

The psychological effects of video games

How game design influences players and buyer decisions



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Abstract

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ABSTRACT

Video games have evolved significantly during the last decades. What once were simple interactive applications that filled the arcade halls and then came to home computers and entertainment systems, are now some of the highest-grossing media forms in the world. In many ways, video games are now also recognized as a form of art and they work as an interactive way of teaching kids, teens, and adults alike.

The goal of this thesis was to discover and analyze what differentiates video games from other forms of art and media and what gets people even addicted to games. The design philosophy of game developers and how some of them purposefully design mechanics to be addictive, was also researched.

Game design was also researched by examining three different games, through case studies on specific role-playing, and mobile games. With the research done by analyzing the games, a lot of new information about game design and addiction was found. The research and survey results in this thesis, were also comparable to other previously done large-scale surveys.

Psychology was also a large part of the thesis, and it was possible to link psychology and the purposes of certain game mechanics to each other. Through this thesis, and the research surrounding it, a better understanding of the psychological effects of video games on player and consumer behavior was gained.

Keywords Video games, game research, design philosophy, immersion, addiction

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TIIVISTELMÄ

Videopelit ovat kehittyneet vuosikymmenien ajan merkittävästi. Yksinkertaiset interaktiiviset sovellukset, jotka alun perin valtasivat pelihalleja, lopulta kotitietokoneita ja pelikonsoleita, ovat nykyään maailmassa yksi eniten rahaa tuottavista mediamuodoista. Monilla tavoin videopelit tunnustetaan myös taiteen muodoksi ja myös toimivana interaktiivisena opetustapana lapsille, nuorille kuin myös aikuisille.

Työssä oli tarkoituksena tutkia mikä erottaa videopelit muista taiteen sekä median muodoista ja mikä saa ihmiset riippuvaiseksi videopeleistä. Kävin läpi tekijöiden design filosofiaa ja jopa tahallisesti addiktoivaksi suunniteltuja pelimekaniikkoja, sekä mekaniikkoja ja pelisuunnittelua, jolla ylipäättään saadaan pidettyä pelaajien kiinnostusta yllä.

Pelisuunnittelua tutkittiin myös kolmen eri pelin avulla. Pelien analysointi toi paljon uutta tietoa pelisuunnittelusta ja erityyppisistä peliriippuvuuksista. Työtä varten luodun kyselyn kautta, tuli selville paljon positiivisia sekä negatiivisia asioita pelaamisesta, suoraan kyselyyn osallistuneilta henkilöiltä. Tämän tutkimuksen aikana saadut tutkimustulokset olivat verrattavissa myös muihin aiemmin tehtyihin laajempiin tutkimuksiin.

Psykologia oli myös suuri osa tutkimusta, ja työn aikana pystyttiin löytämään yhdistäviä tekijöitä psykologian, sekä tiettyjen pelimekaniikkojen välillä. Työn aikana löytyneen tiedon avulla on myös mahdollista ymmärtää paremmin, videopelien psykologisia vaikutuksia pelaajiin ja kuluttajakäyttäytymiseen.

Avainsanat Videopelit, pelitutkimus, suunnittelufilosofia, immersio, addiktio

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Terminology

AAA (Triple A) is a term used for very high budget video games. It is the equivalent of a movie “Blockbuster”.

Design philosophy means the way an art piece or work has been designed, and the philosophy that was used to achieve it.

Dungeons & Dragons is a series of fantasy-themed role-playing games. The games generalized the foundation of rules for fantasy worlds, within which players can build their own character and story and then adventure through in their own fantasy world just by using their imagination, usually with some pen, paper and dices included.

Experience points are earnable points in video games. Gaining experience points usually rewards players with new abilities and skills.

Grinding is the act of performing repetitive tasks in gameplay. The point of grinding is to find the most efficient way to gain experience.

Immersion means diving deeper into a subject. In the context of this work, it means diving into the game world, so the player momentarily forgets the real one.

Ludology is the term for game studies and research.

Ludonarrative dissonance is a term for conflict between a video game narrative and the game mechanics.

Microtransactions (MTX) are a type of business model, where users can buy virtual items with small sized payments.

Modding is the act of modifying hardware or software, to change the way it operates.

Pen & paper means a game that can be played with just pen and paper (usually including dice).

Quality of Life in games is a term which describes features that makes an experience more or a game feature more convenient to the player.

Topography Means describing environmental surfaces such as forests, seas, and mountains. In video game context, it describes the world's appearance in level design.

1 Introduction

Video games have grown at an incomprehensible speed over the past decades, as they evolve into a part of our culture and the entertainment world. Games that were at first created as simple ways to have fun, were then turned to be as difficult as possible, to fill in the arcade halls, with people who wanted to have fun together, trying to beat high scores, and inserting as many coins into the machines as possible. These same games have now evolved into multi-hundred million budget works, that consist of realistic-looking graphics, smooth animation, memorable music, worlds, and characters.

These reasons are only a part of the overall picture that explains people's interest in these games. But how do these video games differ from other forms of art like literature and films?

The very basic way that separates video games from other mediums of art, is interactivity. The ability to affect different events and things is a feature that books, and most movies or television series, cannot provide the viewer. Especially character creation, introduced by role-playing games is a way to name the player character, affect their talents, points of interest, actions, and choice of words. Games based on the **Dungeons & Dragons** -series usually even provide the opportunity to write the background and life story of the character, in a classic **pen & paper** style. This is one big part of **immersion** because when people are playing the game, it truly feels like they are part of the world.

The second big part of interactivity is the possibility to explore fictive worlds that people could never experience in real life. Of course, when reading books, they can also use their imagination to visualize the world to themselves.

But when the world is visually presented to them, it can be truly breathtaking to see the beautiful world design with all its little details, further strengthening the feeling of immersion.

In many games, the player can also affect the narrative and the events happening in the game world, in a way that suits their personality and gameplay style. In some games, they can even change the way the world looks, by changing the **topography** of the world.

In this thesis I will further dive into three different types of games:

- World of Warcraft: a MMORPG (Massively Multiplayer Online Role-playing game) focused on community and character building.
- The Legend of Zelda: Breath of The Wild: an adventure/survival game focused on exploring and adventuring around a huge land, while trying to survive from forces of nature, different beasts, and enemies.
- Candy Crush Saga: A mobile game made for more casual audiences on mobile phones. The focus of the game is to complete increasingly more difficult levels, by swapping around colored candy pieces to match three or more of the same color.

I will talk about the origins of each game, what made them popular in the first place and how their franchises have grown into their current iterations. I will also go through the main mechanics and game loops used in these games, and how they are used to keep the players interested. Throughout all these case studies, I also want to bring out the good effect of video games, and the way they can also be used for teaching, especially for young people.

I will go through basic game theory, some rules and standards that are used to make a game in the first place, how genres are defined, what basic rules developers should teach the player, and what kind of decisions can be bad game design. All these design choices will contribute to the player either continuing or quitting a game.

Video games continue to innovate, not only as entertainment but also into areas far more profound. Experiences with their foundation in video game technology, are being used to help surgeons, practice before a difficult procedure. And to enable college students to simulate business situations and develop real-world skills. I may no longer be an executive in this industry, but I'll always be an ambassador for video games, as a force for good and a force for fun. (Reggie Fils-Aimé, ex-president of Nintendo of America, 2019)

2 Theory

2.1 Basics of game mechanics and the industry

To understand how game mechanics are designed to be psychologically enticing, it would be good to understand some basics of game theory and the way the games industry works. One of the first things when making a game is to plan for the so-called “vertical slice”.

Vertical slice means the overall structure of a product, which showcases all the important parts that act as a proof of concept, and it entails all the “layers” of the final product. (Schell, 2020)

Just to make it clear, vertical slice differs from the term prototype, because it is used more as a way to impress stakeholders during a game’s development, not necessarily the players.

In general, a proof of concept for games usually needs to include the genre of the game, what the main game loop is, what kind of a world the game takes place in, and if there is a story, what is it about.

Nowadays, since there are so many games on the market, game developers must separate their product from others, by giving the game mechanics a twist, so that it stands out among dozens of other competitors. They can also base their game on an already beloved game series, but even then, they probably need to add something new, to make the game experience feel fresh.

2.2 Effect of business models

When compared to other forms of entertainment, video games are also much more expensive. The average price for a **AAA**- game, is around 60—70 dollars. Some countries and continents, like Brazil and Australia, also have ludicrously expensive prices for games. In Australia, games cost around 80—110 Australian dollars. (Parker, 2012) In Brazil, while the prices are not that high, they are very expensive, when compared to the average salary. In Brazil, the newest Sony game console, PlayStation 5, costs about 4,499 Brazilian real, which

is about 800 US dollars, while most countries have priced the consoles around 500 dollars (excluding tax). (Nelson, 2020)

Information provided by the website “tradingeconomics.com”, shows that the average salary in Brazil is around 2500 Brazilian real, meaning that the game console would cost nearly two times the monthly salary of an average worker. (Instituto Brasileiro de Geografia e Estatística, 2021)

According to a study by Statista, there are now over 2,4 billion gamers around the world and the number is expected to rise all the way to 3 billion by 2023. (Clement, 2021) This already shows how influential and addicting games can be. But it is not all just about addiction. A lot of games are good and the creative stories and game worlds that pull people towards them can truly hook people.

This is not necessarily a bad thing either, because connecting people through this hobby, is a very positive thing, and there is a sense of community built around many games and franchises. And that is what most humans look for in their life: a “tribe” of individual people, who are interested in the things that connect them.

The bad side of this is that people tend to cling to beloved franchises, even when their quality is declining, and the industry is just taking advantage of them. Nostalgia and personal experiences are a very strong reason that makes customers blind to dishonest marketing. Video games also utilize the sunk-cost fallacy and FOMO (Fear of missing out) effects to further lure people to spend their money.

Sunk cost fallacy happens when a person has already paid for a product, and they feel like they need to use it or consume it so that their money would not go to waste. (Arkes & Blumer, 1985, pp. 124—140). In video games, many players get stuck in a loop of playing and then again paying for more **microtransactions**, which once again starts the sunk cost effect.

FOMO on the other hand is a form of social anxiety, which occurs when a person compares themselves to other people’s property or social status and what they are missing out on. The effects of FOMO can be seen especially well, through frequent use of social media, where

people can post, whatever they want, and other people will always have a need to compare themselves to those people. (McGinnis, 2020)

In games, FOMO usually occurs through multiplayer games and their cosmetic items, since next to player skill, cosmetic items are the only way for players to compare themselves to others. Since social media and video games are related in many ways, both of these platforms strengthen the FOMO effect. Developers use FOMO by selling limited items, which makes players more likely to buy those items, because of their artificial scarcity. (Kristensen, 2020)

These are especially effective on “Whale customers”. Whales are a very small part of the customer base that brings a company most of its revenue. Information provided by the mobile marketing company Udonis (Grguric, 2021) shows that in most mobile games with in-game currency and microtransactions, about 2 % of the customers bring around 80 % of the whole revenue.

These are incredibly high numbers, and the most addicted customers can use thousands of dollars a month just on a single mobile game. A lot of the addicted customers are young and old adults, but nowadays even games meant for children include these manipulative tactics.

While this is common in all areas of shopping and consumerism, the personal experiences, are especially effective among video game fans. On the other hand, these personal experiences can also be used against bad practices in the industry. When gaming companies do something dishonest, many players also notice this, because it affects a franchise that they truly care about.

In the following thesis and the three different case studies, game design and its effects on game popularity and sales numbers will also be researched.

3 World of Warcraft

3.1 History of World of Warcraft

World of Warcraft (WoW) is an MMORPG developed and published by the American game company Activision Blizzard. Originally released on November 23, 2004, World of Warcraft was the game that would eventually become the biggest MMORPG in the world. While there had been other “massive multiplayer online” -games in the market before, like Ultima Online and EverQuest, these games were aimed at more specific hardcore gaming groups and the penalty for character deaths was much higher. (“World of Warcraft,” 2019)

WoW was the game that changed the genre and set a new standard for it (Milzarski, 2018). Compared to previous MMOs, WoW marketed itself as a more casual-friendly game and it introduced a lot of **Quality of Life** mechanics, like the ability to recover equipment easily after dying. It also introduced a new game mechanic called “rested bonus” which allowed players to gain more **experience points** if they had left their character in a peaceful area when they quit their previous game session. This allowed people to catch up to their friend’s progression.

Compared to other MMOs, WoW also made questing a much bigger part of the game world. While other games had **quests**, they were usually common everyday tasks that were not part of the bigger story.

World of Warcraft integrated many quests to each other so that they would be combined into chained questlines, which would naturally continue the narrative of the world forward while also giving significant amounts of experience points so that the player character would also progress at a good pace, instead of doing repetitive **grinding**. (Thursten, 2015) The challenge would come in the form of dungeons and raiding, which will be covered later.

To keep the game experience fresh, updates had to be introduced, and hosting large game servers cost a lot of resources. That is why WoW uses a monthly, subscription-based payment model to earn consistent revenue, from the active player base.

Later it also introduced many expansions which would expand the game world, story, and mechanics further.

After the initial release, WoW was the best-selling PC game for two years in a row in 2005—2006 after which it received its first expansion called The Burning Crusade. Just 1,5 years later, it already received its second expansion called “The Wrath of the Lich King”, which brought the game’s player base up to 12 million. (Brown, 2020)

WoW’s popularity also created a wave of other MMOs, usually nicknamed as “WoW clones” or “WoW killers”. These were games that tried to match the popularity of World of Warcraft, a feat which most games have still not reached. (Harper, 2013)

World of Warcraft is a massive game, and it would take a lot to write about every single aspect of it. For this case study, focus will be placed on a few large parts of the game’s design. These include the addiction of living in an evolving game world, the effect of social mechanics, FOMO, and the sunk-cost fallacy effect, WoW and its subscription-based payment model create.

