

How video games increase mental health awareness and assist with the treatment of mental illness?

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BA Game Design 2022

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Abstract

The purpose of this thesis is to highlight where video games are currently being used to treat mental illness and increase mental health awareness. Each section of research covers an area of the industry that is currently having some form of effect. Those areas include the non-commercial sector and the commercial sector with regard to mental illness treatment and the commercial video games currently being used to increase awareness. The arguments include whether the game is fun and engaging for the player, are the mechanics or design features that are treating the illness versatile enough to be used in other games, how much success has the treatment had and is the game easily accessible to patients or the public. The investigation found that currently video games are used as a therapeutic device to be used alongside traditional medicine. However, the research suggested that there is potential for video games to be used as the only treatment for some illnesses. Awareness through video games is currently much more successful and through different examples, has shown that it can be brought about in many ways and affects both the medical industry and the general public. The research conducted in this area is in the very early stages and a lot of breakthroughs are being made with regard to how video games are used as treatment as well as how mental illness is portrayed through games. The thesis has shown that there are beneficial mechanics which suggests there are also detrimental mechanics and that gaining the knowledge about which is which has the potential to progress the industry.

Introduction

Gameplay is a psychological experience. – Sid Meier(Meier, 2010), a famous American programmer well known for his games Civilisation(MicroProse, 1991) and Sid Meier's Pirates! (Firaxis Games, 2004). There have been many articles and journals written that investigate how psychology overlaps with game design over the last ten years with established game designer Jason Vandenberghe, who was previously the creative director at Ubisoft and Activision, proposing a way of understanding types of players and why they play the games they do(Adams (2014)), and Nicole Lazzaro who has over twenty years of experience in Player Experience Design creating a model on the four keys to fun(Bye (2015)). Since then Game Developers have seen the positive outcomes this could have and are increasingly hiring psychologists to help make their games be the most beneficial and fun for the player as well as the most profitable.

The popularity of gaming has increased with the number of gamers expected to exceed three billion by 2023 (Newzoo, 2020). That is nearly 40% of the world playing video games. In 2020 digital games revenue reached 2.5 billion pounds in the UK making it the UK's most lucrative entertainment sector(Clement (2021)). The spike in revenue came after the UK's first lockdown where many people remained at home and were playing games more than ever due to the social restrictions.

The advent of the Covid-19 pandemic has challenged the population's mental health and has since given rise to an array of efforts dedicated to improving it. Mental illness is becoming increasingly common. In 2007 England, it was reported that 24% of the populace are accessing mental health treatment for anxiety or depression. In 2014, this figure had risen to 39% (National Health Service, 2016). However over the course of the first national lockdown, the over 18s who reported psychological distress "increased from 20.8% in 2019 to 29.5% in April 2020"(Office for Health Improvement & Disparities (2021)). One example of improving the population's mental health is to facilitate communication during an isolated period to assist in the prevention of

isolation-based mental health issues. People communicated more during the national lockdown because of online video games. Many video games support the capacity to correspond with others, for example communicating via voice or text online, therefore having the capability to improve a person's social well-being: a subsection of mental health, by decreasing the loneliness factor that can go on to cause other unwanted negative emotions in a person. There exists an opportunity to take advantage of the mechanics and features games provide. Although video games are associated with the causation of unsatisfactory behaviour or mental illness (Waters (2005)), the proposed advice to parents and policymakers derived from previous research has omitted objective data and robust evidence (University of Oxford, 2020).

This thesis aims to highlight the positive effects video games can have on mental health and illness. Chapter one will look specifically into non-commercial games in the medical sector, with a focus on the types of illnesses that are currently being treated and how the game design and mechanics allow the aid these games provide. Chapter two will focus on commercial games that are not only being used by the general community but also by people suffering from mental conditions. A deeper investigation into how these games are helping people through their design and mechanics will be conducted. Chapter three looks at mental health in video games from a different perspective from the other two chapters, observing how video games are bringing about mental health awareness and what effects on the player base these games have had.

Chapter 1: Non-Commercial games in the medical sector

There exist video games in the medical sector that have been developed to treat specific mental illnesses. A mental illness is a condition that causes serious disorder in a person's behaviour or thinking. Examples of mental illnesses include anxiety, depression, and addiction. Groups are actively trying to create ways to treat mental health and illness with video games, bringing together researchers to discuss the potential methods (Butt (2017)). The illness that is being treated and will be discussed in this chapter is ADHD (Attention-Deficit/ Hyperactivity Disorder). The use of video games as treatment has the potential to have a positive impact on how games are viewed by the general population and cast light upon alternative non-invasive treatments for people with these illnesses.

