could further distract me from the experience meaning possible threats to flow like small performance issues or other problems could more easily stop my flow.

Change

I also noticed the impact of changing a game on a player's experience and flow. While this project was ongoing the design used in game for some text in Halo Reach was changed (Figure 12). I'm not sure if it's a different font or just a bolder version of the previous font, it is used in at least the

Figure 12. Top: The font after I noticed the change.

Bottom: The font previously.

in-game feed and the game's scoreboard. When this was changed it really stood out to me and would take me out of the game when I noticed it which would break my flow. The previous style for the text was fine, I think it was like that when the original Halo Reach released. I had got used to the previous font. Even this small change could distract me. While this change was just an update to an existing release, changes and differences between games in the same series can also cause issues for
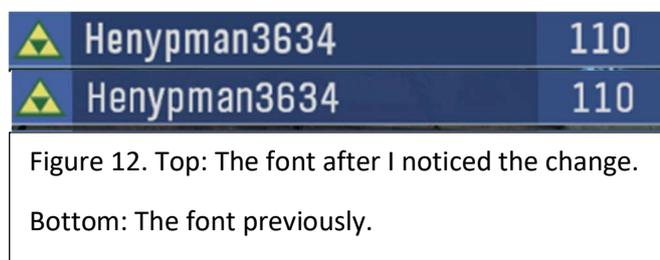
players. Different Halo games have different guns, in Halo Infinite some guns aren't present, while this may mean we get some new weapons, it still stands out that some guns from previous Halo games aren't in the game. Before Halo Reach the Halo games didn't have a sprint function, Halo Reach added armour abilities, one of which was sprint, allowing you to run. Halo 4 allowed players to sprint and have another armour ability as well. In my opinion, sprint made the game fun and more fast paced as well as allowing for more momentum based movement. Sprint was a controversial addition to the game and Halo Infinite has changed sprinting. It's a lot slower than in the previous Halo titles which to me makes the game seem slower than previous Halo titles. During my research Overwatch 2[18] was released. Overwatch 2 has a few changes from Overwatch, one of these changes is the games new 5 versus 5 nature. Overwatch was a 6 versus 6 team game with different roles, players could choose which roles to play in a match using role queue. Among the team the roles were set up as: 2 tanks, 2 damage heroes and 2 support heroes. Each role had its own set of characters you could choose from. Overwatch 2 still has role queue for some modes except the team set up is 1 tank, 2 damage heroes and 2 support heroes. This is quite a large change to the game people knew. Blizzard also replaced Overwatch with Overwatch 2 meaning there is currently no way to actually play Overwatch. Overwatch 2 is strange in that the name makes it seem like a numbered sequel, which is what the game is being pushed as, but people joke that it is just an update. Content has essentially been removed and it's a shame. Progress from Overwatch that players made was carried over to Overwatch 2 meaning you still have your old cosmetic items like character skins from the game, however, how new cosmetics are earned has changed. The game is now free-to-play and it is less consumer friendly. Overwatch 2 has changed lots of things from the original game but the shutdown of the original game is annoying. For me it feels very similar to the original game. I miss 6 versus 6 and even though I like the new characters, the game's progression system makes me wary of playing them as they are harder to personalise as opposed to the ease of the previous game.

Changes in existing games and franchises like this can lead to comparisons with previous versions of the same game or previous games in a series. If a feature is missing or the previous iteration was preferred then players can be taken out of the game by thinking that the previous version was better when they notice these changes. It may be that players can't get into a flow state because of a change, for example, with Halo Infinite's new slower sprint I can't do as much momentum based movement as in previous Halo games. When I'm moving quickly in Halo and smoothly playing a match I am in a state of flow that feels really good. Halo Infinite still has movement options but they feel a lot slower so I'm sprinting slowly most of the time which is downtime between the fun, this is a contrast to Halo Reach's fast sprint where I will often sprint to a fight and leap into a fight with momentum, putting me closer to the enemy and surprising them up close. I'm not trying to say that no changes should be made but they can often detract from the experience if I'm not fond of the change.

Halo's Options

One thing in Halo that really helps with flow is the vast amount of options you have at your disposal in a match. There can be a large amount of options or strategies to try ensuring that players have things to do. If a strategy isn't working then you can try a different one, if you're bored of a strategy you've been using a lot you can try a different one. It means that there is usually something for the player to do next. There are many different ways you can attack players, you can shoot them, punch

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[18] Developer: Blizzard. Publisher: Activision Blizzard. Release date: 4/10/2022. Platforms: Xbox One, Xbox Series X/S, Playstation 4, Playstation 5, Nintendo Switch, PC. (IGN – Overwatch 2, n.d.).

them, run into them with a vehicle, set off environmental hazards, blow something up that is next to them, throw grenades at them and more. In Halo you have rechargeable shield and health, your shields will recharge after not getting hit for a short time, usually to kill someone you will want to break through their shields and then kill them although some weapons can kill through shields. To avoid getting hit you can do many things involving running away or taking cover. How a fight starts is another matter as well and can shift the tide of battle in someone's favour, if the battle is going better for your opponent you can try and turn it around. You can also kill opponents without much of a fight as well. The amount of options at your available really helps me focus and I can make split second decisions on what to do. Due to the amount of options it is hard for me to fall out of a state of flow when I'm in one as there is plenty for me to do and try.

In Halo dying isn't always a huge loss as you can still play the objective, for example, if you think you're about to get killed you can try and kill as many enemy players as you can before you die. In a deathmatch mode this can give you a net positive of points. Even if you die you can still die in a way that favours your team in an objective based game mode. For example, in capture the flag you can move towards your teammates or your base with the flag as you're being shot and if you jump the flag will drop to the ground with the momentum of your jump when you die, further moving the flag closer to your base. I played a lot of Halo and there were many options available to me. This meant there were lots of avenues to continue my flow and even if I get killed, I still feel like I can succeed in trying to optimise an encounter I'm likely to lose. As an example, I was playing Halo 2 Anniversary, a Halo game I don't know as well as some others and I was in a dangerous situation. I was at the bottom end of the map and in a tough situation, there were a couple of enemies nearby but also a bit of cover, to kill me they would need to siege a small cave area with lots of openings to get me, I had the defensive advantage. There were maybe three people after me and a warthog – a jeep – in one of the openings to the cave. The cave was slightly elevated from the entrance. I had so many options, sneak to get the advantage or be fast but easier to notice, possibly even wait and strike. I could also choose what gun to use and where to have the fight. I could also use melee to my advantage. In the end I think I died but during this time I was in an intense flow state, acting quickly with each of my actions flowing into the same one, a merging of action and awareness. Even though there may be multiple people fighting me at once I still feel I can succeed and I focus on getting some sort of positive outcome.

Due to rechargeable shield and the amount of options fights can take longer than in other shooters, this can help you focus and get into a flow state, working out what you can do to win, however, these same features can push players to be quicker. If in a fight and someone has low shields you may want to press your advantage and rush in and finish them off, this can be risky but is an option. There are also forms of preventative counterplay you can do in Halo to get the advantage on someone trying to rush in and kill you once you've taken cover. I often throw grenades at doorways or just through doorways if I think someone is at the other side, softening up enemies who may be coming in. When playing Halo Reach I will often throw a grenade at my feet if I think I'm about to die, this can often kill a weakened opponent who I am in a melee fight with. The amount of options and things you can do in Halo, especially Halo Reach can keep me in a flow state during a match. Even if I die then I don't exit a state of flow as, for example, if I have thrown a grenade at my feet before I have died I can watch the death camera which focuses on your body after death to see what happens, I can also check the kill feed to see if I got the kill. Respawning doesn't take too long so it can entertain me until I respawn. As an example, there was a situation in Halo 4 where I was playing BTB fiesta, an 8 versus 8 mode where you start with randomised weapons. I spawned with a DMR and an assault rifle, two fairly standard weapons that you'd usually expect to spawn with when playing a regular Halo Reach game mode. I started moving away from where I spawned and

eventually enemies appear on my radar, there is a wall in the way and I throw a grenade towards the other side of it. The enemies don't seem to be approaching the corner so I move up a ramp towards them. The enemy starts to approach me. I move stealthily up the ramp in hiding. I swap to my close range assault rifle, rush out from my hidden spot on the ramp and begin shooting the enemy. He switches to an energy sword, a one hit kill close range weapon, I continue firing and then melee him before he strikes me and I kill him, I then pick up the energy sword.

Power Weapons, Vehicles and Abilities

A large part of the flow in Halo is related to its power weapons, vehicles and abilities. Power weapons are often weapons that can kill an opponent very quickly, often quicker than the regular weapons you start with in a regular deathmatch. For example, these weapons could be the sniper rifle (Figure 13), rocket launcher, shotgun or energy sword among others. Vehicles (Figure 14), like weapons, can also be very

Figure 13. Me sniping a ghost with a sniper rifle.

strong with tanks and flying vehicles being available. There are also many different abilities that can be used like the active camouflage and jetpack. When players get hold of a sniper rifle for example you can feel very powerful and get into flow easily with this weapon. The issue with this is, as the weapon is quite good, players on the receiving end of your shots probably aren't going to be in flow. I played a match of Halo 2 Anniversary on Bloodline, a large valley with two bases at either side with a lot of open space. It is possible to get a sniper rifle on this map. An enemy was using a sniper rifle type weapon. The player with the sniper would kill me when I left cover on the map, I was just trying to play the game but was getting shot and killed repeatedly by a distant player. When you die you then respawn so I would wait to respawn and then get shot again when I did. I was not in a flow state, in fact, it was quite frustrating. On this same map there is a Hornet, a fast-moving flying vehicle. On this map the hornet is extremely fun to use, flying low through the dirt road in the valley for cover and shooting at people who I could kill, it's a very fun experience as opposed to being on the receiving end of a sniper. These items are very important parts of Halo's flow. Usually they are available to be obtained on maps, but, in some modes you can earn them or spawn with them. The intense power of these items are a huge bonus to flow. Using them is often fun and can get you into flow but even when not using them their presence can increase concentration and improve flow. Many people will race to the location these items appear on the map, which can quickly get players into the game. If an enemy has one of these items then you can try and stop them from using it by perhaps killing them or taking the item for yourself, this can lead to some interesting plans and strategies which benefit from the wide array of options available in Halo. These items are a very big gameplay focus in Halo. Mint Blitz is a Halo youtuber who makes content on the Halo games. He uploaded a clip to his YouTube channel of him playing shotty snipers in Halo Infinite, a game mode where the player uses a sniper rifle and a Bulldog shotgun. Mint Blitz gets 50 kills and doesn't die once in the clip. There is a face camera in the clip showing him in real life. When getting kills with the sniper rifle Mint Blitz doesn't speak often, he is focused on the game. The only times he really speaks

during the match is when he thinks he may be about to die or when there aren't many enemies around for him to shoot. For the majority of the match he is silent and focusing while fighting the enemy team. At the end of the match he is very happy with his performance (Mint Blitz, 2022). This shows how much power weapons affect gameplay and flow.

These items can also harm flow for other players like I mentioned above. Active camouflage is an ability that allows a player to be almost invisible when they move slowly. The player is still visible as there is an effect around them that slightly distorts the objects behind them making them noticeable if you are careful. In some games it's a pick up on the map that lasts an amount of time before it wares off, in Halo Reach it is an armour ability that can be turned on if there is enough charge for the player to use it. Active camo can be fun to use but its not always fun to play around. I played a game of Halo Reach's slayer on the map Sword base and the match was slow with a lot of camping as the enemies were using active camo. This meant there were long stretches of inactivity which could come to an abrupt end with the enemy suddenly appearing. Playing against active camo can require intense concentration that can be unenjoyable and harm the flow of the game. As Griesemer (2010) states in his talk on the Halo 3 Sniper rifle, power weapons can be great for flow but they can also harm flow as well (Griesemer, 2010). The banshee, an alien flying vehicle, can be very good for getting into the flow state, it is fast, manoeuvrable and deadly. Its speed and power really make it a powerful vehicle and its scarcity in matches means you want to get the most out of it when you use it. Its quick movements allow you to quickly push into enemy territory, kill an enemy and retreat as well as fly towards a safer location when someone begins to shoot at you. For example, the Halo Reach map Breakpoint has a large cliff separating the two sides of the map. The two teams essentially have a base on each side of the map at the start of a match. You can use the banshee and fly over the cliff to kill enemies on the other side and then retreat to the other side of the cliff for safety after a dive. Similarly, if you fly above the cliff and begin getting shot at you can use the cliff for cover and duck behind it to avoid damaging your vehicle. Some maps require similar yet subtly different strategies, for example, Breakneck in Halo Reach. This map is a war torn city with various objects higher in the sky for banshee pilots to avoid. On this map there are many vantage points to shoot from and many places for a banshee to retreat to are still exposed. This means that banshee pilots are required to be more alert to threats and stay on the move. On this map, when you try to get away from enemy fire you may escape from an enemy but be vulnerable to a different enemy. I enjoy using the banshee on this map greatly. Keeping on the move allows me to have fun with the banshee's speed while playing. It requires on the fly thinking which I enjoy and strategising for it is enjoyable.

Figure 14. Me piloting a warthog gauss turret. Challenge progress can be seen on the right above the timer.

Halo's Radar

The radar in Halo is great for flow (Figure 15). It is in the corner of the screen on many Halo games and it tells you of nearby enemies. Enemies appear as dot or triangle when they move faster than crouching speed or shoot their gun. Different Halo games give you differing amounts of information with the radar, some just show red dots while other Halo games change icon's shape or colour to indicate if an enemy is above or below you. The radar can be incredibly useful for planning strategies using Halo's diverse and large array of options. I mentioned above an occasion where I snuck up on an enemy I had noticed on the radar and killed them despite them using an energy sword and me using an assault rifle. The radar can also keep flow going when

Figure 15. The radar.

you aren't in a fight, you may notice an enemy on your radar and start stalking them in an attempt to kill them. The radar is so important that sometimes when in fights around doorways or in cover I will look at the radar to work out when an enemy will be coming into view so I can kill them. I sometimes use the radar to tell me when to throw grenades around corners or in the entrance to doorways as well.
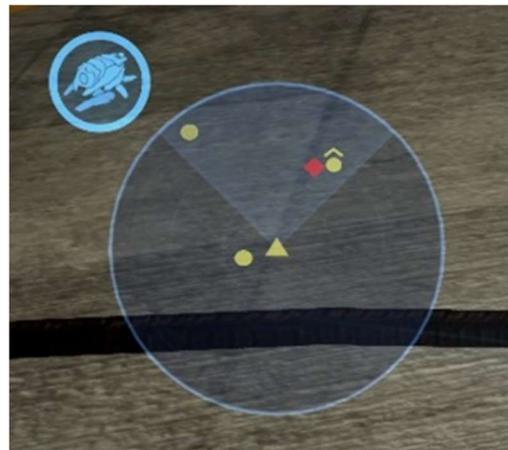
Halo's Shields

Halo's shields are also a good mechanic for flow. When I start getting shot they give me the chance to run for cover. While some weapons can one hit kill you, a lot of them can't meaning you have the chance to do something when someone begins attacking you. I remember playing Halo 4 and sprinting for cover, running across an open area to drop down a ledge for cover. With the feedback from the game telling you you're taking a lot of damage there is a sense of urgency to get to cover, immersing you in the experience. When shooting at an enemy player who has shields you can see how much damage you're doing to their shields. It is also noticeable when an enemy's shields have been broken. When I notice an enemy with damaged or no shields then I will try and finish them off. Most of the time I will try to dispatch a low enemy with a headshot from a weapon capable of getting headshots. What really feels good about the shield mechanic though is breaking someone's shields. When someone's shields are low they have an yellow crackling effect which bursts when you break someone's shields. Using a weapon like the assault rifle to quickly break down someone's shields to the point they are nearly broken and following up with a melee to kill them is very satisfying. The visible shield damage is very good feedback and it drives the player to try and kill their opponent.