3.2 The addiction of living in an evolving game world

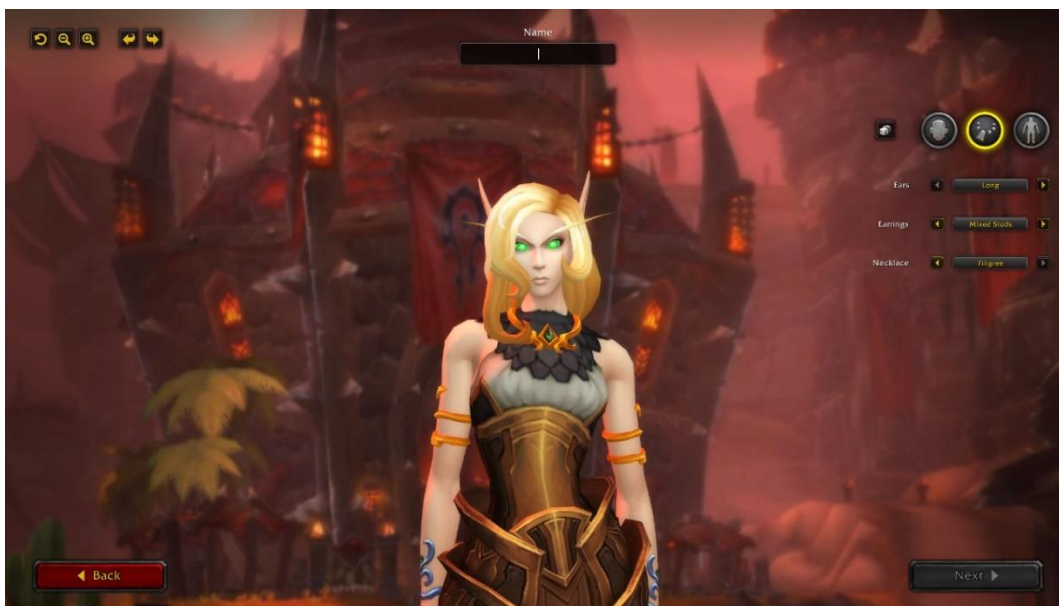
In the current expansion, Shadowlands, WoW lets players choose between 23 different races that are divided between the two warring factions called the Alliance and The Horde, with the exception of the panda-like race, Pandarians, who can choose between either faction. In addition, they can choose a class, which affects what kind of abilities and skills they possess.

In the current expansion, players can choose between 12 different classes. Warrior, Hunter, Mage, Rogue, Priest, Warlock, Paladin, Druid, Shaman, Monk, Demon Hunter, and a Death Knight (Figure 1). Different races can only use specific classes. Every class also has its specific “talent trees” which lets them further specialize their class to a certain role in the game.

Figure 1. The character creation menu. (Blizzard, 2004, World of Warcraft, Activision.)



Figure 2. Further character customization. (Blizzard, 2004, World of Warcraft, Activision.)



After picking a race and a class, players can further customize their character to make them look like they want. (Figure 2) They can change the character's skin color, face, hairstyle, hair color, eye color and more. Some races have their own special customization options, like different horns for the alien race Draenei.

All this customization is usual in video games nowadays, and the point is to make every character feel as unique as possible, so the player can truly relate to their own creation.

Once the player has created a character, they begin the game in a zone called the “starting area”. The area changes depending on the player characters’ race, since the starting area is always next to the race’s largest city. The starting area is made to introduce the player to their own starting area, their race’s history, the most basic game mechanics, user interface and overall game loop.

Especially in a game as large as WoW, it is better to start off in a small area, and little by little introduce the way the game operates and what they should expect from it. This helps players to get familiar with it first so that they are not instantly turned off by too much explaining and learning at once.

Figure 3. The alien race Draenei, start on a crash site their ship fell to. (Blizzard, 2004, World of Warcraft, Activision.)



One thing about games is letting players do what they want, but at the same time, they need to have some idea of what they are supposed to accomplish (Rouse III, 2001, pp 10–11).

The first thing players learn is how to move their character and the camera. After that, the game introduces how to talk to characters (Figure 3). This then leads to their first quest. (Figures 4-5) Every quest tells a quick summary about what has happened, so the player can get immersed in the world and what they are currently trying to achieve.

The quest info will also show the quest objectives, and the reward they will earn. In this case, the player will receive some new equipment, bronze coins, which is the currency of WoW, and some experience points, which will help the player character get stronger.

Figure 4-5. Example of story summary, quest objectives and rewards. (Blizzard, 2004, World of Warcraft, Activision.)



The basic game loop in WoW consists of completing quests, dungeons, or participating in PvP (Player versus player) activities, then gaining levels and new abilities through them. After gaining enough levels or completing all the quests in an area, the player can choose the next area they want to complete, if they meet the level requirements. Quests can be done alone, or together with a group of up to 5 members.

Since 2004, WoW has also added eight expansions which all have affected the game world of Azeroth in several ways. The expansions have revealed new islands and even planets that the players can explore. The 3rd expansion, Cataclysm even destroyed multiple parts of the original game world, changing once familiar areas completely.

In this thesis, storytelling and character building will not be heavily focused on, but like in most narrative works, one key point of progressing the story, is to see the growth and changes that the key characters in the story go through, and in World of Warcraft's case, how the actual war changes the politics, the world, and the characters themselves while the players are also a part of it (Passi, 2019).

Figure 4. Choosing the next questing area out of 3 choices. (Blizzard, 2004, World of Warcraft, Activision.)



Figure 5. Example of a dungeon party, facing the dungeon boss, Epoch Hunter. (Blizzard, 2004, World of Warcraft, Activision.)



3.3 The effect of social mechanics and FOMO

Since players are always online, there are a lot of social aspects embedded in the core structure of WoW. While they travel around the major cities or the wildlands surrounding them, they will run past hundreds and thousands of players all the time. They can send a message to any one of them if they need help for example. They can check out what kind of equipment other players are carrying, or what the legendary mount they are riding is called so that they can then research how to obtain it for themselves. All of these are clearly intended by the developers, to make the players explore and find out more about the game world and other players.

There are even separate role-playing servers in WoW. On these servers, the players will make a backstory for their character, and choose their personality, fighting style, and professions based on that character, and even act as that persona while speaking to other players.

According to Neuroscientist Dr. Andrew Doan, included in basic human needs, is the want to satisfy curiosity and overcome isolation by offering companionship (2012).

This of course makes the player once again, immersed in the world. These mechanics make the game feel alive and the social aspects support the players' decision to play the role they had chosen for their character and continue hanging out with other people.

Finding friends is also a great way, to start group activities like player versus player arenas and battlegrounds or dungeons and raids. Dungeons and raids are separate game instances, which take place in a special area, filled with harder enemies and bosses that are meant to be completed with a group of players.

Arenas and battlegrounds are instances in which players fight against each other as groups. This also makes players work together and fight against other "tribes" which is natural to humans. (Clark et al, 2019). This is also reflected, in the conflict between "The Alliance" and "the Horde", the two warring factions in World of Warcraft.

3.3.1 Dungeons & Raids

One of the best examples of teamwork in World of Warcraft is the act of completing dungeons. In dungeons, everyone in the group has their role. The role of a “Tank” is to provoke enemies to attack them, and take enemy damage away from other party members, while DPS (damage per second) dealers, quite literally are tasked with doing as much damage to the enemies, as fast as possible. The healer’s job is to heal the whole party and keep them alive. If even one of these roles fails, it can easily mean the defeat of the whole party.

This importance on group roles gives every player a sense of importance and gives them a chance to prove their specific skills, which gives a feeling of being part of a bigger whole.

Originally if a player wanted to find a group to join, they had to specifically join a “looking-for-group” filtered chat, where they would leave their message and hope that other players would fill their party needs. This was another social aspect that made the game world more realistic, even with the risk of being inconvenient.

Currently, this archaic system has been replaced with a mechanic called the “Dungeon Finder”. Through the Dungeon Finder, players can choose the role they want to play, and the system will automatically look for remaining players until all roles are filled. This includes 1 tank, 1 healer, and 3 DPS roles. A player can also choose to be in a leader role in addition to their main role. The leader should be a player who has previously completed the dungeon, and who knows how to complete it and can guide other players through it. (Figure 8)

Figure 6. Dungeon Finder and the four roles to choose, from left to right. Tank, Healer, DPS, Leader. (Blizzard, 2004, World of Warcraft, Activision.)



In WoW's endgame, the point of doing dungeons and their more difficult form, raids, is to work as a group and complete large areas, with challenging enemy and boss encounters, by working together and earning rewarding loot in the process.

Using the Dungeon Finder gives two options to choose from: "Specific Dungeons" and "Random Dungeons". The "Specific Dungeon" option allows them to choose between all available dungeon choices if they really need a specific piece of gear that is only obtainable in one specific dungeon.

As the name suggests, the "Random Dungeon" option, chooses a random dungeon, from the ones available to the player. This way, finding full parties will be much faster, since there are no additional variables, excluding the previously mentioned party roles.

The game encourages players to play random dungeons, by giving a bonus reward for completing them. This includes a coin bonus and a bonus reward, which ranges between a pack full of player gear or some special currency, which can be traded for unique items at specific vendors.

When a party defeats a dungeon boss, it will drop a specific number of items and gear, from their respective “loot pool”. The pool contains items and gear, that are usable by different character classes. When the items are dropped, each player has a choice to roll a digital dice which decides whether the player gets the item or not.

The endgame of WoW and other MMOs consists of earning the best possible gear for a character and reaching the highest item level. Every item has its own item level, which is determined by its overall stat benefits and the player level needed to wield it. The average value of the gear pieces currently being worn is what determines the player’s overall item level.

Every time a new expansion is released, the new additional dungeon/raid gear raises the item level, which among other new content, will be one of the new main objectives for the player. This is where FOMO once again starts to kick in, as the “need” for keeping up with the current item level requirements, asks the player to play very actively. Every time a raid is completed, it is locked for one week.

This design choice was most likely made so that players cannot rush through new content instantly, since it would make gaining all needed gear much faster and then make the player quit earlier, which would of course lead to lost revenue due to players stopping their subscriptions.

This means that every time a raid lock unlocks after a week, the player should play again, to keep up with other players and the item level standard. If a player decides to not play for a while, it obviously puts them at a disadvantage, since they are a liability to the rest of the raid group.

Like previously mentioned, raids are the hardest part of WoW, and they really need strategizing and nearly perfect coordination and communication between the players. That means that if a player has taken a break, they are out of the loop, which naturally puts a lot of pressure on them, and makes sure that they will more likely keep playing actively, to avoid these kinds of situations.

With the weekly raid lock and the random factor of loot drops from bosses together, it can take a long time for a player to get all the items they need. And if the player plays multiple different roles, it can take double or triple the time, to get all the intended gear for those roles as well. In addition, most players have multiple characters, which further increases the average playtime.

At the time of writing this thesis, the highest item level obtainable is 235 and it will keep rising as the expansion introduces new updates. This means that the game asks players to be constantly ready for new content unless they want to fall behind others.

Figure 9. Character info (Blizzard, 2004, World of Warcraft, Activision.)



Figure 10. Dungeon list (Blizzard, 2004, World of Warcraft, Activision.)

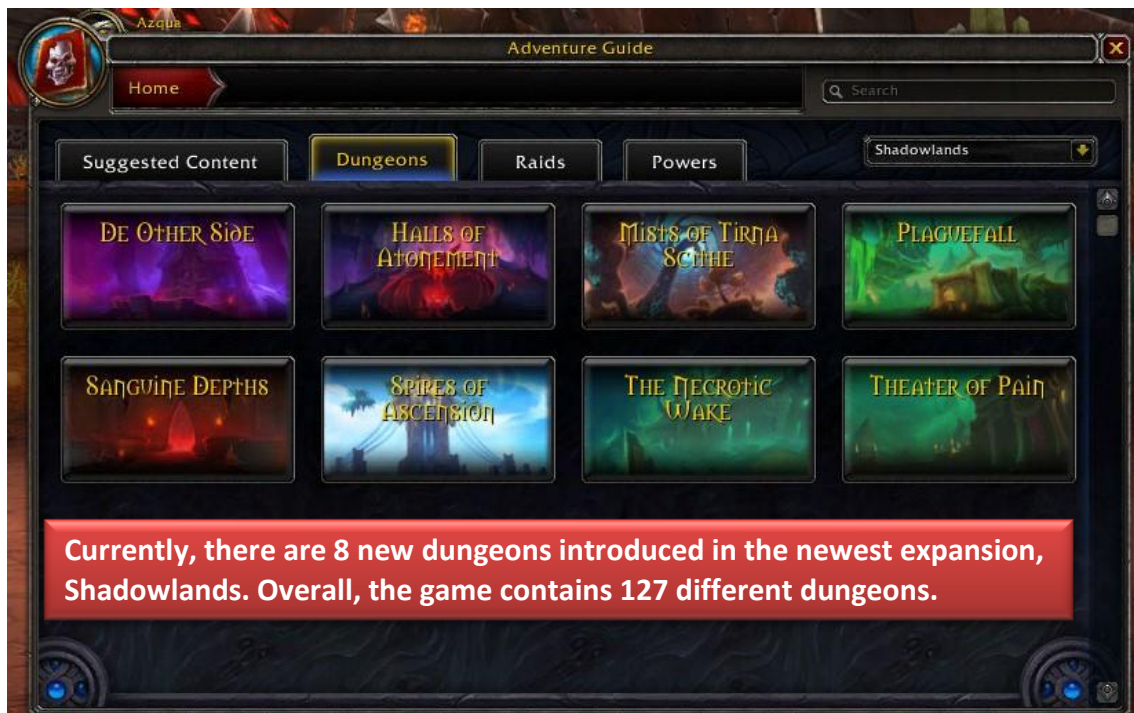


Figure 11. Raid list (Blizzard, 2004, World of Warcraft, Activision.)



Now just to make it clear, raiding can be very difficult and take a lot of playtime. The average raid time is from 1 to 4 hours for just completing one raid. It can take significantly more if the players are having trouble with certain sections of the raid. This can lead to players bashing their heads against a raid, even though it would be probably more beneficial to take a break and try again later. Then again, raid groups consist of either a 10-player or a 25-player group, so scheduling a raid time without random players can get difficult. All this once again makes players more committed to spending their time playing WoW and other similar MMOs.

3.3.2 Side activities

In addition to questing, raiding and PvP, WoW also offers multiple side activities that players can participate in, like yearly festivals, special events, and other mini-games. It is also recommended for players to join or create their own guild. Guilds allow players to form their own groups, each with their own member hierarchies and ranks.