EndeavorRx(Akili, 2020), created by Akili is an endless runner style video game aimed to help treat ADHD for 8- to 12-year-old children. The player can unlock diverse characters and different levels with unique environments, such as forests, lava volcanoes, space and ice caves. The character stands on a hoverboard and must either dodge or hit the objects on the floor, depending on the level, for example, in the lava level the player must dodge the fires but in the space level must hit the lights. This creates a nice variety of aims at each level. Each character has different voices and provides a positive narrative such as "you did it, nice!". Outside of the endless runner game mode, the player can build the world from the points they have collected by playing. That then unlocks new levels, environments, and characters. Player and parent testimonies show that the game is fun, entertaining and engaging (EndeavorRx (2021)). The overall goals of the game are well known as endless runners are common, but the game brings more through the art and differing level-specific tasks you can carry out and out of the extra mechanics outside of the endless runner mode. All the elements are very imaginative and creative which matches the games target audience well.



Figure 1 In-game screenshot from EndeavorRx (Akili, 2020)

“Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder of persistent impaired attention, hyperactivity, and impulsivity that negatively affects daily functioning and quality of life. ADHD is one of the most commonly diagnosed paediatric mental health disorders” (Kollins (2020)). ADHD is treated through the challenges of the video game which use sensory stimuli simultaneously with motor challenges that target the area of the brain that deals with attention. The game uses adaptive algorithms that measure the player's performance and increase or decrease the difficulty with relation to the player's abilities, creating a personalised treatment(EndeavorRx (2021)). It is designed to work alongside the person's treatment plan. It is a therapeutic program and is not considered a substitute for ADHD medicine although the successful findings of the clinical studies were found by testing patients who were not currently taking disorder-related medications but who had confirmed ADHD. The game has been proven through clinical studies of 348 patients to improve attention and is the only video game to be authorised by the FDA (U.S. Food and Drug Administration) for ADHD. The clinical study allowed patients to play roughly twenty-five minutes per day, five days per week for four weeks and a second trial showed that playing for a second month had increased benefits with no serious adverse events to be seen throughout the trials (Kollins (2020)). It is available as application software and is developed to be played on a mobile or tablet as its movement mechanics operate through physically tilting the device. The app is available through the medical sector currently in America only and is not available to the general population.

EndeavorRx is the best example of non-commercial video games within the medical sector. The success of EndeavorRx could provoke greater research into this area and the monetary and medical success this game has had will impact the number of companies and developers interested in this usage of video games. It could also inspire more research into more non-invasive treatments and possible uses of video games as only treatments and not just to go alongside a regular medication regime.

The success of this prescribed video game provides a strong foundation by which to build upon the evidence that video games can have a positive effect. With the illness it is treating being so common, it can help a lot of people and that will light the way for more investigation into how it is possible to use games in this way or how this use could affect the commercial sector. People who do not play games or don't understand the hobby might not be able to empathise with players when talking about gaming within the general entertainment industry, but the factual success of a video game that is being used in the medical industry to help people has the potential to help open people's eyes to the fact that games can bring a lot of benefits.

EndeavorRx is currently only targeting children. This may in part come from the idea that video games are for children. However, with the advent of covid, this misconception may be overcome with more and more over 30's turning to video games due to their isolation. In this way, covid may have helped push for the idea of video games and mental health coming together in a beneficial way for adults.

Chapter 2: Commercial games in the medical sector

Commercial video games are games made for the general population. Video game developers and companies in the commercial sector generally focus on enjoyment for the player and monetary benefits. They range in target age, genre and platform to name a few. Some of the examples of genres include adventure, strategy, simulation, massively multiplayer, role-playing and action games. The games are developed for the purpose of entertainment but have been found to have more than just an entertainment application. The research into video games being used to treat mental health and illness over the past 10 years has increased significantly and more and more studies are suggesting that this is possible with a wide range of games. Within this chapter, the video game Tetris (Alexey Pajitnov, 1984) and its application in treating PTSD (Post Traumatic Stress Disorder) and the research into the action genre treating Anxiety and Depression will be investigated and discussed.