Queue Times

Queue times are an issue when it comes to flow. In some online multiplayer game – especially competitive ones – you can start a matchmaking queue to find players to play with and against (Figure 16). Unfortunately, some matchmaking queues are quite long, taking several minutes to find a match, this is not good for flow. Over the time I have played Halo the Master Chief Collection on PC queue times have fluctuated. There are many factors for this, sometimes I don't want to play the games and modes which are most active. Recently, Halo MCC queue times have been taking a while for me to play my preferred games and modes, I like to play game modes that have two teams of
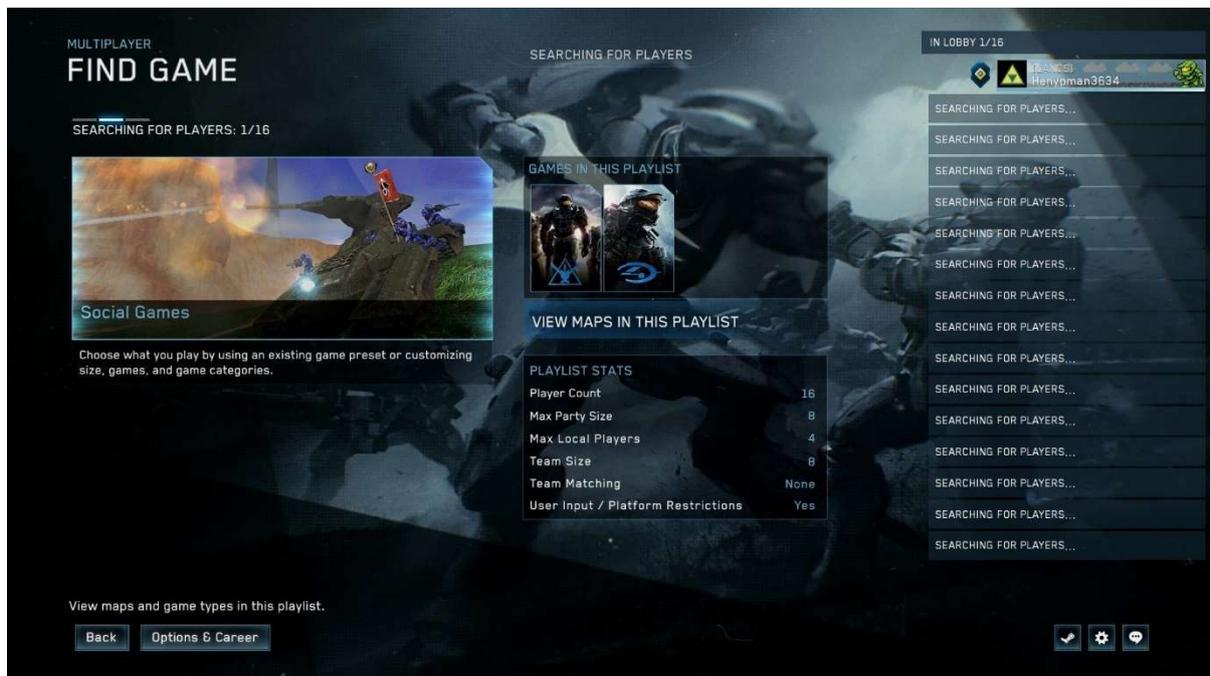
Figure 16. Queueing for a Halo match.

eight players. Sometimes I don't queue into Halo 3 matches as I want to play other Halo games and I may also turn off regular slayer and capture the flag game modes. With this search criteria matches can take many minutes to find, it feels like I often wait over 10 minutes. Oddly enough this long wait mostly seems to occur if I have only just started queuing for a game mode, if I have just finished a match and continue queuing with the same criteria, the time to find a match can often be shorter and I think it queues me with many of the players who were in my last match. This would make me think that it was due to a dwindling player population of Halo MCC, however, there are people online claiming that there are plenty of people, it is how the game is made which make it take such a long time. Halo Infinite has also had issues with matchmaking queues as well. Halo Infinite's method of queuing has players choose a category to search for, however, some of these categories have dwindling player bases meaning it may take longer to find a group of players to play with. One new mode that was released for Infinite is no longer available for players to queue for because of a small population playing it. Before queuing in Halo Infinite you are shown an estimated queue time. I will often wait longer than the displayed queue time and will often give up. Overwatch and Overwatch 2 can sometimes have long queue times depending on what you queue for. If you play the regular game with role queue in the unranked and ranked game modes your queue time can depend on how you queue (Figure 17). There are three roles, tanks, damage and support. In Overwatch the tank and support queues were quite short for the unranked mode, but, in the ranked mode support queues could be quite long. The longest queue, whether ranked or unranked was damage. Damage had one of the largest pool of characters to choose from and was quite a popular role to play.

Queues could take upwards of 7 minutes. In Overwatch tank was a relatively short queue. In Overwatch 2 the game was shifted to 5v5 instead of 6v6. Tank queues are longer now, but, damage queues are shorter, however, both roles generally have queue times that are very similar, around 6 minutes each sometimes. Support is a relatively fast queue. Both of these games had an open queue option where it didn't ask you to choose a role allowing you to have more of a certain role and choosing from a larger pool of heroes. Queue times for this mode in Overwatch 2 are very short. I have recently been playing more open queue than I usually do and the queue times have been a lot shorter, allowing me to play more matches in the same length of time. Queue times can be affected by many things, for example, the game's population. It can also depend on how many matches the provider can host at a time, the game modes population and what you are queuing for. Long queue times can really break up the experience of playing a game, you may have a really good match and then waiting ages for your next match, by this time you may no longer be in a flow state from the last match. Sometimes I go to Halo MCC on PC, start queuing and then when I've waited a short time and not found a match I stop queuing because it usually takes a while to find a match and I don't want to wait for a long time. This means recently I haven't being playing as much Halo as I used to. Long queue times can really break up an experience and make it feel disjointed. Overwatch and Overwatch 2 allow players to play other game modes while they wait, however, knowing you could be connected into a different match at any moments stops me from getting into a flow state in these wait periods. The modes available while you wait are training mode, skirmish, deathmatch and custom games. I usually use training mode out of all these options and just have fun while I wait. Matches were found quicker at the beginning of my research.

Figure 17. The menu for picking a role in Overwatch.

Feedback

The Halo games in the Master Chief collection have good feedback. In Halo you are awarded medals for doing different things, for example, killing multiple enemies in quick succession or killing a number of enemies without being killed. These medals are displayed to you when you earn them.

Figure 18. A screenshot of Halo 2 on the MCC with medals displayed on the left of the image.

Often you can earn many medals at once which is great for flow, showing you you're performing well (Figure 18). One of the best games for this is Halo 4 where it shows you the medals at the side of the screen but also displays the names of some of the medals you've earned along with a score underneath your aiming reticle. For example, in one instance I fired a large rocket launcher type weapon into an enclosed area and killed many enemies. I got many medals for doing this, rewarding me for my performance. In Halo 4 two sticky grenades is usually enough to destroy a warthog, doing this with enemies inside can reward the player with many medals. When an enemy occupied warthog drives past you at speed and you stick it with two grenades the feedback of the medals appearing on your screen is very rewarding and works very well for Halo 4's fast paced nature. After a match these medals are displayed to you and you can also look at them in the carnage report. These medals don't come without their issues however. The volume of medals you can receive at one time in Halo 4 can sometimes detract from flow and there is a particular medal that doesn't feel

good to get. The comeback kill medal is awarded to you if you get a kill after dying a number of times without getting any kills since your last kill (Figure 19). For me this medal just tells me I'm not playing very well, if I think I'm not playing very well then I continue to feel that way and if I haven't realised I haven't been playing very well then it lets me know that I'm not playing very well. The medal are a good feature for feedback but there are issues. In many Halo games your aiming reticle goes red when you are in effective range of an enemy, this is a useful indication to show you should attack and helps with aim. In Halo Infinite they removed this feature for mouse and keyboard players. This key piece of feedback which players have grown accustomed to was removed for a part of the player base. As well as harming feedback it also splits the player base and removes a feature for many which they had previously

Figure 19. The comeback kill medal.

used. The feedback improves as the Halo series gets older and hit's its best feedback at Halo 4. Halo 1's feedback is lacking compared to later entries with the damage feeling less clear, there is also the lack of a radar and you can die to easily. Halo Reach feels like a very good game and the feedback feels good. Halo 4 improves on this by adding hitmarkers. An issue with the medal system in the Master Chief Collection is that there are some games where you don't earn medals for things you can do in those games. This isn't a huge issue however.

Stage Fright

There are times when using these power weapons can cause a feeling similar to stage fright. A pressure to do well with the power weapon or vehicle. This may cause players to not use a power weapon or vehicle. This may partially be due to the toxicity that can be found in many online games. Players may get stressed out and not enjoy themselves when using the weapon or vehicle. Players may not want to disappoint themselves by not performing very well. Online games and communities are partially to blame for this due to their toxicity. I often worry when I pick up a sniper if I'll take advantage of it. Power weapons and toxic communities can cause players to become stressed. In one of my matches I was doing really well at the start of the match and had amassed quite a high score quite quickly. I could possibly get a higher score than usual if I played how I usually do. However, I flustered the rest of the match.

Goals

Halo also has clear goals and allows you to fit what role suits you at the time. Clear objectives tell players what they need to do, in Halo objectives can often be clear and easy to work out, even if you don't fully understand a mode, how it is played can be very clear. For example, many of Halo 4 has many clear objective based modes for its 8 versus 8 matches. Halo 4's Dominion game mode is a game mode where two teams battle to control 3 points on the map, controlling these points earns your team points (Figure 20). If a team controls all 3 points then a last stand mechanic activates where players on the team with no controlled points gain extra shields and try and capture a point. I'm still unsure of how the last stand mode works, however, the objectives for the immediate

Figure 20. A screenshot from a match of Halo 4's Dominion game mode.

present are clear. When there are points not controlled by your team, capture them and defend your own and if you control all the points, defend them and fight your enemies. Even though the mode seems complex, what a player needs to do is very clear. This is one of my favourite Halo 4 modes. Playing a role can also be good for flow it can give you a clear playstyle. For example, on modes where you have to plant a bomb you can escort the bomb carrier, checking around corners and protecting the bomb carrier in an effort to plant the bomb and score a point. In a game like Halo you can change your role as you please, if you find a sniper rifle you can snipe, if you find the flag you can be the flag carrier, it is easy to play different roles with regular weapons but you can adapt to what you find on the map and to what situation you find yourself in. There are plenty of options to keep you occupied meaning you never get bored. You player can play the game how they want to. Roles can give players something to focus on. It can give players a goal which can be good for flow.

Balancing

One issue with online player versus player multiplayer games is balancing the experience for both sides. One of the things that needs to be balanced is flow. Balancing flow can come from balancing other areas of the games, for example, fairness. When you are steamrolled in a game it means the enemy team is easily overcoming your efforts to defeat them. Steamrolling is easily overcoming the enemy's efforts to defeat you. Being steamrolled is not fun in most cases, but, in a many cases, steamrolling the enemy team is fun. Being rolled by an enemy team is not good for flow. In Overwatch there are game modes where the two teams take it in turns playing attack and defense, one round, a team has to defend an objective while the other attacks it, in the next round it switches, there can be more rounds and after the first two the teams might not switch. If you are playing offense and fail to get very far and are then steamrolled quickly in the next round it isn't good for flow as it feels like you can't win. Similarly, if you are playing defense and are steamrolled in the first round and you struggle to make any progress in the second round it is easy to exit the flow state. Steamrolling people is fun and good for flow, however, it can sometimes break flow. Some Overwatch maps are multi-stage and if the first stage objective is a capture point, once you've steamrolled the enemy team you just wait until the point is captured by standing in it. This could break the flow state of players. Sadly, steamrolling is a difficult thing to balance for.

Teammates

Playing with a good team is also good for flow. If you are playing well with your team then you may feel more confident and you may be better prepared for a fight when one happens if you're with a teammate. You may be able to try different strategies if you play with a teammate.

Missed Shots

There are some moments when playing Halo where I feel like a shot should have hit yet it doesn't. These times are especially bad for flow as the realisation you missed your shot may be irritating. If the shot was a shot you expected to kill someone then you may have started doing something else before you realised you'd missed, disrupting your actions and disrupting your flow. These can really break you're flow state and cause irritation if you die soon after it.

A Benefit of Flow

Being in a flow state allowed me to be more adaptive to my situations. When focused on the game I found it easier to perform well and adapt to situations. For example, if I'm in a fight with an opponent I can easily weigh up my options without much thought. It is almost as if my action and awareness merges.

Focus and Forgetting the World Around You

While playing Halo I sometimes listen to music. On one occasion my music stopped playing and I got a message, I didn't change my music or check the message, perhaps I was focused on the game. This is one of the component states of flow.

Halo and the Components of Flow

As I said before, there are 10 components of flow. I will go through these 10 components and discuss my thoughts on Halo's relationship with these components.

"Intense and focused concentration on what one is doing in the present moment" (Snyder et al, 2005). I easily got this feeling playing Halo, after all, it's a video game series which I enjoy. I think the use of the word intense is a bit strong, I was focused and concentrated on what was happening.

"Merging of action and awareness" (Snyder et al, 2005). My actions flowed natural from my awareness while playing, when are many moments when playing Halo where I will act quickly and easily. The fast-paced nature of some of the Halo games suits this well. I described a moment earlier in the thesis where I was in a cave like area with enemies approaching. My actions flowed easily in this situation.

"Loss of reflective self-consciousness (i.e., loss of awareness of oneself as a social actor)" (Snyder et al, 2005). I feel comfortable most of the time when I play Halo, I don't often feel self-conscious when I am engrossed in the experience. This isn't always true though, I discussed a feeling akin to stage fright earlier and as I enjoy Halo I have played it when I have things on my mind as well. There are times when I get engrossed in Halo and focus on the game, enjoying the gameplay and thinking about my actions and possibilities. However, it can be easy to autopilot on Halo as it's a multiplayer game so I may not forget about my worries when playing.

"A sense that one can control one's actions; that is, a sense that one can in principle deal with the situation because one knows how to respond to whatever happens next" (Snyder et al, 2005). I get this feeling playing Halo. I've played Hao quite a lot. I can use Halo's broad selection of options to respond to what happens. I think when I have performance issues this component of flow is no longer satisfied.

"Distortion of temporal experience (typically, a sense that time has passed faster than normal)" (Snyder et al, 2005). I am familiar with this concept. I don't think I timed all my play sessions.

"Experience of the activity as intrinsically rewarding, such that often the end goal is just an excuse for the process" (Snyder et al, 2005). Playing Halo's multiplayer is intrinsically rewarding to me, I enjoy it. However, I do think some element of progression is important.

"Immediate feedback" (Cherry, n.d.). Halo has very good feedback as I already explained. Its medals are an immediate and good way of providing feedback to players. The games in the Halo series vary in feedback with feedback improving with subsequent releases in most cases.