Being part of a guild gives players numerous in-game benefits, and it also helps in finding new friends and players for dungeon and raid groups. Being active in a guild is also another incentive for players to keep continuing playing and paying, because most people do not want to let down their own guildmembers, since they can offer a community in the virtual world. (Olle & Westcott, 2018, p. 19)

Players can also train in different professions like alchemy or leatherworking, which provide them with skills that can be useful for themselves, their friends, or as a way to sell created items to other players in the auction house. Overall, there are 8 crafting professions, but a player can only choose 2 professions per character, which forces players to create more characters and spend even more playtime in training them.

3.3.3 In-game shop

In addition to paying for the game itself and paying a monthly subscription, World of Warcraft also includes an in-game shop, which lets players buy special cosmetic items with real money. These items range from rideable mounts, to pets, toys, and cosmetic items. Mounts can cost up to 25 dollars, while pets usually cost around 10 dollars.

The in-game store also features multiple different game services that players can buy. These include the ability to instantly boost a character to near maximum level by paying 60 dollars. Changing a faction from Horde to Alliance or vice versa costs 30 dollars, while changing your character or their race, or the server they are located, costs 25 dollars. Changing the character's name, also costs an additional 10 dollars.

Especially the cosmetic items, mounts, and pets, are another reason, that might create a FOMO-effect on players, which further lures them to buy cosmetic items from the in-game store.

3.4 The importance of community

In comparison to other case studies in this thesis, World of Warcraft's gameplay is the most affected by social mechanics and a basic human need to meet and talk to others. In the worst-case scenarios, most addicted players can forget to sleep, eat, and drink. One reported gaming session even led to a Chinese player dying from the lack of self-care. (Roberts, 2015) Fortunately, these extreme cases are few and far between, but the effect of game addiction can still be very concerning.

The best aspects of WoW's social effects appear in players acquiring new friends and even romantic partners through playing. The best parts of the community also display the importance of human connection, friendships, and the effect of working together.

The game is also very popular amongst YouTube content creators and streaming channels. Since 2007, WoW started to gather views on YouTube and streaming services, led by the player Bachir Boumaaza, commonly known as Athene.

Since the beginning of WoW's streaming and VOD (Video-On-Demand) popularity, many other streamers including Athene and Swifty brought new life to the community and streaming in general. The most-watched player, Asmongold, has an average of 35,644 viewers. (Twitchmetrics, 2021). For a game released in 2004, WoW is still incredibly popular.

Athene himself was involved in several gaming-related charity events, including his own called Gaming for Good. When he was involved with "Save the Children" fundraising events, he raised over 3 million dollars for charity through his own community. (Past projects benefiting Save the Children, nd). This shows that gaming communities can do a lot of good even in the real world.

There have also been tragic moments in the community, which can bring people together. This can be demonstrated with one of the community's biggest streamers, Byron Daniel Bernstein, more commonly known by his player name "Reckful". On 7th of February 2020, Byron took his own life, after a long struggle with depression. The whole community was shocked by the sudden loss of a popular and loved community member. Immediately after the announcement of his death, all the WoW servers were filled with players from all over

the world, bowing down in front of the game world's capital cities and monumental areas and paying their respects. Many came forward with their own stories about Reckful and his contribution to the game and the community. (Reckful Tribute, 2020)

In summary, the effect of World of Warcraft and the social aspects it provides are still a large part of gaming, and the game can truly help people around the world and the players themselves in their personal lives. The negative sides of the game's addictive nature like the peer pressure and sunk-cost fallacy, caused by a long-time commitment to monthly subscriptions, can also make players escape their personal problems too much.

Figure 12. Hundreds of players paying their respects in the Horde faction's capital city. (Blizzard, 2004, World of Warcraft, Activision.)



4 Candy Crush Saga

4.1 Introduction to Candy Crush

Candy Crush is one of the most popular mobile game series in the world right now. It was developed by the game company King, originally for Facebook, and then a bit later for mobile phones. The game is part of the “match-three” genre, in which the core gameplay consists of swapping around adjacent different colored candies, to make a combination of at least 3 candies in a row. Every time a player clears a row of candies, the row disappears, and more candies fall into the empty spaces. The more candies a player combines, the more points they will earn.

The challenge comes from the number of turns a player can make on a single level. If they run out of moves, they lose. The main attraction of the game is the easily understandable game loop and the ease of playing because of the access to mobile phones.

The Candy Crush Saga series includes multiple different versions. Candy Crush Soda Saga, Jelly Saga, and Friends Saga. Candy Crush has been called the most addicting mobile game of all time, and not without a good reason. Newspaper website The Guardian reported that more than 9 million players spend between three to six hours or more playing the game daily. (Sweney, 2019)

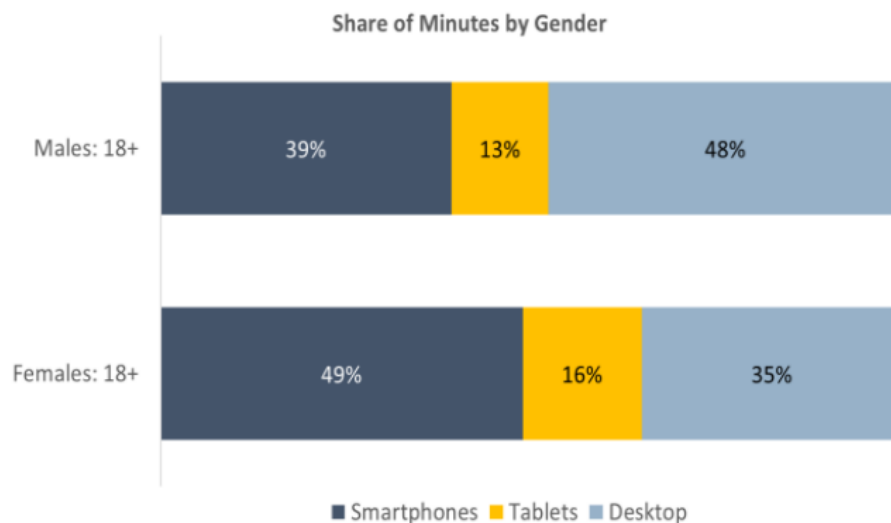
These are huge daily numbers and if even a fraction of the players spends money on microtransactions, the cash revenue is massive. While King’s senior executive, Alex Dale did comment that out of 270 million players, only a few contact them monthly, because of concerns about too much spending, it is not as easy to prove that other users would not spend too much money without reporting it. (Sweney, 2019)

Many large-scale- surveys have concluded that a significant portion of gamers in general, spend money on microtransactions. A 2020 SellCell survey showed, that an estimated 8.2 percent of parents stated that their children spent more than 100 USD on in-app purchases in a single month. (Clement, 2021)

The core audience of the Candy Crush series is women aged 35 and over (Day, 2014). It is difficult to say the exact reason for this, but it might have to do with the fact that the game is playable through Facebook, which is used more by women in the United States.

(Tankovska, 2021) Globally, women are also significantly more active on mobile phones, which could influence the size of Candy Crush's female player base, even though men generally play mobile games more. (UKOM, 2016; see also Andone et al., 2016)

Figure 13. Average time spent on mobile devices and desktop (UKOM Insights research)



Nonetheless, the game is popular among all ages and genders and there are many psychological effects at play. Out of all the case studies in this thesis, Candy Crush Saga is easily the most manipulative in terms of audio-visual feedback. It depends on a simple game loop, supported by bright colors, and exhilarating sound effects, akin to slot machines.

Since the game is free to play, its main revenue is through microtransactions. It is possible to buy "gold bars" the game's premium currency, for real money. These packs range from 2.29 euros to 109.99e. (around 132 dollars.) These bars can be used to buy extra lives if the player loses all their lives. The cheapest pack of 10 gold bars, which costs 2.29e, is not even enough to buy a refill of lives, which costs a total of 12 gold bars.

This means that the player is forced to buy either 2 sets of 2.29e packs, or buy a more expensive pack of 8,99 euros, which gives the player 50 gold bars. In addition to buying gold bars, the players can also buy bundles which include some gold bars, different booster items, or a limited time of infinite lives, which lets the player lose as many times as possible without reducing their lives. The bundle prices also range from 2.29 euros to 109.99e.

The game also later introduced features like “Candy Chronicles”, which lets players earn discounts to the shop, by beating difficult levels, but to use the discount, players must still pay a price of \$ 3.99.

While the term “micro” should and did originally imply small amounts of money, nowadays in the worst-case scenario, some free-to-play game prices can go up to 27 000 dollars, like in the case of the game Star Citizen, where this amount of money provides the player with 100 digital starships to command. Most microtransactions however are still priced between the 5— 100 \$ price range which Candy Crush also uses, due to the nature of the casual fanbase.

Figure 14. Candy Crush Saga’s shop page. (King, 2012, Candy Crush Saga, King)



Children are especially susceptible to these bite-sized transactions since they do not have a real sense of currency and its worth. Lately there has been a lot of anecdotal evidence, where children have used thousands of dollars on just a single game by using their parents' credit cards. (Kleinman, 2019; Thornhill, 2020)

While it is always the parents' responsibility to take care of their children, since microtransactions in gaming are a relatively new concept, a lot of parents are completely oblivious to the fact that these games even include such an option.

Before April 2020, the official game rating board, ESRB, and its European equivalent PEGI did not even include a tag that would inform customers of microtransactions in a product. In addition to that, since games can be updated nowadays, there is even a case, where a game has been released physically without the microtransaction tag, after which microtransactions have been added retroactively. (Madan, 2020; Van Allen, 2019)

In the case of a mobile game like Candy Crush Saga, this physical tag is not a problem. But nowadays these microtransaction models can be seen outside of mobile gaming too.

4.2 The effect of audio-visual manipulation

Candy Crush Saga has been designed to be a visually pleasing game. It is made of soft colors and contains many cute character designs. The more welcoming a game's visual design and its theme are, the larger the global audience will most likely be. The cuteness and peaceful nature of the game are also much more inviting when compared to games like World of Warcraft or Call of Duty for example. It is much more likely that a player will continue playing when the game experience is relaxing.

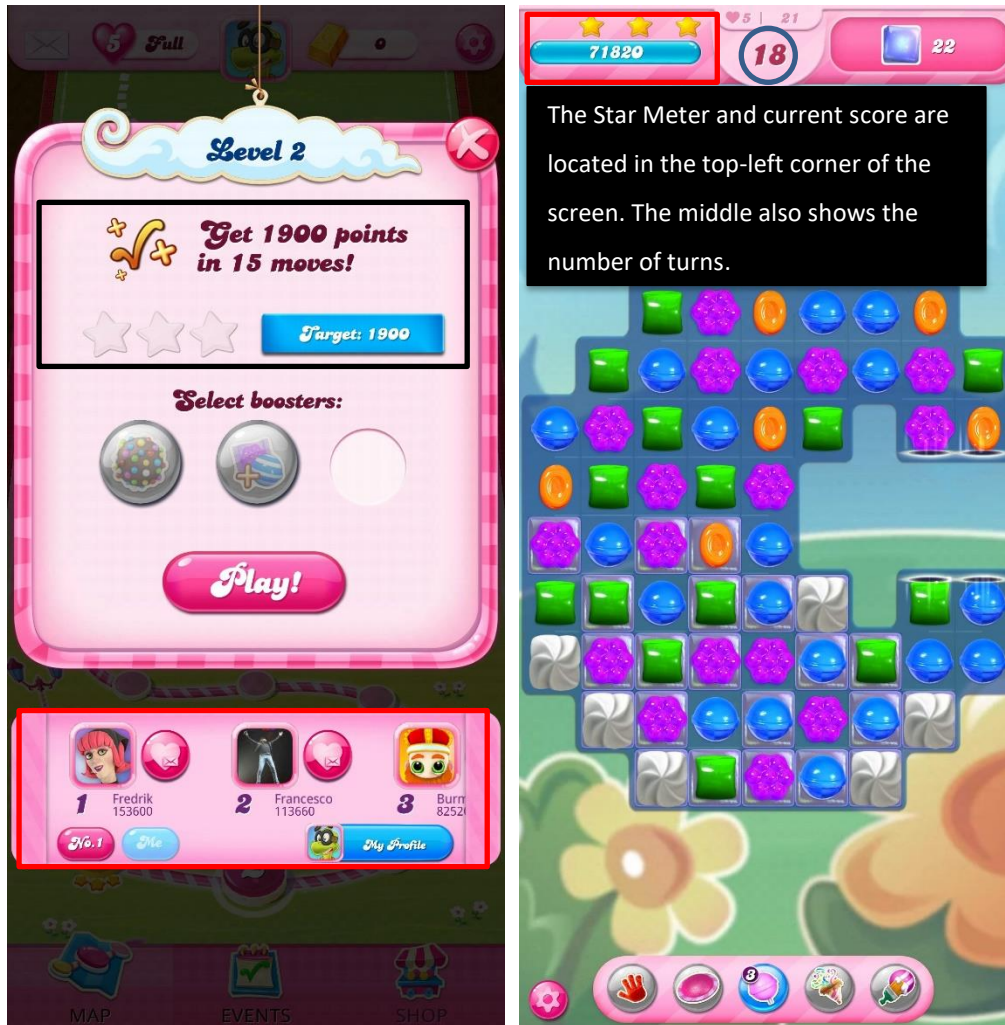
Figure 15. Demonstration of the visual design. N.B. the text in the middle image says, "Escape the stress of today" (King, 2012, Candy Crush Saga, King)



Right from the start, the game menu is colorful and inviting to the player, with a cheery character smiling right below the "play" button. The world map, where the player selects a playable level, also consists of bright colors, and simple but cute characters and objects.

It is easy to see the progression on the world map by following the line, going from the bottom of the screen upwards, with each level numbered, to always show the player where they stopped the last time they played.

Figure 16. Level Info and Star Meter. (King, 2012, Candy Crush Saga, King)



When a player chooses a level they want to play, the game shows the needed number of points, and the number of moves they can make. Below it, players can see the number of stars they have obtained from completing the level. When a player reaches a level's target score, they gain one star. When they get a certain amount of extra points above the target score, they can earn the other two stars. Stars are one of the main elements of the game and will show how good the player is on each level. They do not add any benefits to the gameplay, but they are one of the many reasons why players replay already completed levels.

The level info screen also shows boosters that the player can use beforehand, to make the level easier. The top 3 players and their respective scores are also displayed on the bottom of the screen. This might entice more competitive players to try and surpass them, which increases playtime even more than usual.