Tetris, created by Russian game designer Alexey Pajitnov in 1984, is one of the first successful casual video games. It is an endless runner style game where different shaped blocks fall from the top of the screen downwards and the player must rotate and fit them together. The goal of the game is to fit the blocks into a row which will earn you points and prevent the whole game space from filling up with blocks and overflowing as that is the lose condition. The speed of the blocks falling increases over time making the game more and more difficult. The game is very simplistic, however, has been an incredibly successful game for almost 40 years, especially on mobile and tablet devices after computer games have improved drastically in graphics and complexity since Tetris' release (Tetris, 2021). The game is widely available to play on computer, mobile and tablet devices and is commonly playable for free which makes it accessible to the general population of whom eighty-seven percent of the UK own a smartphone as of March 2020 (Strugar (2021)).



Figure 2 In-game screenshot from Tetris (Alexey Pajitnov, 1984)

Tetris' success partially lies within its simplicity. At its base it allows the player to create order out of the chaos which people find innately satisfying. The game does not take too long, which as a simple game that someone would typically play for example on their journey to work or while waiting for an appointment, is a benefit to itself. The difficulty increases over time and creates competitiveness in the player and means that there is a level of struggle for everyone. If the player is especially good at the game, the short play duration will mean that the player will not have to wait too long for them to find it difficult to overcome. Newer versions of Tetris have a win condition where the game ends when you reach over a certain score, however, the original version did not include this, but satisfaction can be gained through reaching your highest score.

A study by Holmes (2009) discusses how playing Tetris after viewing traumatic material, reduces unwanted, involuntary flashbacks. Tetris is a form of early treatment to prevent Post-Traumatic Stress Disorder (PTSD) flashbacks. "Post-Traumatic Stress Disorder is an anxiety disorder caused by very stressful, frightening or distressing events. Someone with PTSD often relives the traumatic event through nightmares and flashbacks." (National Health Service, 2018). The study was tested on forty participants who watched a twelve-minute distressing video. They were then split into two groups where one would sit in silence and the other would complete the visuospatial task. Those who undertook the visuospatial task recorded significantly fewer flashbacks than those that sat in silence. The researcher's hypothesis for the success the game has with the prevention of flashbacks is due to the visual-spatial demands or telling where objects are in space, of Tetris. It disrupts the creation of flashback imagery within the sufferer (Nixon (2012)). Therefore, the player simply watching the blocks fall and focusing on their shape, where to fit them into the other blocks and rotating them is what is allowing this video game to have its positive effect.

Tetris is a fun and entertaining video game with almost forty years of success. The enjoyment gained from playing the game will mean that sufferers of PTSD will be more willing to use it as a therapeutic non-invasive treatment. Its wide accessibility also makes it a very tempting form of treatment. The application of such a simple, accessible game could pose as a model for future games made to treat some form of mental illness. Many concepts are gamifiable, which suggests that if there are currently known ways of treating an illness, such as the use of visuospatial conditions, game mechanics could be made out of these known ways. With knowing that the visuospatial mechanics work to aid sufferers of PTSD, more games in the future could be made using mechanics that utilise the idea, making more games available for those it could help but also for the enjoyment of the general population. The success of Tetris should entice both the medical and entertainment industries as it provides both medical and monetary benefits.

Contrasting Tetris being a single game with a specific type of aid provided, this part of the chapter will look at the potential benefits an entire video game genre has. It will discuss the action genre and its effect on depressive symptoms. "Action games focus on physical challenges that require hand-eye coordination and quick reflexes. First-person shooters, platformers, fighting games, "beat 'em ups", survival games and rhythm games are all a part of the action genre" (MasterClass, 2020) explains Will Wright, designer of SimCity(Maxis, 1989) and original designer of the well-known game The Sims(Maxis, 2000). Examples of video games within this genre are Counter-Strike: Global Offensive (Valve, 2012), a first-person shooter, God of War (Santa Monica Studio, 2018), an action-adventure game, and Cuphead (Studio MDHR, 2017), a run-and-gun game. The action genre is the most popular video game genre among all ages between sixteen and sixty-four, with its subsets of shooter and action-adventure being at the top (Clement (2021)). There are many games within this genre, which are available on mobile, tablet, console and computer making

any game in this genre widely accessible. Common mechanics consist of point, aim and shoot, timed events and dodging. They involve lots of excitement, thrill and events happening simultaneously.