"Knowing that the task is doable; a balance between skill level and the challenge presented" (Cherry, n.d.). I can play Halo. There are issues with people being too skilled sometimes and issues with harder matches but most of the time this isn't too much of a worry. This component is not satisfied when there are performance issues, playing through lag and performance issues is difficult. There is also a degree of safety with this as well. I am unsure how the Halo MCC matchmaking system matches players to play with but I would think it would work partially on a skill level to balance the teams.

"Lack of awareness of physical needs" (Cherry, n.d.). While it is not a need, I did mention before there was a situation where my music stopped and I got a message while playing and I didn't put more music on.

"Clear goals that, while challenging, are still attainable" (Cherry, n.d.). I mentioned how Halo's multiplayer game modes often have quite clear objectives. Playing online keeps the game fresh and challenging. There is an issue with winning feeling unattainable in some matches.

Playing Left 4 Dead 2: A Multiplayer Experience

This section is about my gameplay session with participants. We played the game Left 4 Dead 2. Left 4 Dead 2 is a first-person shooter. One of the main features of the game is the zombies. The game features a campaign mode about a group of survivors in a world with zombies. In the campaign you control one of four characters, the aim is for the player to get to the end of the level, zombies attack the player throughout the level. Weapons and items can be found in the levels for the player to use. The game can be played in multiplayer. The campaign can be played co-operatively with four players controlling the survivors. The game features special infected, enemies which have special abilities.

Levels are split up into parts by safe houses.

Mods can be installed which can change the visual and audio of the game. We used mods in the play session.

I played the co-operative zombie survival first person shooter Left 4 Dead 2 with a group of participants. This is a summary of the events.

First, we start playing a campaign mission from Left 4 Dead. A player has technical issues, and my game eventually crashes.

As Left 4 Dead campaigns may cause issues, I suggest we play Left 4 Dead 2 campaigns. Player3 jokes his flow state is completely ruined.

Dark Carnival

We play "Dark Carnival" on normal mode.

Instead of focusing on what the characters are saying we talk about the mods we have. We quickly equip ourselves and fight some zombies. Player1 remarks sarcastically that the tutorial is playing for him. We push forwards without many callouts, we reach a special infected and Player1 calls out a spitter which he then kills. A jockey jumps on Player1, he didn't realise it was a jockey because of his mods. I am startled by a boomer and kill it. We mill around in the same area and kill zombies before advancing. I shoot a zombie that is chasing Player2 that he hasn't notice. Soon after this, Player3

calls out one of his mods while I hear screaming, I then turn around and notice a different kind of enemy which I approach and it leaps on me as I call out an enemy. We are of course talking about enemies in the game, however, as they are modded they are different for each of us, Player3 must have had one mod while I had a mod that replaced the same thing his mod replaced but with something else, the enemy is actually a hunter. Shortly after it jumped on me it is quickly dispatched by a teammate. We press on while discussing my mods, Player2 is soon attacked by a smoker which myself and Player1 quickly react to and save Player2, while going to help Player2 a jockey attacks me which I call out, the other players get it off me. Player2 disappears and goes away from the game briefly before coming back. Player3 asks about a game mechanic. We press on to the roof of a building by a motel. We are silent, the area seems ominous and creepy, Player3 calls out a smoker. I quickly notice it and aim at, Player3 kills it. I fall off the roof and fend for myself. Player2 and I are both on the ground and Player2 is charged out of nowhere. Player2 is downed and needs reviving, Player1 comes off the roof to help. In trying to help while killing the surrounding zombies I accidentally set off a car alarm alerting nearby zombies of our presence. As zombies approach a quick plan is formed, I throw a bomb to get the zombie's attention so Player2 can be revived. We become swarmed by zombies but don't call out much during this period. We all appear to be trusting each other with doing our part. We follow Player1 up some stairs and talk about if Player2 should heal himself. Player1 calls out a witch. Player3 calls out a tank, one of his mod sounds seems to be why he thinks this. Player1 says it might be the witch. I scout out looking for the witch while we talk. I notice a corpse with blood everywhere, the corpse looks like a regular corpse, I call it out. Player1 calls out a hunter while we move forwards. He later corrects himself, stating it is a jockey as it attacks him, we promptly dispatch it. I call out a charger. It is quickly killed when it appears. I heal myself once most of the enemies in the area seem to have been defeated. Player3 asks how to do something in game again. Player3 and Player1 call out two different enemies before a tank appears, Player1 mentions he was trying to remember what one of his mods signifies. We joke as we shoot the tank. While fighting the tank more special infected appear and are dispatched. I think the tank has died before it actually has. As Player3 runs out of ammo he finds another gun. The characters also call out items. We continue, helping each other out and calling out special infected.

As we continue Player3 mentions it is hard to headshot the zombies because of the mod he has.

When we reach the end of the chapter the game displays the group stats as the next section loads, these provide talking points. The game show us how many infected we've killed. Player 3 asks why they kill the lowest number of zombies every time. Player3 talks about an issue they have where their mods mean they can't tell when an enemy has died so they shoot them for longer than they need to. The group doesn't seem too competitive about who got the best score.

We equip ourselves in the safe room and start the next chapter. There is an optional feature in this mission to win a gnome in a fairground game and carry it through the level, I mention this is the area for that and Player1 tells me we aren't doing that. We fight a horde of zombies, talking about general things and the game as we play. Player2 mentions his YouTube notifications are displaying above the game. We are attacked by a tank and zombies, I throw a pipe bomb to get the zombies away from us. Player3 wonders if he was hit by the pipe bomb, he didn't know where it was thrown. I ask about the gnome game, Player1 says no again, mentioning that getting the gnome isn't the problem, the problem is carrying it through the rest of the campaign. Player3 launches a Molotov into the room I am in, it lands close to me setting the whole room on fire. We question why he did that and have a laugh. We wait for the fire to go out. I notice some flammable items, I tell Player2 to move away from where they are and blow them up. Player1 finds the witch, I ask if he wants to kill it and he doesn't want to. Player3 is killed very quickly by a spitter, we quickly get him back up. Player2

shoots the witch and it goes after him. He jumps away but still gets downed and we kill it. Player1 asks Player3 why he is still shooting, he can't tell the witch is dead. Player2 appears to be away from the game. We wait around for a bit and the game says he is idle. When this happens, the CPU controls his character. We carry on. Zombies approach and I fight them before we carry on as there are a lot of zombies. Player3 doesn't know where we are going. I go inside to look for stuff while they fight enemies outside. While Player2 has been away we have been focusing on the game more. Player1 wants the CPU to pick up an item.

We approach a carousel, the current area of the game is a carnival area, the aim of the section is to press a button to open a door to let us through a small area. Once it is pressed zombies begin to approach us, we want to get to the other side of the carousel and stop what is drawing the zombies to us. I rush through ahead of the other players, walk around a corner and straight into a witch. There is also a boomer and a jockey, I kill the boomer and the jockey rides me, the witch becomes startled by me and attacks me. It knocks me down. The team revive me. Player1 is grabbed by a smoker, he remains calm and tells Player3 how to help him. After being revived I shut down the carousel. We get to the end of the section and question if we should wait for Player2. Player3 finds the chainsaw amusing, we both have the same mod. We wait for Player2 and talk about our mods. Player3 has a laugh. I don't know how to do sprays and I ask how. Player1 wonders if typing kill in the console kills you in this game. Player3 and Player1 try and find out if you can kill yourself by using console commands. We carry on before Player2 comes back. Player1 encounters issues with the game. Player1's game has crashed. He decides to close the game. We wait around and zombies attack. Player1 discovers a message saying Player2 will be gone for around 10 minutes. Player1 joins back. His mods haven't loaded. We push forwards. Player1 remarks it feels like a different game when the "zombies are zombies". Player2 gets back. Player1 catches him up on what he's missed and so does Player3. I notice another regular corpse and blood, I look at it. We are attacked by a large group of zombies in an enclosed space, there isn't much talking. Player1 jokes about not recognising special infected without mods. Player1 and I move forward, Player2 goes again and Player1 moves back, I find laser sights for guns and then I am attacked by a special infected while we are split up. Player1 and Player3 come to help me. We realise a witch is nearby, it is in the way. We create a plan, I'll throw a Molotov at the witch and then run. The expectation is it will chase me and the others can kill it. I throw the Molotov. The game says Player1 startled the witch meaning it should go after him. I turn around to help fight the witch and tell Player1 to run. We kill it quickly. Player1 prepares for the next section by healing.

This section is a set piece. There is a rollercoaster which we can activate, once activated, it draws zombies to us, we are meant to run along the rollercoaster and deactivate the ride to turn off the alarm. It takes a while for the door to open but the seats go past and the door opens. We run while Player1 tells us trivia. The call outs from Player1 are quick but not from Player3. I go ahead. I am attacked by a jockey and try to stay on the ride. The other players get it off me. Player1 goes and turns off the ride quickly. Player1 remarks we were quick and it is usually quite hard. Player2 mentions that the zombies slow you down when they hit you. I say we did pretty well. We get to the end of the section and reach a saferoom. Once again there is a loading screen where the game shows us group stats, it shows us stats to do with the witch and we start discussing why it targeted Player1 instead of me earlier.

As we continue some of the group notice a special infected and try and find it. It is killed by a member of the group.

I ask the group if they want to go on the bumper cars, the area of the map we're in has some bumper cars, Player1 mentions you can't move them. Near the bumper cars we find another witch in

the way. Another plan involving a Molotov is formed but Player2 throws the Molotov early before Player3 has reloaded. The plan goes smoothly and we kill the witch. A jockey who is on fire grabs Player1, it dies. We notice a spitter and instead of killing the zombies around me before killing it, I shoot the spitter while the other zombies swarm me. The spitter separates Player1 and I from Player3 and Player2. To get back to us they wait for the spitter goo to disappear and re-join us. Later a tank appears and we don't talk until Player2 jokes about the tank and his mods. A character in game mentions there is a hunter nearby, Player3 mentions there is a hunter and Player1 tries to find it, he thinks it is on the roof, he then finds it on the roof. Player1 mentions a prompt on screen telling him to heal himself with first aid, he seems to want it to go away.

As we carry on there is a pile of regular corpses and blood, I look at it.

We reach another set piece. A small area with some scaffolding, you activate a button to start opening some doors and zombies attack you. Player1 describes it as miserable, in an exaggerated manner. We talk about the game as we play for a short while and we focus on the game. The gates open and I decide to act as a vanguard near the front of the group attacking enemies with my sword, I am charged by a charger and my friends quickly help me. It becomes a general push and brawl that opens out into a brawl as we try to get inside a building. The game shows us group stats again while the next section loads which prompts a conversation.

We leave the safe room and start the next chapter. Near the beginning I find some boomer bile which is modded. I mention this and we talk about the mod. We get to the final set piece of this level, a concert. The in-game reason for why you are here is to set off the concert to alert a helicopter of your location to escape. When you set it off enemies start attacking you in a horde. To finish the campaign you survive until the helicopter arrives then get on it. I turn on the stage lighting while we prepare for the horde. I start the concert section.

Sparklers are set off and the music begins. A charger grabs Player1 and it is killed. We fight the zombies. A jockey grabs me and it is defeated. Player3 is very quick with the callouts. We stay and fight around the stage area. Later in the concert I set off the sparklers again. The music changes again. A tank spawns, some of us aren't on the stage anymore, spreading the fight, I move towards the tank off stage. Player1's game crashes. We fight the tank. There is a period of rest before another horde spawns. Player3 is grabbed by a smoker and more music starts. I go and kill the smoker that has grabbed Player3. We are off the stage now and are fighting more enemies. I get hit by zombies before a jockey grabs me and I take a lot of damage. The jockey is killed. I notice a smoker, I shoot at it and I run out of ammo, it grabs Player2. Switching to my sword I run up the steps to try and get to Player2 on the concert seats. I knock Player2 out of the smoker's tongue and then kill the smoker. My character is low on heath at this point and I have a melee weapon, I use an adrenaline. The adrenaline in this game puts a visual effect on screen and changes the sound, the other sounds become quieter but I can still here the music, it is very immersive and gives me an adrenaline rush, it really gets me into flow. I go and get some ammo, after, I fight some zombies. Some of the adrenaline's effects wear off. A boomer is sick on me and I am attacked by zombies. I get incapacitated and need to be revived. My friends try to rescue me and in the ensuing chaos Player1 throws a Molotov and comes to help me. A jockey appears and starts riding Player1, he stops reviving me. Player1 is incapacitated as well. The music changes again. Player2 comes to revive Player1 and is grabbed by a smoker. As Player2 is grabbed Player3 starts to revive me, he quickly stops. Player2 is dragged away and Player3 goes to get him, a charger runs over to them. The charger is killed. Player1 mentions the helicopter. Player2 starts reviving me, as he does this, a tank arrives. I tell him to get me up. It is right next to where Player1 is incapacitated. Player3 runs away, Player2 follows and then so do I. Player3 and Player1 laugh as we leave Player1. We run away and I

ask where the helicopter is. My character is low on health so they move slowly. I shout for Player2 to help me, the tank is throwing projectiles at me. Player2 takes cover and heals himself. Player3 asks where it is and then starts shooting. I heal myself. The tank throws a projectile at Player2. We finish off the tank. We think we might be able to save Player1. I go back towards him. I turn around. The helicopter arrives. I go towards the helicopter. I get in the helicopter. There is a tank and zombies around the way in. Player2 gets in as well. Player3 struggles to get in and is pushed away. Player1 mentions if he gets incapacitated then we will leave without him. Player3 is incapacitated and the campaign finishes. We laugh about it and Player3 asks "Why is it always me?" as the credits roll.

This campaign took us 59 minutes on normal mode with no restarts. The credits tell us group stats which we talk about.

Swamp Fever

The next campaign we did was Swamp Fever. I changed some of my mods before we did this campaign.

We start the level. I changed the mod for the character Player1 was playing as, the new one is broken. We talk about how it is broken. Player3 picks up an item I wanted. Already, Player1 regrets his choice of gun. Player3 explains he prefers the shotguns as they don't punish him for reloading constantly. My game crashes. I reload my game while they carry on playing. I wait for my mods to load. My mods load and I change the mod I think is faulty. I re-join the game. We very quickly get into another set piece where we wait for a floating pontoon to come from one side of a river. There isn't much talking while we play, this could be because of focus. A jockey starts riding Player2 and moves him away from the fight, he doesn't seem too bothered, I go and help him. There is a charger corpse hung up near where we are fighting, after helping Player2 I go and look at it. When the boat arrives Player1 tells us and we get aboard. Much of the conversation during the section was about what was happening in game. As we take the ferry over to the other side of the river I heal myself. We also chat on our way over. There is a witch somewhere and we easily walk around it. Later we find the safe room and someone closes the door on Player2. He is then let in. We finish the chapter. There is a loading screen between chapters and it shows us the group stats, this sparks conversation. The group notice a witch but aren't sure where it is. I move forwards and a jockey starts riding me, the jockey is killed. Unfortunately, I am near a witch, I turn around and look at it, my flashlight is on and the witch is startled by me. The witch gets up to fight me and a hunter leaps on me. Player3 remarks he can't tell when the witch dies so continues to shoot it. We find a man hung from a tree by the parachute, you can pick up his gun and we joke he has an infinite supply. Later we arrive at another small set piece, Player1 isn't sure what kind of segment it is. During the set piece we talk about the game.

We come across a shed and Player1 throws a pipe bomb, I also throw a pipe bomb, Player1 walks over to it without realising.