The levels themselves are also colorful and consist of different colored candy designs and a cozy background image that changes depending on the current level. This makes the overall visual design relaxing even during gameplay, even if the playable level was otherwise frustrating and difficult.

When the player combines different candies, they usually explode in different ways, while also displaying multiple different visual effects, like explosions or sparks of electricity. All the points they acquire from a candy combination also pop up on the screen simultaneously, showing all the points the player just racked up, and then adding them up to the star meter. At the same time, an announcer's voice says lines like "Sugar Crush!" and "Sweet!". If the player earns all three stars, at the end of the level they all light up and start to spark.

All these little audio-visual cues add up to a satisfying experience that makes the player feel good for playing and while it might not seem like a big deal, they subconsciously trigger the human brain to release mesolimbic dopamine, activating something commonly known as "the human reward system". This same reward system also activates when a person is addicted to gambling, according to neuroscientific research. (Anselme & Robinson, 2013; see also Lorenz, C. et al., 2015).

A certain part of the human brain called the amygdala, in addition to emotions in general, is responsible for the feelings of pleasure that we receive when we are awarded something through our actions. That is also why so many games are structured with a certain goal in mind. Not only is it easier to understand when a level has been completed, but also the act of reaching a certain goal or the end of a game, for example, gives humans a feeling of accomplishment and a sense of closure. (Maeda et al., 2018)

It is also important to use, a "risk vs reward" system, which makes sure that the reward does not seem too easy or too difficult to obtain.

The balancing of a game is also a very important part of game design, because if the game is too easy then the player loses interest and more likely stops playing altogether. If the game is too difficult, the same problem occurs, which is why making the reward system balanced, will make a difference between a constant stream of revenue or diminishing returns for a

developer. It is also important to make sure that the reward gained from completing a goal, is sufficient to justify the difficulty of an objective.

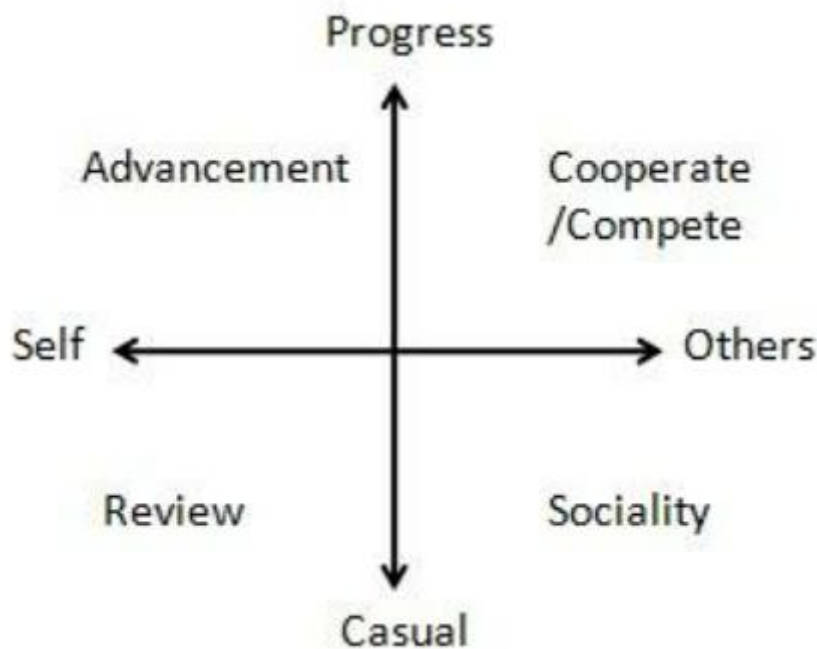
In his book on game design, theory and practice, Richard Rouse III describes the rewarding process as something that should be used to encourage a player who completes even just a simple accomplishment. Giving even just a small reward makes the player feel like they are on the right track, which of course encourages them to continue playing. (Rouse III, 2001)

It is no surprise then, that many addictive games intentionally use mechanics, which produce the kind of stimulus that activates this reward system, and Candy Crush is no different.

Figure 17. Multiple visual effects when earning points and completing objectives. (King, 2012, Candy Crush Saga, King)



Figure 18. Demonstration of game reward systems (Sun & Wang, 2012).



Depending on the person playing, games like Candy Crush can activate a few or multiple different parts of the reward system. Because of the casual nature of the game, most players will likely activate the “casual” and “progress” parts of the reward system by spending their time playing and progressing through the levels. Others might also activate the “Compete” part of the reward system, by trying to beat level high scores.

4.3 The addiction of precisely designed difficulty

At the time of writing this thesis, the mobile version of Candy Crush Saga has 9395 levels to play. These are divided across 627 “episodes”. The levels are divided into 6 different types, including “Moves”, “Jelly” and “Ingredients”. Each level type has its own rules to follow. Only by following these rules, can a level be completed.

There are multiple reasons for different level types in Candy Crush and other games. But the most common reason for diverse level types is to avoid boredom and desensitization. As explained in a video by the YouTube channel Game Theory, just like other activities that produce dopamine, games that are too repetitive make the brain desensitized to the activity, by closing several dopamine receptors. This means that the game’s repetitive nature makes

it too boring to play and the only way to reactivate the closed receptors, is to add divergence to the gameplay. (Patrick, 2014)

To achieve keeping the players' interest high, developers create levels with different objectives, visual themes, and varying levels of difficulty. They might introduce new mechanics, which will be used for a while so that players can get familiar with these new features. When the level types and difficulties are mixed at a balanced rate, desensitization can be avoided or at least postponed, depending on the player. (Patrick, 2014)

The game also has a Daily booster wheel that can be spun for an extra item, but this also requires the player to be connected to the internet. This is another feature that will more likely make players return to play, daily.

Candy Crush includes 12 different types of difficulties, from "very easy" to "impossible". Each episode of the game includes some "easier" levels, "somewhat hard" levels, and "hard" levels. The further the player has progressed, the more likely there will be levels ranging from "very hard" upwards. The first "very hard" levels are introduced in level 122. This way it is more likely, that players are already invested enough so that they do not immediately give up playing the game after encountering a bigger challenge. Difficulties like "extremely hard" and "nearly impossible" are introduced much later in levels 688 and 2076 respectively.

These more difficult levels can be progression blockers for many, since failing a level multiple times reduces the player's lives to zero. Players with addictive personalities can be incentivized to use real money to buy more lives, since the only other way to gain all lives back, is to wait for 2,5 hours. It is also possible to look at advertisements every now and then to earn some free lives or send free lives to friends, although not all players have these possibilities.

This is because the developers sometimes test different features for a subset of the community, to see if they are popular enough, to utilize globally. ("Where can I get my events?", 2018)

Difficult levels also incentivize the players to pay for the “unlimited lives” bundle, since they might be aware that they will face more difficult levels, the further they progress in the game.

When a person has high levels of dopamine, cutting them off by forcing them to wait for the lives to recharge, makes the brains crave more of the source of dopamine. This happens because players have achieved “flow”. Flow is a psychological term for a person’s mental state when they are fully immersed in an activity. (Olle & Westcott, 2018) If this flow is broken prematurely, many players need to continue going, even if that means spending real money.

This is the reason why players are more likely to wait addictively for their lives to recharge or spend real money to recharge them immediately. The average playtime of Candy Crush is so short, that the brain does not have enough time to be accustomed to these short bursts of dopamine and leaves the players always wanting for more.

This quirk was and still is used in arcade halls, where the play sessions are usually very short and require players to insert more coins to continue playing.

In a longer period, the more hours a player spends playing a game, the more their brains are rewired to “expect” certain amounts of dopamine from this source, which starts a loop that can be difficult to get out of. It also makes a person’s brain build tolerance, which means that they need even more of the same addictive “substance” to feel good. (Revolution psychiatric and addiction treatment, nd.)

Candy Crush Saga also frequently advertises special deals between the completion of levels further incentivizing players to visit the shop and spend money on gold bars or other bundles.

The previously mentioned Candy Chronicle deals are also time-restricted, so after a player earns the Candy Chronicle deal, they have only a limited time to use it, which puts even more pressure on the player, to immediately use their money. These are just some of the reasons why “Whale” customers exist.

Game developers are aware of this and design their games around this concept of “recurrent consumer spending” to gain large amounts of revenue, even when the base game is completely free-to-play. (Colagrossi, 2021; Good, 2017)

4.4 The ease of mobile gaming

The accessibility of mobile games like Candy Crush Saga is another reason why the games are so addictive to many people. In recent years there have been several research papers indicating a growing addiction to the usage of mobile phones.

A research by Experimental and Clinical Sciences (EXCLI) attributed this growing addiction to social media, business emails, and mobile games (Shoukat, 2019). Since a large portion of people nearly always carry a smartphone with them, the ease of starting a game and playing a couple of levels every now and then, is only a couple of finger taps away.

Every time a person is traveling on public transport, waiting for their next lecture or an appointment, or just simply being bored, the temptation to play can be irresistible for many.

The previously mentioned craving for dopamine, is even easier to satisfy when the phone is always accessible. Combining this with the colorful and friendly art design and the addicting game loop, it is clear to see why Candy Crush has been titled one of the most addictive games of all time.

5 Legend of Zelda: Breath of The Wild

5.1 Introduction to The Legend of Zelda series

The Legend of Zelda: Breath of the Wild is a 2017 action-adventure game developed for Nintendo Wii U and Nintendo Switch. Excluding **remakes**, it is the 19th game in a franchise, that started back in 1986. It was heavily inspired by the original “The Legend of Zelda” game, where exploration is very much encouraged, and advice in proceeding in the game is very minimal.

The series is one of the oldest and beloved game series of all time. It set a new standard for adventure games back in 1986 with the first iteration of the series. Combined with the more relaxed setting of the Super Mario franchise and the more serious sci-fi-themed, Metroid Series, Nintendo cemented itself as one of the greatest game companies in the world. To this day, the Zelda- series keeps innovating itself while at the same time sticking to the classical medieval story, about a chosen hero trying to defeat an ancient evil and saving the princess at the same time.

Most mainline Legend of Zelda games start with the reincarnation of a chosen hero called Link, answering the call to action akin to the classic “Hero’s journey” template, coined by the writer Joseph Campbell (1949).

The usual gameplay starts with Link finding a sword, or another piece of equipment, to help him protect himself against different enemies. Most games in the series revolve around Link needing to find some legendary artifacts or magical items, which he will need to defeat his archnemesi, The Demon King, Ganondorf.

The player’s job is to explore different dungeons, that will reward Link with one of the needed key items, and a new piece of equipment, that can be used to continue the journey, by gaining access to previously restricted areas. They are items like the bow which can be used to shoot otherwise unreachable switches to unlock doors, or the Hookshot, which Link can use, to grapple himself to higher locations.

Most dungeons are full of puzzles centered around the dungeons' theme. The task of the player is to understand this specific theme and work their way around the dungeon until they find a boss key, which will let them reach the dungeon boss. Once all the dungeons are completed, and Link has gained the necessary key items, the player can proceed to the final confrontation with Ganondorf, and save princess Zelda, the titular character of the series. The Zelda series keeps this structure in nearly all the mainline games, with some added mechanical differences, like the ability to turn into a wolf, in the more gothic styled *The Legend of Zelda: Twilight Princess*, or the ability to turn Link into a small fairy type character, which lets him go into smaller otherwise reachable places, in *The Legend of Zelda: The Minish Cap*.

The game has also gone through multiple changes in art styles, from colorful 3D graphics to pixel art, glass-stained art, cel-shaded graphics, impressionism, clay models, gothic art, and much more. (Nintendo, 2017)

The game series was originally inspired by its creator, the legendary developer Shigeru Miyamoto, who used to explore nearby fields, forests, and caves near his hometown, Kyoto. The experience of exploring the unknown and finding wondrous things in nature, was something that Miyamoto wanted everyone to feel, while adventuring around the original game.

Back in the day the restrictions set by game consoles of its time limited the size of the game world originally, but the further the series has gone, the easier it has been to build much larger worlds, for players to explore.

Miyamoto realized one of the most important aspects gaming could provide: Exploration and the ability to visit locations players could never find in the real world. The early games especially did not provide the player with an in-game map, so everything would have to be found naturally and without help, although a physical map was included with the first games' disc case.

The Legend of Zelda: Breath of the Wild, released March 3rd, 2017, for the Nintendo Wii U and the Nintendo Switch game consoles. Through this case study, it will be possible to demonstrate the open world design, that the Zelda developers originally aimed for in 1986.

The case study on *The Legend of Zelda: Breath of the Wild* will focus on the effects of archetypes in video games, and the effects of audio-visual design. The case study also explores how a clear goal, and clear rules combined with well-designed audio-visuals can naturally guide the players while also giving them player agency.

5.1.1 The effect of archetypes in game design

Archetypes are universal models for different types of people and their personalities. They have been used in storytelling since the Epic of Gilgamesh, theorized to be written around 2100 BC. While these archetypes may have not been perceived as such in those years, writer Joseph Campbell (1978) and psychoanalyst Carl Jung (1978), were the ones who spoke most of the importance of archetypes and found the connection between multiple classic stories. These can also be seen in more recent works of film and literature, such as *Harry Potter*, *Star Wars* or *The Matrix* (New York Film Academy, 2015; see also Khan, n.d.).

The main character, Link is a Hylian (fictional elvish race) usually portrayed as a young man in a green tunic and a green hat, and carrying the legendary Master Sword and the Hylian shield. He is the incarnation of the Hero of Time and possesses the power of Courage, one-third of the holy trinity known as the Triforce. (Nintendo, 2017). He clearly mirrors the “Hero” archetype (Jung, 1978; see also Campbell, 1949).

Link was named as such, to literally portray the link between the player and the game character. Link is also usually portrayed as mute so that the players can insert themselves into the character as much as possible since there would be no dialogue that would make the player disagree with the character’s thoughts. (Byrd, 2021)

Princess Zelda has usually been portrayed the same age as Link. In most designs, she has blonde hair, a crown, and a pink princess dress. While she does get kidnapped in most games and ends up being a damsel in distress, she also possesses great intellect, magical powers, and the legendary Bow of Light, which give her the ability to defend herself in many situations. She is the reincarnation of the goddess Hylia and carries the power of wisdom, the second piece of the Triforce (Nintendo, 2017). She represents the “Princess” archetype. (Jung, 1978; see also Campbell, 1949).