Figure 3 In-game screenshot from God of War (Santa Monica Studio, 2018)

A study was conducted on the effect action games have on the depressive symptoms, rumination, and subjective and objective cognitive ability. Rumination, a process of continually thinking about the same thoughts, is highly associated with depression and anxiety. Depression has unique effects on individuals, but some symptoms consist of lasting feelings of unhappiness or hopelessness or physical symptoms such as being constantly tired or having no appetite. It is common for people who suffer from depression to also have anxiety (National Health Service, 2019). Anxiety consists of feeling uneasy, worrying or scared that for people with anxiety is very strong and persists for long periods (Mental Health Foundation, 2021). Kuhn's study (2018) showed that the participants of the 6-week training with a fast-paced action game contributed to decreased rumination and increased subjective cognitive ability. As previously discussed in the introduction, with the increasing number of people with depression, studies showing that video games can decrease the dangerous symptoms that can lead to this illness is a large step towards gaining the benefits of video gaming. Executive functions e.g. memory, flexible thinking and self-control, enable the person to inhibit ongoing actions and thoughts. Rumination is associated with the inhibition area of the brain. The study explains that action-based video games could reduce rumination by improving the players executive functions.

This genre has been involved in a few studies, looking into the effect it has on mental health, illness and wellbeing. The research is a good step towards finding out the benefits this could have if the mechanics were specified and applied to mental health treatment. The research is currently in the very early stages however when looking at the discussion about EndeavorRx in the previous chapter, it shows that this research could create something positive as it progresses. The game can effectively target and reduce rumination, part of depression, but less effectively target the emotional part of depression, leaving room for continued research in this area.

In this chapter, the effects of the video game Tetris on PTSD and the action genre on depression have been investigated and discussed. Both games, although provide relief from negative symptoms, do not target the core of the illness the person is suffering with. The mechanic that has been investigated so far is visuospatial design and its effect on preventing flashbacks of traumatic events. It has also been learnt that rumination can be decreased because of video games' ability to improve executive functions, allowing researchers to find specifically what mechanics are the ones responsible for improving these functions. These video games show that games currently in the commercial sector can support the treatment of mental health and illness but only as a helpful additional solution and not to replace traditional therapy. However, further research into other games and genres should be conducted as the potential for more therapeutic methods of aid is always beneficial. That research will also help refine the knowledge of what mechanics or areas of video games are beneficial and those that are not, including the areas of games that are dangerous to a player's health. Learning both sides will help game designers to create games that are not going to deteriorate their player-bases mental health but also have the potential of improving it.

Chapter 3: Increasing awareness through Video Games

Mental health awareness means increasing people's knowledge of what mental health is and what mental illnesses exist. The goal of increasing awareness is to reduce stigma around the topic and urge more to be done with regard to support and care for people suffering from poor mental health. The awareness also helps people look out for one another and recognise the signs of mental illness in colleagues, friends or family members early so that they can be cared for and don't have to struggle alone. Mental health awareness has been increasing over recent years with charities creating events such as mental Health Awareness Week (Mind, 2021). Not only has attempts to increase mental health awareness happened through charities but video games have also been portraying more and more mental health issues. There have been many releases of games with these narratives or mechanics since 2008 however the majority were released around 2017 with some of the topics the games focus on including feelings of isolation and anxiety, coping mechanisms, depression, loss and grief, PTSD and agoraphobia. Two of the most well-known games addressing mental health are *Life is Strange: Before the Storm* (Deck Nine, 2017) and *Hellblade: Senua's Sacrifice* (Ninja Theory, 2017).

In this chapter, three games will be discussed, addressing the mental health or illness they face, the use of mechanics, narrative and art in portraying these issues and how they have managed to help people with their success.

Firstly the video game *Limbo* (Playdead, 2010) will be discussed and explored. *Limbo* was released in 2010 and was developed by Danish developer Playdead. The player controls a boy who is seeking his missing sister and comes across few people, those of which are either caged, dying, dead, attack the player or run away scared. He must escape numerous spider and glowing brain worm attacks. *Limbo* is a 2D side-scrolling puzzle-platformer where the player must move items within the environment to solve the puzzles and progress using the run, jump and grab abilities. The game is broken up into extremely common save points that are not seen, making the game flow extremely well, without a break of immersion from loading screens. If the player dies while attempting to solve the problem, which is a common occurrence, they restart from the nearest save point. The game uses a monochromatic colour palette and minimal ambient audio to create an eerie atmosphere.