We come across a section with lots of regular bodies, Player2 mentions something about this.

We get to the saferoom and Player3 shuts the door on me. I then get inside.

We leave the saferoom to do the next chapter. Player1 notices there is a witch. Player2 has a Molotov to throw at her. We move past her and Player2 throws something at the witch and startles it.

Later, a tank appears and we talk about our mods while fighting it.

In the campaign we are playing there are some walkways so you aren't in the water all the time, I fall off one of these and am then attacked by a jockey which is then killed. Player3 remarks that he accidentally switched his weapon instead of zooming in. Player1 wants the game to stop telling him to heal himself with first aid, the tutorial and prompts seem to be annoying him.

The next set piece is a bridge that lowers while zombies attack you. We wait for the bridge and chat about what is going on in game. The part after this is quite hard and we mostly talk about the game. Player3 wonders why the game won't let him revive Player2, Player1 is doing it. The game continues throwing difficult combinations at us, two people are vomited on by a boomer and one is ridden by a jockey. The jockey pulls who it is riding far away and the two people who were vomited on struggle with the zombies that are attracted to them because of the vomit. I am reloading and when I go to shoot the jockey off Player2 he goes behind a tree. Player1 is incapacitated, followed shortly by Player2. I revive Player1 and go over to Player2. Player3 revives Player2. We discuss what happened as we move on. We reach the saferoom at the end of the chapter.

We start the next chapter. We play through it fairly regularly. We chat about Valve's source engines for a bit.

We reach the final set piece for this campaign, a large house where you survive until a boat comes to pick you up. The house has a minigun, a balcony and a large garden area. We arrive and begin gathering resources. Player1 calls out the location of some med kits. A charger pummels Player3 inside, Player2 struggles to get to him. Player3 takes a lot of damage, it seems to amuse him and he becomes incapacitated. Player1 revives Player3. We have a conversation about Player2's common infected mod. While everyone collects items we strategise about what to do. We then get set up for the final set piece, getting to the top floor and getting someone on the turret while one person goes to the boat call point to call for the boat. Player3 is on the turret and doesn't know how to get off it. A charger pummels him when he is on the turret, it is then killed. The turret overheats. Player3 can't tell when it will overheat. There hasn't been much conversation while we have been defending ourselves, we occasionally talk about the game. A tank appears and Player1 goes out the door and is attacked by special infected, Player1 is incapacitated, the tank gets to the top floor as I go to help him. Player3 revives Player1. The tank is finished off. There is a moment of calm, Player1 recommends we grab ammo during this time, I heal. The next wave starts and I tell the other players to give me cover as I go to get some more ammo. Player1 throws a pipe bomb to keep the zombies off us while we go to get ammo. Player2 is grabbed by a smoker in the house, Player1 kills it and Player2 falls off the balcony of the house and becomes incapacitated. He didn't realise everyone was outside. Some spitter goo is launched from the garden just before he says this, I go in the direction it came from and dispatch the spitter. A jockey starts riding Player3 in the house and he is incapacitated. Player1 revives Player2. Around the time Player1 gets Player2 up I am surrounded by zombies; I throw some boomer bile and some zombies are caught in it and I get away. The bile attracts zombies. I go inside and revive Player3. I go to use the turret. The game spawns a tank for us to fight. It is defeated but there is another tank. Player1 says this means the boat is here. We start moving towards the gate. A tank incapacitates Player3 on the first floor of the house. Player1 goes to help Player3, I try to get closer to the house but the tank chases me towards the gate. Player2 and I fight the tank. Player1 revives Player3 and I heal myself. The boat arrives. Player1 is worried he won't survive as he is low on health and can't move quickly. We move towards the boat. I cover people who are closer to the zombies. We get to the boat and finish the campaign. The credits roll and we are shown our stats.

It took us 44 minutes to complete Swamp Fever on normal with no restarts.

We talk about the stats. Player1 says we all survived, mentioning none of us died. The stats for the number of med kits used appears. Player1 starts to talk about it. Player3 mentions he had to use a lot of med kits as they were attacked while by themselves a lot. Player1 asks about the number of jockeys, there were quite a few, this prompts some laughter. We talk about jockeys briefly. These are some of the things we talked about when we knew the stats.

After we finished playing, I interviewed them as a group and got them to write about the subject and send it back to me. We talked about a few things in the interview.

One thing that comes across in the interview is how the participants understand Left 4 Dead 2's structure. We talk about how the game sets up tricky situations and has set pieces where the participants concentrate more. We also talk about the quieter in between sections between these larger set pieces and how these bits are different, they seem to find these sections less engaging. They understand the need for the quieter bits, but they are less fun to them nonetheless. The set pieces the game has force them to concentrate in order to survive and succeed. When talking about how these set pieces force players into flow the answer from the group is very simple, the horde, a large group of zombies which attack the players. It creates a need to take action in order to survive. In the group interview the larger set pieces and the down time between them are talked about. When walking around in the in between sections the group are less engaged, they're waiting for the next bit, the next set piece. One of the group members mentions how these gaps between the high tension set pieces balance the game out. The group opinion is that most of the time playing the game is just messing around but there are moments like the finales – the set pieces at the end of the campaigns – where things get serious. The set pieces and finales are the sections the group think are best for flow, they have the best engagement as they have a lot of action. One of the members says that in these sections they aren't in flow but they are close to flow. This member has said they don't get into flow while playing this game as it is too casual. The written pieces of feedback given by the three participants other than myself all mention the set pieces and finales. One of the participants just mentions how the finales are good for flow as there is more to pay attention to while the other two talk about the set pieces and the downtime in between them. They talk about how flow and concentration came from the set pieces due to the higher difficulty and increased number of things happening. One of the participants says the set pieces allow players to enter a state of flow by ramping up their concentration in crucial moments. The two participants understand why the game has the slower paced intermission sections, one of them mention they work well for the game but aren't massively engaging and the other mentions that players can relax during the lower activity periods. The feedback on this topic is quite consistent. The busy nature of these sections is apparent when looking at the summaries of the play sessions above, the set piece with the scaffolding, the concert section and the finale in the mansion, all of them are active and busy sections where the group aren't as talkative unless it is about the game.

We also talk about callouts as well. A call out is when you tell other players things you have noticed, in Left 4 Dead 2 this might be calling out the existence of a special infected and perhaps its location as well. It is remarked that callouts are important as you might die if no-one kills the special infected, for example, if people aren't aware of a witch, it could attack them and another example could be when someone is attacked by a hunter, if they don't call out that the hunter is attacking them then they may be killed. In our play session callouts were affected by the mods we had installed. Player1 mentions that he tries to call out what the special infected is, for example a smoker or a hunter, instead of what the special infected is modded to appear as in their game. He thinks calling out the mod isn't as clear. Player3 mentions he also does this. Player2 mentions that he doesn't. In the write

up of the play session above there are many times when people call out the location of an enemy, this doesn't always stop the enemy from attacking people but the enemy is often dispatched quickly after it attacks as people are more ready to fend it off. Callouts are a fairly common occurrence in the play session, happening in the areas of down time and the more high tension set pieces and finales.

Throughout the discussion the use of mods comes up quite a bit. I let my participants use mods if they wanted to. It was interesting to get data on the experience of playing the game with mods. It was generally decided that some mods harmed immersion, however, the participants weren't getting that immersed anyway. Player2 said that mods hampered his ability to get into flow, he mentions hitboxes when talking about this. Most of the mods used were cosmetic, they would change the game's appearance. Player2 was using a mod that changes the zombies so they don't fit the zombie's hitboxes which might confuse someone. It might work well as a joke but not as something which works with normal gameplay. For this player mods are hampering not helping which seems to be the case for the three members of the group other than myself. Player1 mentions that mods are more there for comedic purposes instead of for improving the state of play. Player2 mentions that the comedy element is funny but they aren't focused on that, saying that it's the opposite of being focused. Player2's mods seem to bring him out of the game, for example when tanks would appear he would often mimic some of the audio that plays for the tank. Player1 thinks that the games audio suffers the most when it comes to immersion when playing with mods as you hear so many silly things. It was mentioned that the game wasn't particularly challenging and that was what harmed the flow state, they said that the mods didn't add to or take away from that apart from the fact they are silly. In the written feedback Player2 mentioned that mods detract from flow due to them thinking they are for humour which makes them less focused. Player1 mentioned mods hindered flow as they were used for comedic effect. Player1 mentioned that mods meant people would call out what their mods had changed something to be instead of what the thing in question was. They mention that means that other players might need to think about what that means or ask for clarification. They say it brings you out of the flow state. Player3 mentioned in his feedback that flow was harmed the most when someone had technical difficulties caused by their game crashing and the group waited for them to re-join meaning they weren't doing anything. There were a couple of crashes during gameplay. We also waited around for a while when Player2 had gone to do something else.

The game's difficulty, engagement and the nature of the game were also discussed. The participants weren't engaged with the game apparently, mentioning the game's difficulty as why. We played the game on normal difficulty and this apparently wasn't hard enough for them. They said it wasn't hard enough that they needed to take it that seriously when playing. Player1 mentions that the fact it wasn't very hard and the fact that we were playing in multiplayer had a positive and negative effect on flow. They talk about the fact that they weren't thinking too much about the game so maybe they are in a flow state but they aren't really thinking too much about the game so you could argue that they are not immersed or focused on the experience. It is kind of like an autopilot, an interesting thing to think about when it comes to flow, a person isn't thinking too much about what they are doing yet their actions and awareness seem to have merged. This is almost like another form of flow; the person isn't fully engaged with the activity, yet it is coming naturally to them. They say they aren't very concentrated on what they're doing as they don't feel they need to engage with it on a particularly high level. They also mention they would be more focused if they were playing a more difficult game or a game where they are the reason they succeed or fail like in Dark Souls. It sounds like they would be more focused playing singleplayer games. When Player1 dies in game he mentions he is not too focused on succeeding. They say that the set pieces and finales are best for

engagement as there are things to do. In the interview Player2 mentions that the game is mostly casual when discussing the fact he wasn't in flow, later in the interview the nature of the game and the difficulty are mentioned a lot. It seems that during the set pieces and finales the participants were more engaged and closer to a flow state and the difficulty seemed to be nearer what they wanted while the difficulty during the downtime sections didn't seem to be enough. Perhaps there wasn't a high challenge-skill balance even in the more intense sections. Player1 says he doesn't think we'd do very well if we increased difficulty, he doesn't think we are trying very hard. It seems the casual nature of the game brought them out of it. Player3 says it is not a competitive game, implying that why he didn't get engaged with it. It is mentioned that the thing that harms the flow state is that the fundamental game experience is not challenging enough with a participant describing what you do as "going through the motions". In the written feedback Player1 said that normal mode was quite easy but this meant they could autopilot. In Player3's written feedback he mentions he didn't enter a full flow state because they didn't find the fundamental mechanics engaging enough and because he thinks that the gameplay caters to a more casual experience.

In the interview we talked about multiplayer. In the interview pacing issues in multiplayer games were mentioned. Player3 says that he doesn't feel engaged when he wants to progress through the campaign but other players are looking around buildings for items and when other players disconnect. Left 4 Dead 2 is a team-based game, if you rush ahead you might need to wait for your team later on or you could be killed by zombies or a special infected, without your team one special infected who appear quite regularly could kill you. The idle mechanic is brought up as well. If a player in a multiplayer game of Left 4 Dead 2 goes to do something else without leaving the game then their character will be controlled by the game until they return. Player2 mentions that he thinks the idle mechanic is needed or something like it for co-operative games. Later in the interview Player2 says that he doesn't get immersed in multiplayer games as you're playing with other people. This is interesting as something I thought about during my research was how flow seemed to be a very solo experience so the current aspects of flow don't seem to fit with multiplayer games. These solo notions seem to fit Player2's experiences with multiplayer games. Player1 says that multiplayer games aren't usually designed around high immersion. Player2 says that we're more likely to call things out as we're a group of friends than we are if we were playing with strangers as there is chemistry. Player1 even mentions that Left 4 Dead 2 doesn't have much value if you're playing by yourself, suggesting the game is really just for multiplayer. When asked about how multiplayer affects flow its mentioned that the game isn't hard enough that it has to be taken seriously. Player2 mentions that he does take into consideration the other people who are playing but says that at the level we were playing its not too much of a concern. As mentioned above, Player1 said that the multiplayer aspect and the fact it wasn't too hard had positive and negative effects on flow. They didn't have to think too much about the game to play it like an autopilot, suggesting they had some flow components. However he also wasn't thinking too much about the game suggesting he wasn't very engaged. Player1 mentions that he'd feel more focused if he was playing a more difficult game or a game where he is the only decider on whether he wins or loses, for example, a singleplayer game. His example is Dark Souls. It was mentioned in the interview that my participants are messing around most of the time. Friendly fun seems important, it seems to be common. Difficulty comes up many times in the interview and Player1 remarks that he doesn't think we'd do very well if we turned the difficulty up, explaining that we aren't trying very hard. It was mentioned in the interview that playing with friends improves engagement as you're more into the game. Instead of just registering something for yourself you communicate meaning there is a response to the stimulus beyond just registering it. Playing with friends and multiplayer were also mentioned in the individual written feedback I received. Player2 mentioned that playing with friends helped them relax and

focus because they knew them well enough to know how they would respond to calls. Player1 mentioned that multiplayer increased enjoyment due to callouts.

When playing one of the campaigns in Left 4 Dead 2 you can find a gnome in the campaign. If the gnome is taken to the end of the campaign you can get an achievement. The gnome is an item that you carry. I asked my friends if they wanted to try carrying the gnome to the end of the level, they did not. It seems the added challenge of carrying the gnome makes the game harder and less fun for whoever is carrying it so we decided to leave it.

From the data we can learn interesting things about constructed experiences within games. In Left 4 Dead 2 these can take the form of the set pieces mentioned. For example, the concert section and the section with the house with the balcony from the campaigns played in this study. These sections can often be busy with a lot going on. As the campaigns in Left 4 Dead 2 are level based the developers can more easily create constructed encounters which can vary in size. What works about these set pieces is how busy they are. They can often have special infected and large amounts of infected in them and can have objectives as well. The objective can be to survive but also do other things as well, for example, there is a set piece in the game where players search for fuel for a car so that they can escape. It is fun. The concert set piece is exciting as there is music blaring and pyrotechnics and the zombies flood into the concert venue and will run towards you if you're on the stage. One of the set pieces played for the study has a balcony with a turret overlooking a garden where you try and survive until a boat arrives to pick you up. These sections are exciting and can be tricky. The large number of enemies means there is always something for the player to do and if they are unsure of what to focus on there isn't a lot of downtime as there are enemies attacking you. Some set pieces have supplies for players to use as well which ensures they aren't too hard. The supplies given are well tailored to be just enough for players to make it through the set piece. Playing with a group works for these sections to as different players can occupy different roles and hold different areas as well as support each other. The addition of communication as well allows players call out powerful enemies in the busy fighting which players can then try to fight in the busy set piece. There is a lot of chaos which really works for them in their favour. They can be challenging yet doable and can focus players on the game and is great for the merging of action and awareness. The mode we played was player versus enemy where the players play co-operatively.