Figure 19. Artwork of the main characters, from left to right, Link, Zelda, and Ganondorf.
(Nintendo)



The antagonist of the series, Ganondorf, is portrayed as an older man, of the fictional desert warrior race, The Gerudo. He has green skin and goblin-like facial features with red hair. He is extremely powerful and holds the final piece of the Triforce, the Triforce of Power, which grants him near-immortality. He is usually armed with a large sword and dark magic.

He is the reincarnation of the original Demon King, Demise. Throughout the series, he also has different methods to transform into his more powerful form called Ganon, a pig-like gigantic monster either standing on two feet and using swords or a more beastlike form on all fours. His only goal is to gain as much power as possible and take control of the land of Hyrule (Nintendo, 2017). Ganondorf represents the “Shadow” archetype (Jung, 1978; see also Campbell, 1949).

These archetypal characters are used for a reason. The stories told through archetypes are clear to understand and contain characters that people can identify with. While overusing them to the point of caricature can make the experience boring, archetypes can still be used to build a solid foundation for a narrative, and more complex concepts and character can be built on top of them. (Mark & Pearson, 2001). This is true for books, movies, and video games.

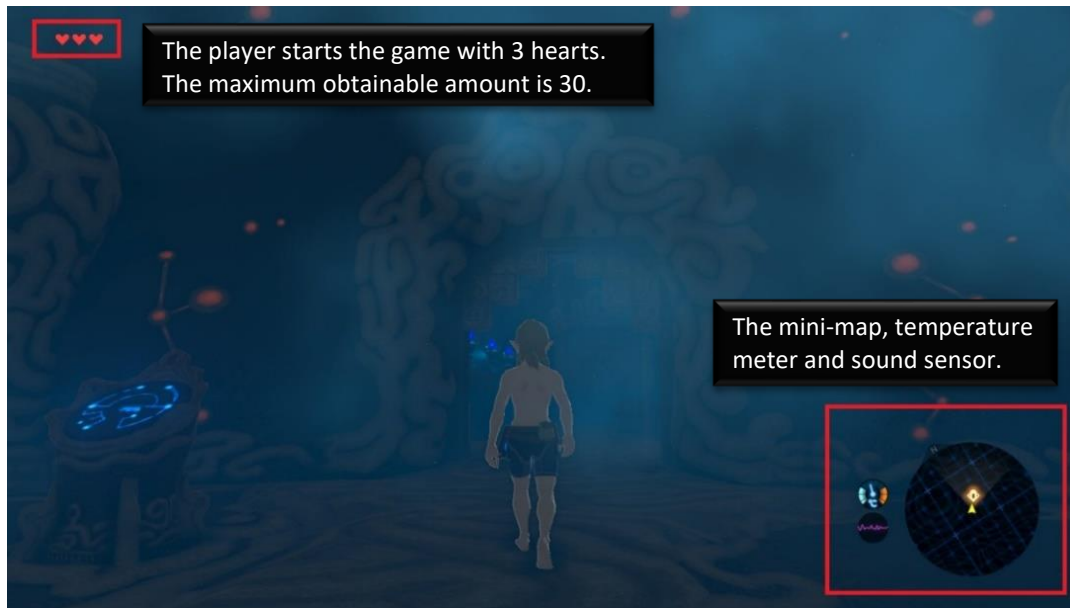
The Zelda series also uses a lot of its own re-occurring side characters like the bug collecting merchant, Beedle, or Impa, the princess' bodyguard, who often embodies the "Wise Sage", archetype introduced by Carl Jung (1978).

All this simple storytelling is a great way to build the game world to be easily recognizable for a large portion of players to get invested in. When the story structure is familiar, developers and narrative writers can easily start adding in their own lore and rules of their game world. The more comprehensible it is at first, the more players will get immersed right from the beginning and will most likely keep going. That said, a too simple story can also make players uninterested, so there is a fine line between simple and shallow world-building.

5.1.2 The introduction to Breath of the Wild

When the game begins, Link is awakened from what seems like a stasis chamber of some sort. The player starts in a chamber, lit by some sort of ancient-looking technology. The game tells them the basics of controlling the character, camera, and the ability to lookup more complicated controls. Immediately after that, they are presented with one of the key items of the game: The Sheikah Slate. The Sheikah Slate is a tablet-like piece of equipment that lets them use various abilities as they progress further. For now, the player can only use the ability to view a map of the surrounding areas, a temperature meter, and a sensor, which shows them sound waves from their surroundings.

Figure 20. The user interface. (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)



The first thing to take note of is the fact that the user interface is very simple. The upper-left corner of the screen shows the character's health bar, which consists of 3 heart shapes. The lower-right corner has a circular mini-map, that shows the character in the center and a yellow icon, which shows the first objective they should examine to continue. Examining it will give the player the Sheikah Slate and teach them how to interact with objects of interest. Further along the room are two treasure chests, which teach the player how to open them, while also containing a pair of pants and a shirt, which act as a tutorial to equip new clothes.

Once again, like in World of Warcraft and Candy Crush, the game's beginning is designed to be very simple and welcoming, so that players can get easily hooked into the experience. Going a bit further along, activating another pedestal with the Sheikah Slate, will open the door to the outside world, along with Zelda's voice telling Link to hurry and go forward, to whatever waits outside. After this, the game presents its first real tutorial area, the Great Plateau, which offers a great way to explain the **design philosophy** behind the game.

5.2 The game design philosophy of Breath of the Wild.

As opposed to other games in the franchise, Breath of the Wild is the first true open-world game in the series. This change alone made it a very interesting venture for both the players and the game designers themselves. The developers took notes from survival games like “Don’t Starve”, while crafting aspects were inspired by games like Minecraft and Terraria, according to the director Hidemaro Fujibayashi.

“I was rather inspired by playing Minecraft and Terraria. I was able to learn from the gameplay and the possibilities found in. I could learn from the sense of adventure, exploration and how it inspired curiosity” (Richards, 2017).

For real-life inspiration, Fujibayashi also added that just like the childhood adventures of Shigeru Miyamoto, which fueled the original The Legend of Zelda game, the developers of Breath of the Wild, also went to do cave diving and rafting, which influenced activities available in the game.

The core philosophy of this game was to keep the player engaged no matter what. The developers believed that the sense of exploring and finding out different locations, creatures, items, or artifacts should be the driving force in making the game interesting and fun. Every little thing that one might at first think to be insignificant, has a purpose. From cutting trees to collecting mushrooms, hunting animals, or picking up rocks, there is nearly always something players can do, to help their adventure. This will be specified more with the introduction of the game’s tutorial area, the Great Plateau.

As reported by the gaming website Polygon, the developers also went through the game design in-depth, at Japan’s Computer Entertainment Developers Conference (CEDEC) in 2017. The idea while designing the world and its terrain, the developers used the help of a method dubbed “field triangle law”. (Frank, 2017)

When designers place a triangle-shaped obstacle in the world and place something visible behind it, the player’s interest is immediately caught. This also places a decision for the player, to either climb the obstacle or go around it. Going around it might be easier, but it

can also easily lead to missing something else on top of the structure. Climbing the hill can also lead to the player gaining a better spot to view other objects in the distance.

Either way, going to the other side of the object will always present the player with whatever scenery is behind it, revealing even more areas and points of interest to explore. Humans tend to be deeply curious, and we are prone to exploring (Kidd & Hayden, 2015), which is exactly the quirk the developers are taking advantage of.

Figure 21. Demonstration of the triangle effect

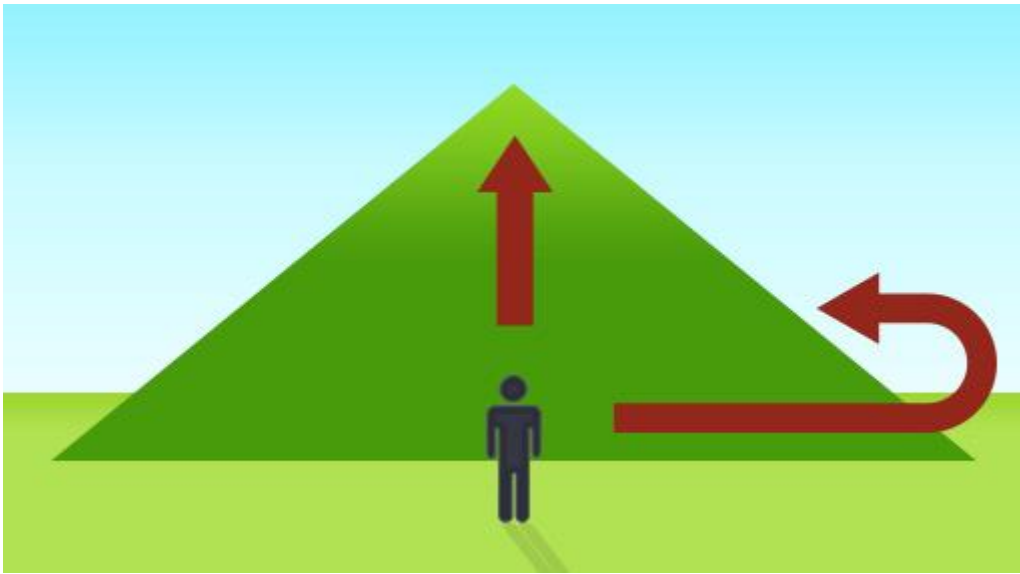


Figure 22. Further demonstration of the triangle effect



Nintendo's senior lead artist, Makoto Yonezu further explained the philosophy of creating scenery at the conference. Paraphrased from a Japanese translation:

Triangles have a high effect of guiding the line of sight to the tip, so by placing a peculiar object, on the top of a mountain or a hill, you can encourage interest in it. In the end, the development team decided to design the level for "the field triangle law" that can be seen from the player's point of view, assuming three roles. (Nishikawa, 2017)

These three roles included large, medium, and small-sized triangles. The large ones were set to portray large objects like mountains and mountain ranges. These kinds of large objects would be easy to see even from far distances and are placed there to just show the player, that there is indeed more to explore all the way further.

The medium triangles were used to mostly hide objects of interest as shown in the previous examples. Placing different buildings like towers or windmills behind the triangles, just so that they can be seen from different angles, makes the player interested in exploring further.

Small-sized triangles were used to make the player plan their movement by dodging and choosing between the approach of getting past these small objects, which could be hiding some natural resources or a treasure chest for example.

Figure 23. Demonstration of the different sized points of interest and terrain



To make this philosophy a bit clearer, in chapter 5.2.1 the very start of the game's tutorial area is analyzed step-by-step to demonstrate in depth the usage of "the triangle law".

5.2.1 In-game demonstration

As soon as the game's intro cutscene has ended, the tutorial will begin. The tutorial will be demonstrated step-by-step, to give more insight into the developers' game design choices.

Figure 24. Demonstration of the tutorial

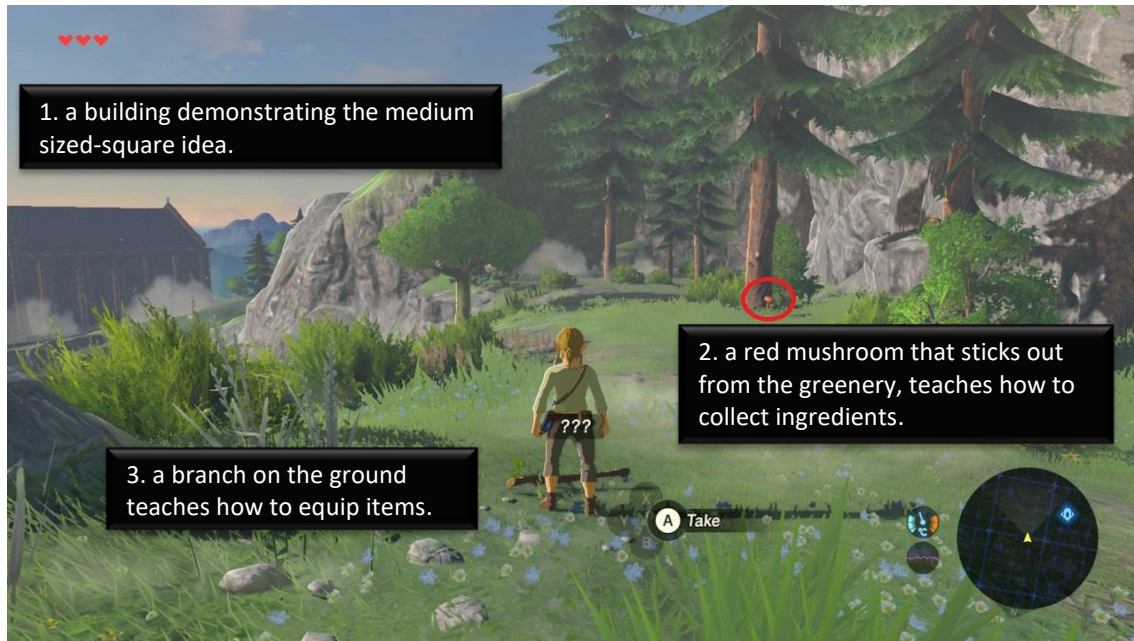
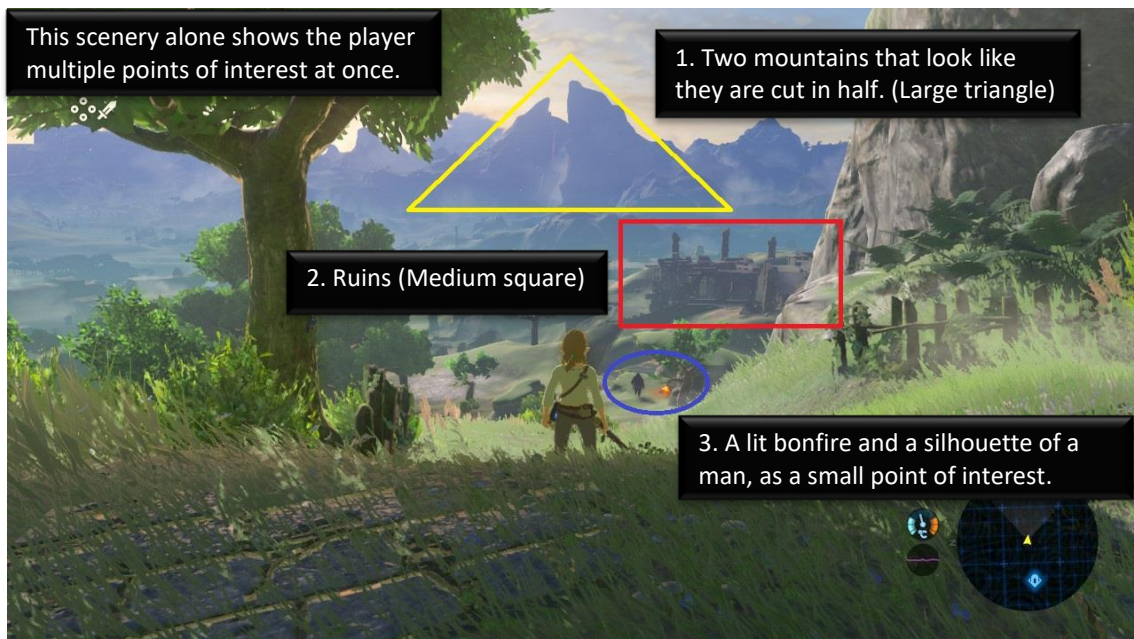


Figure 25. Demonstration of Triangles and Squares (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)



The road the player is standing on also seems deliberately designed to point right towards these points of interest, because on the player's right side there is a high wall and on the left side, there is a very high drop that would most likely kill the player. The mountain on the right does give a chance for the player to climb it. When they do try to climb it, the game naturally introduces a green stamina meter, which depletes, when the player does exhausting actions, like climbing or running for example.