Figure 4 In-game screenshot from *Limbo* (Playdead, 2010)

Limbo's release in 2010 makes it one of the earlier games to be made that portrays signs of mental health. The game speaks of struggles with loss, grief and depression. It does this through the game's aesthetic with the black to white colour palette, the player's absence of voice, their limited mechanical ability and the unspoken narrative of chasing a lost loved one. The player has fallen into depression and grief and as the title says, limbo. The player is in a period of uncertainty, where they don't know where their sister is, or what is going on around them. In many different cultures, black and white are associated with life and death. In the west, black has been associated with death specifically and is the colour of mourning (TextielMuseum, 2019). In Limbo, the predominant colour at the forefront of the screen is black, the character and the other children are completely black except for the character's small white eyes, and in the background is white. This depicts the character to be lost in the darkness and depression and away from the light.

With an overall review of Very Positive on the Steam store page from over twenty-one thousand reviews (Steam, no date), Limbo's success stirred multiple different articles to be written on it (Mozuch (2021)), but some focusing specifically on its theme of mental health and illness portrayal (Machkovech (2010)). The game has started the conversation about mental health which in turn creates awareness in the gaming community. The depressive mood of the game has also been used in studies about the potential for commercial games to lessen mental health disorder symptoms. Casual games like Limbo have had outcomes of decreased negative effects by promoting enjoyment and motivation. Limbo players specifically self-reported improved depressive moods (Kowal (2021)). The game's eerie atmosphere and depressive themes not only bring awareness commercially but has also shown the capability of actively improving mental illness sufferers. The game's accessibility affects how useful this game could be and as a game that brings awareness and health benefits. The game costs £8.99 at the Steam store and while that is a very accessible price, it is not as accessible as free for example like Tetris as previously been spoken about. However, with other games offering these benefits it is a great more accessible alternative.

The second game that is going to be explored is Life is Strange: Before the Storm. Life is Strange is a four-part episodic adventure game and is the prequel to the first game in the series. The story is based around a rebellious teenage girl called Chloe Price whom the player controls and follows her relationship with classmate Rachel. The story is narrative-heavy with the player making dialogue decisions which will result in a different story or progression later on. Some of the dialogue decisions have a limited time, forcing the player to make a decision quickly, whereas others don't have a timer, giving the player a chance to think. During conversations between Chloe and other characters, Chloe sometimes has a dialogue option that will open a small minigame where the player must pick the correct things to say to get the other character to behave the way Chloe wants them to. Chloe's intentions are usually explained through hearing Chloe's thoughts as the player. The game's beautiful lighting, emotional and relatable characters and captivating storytelling are part of the reason why ninety-three per cent of thirty-one thousand reviews on the Steam store have given the game Very Positive (Steam, no date) and Metacritic's biggest criticism are the few plot holes (Metacritic, 2017).

The main character Chloe is suffering from depression, caused by her experiences of abandonment, loss, isolation and betrayal. The mental illness is not outright declared. The story, experiences and actions of the character are what suggest what she is struggling with internally. Chloe's loss is explained through the first game where her father dies in a car crash, and then in the prequel, the player sees events leading up to this. At the beginning of Before the Storm, she also loses her best friend who has moved to a different city. In contrast to Limbo, the game's awareness brought to mental health is primarily through story and direct dialogue from the characters. The

game is looking at a teenager slowly transitioning towards adulthood and mentions a lot of the issues a teenager would or could be facing at this time in real life. The player can relate themselves to the characters and empathise. The interactability that a video game allows, can let the player feel even more involved in the story. The developers hoped that the dialogue with other characters and how Chloe opens up to friends would entice people in the same situations as Chloe to follow her influence. If the player, on the other hand, doesn't relate their real-life to Chloe's, then they will potentially learn and begin to empathise and understand the issues that other people are facing (Robertson (2017)). The game has sparked talk between the fan base about the mental illnesses the characters are struggling with, some suggesting that Chloe is suffering from bipolar disorder, and her close friend Rachel in the game suffering from Borderline Personality Disorder (BPD) (Quinlyn (2018)). This Reddit article is proof that this game has brought awareness to numerous mental health issues, instigating conversations about them and hopefully increasing empathy and knowledge on the subjects.