In player versus player games maps and modes can be designed to try and create points where players often have encounters like the set pieces in Left 4 Dead 2. Overwatch 2 maps often have choke points which are areas where players will try and defend at and the other team will try and push at. This depends on the map and the mode. For example, there is a Hollywood map which has a long open area from the attacking team's spawn. The first objective for the attacking team on this map is a capture point which the attacking team has to stand in while none of the defending team are in the capture point's area for a period of time. This capture point is in a fairly open area with something in the middle. In order to get to this area, the attacking team has the option to go through a few areas which are all fairly close to each other (Figure 22). This area creates a point for the defending team to defend from and creates a few options for the attacking team to push through (Figure 21). After capturing this point attacking players then push a payload to the end of the map. The payload can then become a location where encounters happen. In Halo maps can be designed to create points of action. For example, a powerful weapon could spawn at a certain point in the map meaning players may gravitate towards it and fight off other players trying to get the weapon. Objective based game modes can be a good way of creating points of contention in player versus player online multiplayer games. The objectives will draw players together and when played

with maps that support these modes locations where encounters often take place may be created. When playing king of the hill players may fight on or near the hill.

Figure 21. The defensive side of the first point on the Overwatch 2 map Hollywood.

Figure 22. The attacking side of the first point on the Overwatch 2 map Hollywood.

Interviews with Interviewees

In this section I will discuss the interviews I conducted with a game industry professional and an academic knowledgeable in human computer interaction.

Interview 1: Academic

At the start I ask them how familiar they are with flow, they respond mentioning they've known about it for about 15 to 20 years. They understand that flow isn't just present in gaming. They've played Left 4 Dead 2 and Call of Duty with other people and are knowledgeable on human computer interaction and flow.

Near the start of the interview I read out some of the components of flow and they start discussing their thoughts on the flow component concerning the requirement to ignore other needs. They believe that if a person desperately needs the toilet, then they will be taken out of the state of flow. When the needs in question reach a certain level, they believe a person is taken out of the flow state. They briefly mention Maslow (Maslow, 1943). When I ask them about what in those games works for flow, what motivates them, what keeps them playing the games I mentioned and what makes them enjoy the games in question they mention a social element, skill element and an accomplishment element. They voice chat to their friends when they play, mentioning they mainly play with their close friends. When asked if they talk about each other's lives or if they focus on the game they say that when in a flow state they focus on the game. They say that the state of flow is a continuum and that of all the things I've mentioned – I think in regards to the components – a person converges and diverges on these things and that it's a very dynamic thing. I explain that the flow definitions seem quite rigid and we discuss the component regarding ignoring other needs use the needing the toilet example used before. They explain that it's a sort of threshold, in that, when someone's need gets to a certain desperation, they are taken out of the flow state. They discuss a level of how desperate someone is as to whether is "impinges or not", stating that they still understand that there may be some games where a person finishes playing and realises they need the toilet.

They mainly play campaign; I mention co-op and they specify co-op campaign. They don't replay campaigns after having played them the first time. They tend to talk over the cutscenes, mentioning they do this in Call of Duty. To them Call of Duty's story is secondary to the experience as opposed to games like Far Cry. When they play Call of Duty they work out where to go themselves. The interviewee explains that in cutscenes them and their group of friends wouldn't be in a flow state and would talk about football and other things. The interviewee just enjoys it. Enjoying the game and being with their friends is part of the reason they play the game. For them, flow is part of the motivation for playing the game, being in a flow state. This is interesting, flow is an aspect of positive psychology and feels good to most people so its understandable someone may want to do something to get into flow.

After this I start discussing Halo's multiplayer and multiplayer games and flow as well as my ideas of flow in multiplayer games. Temporal element, respawning may take you out of flow, for example, your skill isn't being tested. The interviewee isn't a big fan of waiting to be respawned. When asked how they felt when they were spectating their friends after they had died in Left 4 Dead 2 they said that they weren't bored but weren't in a state of flow either. Some games like Borderlands 3[19] do waiting to respawn better than others. They explain that when they are death spectating someone in a game they don't usually help their friend whereas their friend often would help them out when

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[19] Developer: Gearbox. Publisher: 2K Games. Release date: 13/09/2019. Platforms: Xbox One, Xbox Series X/S, Playstation 4, Playstation 5, Google Stadia, PC. (IGN – Borderlands 3, n.d.).

death spectating. My interviewee just wants to get back into the game, he mentions that this could mean his friend stays in flow for longer because he is still helping my interviewee when he is dead. He thinks his friend is more of a shot caller and more of a team player. Shot calling doesn't take my interviewee out of the experience, "its all part of the drama" he says. He things the drama element gives it the "extra edge" in multiplayer. I ask him to elaborate on this. He gives an example of death spectating someone and calling things out to another player as something that may prolong the drama, he doesn't do this though. He seems to think his friend can maintain the drama better than he can. He and his friends are quite independent in the game, they don't think about going to check if their friends are doing what they think they are. They trust that their friends are doing what they should be doing. They'll co-operate when needs be but are quite independent when playing to the point they can lose track of where their friends are. They acknowledge this strategy isn't very good. He is currently playing Back 4 Blood[20] with some friends and for the level they are on they realise that they need to stay as a group and playing independently isn't efficient. They decided on this new strategy as a group. However, they think having to follow another person is a danger to flow but mentions it depends on what kind of person you are. For example, forcing a lone wolf to co-operate may be a danger to flow, you can't make your own decisions, following another player may cause frustration. It stifles acting in the moment. They think skill is all about acting in the moment so stifling this could take someone out of the experience. They think their group's default independent play style and nature is because of this. Being forced to play as a group in co-op games can be a danger to flow. Your skill/instinct telling you to do something may be stopped by the co-op element if your friends choose a different strategy which could cause frustration. They mention that Call of Duty doesn't allow you to separate from other players too much before being told to regroup which seemed "overly intrusive" when compared with how they wanted to play it. This takes them out of the experience. They link back to the feeling of needing the toilet. As a computer scientist this takes them out of it as they start thinking about why the game is doing this. For them this goes against the idea of an open world game. They still aren't sure why these things are imposed.

I ask them about if someone realises they are in a state of flow, does it break their state of flow. They think that when you have that thought you aren't in 100% flow. They are unsure on whether they think flow is binary or not. They liken it to being in a state of enlightenment, its idealised. They think of flow as an ideal. I then ask them about their thoughts on what they notice in these games about flow from a HCI point of view. They bring up Nielsen's heuristics, mentioning control and freedom. Not being allowed to fly off where you want to go curtails your freedom. They mention that "suspension of disbelief is an important concept". They think that not allowing players to do what they want to in an open world which feels like something they can do then it breaks their suspension of disbelief, the drama and will likely bring a player out of the flow state. The better the physics engine the easier it is to suspend their disbelief; they mention this might not be the case for everyone however. They talk about it as a sliding scale. They aren't interested in the rewards and gamification, it doesn't motivate them, they create their own fun. For them it is about the drama, the drama is important to them. They enjoy messing around, doing silly things and sabotaging the group, however, they don't think they are in a state of flow during this time. They converge to and diverge from flow while playing. Comedy is present just like in my Left 4 Dead 2 group play session, similarly to my participants there, when something comedic is happening, my interviewee isn't in a state of flow. I ask if silliness breaks flow and he mentions again that he doesn't think it is binary in

[20] Developer: Turtle Rock. Publishers: Warner Bros. Games. Release date: 12/10/21. Platforms: Xbox One, Xbox Series X/S, Playstation 4, Playstation 5, PC. (IGN – Back 4 Blood, n.d.).

this way. He mentions that if you're focused on finishing the level then you probably wouldn't shoot your teammates "in the back of the head" and they probably wouldn't do the same to you.

They remark that they find less flow nowadays in games. They talk about when doing things as a group they are looking forward to the end of the activity. People are driven to want the company of others but when in the company of others they want it to end. They mention that they think flow is an idealised, "end of the rainbow type scenario".

I ask if they play Left 4 Dead 2 modded or unmodded. They remark one of the maps they play the most is a Helms Deep map. They play more Helms Deep than they do other things in Left 4 Dead 2. They think that when playing on the Helms Deep map they get into a flow state, there are still "boring" and "monotonous" bits, but, they knew what would happen at certain times. It sounds like the fact they know more enjoyable parts come after the boring parts keeps them interested. The fact they knew what was going to happen possibly made them enjoy it more. They mention a sense of skill, you know what is expected of you. They talk about the challenge-skill balance fluctuating on the Helms Deep map. They mention drama again, points of tension and then points of release. Isn't very interested into silly mods that change your character. They seems to be aware when they play for longer than they had planned mentioning they feel anxious when they play for longer than they have told their partner they are going to. They think there are many things that impinge on flow.

As we finish off they remark they find Back 4 Blood less immersive despite its improved graphics. They mostly play with the one friend and they say that Back 4 Blood tries to get 4 players to play and makes them wait before they can start. They talk about the game's card system and then say that they think the game is "overfeatured". It interrupts gameplay with the card feature that they aren't interested in. The game is overdesigned. It just doesn't feel as good.

Interview 2: Games Industry Professional
The second interviewee is a professional in the games industry.

I thought we'd start by talking about Dead Cells[21]. They explain that they like the fact that Dead Cells tries to keep the player moving fast. They think the game is well balanced and they highlight the rewards, controls and movement options. They remark that it feels really good to play. They also mention the fact that rogue likes can be good to play for a short period of time which they like. They explain that everything about the game is done to keep the player going, mentioning the game rewarding you for completing a level as fast as possible. They remark that "everything just feels really fluid and nice to play". I mention the "one more game" mentality. They start talking about how with each run you learn and understand more about the systems, talking about the colour system, and mentioning what the game does to balance it during the entire run. They explain that good rogue likes and short games pace the learning of mechanics so that learning them becomes a reward giving you a "pounding of dopamine" as you come across new things, the game is constantly rewarding the player. I talk about the idea of teaching players by them playing the game. My interviewee then brings up the Nintendo design of introducing a mechanic in "a phase of 3" to teach something to players. Instead of this the game teaches you in a run, you learn a mechanic, then in another run learn something else that's related and in another run you understand it. I explain that with flow players are meant to feel like they can succeed and that challenge-skill balance is important and that roguelikes seem to not fit this model, they are often quite hard for new players. They explain that the games slowly feed the player new things and that the game feels so good to

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[21] Developers: Motion Twin, Playdigious. Publishers: Motion Twin. Release date: 7/8/2018. Platforms: Android, Apple, Xbox One, Playstation 4, Nintendo Switch, PC. (IGN – Dead Cells, n.d.).

play and that each run you learn more about the mechanics that you don't need the rewards – they do mention that there might be rewards like currency – as you're working towards something and that you will eventually learn and improve, when you do another run, you have more knowledge. The reward isn't just something you unlock in game, it is what you learn that you know for the next run. You know you're moving towards victory and when you work at something hard it feels better when you get further. They mention good controls and responsive controls a lot. When discussing lore they mention that the background lore encourages exploration which can cause players to find more gameplay features. "It always comes down to what its feeding the player piece by piece". They mention that when designers are designing the game they'll think about how much time they want a run to take and how to pace it as well as the game's total length. As an example they explain people will plan the in-game triggers to activate after the player has died a certain number of times or if a player has got to a certain point. They give an example of a player dying 3 times so if they don't make much progress in the next run something like a piece of dialogue could be triggered to avoid the player Ig frustrated. They mention more features of the game could be introduced after a certain amount of runs, if it shows players a changes to the environment then the player is coming across new things. This is something games developers constantly do. They mention that weapons may spawn due to a variety of factors as they want the game to continue improving. They say that when players come across a weapon for the first time it is added to a "spawn pool" so players know that they can find it again in future runs. They say that the game upgrades its drop rates and item rarities which adds to the sense of progression of the player.

I start talking about FromSoftware[22]'s games, about how hard they are and talking about challenge-skill balance. They explain that they love them and that they're very repetitive – in a good way - in a similar way to how roguelikes are. They explain that enemies have tells in their animations and that some things in the game are based on animation events making the game quite timing specific, they talk about how when the player takes advantage of these weaknesses the game camera changes and the game makes itself feel "epic and grand" giving the feeling of a "huge clash of two incredible powers", they then liken it to a dance. "…if you do every single step correct it feels unbelievable".

They use flowcharts when they think about the minute-by-minute gameplay referring to what a player does with their thumbs while playing on a controller. They also think about how the game's events will flow and they then start to build this up into larger periods of time. They think about what the player does each hour and each play session. They always think about what feels good and sufficiently rewarding the player to "breadcrumb them along". They start small and piece it together. They mention prototyping when designing for flow. They have mentioned control a lot in the interview suggesting they think that they are important for flow. They mention that with these prototypes you can figure out how the controls feel. When they don't feel in control of the game it "pushes" them out of flow. They start talking about Overwatch and mention stuns and how they bring them out of the flow state. Some stuns were removed from Overwatch 2. They talk about wanting to get a player back into flow straight away after they've been knocked out of it, after a player has been knocked down you want to get them to recover quickly. They mention that on a physical level where the player interacts with game that they get back into the game and that they're getting "control of things as soon as possible". I talk for a little while about flow in multiplayer games. They think that maintaining flow in a multiplayer situation relies on many different things, random number generators, mistakes, being in sync with teammates and making good early decisions are mentioned. There are many different things that are down to chance they

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[22] https://www.fromsoftware.jp/ww/ (FromSoftware, n.d.). The developers of Dark Souls (IGN – Dark Souls, n.d.) and Elden Ring (IGN – Elden Ring, n.d.) among other games (FromSoftware, n.d.).

suppose. They mention they would like to think about it and do a written response. This is included later. We talk about the Mass Effect games for a while and I ask them about the multiplayer in Mass Effect. They think it works as it's a group versus a horde of enemies. They already had the AI and character controls from the single player meaning they could work on getting the environments to work with the abilities and mechanics. They mention that the game balanced the team with the abilities, they wonder if this is why it worked so well as you were familiar with having different kinds of characters on your team from the singleplayer squadmates. They remark that maybe that was balanced well so that players stuck together. Enemies have cover but there is enough room for them to float up, they transferred that environment design quite well.

The person I'm interviewing has worked on some of the LEGO games. I ask them about flow in LEGO games. They say "nobody thought about flow in lego games". They say every LEGO games was the same so there wasn't much design input. Each designer had different ways to layout mechanics. When they started at the company they already had a formula for how LEGO games worked, you would just put it together. Collecting was important, having "constant rewards" for players like studs and true hero bars. The smashable environment was also important, players could find everything they could smash in the environment. There is always something happening on screen. I talk for a while about the new features added in later Halo games and how some had mixed receptions. I talk about how Halo is a beloved franchise and that maybe adding new features won't work as people will think the previous games had better flow as they enjoyed them more. My interviewee thinks that's people being "…rose-tinted by nostalgia…". They say that people get used to small quality of life features and that they don't realise the improvements unless the reality is presented to them. They say that maybe they should think about flow in LEGO games again and that maybe they weren't being fair before. Iteration is good for designing for flow. They mention that you want players to feel like their skill is an important factor. Rewards are important and how they are presented, they mention using delayed feedback loops to "pull players back in". There is a lot to think about in a lot – if not all – areas of design.

I received some messages from them later. This had been mentioned in the interview. Here is one of their written responses: "I think there's tons of different tactics. It's a total rabbit hole I'm discovering as I work more with team shooters and battle royale. Balancing seems to take tons of time, and you have to think about how players will work as a single unit, and as part of different teams. You have to think about play styles the player takes and roles they like to be involved in and balance all the guns, powerups, gameplay styles around those types of things".