Figure 26. Free climbing mechanic and stamina meter (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)

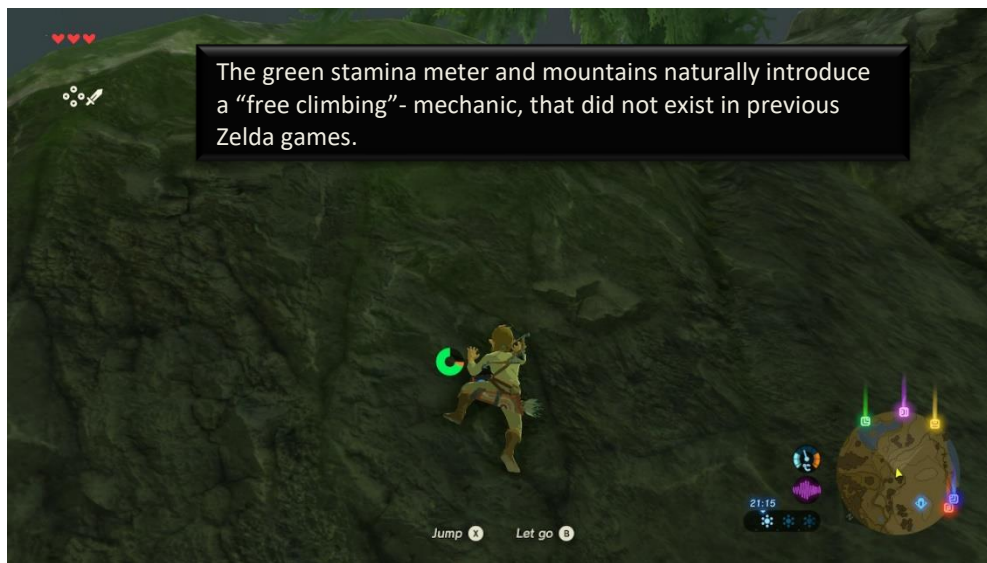


Figure 27. Demonstration of the tutorial. (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)

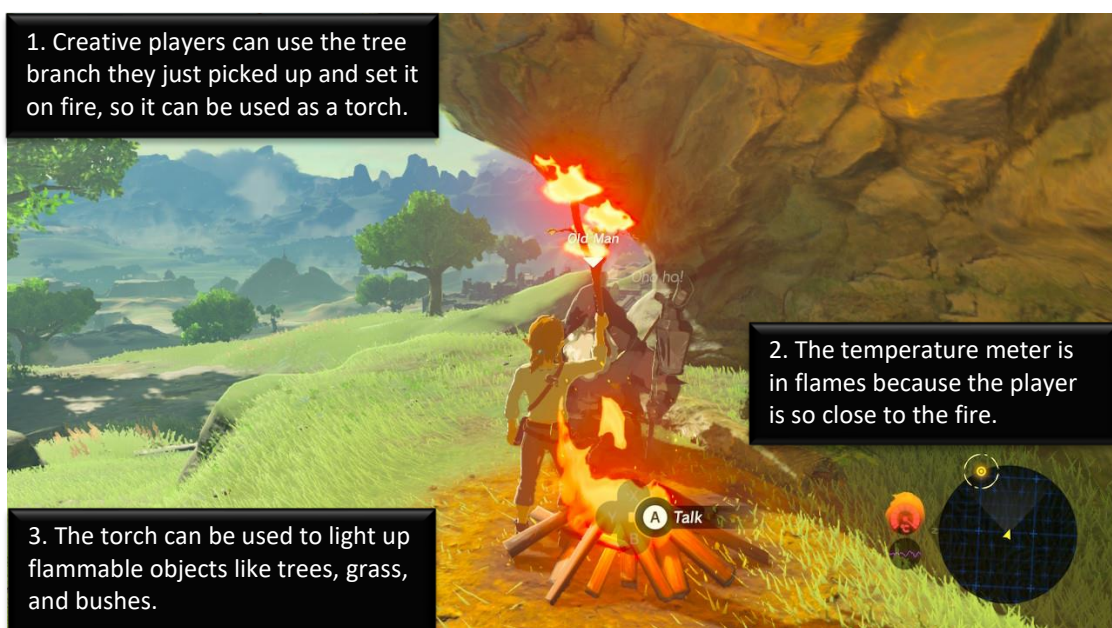


The game will lead the player to an NPC (Non-playable character), a nameless old man. He will tell them that the ruins they saw are that of a temple. The camera pans to the left of the player while directing their attention to the large temple ruins behind the old man's cave. After that, the voice of Princess Zelda guides the player to go to a location marked on the mini map. The player is now free to explore the surrounding area however they want.

Figure 28. Demonstration of the tutorial 2. (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)



Figure 29. Demonstration of dynamic physics. (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)

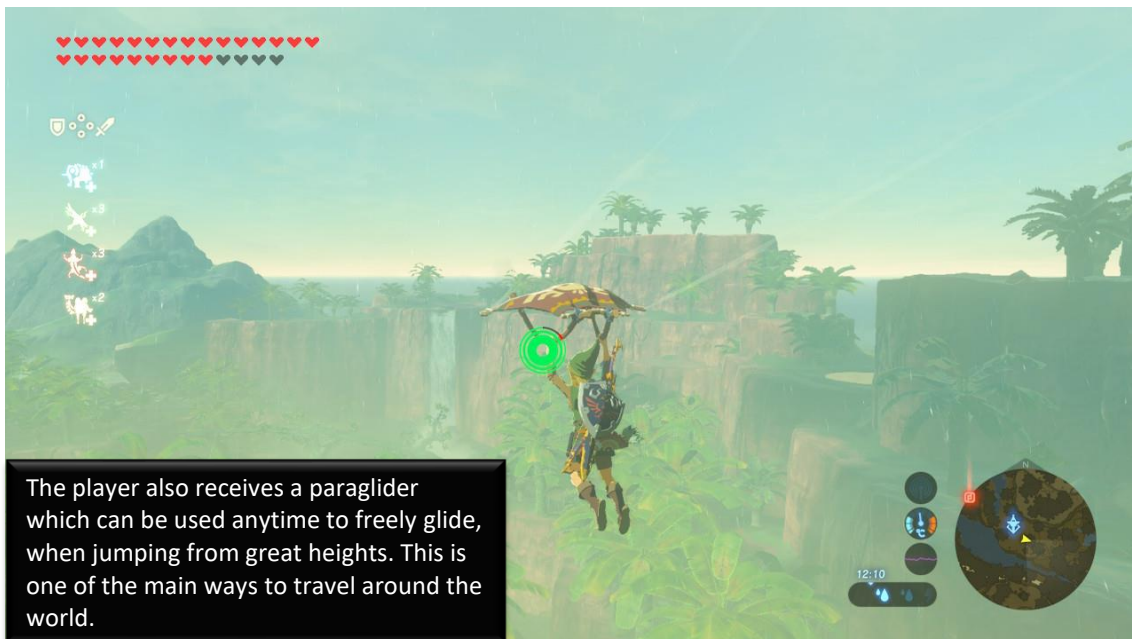


This is the game loop of Breath of the Wild. The game's physics have been made as realistic as possible and most of the game's mechanics are left for the players to experiment and find out.

This is a great way to make the players interested because whether the player is young and is just learning about physics and nature, or an older person who already knows about these subjects, both are learning the numerous possibilities the game provides, in a natural and cohesive way. Nobody is forcing the players to play a certain way, but especially against tougher monsters, clever and creative players are more likely to succeed in defeating them, instead of taking a head-on approach.

After the tutorial has been completed the player gains some important upgrades to the Sheikah Slate. These include the ability to manipulate metallic objects, freezing fluid materials into icy blocks, throwing bombs, and temporarily stopping the passage of time on targeted objects. Once again, the physics apply on all these abilities, and experimenting with them provides players with some memorable gameplay moments.

Figure 30. The player using a paraglider (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)



5.2.2 Working up to a clear goal

After traveling for a while, and continuing the main story a little forward, the player character Link, will meet the old sage Impa, who tells Link what has happened while he was sleeping for 100 years. The player is instructed to defeat Ganondorf by any means necessary. It is even possible for very skilled players to defeat the final boss right after the tutorial, although this is extremely difficult.

The whole world is open for exploration with points of interest like puzzle-filled shrines, hidden weapons, and armor, books that tell more of the game world's history, and much more. The players can tame wild horses and train them to be more obedient or find cute residents of the forest called Koroks, who will increase the player's inventory size if the player completes their puzzles. The player can also try to visit numerous important places in the world to make Link regain his lost memories.

But whatever the players choose to do, the end goal is clear and simple: to save the princess. Many players want a purpose in life, and video games can provide that sense of purpose with different goals. (Olle & Westcott, 2018)

The game does not force the players to hurry either. This makes it more relaxing for them to continue playing, because the fact that there is no time limit to finishing the game, and as all the side activities are completely optional, the players gain more agency.

The fact that the player is not in a hurry can also cause ludonarrative dissonance to some players. Simply put ludonarrative dissonance is a term which describes a feeling of disconnection between a game's narrative and its game design (Seraphine, 2016, pp 1—4).

In the case of *Breath of the Wild*, the narrative tells that Zelda is in trouble and needs rescuing, but the game never enforces the player to go and save Zelda, which might break their immersion.

Ludonarrative dissonance is a usual problem in video games, and depending on the severity of its implementation, it can heavily affect the overall quality, especially if the game is story driven.

Players enjoy having as much control as possible, and in a game, they can control things as much as they want, which might be a reflection of something they are unable to do in the real world. This all relates to the fact that humans naturally have a need to control themselves and things in their environment. (Leotti et al., 2010)

5.3 The effects of audio-visual cues

The game also utilizes audio-visual cues to inform the player of their surroundings in a natural way. Windy weather lets the player know that it is possible to fly upwards by using the paraglider, while rainy weather makes it more difficult to climb mountains. Depending on the area the player is in, the temperature also affects how enemies, animals, and objects in the world operate.

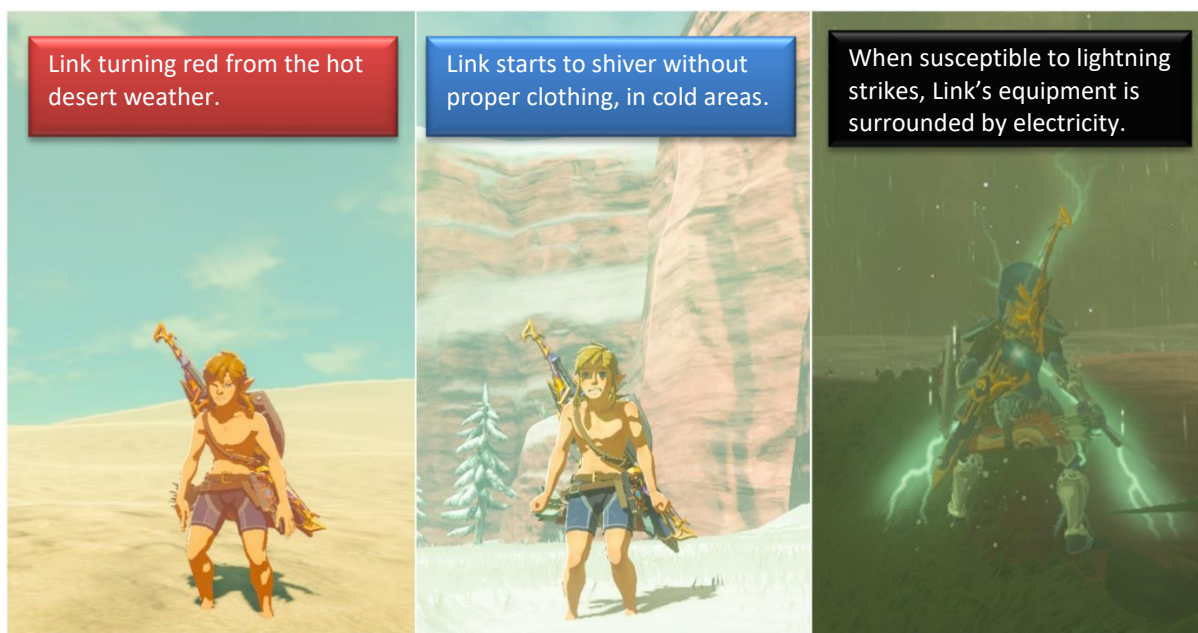
Being in a cold temperature without suitable clothing makes the player lose health due to freezing, while the opposite is also true in extremely hot areas. During rain, there is also a chance of thunderstorms, which can hit the player if they are exploring in higher altitudes, and especially if they are wearing metallic equipment. The players can also protect themselves from lightning, by wearing rubber clothing.

All these restrictions and possibilities heavily affect the approach individual players take during their adventures. Some players might force themselves to climb wet surfaces while it rains, while others might take a longer detour, just to be safe. It is also possible to go back to an inn and let the weather change overnight.