Flow Participants

I had planned a part of my study where people would fill in questionnaires after playing some games. They would do this once that had finished playing games. I did not get many participants for this section. At least eight people were interested but I didn't receive many completed questionnaires and not all of the final interviews were carried out. They either fell through the cracks or the people didn't get back in touch with me. Not much data was gathered through these means. I focused on other areas of the study. I got data from six people, five filled in the immersive tendency questionnaire and four filled in the flow research questionnaires.

The results provided some information. Some participants would often play for longer than planned. One participant who sometimes played longer than planned recorded an instance where they didn't play for as long as planned, rating the session a 4/10. In this instance they played Halo 3 but the experience was difficult and frustrating. They played multiplayer in this instance.

One of my participants played many first-person shooters. They played some multiplayers player versus player modes as well. This person just seemed to be playing a video game, they weren't too immersed in the worlds. When playing the multiplayer player versus player games like Halo 2, Halo 3 and Call Of Duty Black Ops[23] they were moderately in flow. When playing these games they just seemed to be playing a video game and to them it was a game. The flow results from these play sessions weren't as high as for results I got from singleplayer games. If anything this might be useful data for arguments against games making people violent as the experience was just a game to them. They just seemed to be enjoying playing a video game. This participant also played a few story-focused games and modes. They played Borderlands 2[24] and 3. The flow values for these sessions were higher. In one session they felt very powerful.

One of my participants played League of Legends[25], an online player versus player game. In one of the questionnaires they provided they didn't seem to be too focused on the game. They didn't seem to vastly enjoy the experience and playing just seemed to be something that they did to pass the time. This person also played League of Legends and streamed the match to me. They lost the match. To them it seems like just a game.

I had another participant who played some Halo and The Great Ace Attorney Chronicles[26]. In the Halo session their flow feedback results were middle to high. They played multiplayer co-op. Ace Attorney is a series about lawyers. Players learn about cases and try to solve them. They are story driven. The flow results were high in this questionnaire. Their presence results indicate they were immersed.

The results from my participants seem to indicate that flow is easier to come across in story-driven games. The results were strange for challenge skill balance, while some people had it, there were situations where challenge and skill were not balanced but this didn't seem to harm a person's enjoyment of the game. The results are interesting when thinking about playing on autopilot, perhaps some of the participants playing multiplayer player versus player games would autopilot and not think too much about the experience.

Theme: Toxicity

This section discusses toxicity. It features ideas on the subject and a brief summary of how it could affect flow. This theme comes from my autoethnography and my experiences playing Overwatch. Toxic behaviour is usually behaviour which is rude and insulting. Video games and online video games have a problem with this. Flow is related to positive psychology (Snyder et al, 2005) so I won't cover this too much. When I started playing Halo on the PC I turned off the social features. I thought the game chat would have people in who would send insulting things. In Overwatch I had social features on and I do in Overwatch 2 as well. There is a feature on Overwatch and Overwatch 2 that will use "*" symbols to replace characters in explicit words, I have this feature on, however, you are

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[23] Developer: Treyarch. Publisher: Activision. Release date: 9/11/2010. Platforms: Xbox 360, Playstation 3, Nintendo Wii, Mac, PC. (IGN – Call of Duty: Black Ops, n.d.).

[24] Developers: Gearbox, Iron Galaxy Studios. Publishers: Sony Computer Entertainment, 2K Games. Release date: 18/9/2012. Platforms: Xbox 360, Playstation 3, Playstation Vita, Linux, Mac, PC. (IGN – Borderlands 2, n.d.).

[25] Developer: Riot Games. Publishers: Riot Games, THQ. Release date: 27/10/2009. Platforms: Mac, PC. (IGN – League of Legends, n.d.).

[26] Developer: Capcom. Publisher: Capcom. Release date: 27/07/2021. Platforms: Playstation 4, Nintendo Switch, PC. (IGN – The Great Ace Attorney Chronicles, n.d.).

still aware of someone's bad language and there are plenty of combinations of words that can be used to insult someone that the game doesn't count as explicit. While playing Overwatch's competitive mode I tried telling people at the start of the match to stay positive. Some people chose this moment to begin being toxic immediately. I found that when people didn't become toxic we stood a better chance of winning. The matches where people were toxic seemed to end in losses more often. Teammates being toxic to each other is very problematic. Typing in game chat means that whoever is typing is typing and not focusing on the match. This obviously puts the team at a disadvantage. Thinking about flow and its components it is understandable that toxic behaviour can affect flow. It is easy to see how toxic behaviour, especially directed at oneself, can distract people and cause them to be less focused on the game. It can cause a player to feel self-conscious and reminds them of the fact they are a social actor. If an activity is intrinsically rewarding to someone, being insulted while doing the activity may not make the activity rewarding anymore.

A player who has had an insult directed at them may lose focus on the match, feel self-conscious, be reminded of themselves as a social actor and may no longer find the activity rewarding. Some may want to respond to an insult. Responding to the insult may make them lose focus, they may lose focus because of the initial insult and then lose focus again responding. When someone is insulted even if they try to ignore it they may still think about it, distracting them from the match. It is not just the person who the insult is directed at that may lose flow because of this. Other people in the match may also lose focus because of the insult. Other players may begin feeling self-conscious and worry that they may also start being insulted. Some people may want to come to a person's defense, something which a social actor may want to do. Someone being insulted by another person may cause the other players in the match to start typing, making them lose focus on the match. Even if a player wasn't the person insulted or the person insulting someone they may lose focus after the insult. A whole match can be affected by toxic behaviour.

Unfortunately this is a difficult issue to tackle (Beres et al, 2021) and it is present in online multiplayer first person shooters.

Data Chapter Summary
The purpose of this section is to draw some of the data together.

Frame Rates and Technical Issues
I discussed the importance of steady frame rates. Technical issues were also mentioned. One of my participants struggled with frame rates as well.

Feedback and Rewards
Feedback and rewards have been covered and their importance was highlighted. The games industry professional I interviewed mentioned feedback.

Halo's Options
I talked about the options available in Halo. In some Halo games the game can feel very fluid when you take advantage of the options available and succeed. Movement is a big part of this. Movement and controls are important. The importance of controls was highlighted by the games industry professional I interviewed. They mentioned how FromSoftware's games can feel like a dance.

Sociability and Toxicity
Friendliness and sociability can be harmed by the toxicity problem gaming has. I have chat turned off In Halo and one of my participants had chat with other players turned off in League of Legends.

People may turn off social features of games in order to avoid toxicity but will not feel the benefits of these features either.

Converging and Diverging States of Flow

I can get into flow playing multiplayer player versus player games, however, my participants didn't seem too focused. Their flow results weren't too high, they could have been in a less strong state of flow or going in and out of flow states while playing. The academic I interviewed thought people converged to and diverged from a state of flow.

Autopiloting

Some people seem to play games and not focus on them too much. I explained autopiloting earlier. It has similarities to flow. Some of the results from my participants made me think about this.

Bad Press

I talked about how bad press can affect a game and the game's developers.

Change

I brought up the effect changing a game can have on it. In the interview with the games industry professional, they brought up the idea of nostalgia and how people think the older version is better.

Power

Halo's power weapons were covered. They make you feel powerful. One of my participants talked about a build they had made in a game. This build made them feel powerful and appeared to help with their enjoyment of the game. The games industry professional I interviewed also mentioned the feeling of power when discussing FromSoftware's games.

Balancing

Balancing is important. One of my participants who played Halo didn't seem to enjoy the experience very much and their flow may have been harmed by the fact the other team were winning.

Tone

The Left 4 Dead 2 group play session, group interview and individual feedback suggested joking around wasn't good for flow but was still enjoyable anyway. The academic I interviewed thought that when in a flow state, you may not think about joking around with friends while playing. Games developers could design so that when not in flow there are still things to joke about in order to keep the player enjoying themselves.

The Importance of Tone

While playing Left 4 Dead 2 in the group play session I used mods. There would occasionally be corpses that weren't affected by these mods. I would notice these. This may remind people of the game's tone.

Drama and Set Pieces

The academic I interviewed talked about drama and that being important for flow. There are periods of drama in the Left 4 Dead 2 group play session. The academic was familiar with Left 4 Dead. Drama is reflected in the Left 4 Dead 2 group play session.

Changing the Idea of Flow

The academic I interviewed talked about flow not being binary. The completed questionnaires I received from the participants of the ethnography study I did could suggest they were in partial flow sometimes. The autopiloting idea could also be a type of flow. There were times playing Halo I could

have been in partial flow as well. This suggests that not all flow components outlined in my literature review are required to be in a state of flow and that the definition of flow could be relaxed.

Designing for Flow

When talking about my experiences and what I noticed about flow in Halo, multiplayer games and video games I highlight many things. The games industry professional I interviewed explained that flow can be designed for in many parts of a game's design.

Chapter 5: Conclusion

The chapter includes the conclusion of this thesis. I talk about the empirical, methodological and theoretical contributions of this thesis.

This thesis contributes to ideas on flow and design. I was limited to a certain word count and by the duration of my course. There is more work that can be done including more research and data that could be gathered in a study similar to mine. Studies with larger sample sizes can be performed and more games included. This research had no budget. Future studies done could be ethnographic studies that can try and evaluate if my autoethnography reflects the wider demographic of players.

I have provided a rich source of data on flow in video games, this is my empirical contribution. During my research I have considered flow in online multiplayer first person shooter games. To me, flow seemed like a fairly single player experience, I wasn't sure of how multiplayer games fit the concepts of flow. I have learned that flow is something that can be designed for and considered. Reading through the components of flow I outlined in my literature review make it seem like flow has a very strict set of criteria. This makes it seem like flow is a more specific state than I think it is. I mentioned in my thesis the idea of autopiloting and one of my interviewees mentioned that they don't think flow is binary. One of my interviewees mentioned they didn't think that ignoring physical needs was a component of flow. When playing games I may also be doing other things at the same time but can still get into flow. The definitions seem quite specific. I think that the components and definitions for flow could be relaxed. When I am playing Halo there are times I feel like I'm in flow but I don't satisfy all the components. For example, I can be in a flow state while concentrated on a game, I don't have to be intensely concentrated to be in this state of flow. One of the components of flow is ignoring other physical needs. While this can be something caused by flow, I don't think that it is required to be in a state of flow, I can still be in flow even if I have other musings. I would also disagree with the fact you have to be intensely focused on the present moment to be in flow, while playing Halo I will sometimes think about my next steps while playing while in a flow state, being in flow helps me think about these next steps. I think these components could be relaxed.

I think that researchers and academics could consider how strict the current definitions of flow are. I think research should be done on flow that considers a more relaxed idea of flow. I think there should also be research on types of flow and how flow works in different scenarios. I think that the literature on video games could be updated as well. Bartle and Yee's player types are from works from 1996 and 2005 (Silverman, 2006), gaming has changed significantly since then.

Research could be done on partial flow. The academic I interviewed didn't think flow was binary and used a percentage when discussing flow at one point. Research could be done on the idea of types of flow. These flow types could have different components and features. These flow types could be more specific or less specific, they could focus on different intensities of flow or could only require certain components, the components could be combinations of the current components or new

ones. Flow isn't just present in video games so types of flow could be considered which could help when talking about flow in different fields.

I think that people in the games industry should design games with flow in mind and avoid dark patterns. A game design dark pattern can be defined as "A dark game design pattern is a pattern used intentionally by a game creator to cause negative experiences for players which are against their best interests and likely to happen without their consent." (Zagal, 2013).

I hope that this research and my autoethnography has provided information to games developers and designers that can be used when creating video games. It is also important for developers to listen to feedback from their fans, similarly, games creators should try to understand their fans. Halo has had a busy year with the release of Halo Infinite and players have been vocal and provided feedback to 343 Industries. One aspect being discussed is the limited character customisation Halo Infinite offers people. Some armour pieces can't be used with some others and changing the colour of your character's armour is more restricted, as well as this, the shop where players can buy items including armour has received negative feedback due to the pricing of the items in the shop, meaning customising your character can be expensive. For some, customising their character may be important to them and could also make some players more immersed in the experience. Developers should also plan flexibility into their designs so they can respond to player feedback and change the game if required. I think publishers should try and avoid releasing broken or unfinished products. If the game isn't finished it could be delayed. Halo Infinite had issues at release leading to a drop in player numbers and frustrations for players. Big team battle didn't work properly, forge wasn't included and split screen wasn't fully implemented. Keeping a good relationship with your player base can be important. I think developers should be more transparent about their games. People were unhappy with 343 Industries' decision to not include split screen co-op for the game's campaign after they had stated it would be in the game. Fans have recently been told that it was because it would be too much work. Halo Infinite's developers 343 Industries have been very transparent some of the time but not at others. Instead of leaving fans waiting with little information, fans should be kept up to date on what it happening with the game, otherwise they may lose interest and stop playing and they may no longer be interested when new content is released. 343 Industries have recently shown themselves to be very transparent when it comes to Halo the Master Chief Collection by telling fans they were thinking of adding micro-transactions to the game. After fan feedback, they have said they will no longer be doing this. 343 took the fan feedback on board. These controversies build up into negative press and frustrations that may stop people from wanting to play the game.

Developers of video games should be careful when using the live service model. This model is not consumer friendly and not as rewarding for players. The high prices in in-game stores irritate players. In Halo Infinite unlocking things without paying for them requires a lot of effort for not little reward, it is not satisfying and reward and feedback are important for flow. Unless you find the general gameplay intrinsically rewarding the game does not offer much reward for those who aren't willing to pay for content. The game has lacked any sort of satisfying progression for players since release and 343 Industries have tried to rectify these problems throughout the game's release, however, it doesn't feel like enough. Even if you purchase the premium battle pass you still have to progress through it to unlock the content unless you want to pay more to unlock the content you've already paid for immediately. The progression system involves a lot of challenges that until recently have tried to get you to play other modes you may not want to and complete difficult and rather situational challenges. These dark patterns shouldn't be present in what is meant to be a rewarding and enjoyable experience. It tries to keep players playing for an artificially long amount of time. As

someone who enjoys Halo but doesn't want to pay lots of money for the content on offer, completing these challenges and unlocking tiers in the battle pass aren't something I enjoy or play the game to do. There are other Halo games to play with progression systems I find more appealing. 343 Industries are finally changing the challenges to be more casual friendly. The hurdles to unlock content don't feel achievable in a reasonable space of time in Overwatch 2 which is another live service game. Overwatch 2 is a free-to-play live service sequel to Overwatch, a game you had to pay to play. Blizzard replaced Overwatch with Overwatch 2. You can no longer play Overwatch. Accounts from Overwatch were transferred to Overwatch 2 and the things you had unlocked in Overwatch carried over into Overwatch 2. However, the content that people had paid for in Overwatch that they hadn't yet unlocked has to be earned using the in-game currency. In Overwatch you could also unlock things using this currency, the currency took a while to earn and could also be purchased, however, this process wasn't too taxing. In Overwatch 2 the in-game currency can be purchased with real money or can be earned in game. Earning the currency in-game is slow and will take a long time and only a certain amount can be earned over a period of time. The amount of time required or money spent to unlock the game's items are both very large. In Halo Infinite you can't even earn the in-game currency without having purchased the battle pass. The small number of rewards on offer is not good for flow. Those who are willing to and can afford to pay may make those who can't afford to pay feel self-conscious when comparing their items. This again is not good for flow by making players aware of themselves as a social actor. Players are paying for the satisfaction of flow, whether this is intentional or not, it harms the experiences of free-to-play players and players who are not satisfied with this. Players who have paid for the content may find themselves experiencing buyer's remorse, which could harm their flow state by making them self-conscious. Games that require a payment to play like Halo the Master Chief Collection can provide a much better experience. In the MCC you earn XP for playing in matches. This XP can be earned through challenges, playing the game, the team's performance in team-based modes and the player's performance. The game has levels that you level up through which change the level icon next to a player's name. For me, this is enough. It gives a sense of progression and reward for playing well along with the intrinsic reward I get from playing the game. In a game a player has paid for there should be enough content to satisfy players. While paying for a game is probably not a guarantee of this, Halo and Overwatch switching to free to play live service models have caused issues. Players have also voiced concerns about Halo Infinite's prices and there were concerns about microtransactions in the MCC. These consumer unfriendly practices harm players and flow, instead of focusing on these, developers should focus on making an enjoyable game. If players enjoy the game and the prices of content are fair players may find it acceptable to pay for this content. Live service games also tend to release content over a period of time and can make content unavailable as well. Halo Infinite has not been releasing content as fast as players have wanted. Live service models can leave players bored of the current modes on offer while being unable to access the previous modes they may have enjoyed that have been made unavailable. This could leave players thinking they would rather play some other content in the game that is no longer available. Players may become bored playing the same content over and over again before new content is released. A non-live service game should have a complete experience available at launch, giving players a complete and varied experience to play. It is a sad road that the games industry is currently walking which I hope will change. Rewards are very important.

The points of interest I've pointed out in my data chapter should be considered when creating an online multiplayer first person shooter. There are a few things I would like to highlight here.

Frame Rate and Performance Issues

A steady frame rate is important. It can be tricky to keep consistent as well. Dropped frames bring players out of the experience, breaking their flow. Technical issues should also be avoided as they can cause issues even if the player doesn't recognise they are technical issues, they may simply become irritated at the difficulty due to the alteration of the challenge-skill balance. Steady frames are very important for a shooter as well as skill is important in first person shooters and dropped frames can disrupt a skilled player's performance which could lead to frustration. An inconsistent frame rate can make it seem like things in game are jumping from their previous location to the next, it can make the game feel not smooth which could break a player's immersion. In my literature review I listed some components of flow, some of these may be affected by frame drops and performance issues. It can affect immediate feedback (Cherry, n.d.), drops in frame rate can make a game feel less fluid, harming the feedback. Performance issues can also cause the game to freeze, delaying feedback. Merging of action and awareness is also a characteristic of flow (Snyder et al, 2005). Frame drops and performance issues can cause issues for this as if the game freezes for a few moments then a player may lose track of what is happening in the game while it is frozen. If the game freeze as they perform an action then it may cause issues for their action and awareness merging. A feeling the someone is in control is good for flow (Snyder et al, 2005). Frame rate issues and performance issues could make the player feel that they aren't in control. This could be because of unstable frame rates or because the game is dropping their inputs. If a game freezes it could make the player feel no longer in control. Feeling like the task is doable is a characteristic of flow (Cherry, n.d.). Frame drops can put players at a disadvantage in a video game and can mean that players get less information. In a first-person shooter if you are fighting a player while experiencing frame drops then if your opponent isn't experiencing frame drops, they may be having a more fluid and consistent experience than you which could give them an advantage. If a game freezes mid fight or when playing against other players, then opponents could capitalise on this and attack you while your game is frozen. It could make players feel like they are at a disadvantage. It isn't just games developers who can work towards better frame rates and performance. Games developers and players can work towards better frame rates and performance. Developers of games should ensure that their games run on the platforms they are providing them for. This is more difficult with PC releases as they can vary in power. For PC releases games often have graphical settings which can be tweaked to get a game to run better on a computer. Developers of PC games could perhaps provide games that can be played across a wider array of PCs and provide more settings to allow games to be played on less powerful PCs. Games should also be properly tested on PC and on PCs of varying power to ensure the game runs properly on that platform. Companies releasing games for PC could try and get their games to run on PCs that aren't the current latest models which would give more players a better experience. Developers should ensure that their games can run on hardware considered modern in the recent few years leading up to their games release. Games like Halo Infinite and Overwatch 2 are free to play which can allow many people who are interested to give it a go. If developers are trying to get more people to enjoy their products, they should ensure their games can run on different machines. Players can take action to try and get better frame rate and better performance. As mentioned before, many games allow players to tweak the game's settings, players can tweak the settings to try and get the games to run better on their systems. Players can try closing background processes on their computer to try and get the game to run better. Players can try upgrading their hardware or buying new hardware that meet a game's requirements. In order to avoid their machines still not being powerful enough, they could wait until the game has released to do this. Upgrading your hardware or buying new hardware can be expensive. Games developers ensuring their games can run on hardware considered modern in the few years up to

their games launch can make things easier for players so they don't have to upgrade their hardware or buy new hardware often.

Feedback and Reward

Feedback is also important for flow. Immediate feedback (Cherry, n.d.) and intrinsic reward (Snyder et al, 2005) are both characteristics of flow. Feedback needs to be good in visuals and audio. Along with this, hit detection also needs to be solid so that reactions to feedback like enemy player damage aren't missed.

Rewarding the player is important. Whether this is with feedback telling them they are playing well or XP at the end of a match, the extra boost can keep players enjoying your game. If rewarded mid match like with Halo's medals, it can keep players in a flow state.

Moment to moment feedback is important. Things like damaging enemy players and defeating enemy players should have clear feedback. Things like defeating a player should be clear so you don't have lots of players continuing to shoot enemies after they have already been defeated. It should be clear when a player is being damaged as well. There are lots of things that should have good feedback. Feedback should be carefully planned and tested.

Designers should reward players for playing. Players may find playing a game intrinsically rewarding but this may all come crashing down without the game rewarding them, they may feel like they've wasted their time afterwards. When playing a game, some kind of reward may make players enjoy playing more. A player's goal could be to get something in the game, if playing doesn't help them achieve this goal they may be less enthusiastic about playing. A progression system can help with this. Players can play through the game and make progress. Players having a level would be a good idea. While battle passes could be argued to provide this function, if the rewards don't interest players then they may not care about it. Players may also not want to purchase a battle pass. Battle passes may not provide players with a feeling of progression when compared to a traditional level up system. A player's level can show how much they have played a game and levelling up can be a good reward to drive players whereas a level on a battle pass that came out recently may not mean much to people. Having good rewards can make players want to play a game, without them, players may lose interest. In free to play games players should still be rewarded for playing.

Movement

Movement is important in a first-person shooter as well. Quick flashy movement is great for flow so should be allowed for in game, however, alternatives should be provided for players who can't pull off these tricks so they don't feel frustrated constantly attempting them. Movement should feel enjoyable and should allow players to do various tricks if they want to. A player's goal could be to learn and perform fun movement tricks. If movement is enjoyable then players can enjoy moving around and performing tricks as they move around the world. This is interesting when thinking about what one of my interviewees said about controls. If it controls well then the game can feel really enjoyable when it has enjoyable movement.

The Potential to Succeed

I don't think that feeling the potential to succeed is always required to be in a flow state. There are Halo matches that we are likely to lose that I will still feel flow in. There is a whole genre of games called rogue likes that are very hard, these games can be fun if you fail, you may unlock more things for future runs. Flow is linked with intrinsic reward, which, is a characteristic of flow (Snyder et al, 2005). Even though a person feels like they may lose they may find the activity intrinsically rewarding still. I remember a Halo game where a group of players were playing very well and it was

still really entertaining. People may find it enjoyable playing against players that are doing well. Players may enjoy finding out what the other team does next. Players could enjoy trying to kill a specific player in the match. Even though you feel like you may lose the match you could try and win individual fights. This could get players into flow. When I play Halo Reach and I think I'm going to lose a fight I sometimes try and play so that even after I've lost I can still score a point from the opponent by throwing a grenade at the ground. Even once defeated and waiting respawn I can find out if it worked.

Rogue likes can be quite difficult at times. New items can be unlocked by playing. In roguelikes dying can take you back to the start of a run. A run is essentially an attempt at beating the game. In some roguelikes players can unlock more things to use in runs which can then be used in the current and future runs. They can often be hard but this feature of unlocking content can be a large part of the gameplay. Players could feel like they are unable to complete the game yet may still get into a flow state when playing as they are trying to unlock more items.

This could perhaps depend on a person's mood at the time of playing. If more upbeat and casual they may not mind losing and still have fun.

It could be argued that if an activity is intrinsically rewarding enough and enjoyable enough the potential to succeed may not be required.

Sociability

Sociability can be a boon for flow. If you are with a fun and friendly team in Halo or Overwatch you may find your flow increased. You can compliment your team and boost morale which could keep players in a good mood. Other people may increase your flow state when in a competitive game as you may discuss strategy or say call outs to tell your team information. You can come up with a plan and discuss it with your team and you can tell others what is happening in the moment. Talking to your teammates could make your team more efficient. One of the participants in my Left 4 Dead 2 group mentioned that call outs are good for engagement. Sociability in games doesn't always have to be helpful either. A friendly teammate who isn't talking in voice or text chat could keep players focused on the game. In moments of downtime a friendly teammate could run up to you and jump up and down or perhaps wait in front of a powerful weapon to let you pick it up. In Halo some vehicles can have multiple people in them at once. If a random player drives up to you then you can get in the vehicle with a few others and play as a team in the vehicle. If the vehicle ends up exploding you could regroup and find a different vehicle and try again. I remember playing Halo Infinite and using a sniper rifle. A teammate came up to me and dropped their sniper rifle on the ground for me which gave me extra ammunition. This was a nice interaction with another player which can be good for multiplayer games. It made me happy as I'd interacted with someone nice and had more ammunition for the power weapon I was using. This could make players want to win more so their friendly teammates win as well. Players could try and stick with other players who were nice to them during the match which could change how they play. It can provide a fun experience.

Accountability

Accountability is a strange factor for flow. If you are in a friendly and social group of players you may want to perform well and impress them, this may increase your flow or it may make a player feel self-conscious, harming their flow. Accountability allows players to become toxic and blame others for the team's failings. Players may get stage fright which could cause them to feel self-conscious and break their flow. An example of this could be Halo's power weapons where players could feel pressured to do well.

Toxicity

More should be done to combat toxicity and inappropriate behaviour. Playing a game and being insulted is not good for flow. It may break a player's concentration, cause a player to become self-conscious or upset someone. Allowing players to turn off the chat may help with this.

What has been discussed in this conclusion regarding flow and video games is my theoretical contribution to flow and games design. My thesis contributes to the understanding of games design and flow.

For players of video games this thesis can help them understand themselves and games better and to know what to look out for and avoid. This thesis could also be useful for eSports players to learn about flow. They could try and keep their teams upbeat and friendly in matches which could perhaps help with their flow.

My thesis is an example of autoethnography. It uses autoethnography to evaluate video games and flow. My thesis has a methodological contribution to the literature.

While many of my results came from my autoethnography and the number of participants in my ethnography study was low the data I got is still valid. The paper "How many bloody examples do you want?" Fieldwork and Generalisation (Crabtree et al, 2013) discusses if having less results makes the data recorded any less valid (Crabtree et al, 2013). The idea that more data, or in the case of ethnography, more time in the field, makes the data you collect more valid is mentioned (Crabtree et al, 2013). If this were true then surely this means that autoethnography done on a group one has been a member of for considerable time is valid. Yet autoethnography is still questioned. The data recorded in ethnography, however little of it there is, is still data created by ethnography and can still be something a person does or feels. The paper argues that the people in an ethnography study are part of a group of which the activity they have participated in is something that is done. Their experiences are generalisable to the group of people who participate in the activity (Crabtree et al, 2013). There are studies which look into sample sizes (Boddy, 2016) (Hennink et al, 2022). Therefore, even though my ethnography study didn't have that many participants and not a lot of data was gathered, the results from it are still valid. There are still issues of generalisation and reflexivity. For example, the experiences of one person versus those of others.

Limitations

This research had limitations. Some have already been mentioned.

This thesis is a MSc degree thesis. I had a word count and a deadline which left me a limited amount of space to write my research and a limited amount of time to complete and write it up in. There is more that could be covered but that would take time and would increase the length of the thesis. The thesis is already close to the allowed word count with the current information in it. This means that I can't cover or research more areas.

As mentioned in my methodology autoethnography has advantages and disadvantages. One thing that could be considered is the effect doing autoethnography had on my flow. The process of doing autoethnography didn't impact my flow too much. After a match I would take notes. Sometimes I would queue for another match while writing notes and I would find and load into a match before I was done meaning the match would start before I had finished writing my notes. I did try streaming

the game which did impact my flow. Streaming would cause performance issues and distract me as I would provide commentary and check chat. When playing the game and taking notes after matches when I wasn't streaming, aside from the issue of matches starting when I was writing notes, my flow wasn't impacted too much from the action of doing autoethnography. It was a useful process. For the type and scale of the study autoethnography was an appropriate methodology. While it may have had some effect I feel this was because I was aware that I was doing autoethnography. I think that the fact I was studying flow did affect my flow. It could be argued that realising you are in flow could bring you out of flow. You are no longer focused on the activity you were doing as you are thinking about the fact that you are in flow. Studying flow could have affected my gameplay. Realising when a characteristic of flow wasn't present may have caused me to think I wasn't in flow and affect my gameplay. I can think of an example of the study having an effect. When playing Halo 3 while playing the MCC a vehicle spawned in front of me. This made me think about whether this broke my immersion. When playing these games the fact I was studying flow could cause me to have musings about flow. I think these were beneficial to my research. I don't think that autoethnography had a large impact on my flow. It was useful. While autoethnography and my study of flow did affect me playing games it wasn't too large. It is difficult to think of a method that wouldn't affect flow when studying flow. A person's experiences are important when considering flow and if one knows they are taking in a study on flow they may notice when they are in flow or think of what their responses will be. Using questionnaires could cause people to think about how they may fill in the questionnaire when playing. Using diaries could cause people to think about what they will write in the diary. Autoethnography allowed me to study my own experiences. Playing the games allowed me to gain more experiences playing the games which I then took notes of. Perhaps this is an extra thing to think about when using autoethnography to study flow as thinking about what you will note down after the activity could affect flow.

I would have liked to get more results from my ethnography study as I didn't get too many results.

Partial Flow and Types of Flow

The idea of types of flow and partial flow states aren't an entirely new idea. Liu et al's (2020) paper mentions social flow and solitary flow as well as flow intensity. Social flow is flow when in a group and solitary flow is flow someone experiences by themselves. Liu et al (2020) mention that these ideas of flow are not very explored. Flow intensity is concerned with the intensity of the experience when someone is in flow. Liu et al (2020) mention Kaye's (2016) research which found that solo games had a higher reported intensity of flow by players of online games than collaborative games. This shows research on video games and flow intensity has been done. The idea of social flow and solitary flow as well as flow intensity aren't too different from my suggestions of flow types and partial flow. Social flow and solitary flow could be considered types of flow and flow intensity suggests the idea of different intensities of flow. Flow can be considered a two-way process as it requires someone to be focused, clear goals that are challenging and an element of skill. The challenging goals and skill mean that a person should be trying to do the activity in order to experience flow. However, I don't think that this makes my suggestions of partial flow unreasonable. Someone could still satisfy some characteristics of flow and not others. Flow types could be characterised by different combinations of flow characteristics.

Final Conclusion

In this research I wanted to consider flow in video games. At the start of this thesis I set out some research questions. Is flow in multiplayer video games different? What causes flow in these games?