This is a very natural way to let players have agency over their gameplay and decide for themselves, what the best way to advance is. Sometimes their choices might be wrong, which again helps them to adapt on their next try. In addition to these forces of nature, certain enemies can also prove too difficult. Listening to the sounds around them and looking at the soundwave meter on the user interface lets the player be more aware of the sounds of possible nearby dangers.

Some enemies like the chameleon-like Lizalfos, can camouflage themselves into the environment while the squid-like Oktoroks try to mimic bushes. In these cases, the developers have made sure that the enemies can move slightly, to give the player a visual cue, which can alert them in time.

Figure 31. Effect of weather. (Nintendo, 2017, The Legend of Zelda: Breath of the Wild, Nintendo)



In addition to the normal forces of nature, at times, a phenomenon known as a blood moon can also appear during nighttime. During the blood moon, all previously defeated enemies are resurrected. Players can also notice the blood moon rising early, and plan how to continue their adventure accordingly.

It should be noted that the game's mechanics and game design, especially the open-ended nature of the world and its exploration, can be overwhelming and even scary for some players, and some of the mechanics can be vague and push some players away from the experience.

Overall, the game is still celebrated among the Zelda community and the gaming community in general, and it contains a lot of great game design elements that more game developers should utilize, especially the usage of certain shapes in the environment, which invoke a sense of adventure and exploration.

6 Comparison of case studies

As a summary, this table contains differences and similarities between the test cases.

Table 1. Summary table

	World of Warcraft	Candy Crush Saga	The Legend of Zelda: Breath of the Wild
Single-Player	X	X	X
Multiplayer against other people (PvP)	X		
Co-operative multiplayer	X	X	
Social gaming	X	X	
Social aspects	WoW is heavily affected by social mechanics, including raids/dungeons, PvP, guilds, and party questing.	Candy Crush is mostly a single-player game, but it is possible to see other players level scores and compete in beating them	Breath of the Wild is a single-player-only game, and it does not include any integrated social aspects. It is possible to take screenshots and share them online through the game console itself.
Graphical Style	Stylized/Cartoonish	Stylized/Cartoonish	Stylized/Painterly/Cartoonish
Side activities	WoW includes the most side activities, including daily quests, instances, yearly festivals, mini-games, professions, etc.	Candy Crush has occasional events like a daily free spin on the booster wheel or tasks, that can be completed to earn the right to buy discount coupons.	Breath of the Wild includes several side activities, like side quests, photography, collectibles, puzzle shrines, special enemies, etc.
Streaming/VOD popularity	World of Warcraft has had a huge streaming following since 2007 starting with YouTube videos.	Candy Crush does not have a huge streaming following, but it has YouTube videos with millions of views, especially on more difficult levels.	On release, Breath of the Wild was very popular among YouTube and streaming services, but because of its single-player nature, its popularity has lowered significantly.
Monetization	Retail price and a monthly/yearly subscription model	Free-to-play with microtransactions	Retail price and a possibility to buy an expansion pass which provides some more extra content.
Gameplay loop	Encourages constant character progression alone or with other people. Keeps players interested through constant updates and through the implementation of social aspects.	Consists of levels that are fast to complete or try out. Uses audio-visual cues to feed the “human reward system” and keep players engaged.	Uses audio-visual cues, and engaging open-world design, to encourage people to explore and look for an adventure.

7 Survey and Conclusions

To further illustrate the effect of video games, I conducted my own Google Forms-based survey, in which I queried information, such as the average playtime in a week, the genres played, and gaming platforms that were used. I also asked respondents to freely write about the positives and negatives they had experienced from gaming, and how much money they had used on microtransactions in free-to-play and full-priced video games.

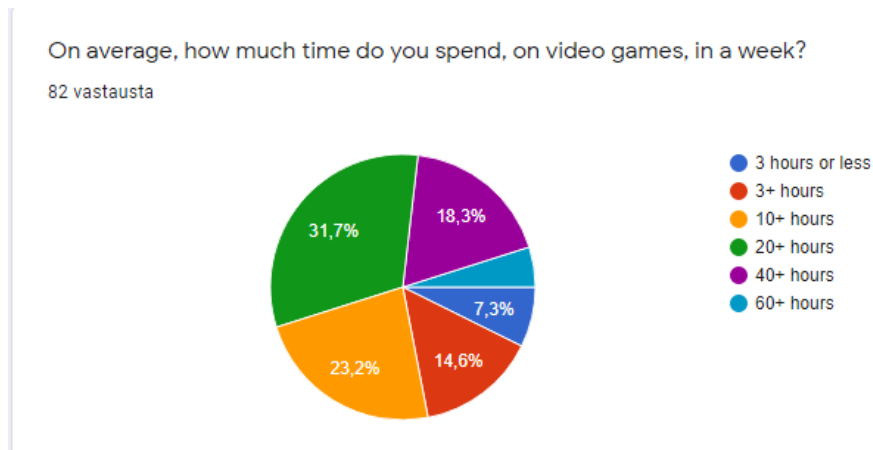
All respondents answered anonymously. Age nor gender were considered. The research was conducted on Google Forms, because it was the most efficient way to gather random respondents.

My respondents were comprised of relatives, friends, and in addition the survey was shared to students from the University of Lappeenranta, Helsinki and HAMK and to random respondents through internet forums

The only requirement for taking the survey was the need to play games somewhat frequently, either on a mobile phone, computer, or a gaming console. Overall, I got 82 responses.

Since the number of responses is not large enough to show conclusive evidence on the subject, I also compared them to larger-scale surveys to make sure the evidence was clear enough so a consensus could be reached. Also, at the time of writing the thesis, the COVID-19 pandemic is still in effect and could affect the results, since so many people need to stay indoors and are also financially affected.

Figure 32. Question 1 answers



On average, the playtime of the respondents in a week, was at least 10 hours or more, while a significant portion of the answers were 20—40+ hours per week. A small portion of 4,9 %, meaning 4 respondents, played more than 60+ hours a week.

Comparing this to a survey created by Limelight Networks, the percentage was a lot lower. This survey comprised 4500 respondents who were all at least 18 years old, which was not a requirement in my own survey. (Limelight Networks, 2019)

Figure 33. Larger research on weekly gameplay

Country	Less than 1 hour a week	1-2 hours a week	2-4 hours a week	4-7 hours a week	7-12 hours a week	12-20 hours a week	More than 20 hours a week	Average Hours Each Week
France	12.8%	21.4%	16.6%	16.6%	13.4%	10.0%	9.2%	6.97
Germany	15.2%	11.0%	17.2%	19.0%	13.6%	12.4%	11.6%	7.98
India	10.8%	14.6%	19.4%	15.8%	23.4%	11.4%	4.6%	6.92
Italy	13.0%	15.6%	19.4%	17.6%	17.8%	10.0%	6.6%	6.79
Japan	21.2%	17.8%	14.0%	18.0%	8.2%	9.8%	11.0%	6.88
Singapore	14.8%	17.4%	15.0%	16.6%	15.2%	10.6%	10.4%	7.44
South Korea	17.8%	17.0%	17.4%	17.2%	12.8%	8.8%	9.0%	6.69
U.K.	15.4%	19.2%	17.2%	16.6%	13.6%	9.2%	8.8%	6.76
U.S.	12.8%	19.8%	14.6%	18.6%	11.2%	11.4%	11.6%	7.61
Global	14.9%	17.1%	16.8%	17.3%	14.4%	10.4%	9.2%	7.11

Figure 1: How many hours each week do you spend playing video games?

Globally only 9.2 % of respondents in this survey played more than 20 hours, compared to the thesis survey, where the amount was a much higher 31,7 %, while most of the respondents in the Limelight Network survey played only 4—7 hours per week.

The second question in the thesis survey asked the respondents to tell their most played game genres. The most popular genres were clearly shooters, role-playing games, and adventure games, which included more specific genres like survival and adventure games, like *The Legend of Zelda*.

- Shooters were played by 62,2 % of the respondents
- Adventure games were played by 63,4 % of the respondents
- Role-playing games were played by 59,8 % of the respondents

Other popular genres were strategy games, simulators, and card/board/tabletop games. Puzzle games including *Candy Crush*, only made up 15,9 % of the answers, while the least played genre was sports games, with 7,3 %. Platformer games and fighting games respectively made 15,9 % and 14,6 % of the answers.

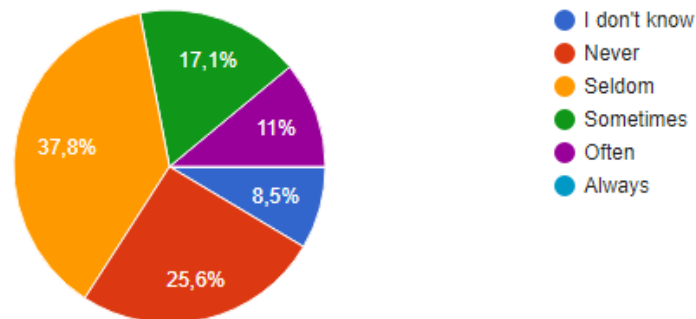
Shooters have been very popular in the gaming community, through game series like “*Call of Duty*” and the “*Battlefield*”- series, while role-playing games and adventure games usually cater to a very large audience of different age groups.

These results were not anything unexpected. The low percentage of platformers was a little surprising, considering how a lot of platformers, including games made by Nintendo, such as the *Super Mario* series and *Donkey Kong* are still very popular. But these results are most likely skewed, because of the small number of respondents.

Figure 34. Question 3 answers

Have you felt FOMO (Fear Of Missing Out) effects in games?

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The third question asked if respondents had felt any FOMO effects in video games.

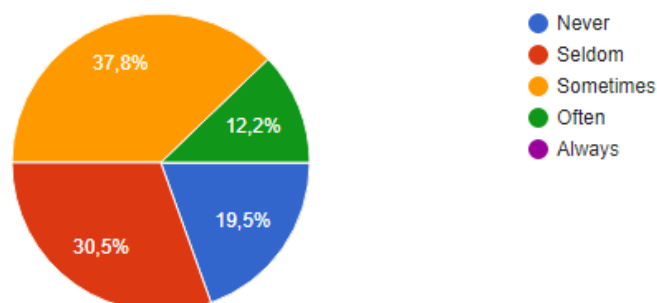
Nearly 55 % of respondents answered that they felt FOMO effects seldom or sometimes.

11 % said they felt them often, while 8,5 % were not sure if they had been affected by such effects. A quarter of the respondents said they had never felt any FOMO effects. Overall, a large majority of players, are clearly affected by FOMO in one form or another.

Figure 35. Question 4 answers

Do you often feel that a game is like a chore to play through, but you still want to complete them? (Because of achievements, cosmetic items, peer pressure etc.)

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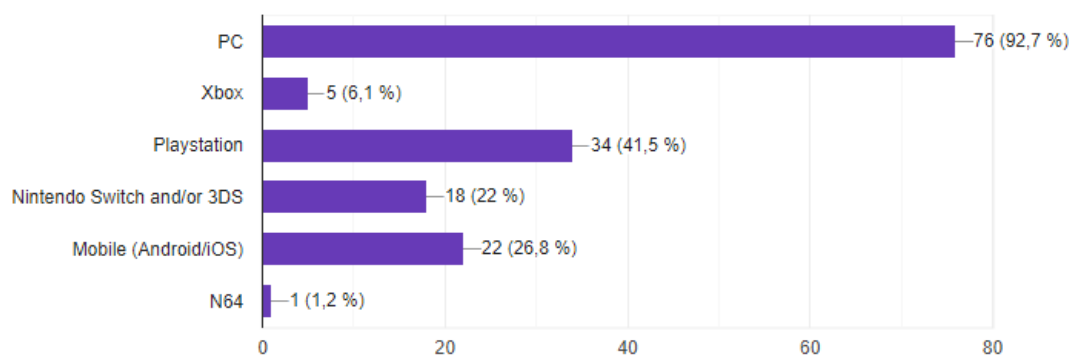


When the respondents were asked about their need to continue playing a game even when it felt like a chore, the answers were quite mixed. Nearly 50 % of the respondents answered that they felt like continuing a boring game, because of achievements, peer pressure, or the incentivization from cosmetic items. The rest of the respondents comprised 12,2 % who often felt that games were tedious, but still continued to play, while 19,5 % had never felt this way.

Figure 36. Question 5 answers

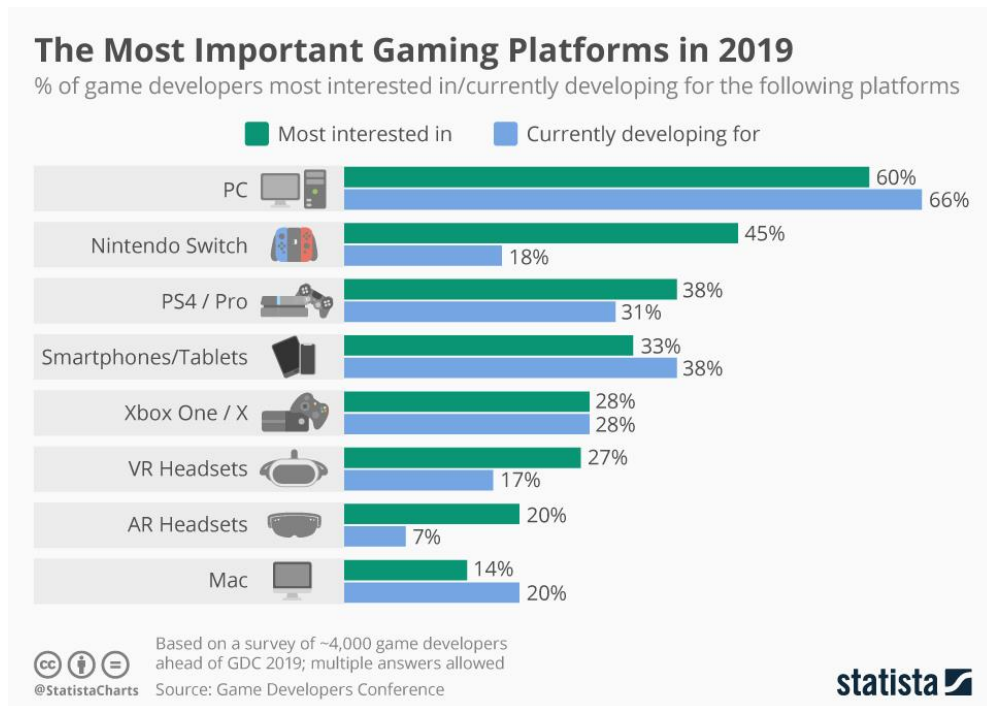
Which gaming system do you use? (You can choose more than one)

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The fifth question simply asked which platforms respondents used. PC was clearly the most used overall, while out of consoles, PlayStation was the most used platform, with Nintendo platforms coming 2nd. Mobile phones were also used, by 26,8 % of the respondents. It is very common that more active players have a PC for most gaming, while also owning at least one console for platform-exclusive game series. The high number of mobile players could be the result of casually playable games like Candy Crush.

Figure 37. Statista.com gaming platform statistics (2019)



This seems to be the consensus according to global statistics provided by WePC.com (2021) and Statista.com (2019), which show that PC is clearly the most used platform for gaming, followed by PlayStation and Nintendo. Handheld consoles like the Nintendo Switch, Nintendo 3DS, and mobile phone-based gaming are also very popular in eastern countries, which explains their placement so high on the charts.

The next two questions allowed respondents to freely write about the positive and negative things, gaming has brought to them. Most people wrote about having positive experiences through meeting new friends, romantic partners and learning different things, like English, problem-solving, history, and even critical thinking.

A lot of respondents also said that gaming helps them relax and escape from constant pressure in daily life. One respondent even said to be suffering from schizophrenia and other things relating to childhood trauma. Videogames helped them cope with these issues. Many others also said that games were a good coping mechanism with social anxiety since relating and “hanging out” with good game characters was a way to not feel as alone. A good chunk of respondents wrote that they had gained more confidence, social and leadership skills, from leading 40-player raids in games like World of Warcraft for example.

Connecting through online games was also a great way to talk to friends who lived far away. Some of the respondents used gaming as a sort of reward for getting through studies or a large project. Great stories and soundtracks were also mentioned as things that really stay in the mind, years later. Some even learned to program after “**modding**” some of their favourite games and got a job because of their interest from a young age, while some simply liked playing as a way to spend free time, especially during the COVID-19 pandemic.

When asked if any negative things had happened because of gaming, most respondents replied that gaming sometimes has the effect of losing the sense of time and being a little too addictive. Many also said that gaming sometimes affected their sleep rhythm and was one of the reasons for lack of physical activity and exercise.

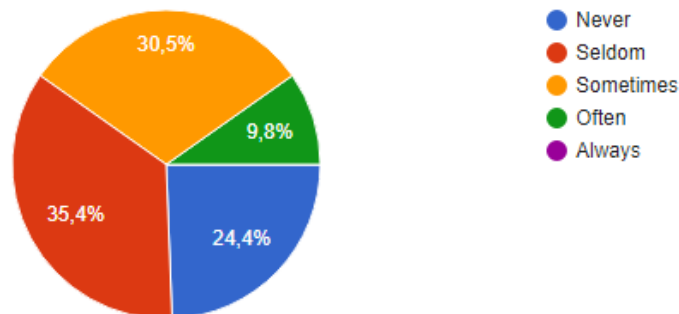
Some also experienced some anti-social behaviour in their younger years, because games sometimes got them slightly aggravated. Online games also made some of the respondents socially toxic. One person also answered that they play games because they are constantly sad or perhaps vice versa.

Respondents also procrastinated their work and studies every now and then because gaming seemed more fun and relaxing. In addition to helping cope with problems, games were also viewed as a negative for some, since they were used as a way to escape problems, instead of trying to solve them. Some respondents simply claimed that they were not negatively affected by gaming at all.

Figure 38. Question 8 answers

How often do video games stop you from doing important things, like work, school, maintaining your relationship or hanging out with friends?

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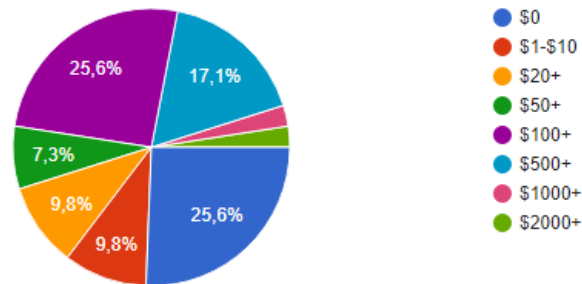
The eighth question continued a little on the previous freeform answers, by asking the respondents if gaming had affected them from doing important things in their daily life. The answers were obviously consistent with the previous questions, where respondents explained how gaming affected their sleep schedule and schoolwork. Most people had been influenced by gaming, while nearly a quarter answered that gaming has never affected their daily life and important activities.

The last two questions dealt with microtransaction spending. The first question asked how much money on average the respondents have spent on free-to-play games, while the latter asked the same question about non-free-to-play games. This means money spent on top of the initial retail price (60—\$ 70).

Figure 39. Survey question 9 answers

Approximately, how much money have you spent on microtransactions, in free-to-play games?

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In free-to-play games, about a quarter of respondents had not spent any money.

While the rest of the answers were quite spread out, people that had spent over 100 dollars on average was the largest portion of answers. The second most, was spending of over 500 dollars which is quite a large amount of money, but understandable in the sense that many free-to-play games are played for a very long period, so splitting an amount of 500 dollars between 5—10 years of play is not surprising.

Both over 1000 and 2000 dollars of spending were given by 2 people in each category, which amounted to 4,8 % of the respondents. These numbers are getting high even for free-to-play standards.

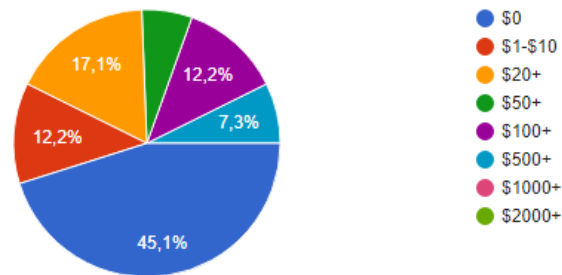
The rest of the responses to this question landed quite evenly between people who had spent between 1—50 dollars in total, which amounted to 26,9 % of the total answers.

While the answers can be once again quite skewed, due to the statistically low number of respondents, it looks that these results are not anything too alarming.

Figure 40. Survey question 10 answers

Approximately, how much money have you spent on microtransactions, in NON free-to-play games?

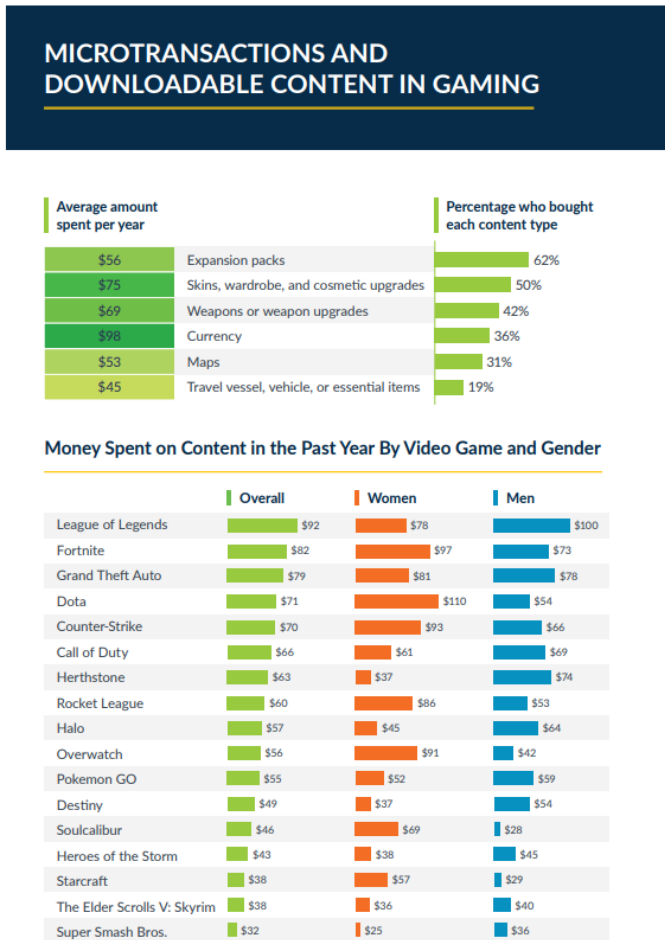
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The last question's summary was quite divided. While almost half of the respondents have not used any money on retail priced games, the rest 54,9 % had used quite a significant amount of money on top of the original retail purchases. 12,2 % which amounted to 10 respondents, had used over 100 dollars, while 6 respondents had used as much as over 500 dollars on microtransactions.

With full-priced games that cost from 60—70 dollars on average, it is quite surprising that there clearly is something lacking in these full-priced games, to warrant players to use even more cash on top of the original purchase. The rest of the respondents had used between 1—50+ dollars, which is still a decent amount of money. When compared to a larger case study, the results still seem very clear.

Figure 41. Larger case study by Arm Treasure Data (2019)



A comparable study provided by Arm Treasure Data surveyed 994 people about their gaming habits. (2019) While the term “Free-to-play” is widely used, it seems quite clear that there is something in these games that still gets players to spend money, even though they do not have any requirements to do so.

Many of the games on top of the list like Fortnite, Dota, Hearthstone and League of Legends are free-to-play games, and they still have some of the highest percentages of in-game purchases. In addition, even some full-priced games, like Overwatch, Call of Duty, and Grand Theft Auto, also provide microtransaction purchases and they are quite high on the list.

And the results in this survey are only annual amounts of money spent. It should be noted that expansion packs are high on the type of content money is spent on. The money is clearly used most on in-game currency and cosmetic items. This would seem to align with the idea that social pressure and FOMO can have a great effect on in-game purchases, since

none of these free-to-play games force nor require players to buy anything, to continue playing. It should also be noted that Hearthstone, Call of Duty, Overwatch, and Heroes of the Storm are all under the company Activision Blizzard, which also owns King, the company that developed Candy Crush Saga.

While not restricted to free-to-play games, the yearly earning of this company is massively high. In only the fourth quarter of 2020, Activision's Net revenue was 1,675 million dollars, Blizzard's was 579 million dollars, while King's Q4 segment revenue was 577 million dollars. Their overall yearly net revenue in total was close to 8 billion dollars. Much of the revenue growth was attributed to the popularity of Call of Duty. (Activision Blizzard, 2020; see also: Parijat, S)

Figure 42. Activision Blizzard's fourth quarter 2020 segment results (Activision Blizzard, 2020)

FOURTH QUARTER 2020 SEGMENT RESULTS			
	ACTIVISION	BILZARD ENTERTAINMENT	King
Q4 Segment Net Revenues:	\$1,657M	\$579M	\$577M
Q4 Segment Operating Income:	\$780M (47% operating margin)	\$160M (28% operating margin)	\$242M (42% operating margin)
2020 Segment Net Revenues:	\$3,942M	\$1,905M	\$2,164M
2020 Segment Operating Income:	\$1,868M (47% operating margin)	\$693M (36% operating margin)	\$857M (40% operating margin)
Key Drivers:	<ul style="list-style-type: none"> Q4 revenue grew 16% Y/Y, driven by Call of Duty in-game net bookings. Q4 operating income rose 12% Y/Y. 2020 revenue grew 78% Y/Y, with Call of Duty revenues approximately doubling. 2020 operating income increased 120% Y/Y and operating margin expanded 9 pp. 	<ul style="list-style-type: none"> Q4 revenue was slightly lower Y/Y as growth for World of Warcraft was offset by a decline for other titles and the absence of BlizzCon. Q4 operating income was lower Y/Y driven primarily by increased marketing investments and amortization of development costs for Shadowlands. 2020 revenue increased 11% Y/Y and operating income grew 49%, with 9 pp expansion in operating margin. 	<ul style="list-style-type: none"> Q4 revenue grew 15% Y/Y, with both in-game net bookings and advertising growing strongly. Q4 operating margin was 3 pp higher Y/Y, driven by high incremental margins for advertising. 2020 revenue grew 7% Y/Y and operating income grew 16%, with 3 pp expansion in operating margin, representing the best financial performance since the acquisition.

Note: These segment results are consistent with how we report our U.S. GAAP segment results externally in the footnotes to our financial statements. The segment performance is exclusive of the impact of the change in deferred revenues and related cost of revenues with respect to certain of our online-enabled products, share-based compensation expense, amortization of intangible assets as a result of purchase price accounting, fees and other expenses related to financings and acquisitions, including integration activities, certain restructuring and related costs, and other non-cash charges. Reconciliation of our segment results to our consolidated results is included in the earnings release dated February 4, 2021, which is available on www.activisionblizzard.com.

It is clear that the video game business has grown into a huge market and a lot of research supports the reasons why video games would be addictive, and how psychological triggers supported by audio-visual cues, are constantly used throughout the design process, to make sure that players keep playing and paying.

The main point of this thesis was to research and find the reasons why and how video games remain addictive and what psychological elements cause said addiction. The objective was also to show the good effects of video games, and how they can help people in their social life, and in teaching them real-world skills.

In *World of Warcraft*, I focused on the community side of the game, since its long lifetime has created a massive fan base, with players who have now played for 17 years. The effects of peer pressure, the want of being a part of the community, and the monetary burden of a long-time monthly subscription, are only some of the reasons why this massive game can truly hook people. The long-time commitment and the help of the community also has a lot of positive effects on people's lives, and many relationships and friendships have been forged because of it.

Candy Crush showed how a very simple game loop can make people addicted, when some of our natural psychological rewarding systems are triggered. This also clearly lead many to spend significant amounts of money on in-game items. Through the case study, and cross-examining other surveys, it was clear that *Candy Crush*, like many other mobile games, is popular because of its casual, easy to pick-up and play nature, which can be very addicting to people, during boring parts of their daily life.

The Legend of Zelda: Breath of the Wild, was a good way to demonstrate a game made for people of all ages, designed to inspire exploring, and using creativity to gain an advantage. It also showed how games can use archetypes to build a foundation to the story and the characters, just like other forms of narrative works.

I hope that the people reading this thesis can now more easily identify possible signs of serious game addiction in themselves or people close to them and help them break out of these addictive game loops. Hopefully, it also helps people to be more aware of these game mechanics when they are playing. Games are a huge part of our culture, and just like movies, literature, and other forms of art, it can affect how we think and view the world around us.

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