How does flow work in these games? What features of multiplayer first person shooters effect a person's flow? What is the relationship between these games and flow?

In regards to if flow in multiplayer games is different, I have outlined my thoughts on the current characteristics of flow and my suggestions for partial flow and types of flow to be considered. The existence of solitary and social flow was mentioned. I discussed what can affect flow in online multiplayer first person shooters and considered the experiences of myself and others. Considering this information it is my conclusion that flow in these games can be different to other kinds of games.

Many things can contribute to flow in these games. A culmination of different circumstances can lead to flow. In my data chapter and conclusion I have discussed various aspects which can effect flow in video games.

Flow in online multiplayer first person shooters has lots of similarities to the current understanding of flow. Both solitary and social flow can be found in these kinds of games depending on how they are played. As mentioned before, research could be done into whether flow's characteristics, research could be done on these games that considers whether some current characteristics of flow aren't required to be in flow in these kinds of games.

Flow isn't required to enjoy a video game, my Left 4 Dead 2 participants seemed to enjoy playing the game when not in flow. Flow can be felt in video games. Flow is a factor of video games that can lead to enjoyment but it something that can come and go and can be present some of the time.

Flow could be different in different kinds of games. Among different multiplayer first person shooters flow can be different, for example, the player versus player experience of Halo and the co-operative player versus enemy experience of Left 4 Dead 2. It stands to reason that other types of game could have different flow. The existence of solitary and social flow could be evidence for this, singleplayer games may work well with solitary flow and games like Left 4 Dead 2 could work well with social flow.

My findings can possibly be used when considering flow in different genres and platforms. Individual things I have outlined like options could be considered in many genres of game. My findings related to feedback and reward may be applicable to others genres. My findings show that flow characteristics can be considered in many of games, this information could be useful when designing many different types of game. While findings were focused around online multiplayer first-person shooters they can be useful when considering flow in other areas of games.

Flow in multiplayer games can share many things with flow in singleplayer games, however, they may be achieved in different ways. Flow in multiplayer games and in singleplayer games can be quite different. When designing a singleplayer game you can consider how the player will react and set up experiences in the game in regards to this one player, enemies and obstacles can be tailored in this way. In multiplayer games these experiences have to be tailored for a group of people, many players playing at the same time with some communicating and interacting with each other more than others. The unpredictable nature of this means designers may want to approach flow – that could be considered similar to in a singleplayer context – in different ways. Instead of designing an encounter where the enemies come at the player from a certain point, in multiplayer you may want to design a similar experience so that it can happen in different areas and situations or perhaps draw players on both teams to where the designer wants a certain type of encounter to happen. Singleplayer games can be put together in a way that is more structured which can make designing for flow in certain, if not all, areas easier. Multiplayer games on the other hands can make it harder to design these

individual moments and a more sandbox approach to encounters and design may be beneficial so that experiences can be had in different places in the game. Singleplayer games can use these sandbox like design ideas.

The information in my thesis can be used and considered by games designers to help with the design of their games. They can consider the conclusions I have drawn and consider their own conclusions from the information in this thesis.

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Flow Research Questionnaire

Flow Research Questionnaire

How motivated are you to play the game?

1: Not at all	2	3	4	5: Very much

Here are some questions to answer after you have finished a session playing games.

Please fill in your responses and if you have anything extra to say about the questions, your responses or your experience please feel free to include them with the question or after the questionnaire.

Flow Short Scale

Question	Answer						
	1 Not At All	2	3	4 Partly	5	6	7 Very much
I feel just the right amount of challenge.							
My thoughts/activities run fluidly and smoothly.							
I do not notice time passing.							
I have no difficulty concentrating.							
My mind is completely clear.							
I am totally absorbed in what I am doing.							
The right thoughts/movements occur of their own accord.							
I know what I have to do each step of the way.							
I feel that I have everything under control.							
I am completely lost in thought.							
I must not make any mistakes here.							
I am worried about failing.							

Immersive Tendency Questionnaire

If this is your first time filling in this questionnaire please fill in the Immersive Tendencies Questionnaire. It should be included with this questionnaire.

If you have filled this in before then please answer these two questions again.

3. How mentally alert do you feel at the present time?

Not alert			Moderately			Fully alert

7. How physically fit do you feel today?

Not fit			Moderately fit			Extremely fit

Presence Questionnaire

Question	Answer						
	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
When the game was turned off, I felt like I came back to the "real world" after a journey.							
The game came to me and created a new world for me, and the world suddenly disappeared when the game was turned off/ended.							
Question	Answer						
	1 Never	2	3	4	5	6	7 Always
During the game, I felt I was in the world of the game.							
During the game, I NEVER forgot that I was in the middle of a study.							
During the game, my body was in the room, but my mind was inside the world of the game.							
During the game, the world in the game was more real or present for me compared to the "real world".							
The game's world seemed to me only "something I saw" rather than "somewhere I visited".							
During the game, my mind was in the room, not in the world of the game.							

Gameplay Session Questions

You can answer these questions with short answers.

How long did you play for?

How long did you plan to play for?

Did you enjoy playing the game?

Did you play multiplayer or singleplayer?

If you played multiplayer:

       Did you play with people you know?

       How did you communicate?

Were you distracted while playing?

Rate your play session out of 10.

What did you play?

What modes in the game did you play?

Were you in a different environment to the one you usually play in?

Was your environment distracting?

Did you play multiple different games?

Can you easily reflect on what happened?

Did you have a goal for the play session?

Did the game give you feedback? Was this feedback good enough?

Did you think you could succeed?

While playing did you forget to do anything?

Did playing feel like a stream of experience?

Did it feel too easy or too hard? If so did this make the experience less enjoyable?

Did you enjoy playing?

Was there anything else you wanted to add?

Immersive Tendency Questionnaire

Immersive Tendency Questionnaire

Question	Answer						
	1 Never	2	3	4 Occasionally	5	6	7 Often
Do you easily become deeply involved in movies or TV dramas?							
Do you ever become so involved in a television program or book that people have problems getting your attention?							
Question	Answer						
	1 Not alert	2	3	4 Moderately	5	6	7 Fully alert
How mentally alert do you feel at the present time?							
Question	Answer						
	1 Never	2	3	4 Occasionally	5	6	7 Often
Do you ever become so involved in a movie that you are not aware of things happening around you?							
How frequently do you find yourself closely identifying with the characters in a story line?							
Do you ever become so involved in video game that it is as if you are inside the game rather than moving a joystick and watching the screen?							
Question	Answer						
	1 Not fit	2	3	4 Moderately fit	5	6	7 Extremely fit
How physically fit do you feel today?							
Question	Answer						

	1 Not very good	2	3	4 Somewhat good	5	6	7 Very good
How good are you at blocking out external distractions when you are involved in something?							
Question	Answer						
	1 Never	2	3	4 Occasionally	5	6	7 Often
When watching sports or eSports, do you ever become so involved in the game that you react as if you were one of the players?							
Do you ever become so involved in a daydream that you are not aware of things happening around you?							
Do you ever have dreams that are so real that you feel disoriented when you awake?							
When playing sports or video games, d you become so involved in the game that you lose track of time?							
Question	Answer						
	1 Not at all	2	3	4 Moderately well	5	6	7 Very well
How well do you concentrate on enjoyable activities?							
Question	Answer						
	1 Never	2	3	4 Occasionally	5	6	7 Often
How often do you play arcade or video games?							
Have you ever gotten excited during a chase or fight scene on TV or in the movies?							
Have you ever gotten scared by something happening on a TV show or in a movie?							

Have you ever remained apprehensive or fearful long after watching a scary movie?		83					
Do you ever become so involved in doing something that you lose all track of time?							

Appendix B

Autoethnography Examples

What follows is a write up of my experiences playing some matches of Halo the Master Chief Collection. These are more formal write ups of some of my autoethnography notes.

I queued for Big Team Battle for all halo games in the collection, this is an 8 vs 8 mode with lots of different game types e.g deathmatch, capture the flag, zone control etc.

Match 1: Halo 3 Rat's Nest Big Team Slayer

Rat's Nest is a mostly indoors mostly symmetrical map. There is an outer ring road for vehicle play and an inner base section mostly for on foot fighting. Big Team Slayer is a first to 100 kills/points game mode.

I find Halo 3 as a Halo game can often have worse flow than other Halo games, the movement feels very limited and it can sometimes feel quite static.

While playing it occurred to me the base weapon, the battle rifle – or BR for short – can be quite good for flow. It can be scoped, allowing players to zoom in for greater accuracy, however, it is very much a mid-range weapon due to its large reticle being unreliable at a distance. This can often hold flow back, however, it has an interesting feature. It fires in 3-shot bursts meaning you click once and 3 shots are fired in quick succession. In Halo players have shields, when these shields are broken with enough damage a single shot to the head will kill a player. Using the BR you can aim anywhere on their body for shield damage, but, as the gun is firing you can move your aim up to the enemy player's head to kill them, leading to a satisfying fast paced kill.

At one point a vehicle spawned in front of me, this made me think about whether this took me out of the game or not, however, right after it spawned I got in it and began using it. It occurred to me that, even though the vehicle suddenly appearing might seem bad for flow reminding players it is just a game, it actually improved the flow, providing me with a new tool to use in the match. This suggests to me that players in a multiplayer game may expect certain things from the experience like players and items spawning in meaning it does not break immersion when it happens.

Match 2: Halo Reach Headstrong Heavies

I matched into this almost as soon as I had gone back into searching for players.

In my opinion, Halo Reach is a very good game. Headstrong is a remake of a map from Halo 2, it is a large war-torn city area with buildings, open space, power weapons and vehicles. The game type heavies is another team deathmatch mode but with a twist, the map is filled with powerful weapons and vehicles in this game type and a score of 150 is needed to win. Scoring is similar to 1 kill = 1 point; however you can gain more points for killing enemies in certain ways.

The match begun with my team losing. At the start I claimed my team's banshee, a flying plane-like vehicle that can rapid fire or use powerful bombs. I flew around our spawn briefly, waiting for the enemy vehicle that counters it to come out of the enemy base, escaping from the general order of vehicles exiting the bases. As I flew around my base I heard other banshee sounds, I flew out of the base, realising the enemy team's banshee was here, I tried engaging in an aerial dogfight, only to realise it would be boring and go nowhere – as well as the fact that one wrong move and I was dead.

I split from the fight and tried to find enemies to kill, only to be destroyed by the vehicle that counters mine.

The next eventful occasion occurred when our banshee respawned. At this point we were losing and I got in our banshee. As a vehicle, the banshee has excellent flow, being manoeuvrable and powerful at the same time, I swooped around the map, destroying unoccupied enemy vehicles and picking off enemies (Figure 23). Around this time, we began to pull back the match.

Figure 23. A banshee shooting at players.

Later we began dominating the enemy team, no doubt disrupting their flow. At this point, I was no longer finding enemies in the banshee and my team were mostly inside, this lead to a short decrease in flow for me, I was patrolling the skies yet the enemy were being kept busy by my team inside. My team were probably having a great time but the match had shifted to a point where the role I was in before, which was very busy and immersive, had become more stale, having to wait and search for opponents as well as becoming stressed that I was an easy target out in the open.

The match ended and I had a high score, we had defeated the enemy team quite soundly. Checking my stats I noticed that the banshee bomb was my main killing weapon (Figure 24).

Figure 24. My carnage report after a match of Halo. It says the Banshee bomb is my tool of destruction.

I thought during this match that power weapons and vehicles greatly improve a player's flow and players compete with other players on the same and opposite teams to acquire these privileges. For example, during the match I acquired a sniper and got a quick one-shot kill headshot.

I did experience another instance of good flow in the match. This occurred when I was in a corner of the map where the enemy had begun spawning, it thrust me into a fight with more than 1 other player and I managed to defeat 2 enemies before succumbing to a third. I was very engaged with the game during this time, thinking about my next steps, processing information and thinking about how I could come out on top in each scenario. I tried to be efficient and cover every option, Halo can be very good for this.

There was also a point in the match where I managed to EMP an enemy banshee, causing it to fall to the ground where my teammates picked off its pilot and it was then claimed by a teammate. In some Halo games you can EMP vehicles by hitting them with certain weapons, doing this causes them to stop briefly.

Appendix C

Information on Halo

Each of these games is an FPS (first-person shooter) (Figure 25) that features a campaign. In all but Halo Reach and Halo 3: ODST the story is centred around the character of Master Chief, hence the name, the Master Chief Collection. These campaigns tell stories from within the Halo universe, set in the future, humanity has begun expanding amongst the stars. In this time humanity has discovered an alien alliance known as the Covenant who wage war on humanity. This isn't the only peril to cause trouble for humanity as

Figure 25. A screenshot of Halo Combat Evolved from the MCC.

the mysterious zombie-like flood have reappeared, threatening all intelligent life. Among these issues there is also the mystery of the Forerunners a highly advanced species who have disappeared. The series also focuses on the Halo rings, large weapons that exist in space. The campaigns have varying difficulty settings.

Two games in the collection – Halo Reach and Halo 3: ODST – come with a Firefight mode where the player fights waves of enemies on a map. This is akin to horde modes in other games where the aim is to survive and defeat the enemies the game throws at you.

Halo 4 comes with a Spartan Ops mode similar to a secondary campaign.

Every game in the collection apart from Halo 3: ODST comes with a multiplayer mode where players fight each other either in teams or in a free for all mode in a variety of game types on various maps with varying amounts of players. You can match into other players using matchmaking (Figure 16) or you can join custom games by invite or through the in-game browser to play on maps and modes selected by players. Many of these maps are created in the in-game Forge mode where players can

Figure 26. Queueing for a match in the MCC.

place objects on stages to create their own maps and areas. The game also features a theatre mode to watch previous matches, however, this is only available in some titles.
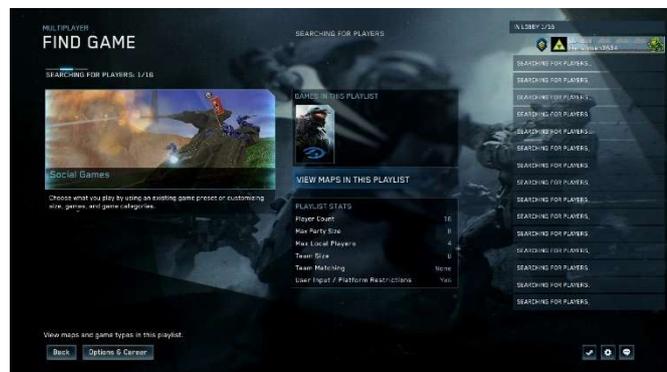
The MCC has added many new features to the original games.

The games feature a high level of customisability. Players can change controls and other such settings expected from a PC game, but, can also change weapon loadouts in some games and player character appearance. The player character can be customised with different armour and colours that can be unlocked by playing the games, these characters differ between games in the collection

and so can most of the armour. Halo 4 allows players to customise their loadouts, allowing them to choose the weapons and abilities they want to play with (Figure 27).

The games have many other features. One of these is achievements which players can unlock by completing things in game.

Glossary

What follows is a glossary of terms that may be useful to know when reading this thesis.

Figure 27. My loadouts.

Term	Meaning
MCC	A shortened way of saying Halo The Master Chief Collection. It stands for "Master Chief Collection".
ODST	This can refer to the game Halo 3: ODST or the in-universe unit type ODST which itself stands for Orbital Drop Shock Trooper.
Spartan	A super soldier who wears a suit of armour.
Banshee	A Covenant flying vehicle