Figure 5 Screenshot from the game Life is Strange: Before the Storm (Deck Nine, 2017)

Life is Strange: Before the Storm brought a wave of awareness to mental health through video games, not only within the gaming community but also outside with articles written by the BBC (Russon (2017)) and RedBull (Robertson (2017)). The BBC's article praises the game for challenging taboo subjects and bringing awareness differently compared to past games where they usually focus on sanity/insanity. The BBC not only brings awareness to the general public, but it also has the potential to help change the public's opinion on video games for the better. RedBull's article speaks of how video game designers are more willing to use the video game medium as ways of discussing complex issues and ideas, including mental health. Within the gaming community, in 2017 Square Enix, the publisher of the Life is Strange series, launched a mental health campaign called "Your Friend, Me" where they asked Life is Strange fans to video themselves reading a letter they have written to one of their friends, telling them about what they mean to them and how much they value them in their lives (Campbell (2017)). A stream was also arranged on the livestreaming platform Twitch, by the team behind Life is Strange: Before the Storm, hosted by the cast of the video game, a campaign for the charity Seize the Awkward which encourages people to do something when they see their friends in a distressed state (Garcia (2018)).

The social impact this game has had and the amount of awareness it has brought about is very impressive and shows the extent to which a video game can have on informing its player base and even the general public on many issues. It is not limited to mental health and illness. The success of *Life is Strange: Before the Storm* could increase the number of designers and developers using their medium to speak about important or taboo topics.

The third game that will be spoken about in this chapter with regard to its relationship with mental health and illness awareness is one that is considered to go above and beyond that of any other game in representing mental health. *Hellblade: Senua's Sacrifice* is an action-adventure game set in the age of the Vikings. The story follows a female Celtic warrior called Senua who is attempting to reach Hel, the realm of the dead, to save her dead partner's soul. From the beginning of the game, Senua hears voices of doubt, contempt and terror. She also suffers hallucinations while on her journey, taking the shape of monsters and demons that she must fight. The player witnesses Senua's uncertainty on whether the monsters she is seeing are real or not. The narration is broken into two parts, the game's narrator, talking through the story and what Senua is doing and then a quieter voice for the voices she is hearing in her head. Both are like whispers in your ear, where you can hear every breath and piece of articulation, immersing you to the point that it sounds as if the voices are in your own head. The audio for the game is mainly ambient sounds, like rainfall and footsteps, with music initiated when you enter a fight. The audio intensifies as well when Senua is having a large internal struggle and the voices she hears become overwhelming.



Figure 6 Screenshot from video game Hellblade: Senua's Sacrifice (Ninja Theory, 2017)

The goal of this game was to portray the psychosis condition as accurately as possible and raise awareness. Psychosis is when a person isn't completely present in reality, which can mean the person suffers from hallucinations and delusions (National Health Service, 2019). Senua's psychosis stems from the profound trauma she has experienced, although the creative director Tameem Antoniades also suggests that the character is more prone to psychosis and that her trauma triggered it (Lloyd (2018)). Wellcome Trust, a biomedical research charity that supports research into life, health and wellbeing challenges through the use of science, helped fund *Hellblade*. They hoped that funding this video game would help start conversations on mental health and increase people's

knowledge of psychosis (Wellcome, 2018). The huge success that Hellblade received, including five BAFTAs in the game awards, including one for Game Beyond Entertainment, which is given for games that offer a transformation experience, more than just for entertainment purposes, speaks for how welcomed and ground-breaking the video game was for how it portrayed mental health. The Hellblade team consulted Paul Fletcher, a Cambridge University Professor who is a neuroscientist specialising in psychosis and used people from the medical industry to learn about psychosis and how to represent and portray someone with the condition. The team also worked closely with real people who hear voices and used descriptions of how people's delusions manifest in order to present the condition fully on-screen (Lloyd (2018)).

In comparison to the awareness that Life is Strange: Before the Storm brought to the general public, outside of the gaming community, Hellblade: Senua's Sacrifice has not had the same impact. However, Hellblade has had a much larger impact on the medical industry, provoking journals to be written about it and the relationship between video games and mental health more generally (Fordham *et al.*, 2019). The way that the developers, Ninja Theory, created this new, extremely accurate and immersive way of portraying a character suffering from mental illness, will open the door for deeper creativity when other developers are considering focusing on the topic of mental health in their games. Ninja Theory is using its success and learning to launch a new project that will work on creating new methods of therapy for mental disorders with the help of neuroscientists and mental health professionals (Farokhmanesh (2019)).

Limbo, Life is Strange: Before the Storm and Hellblade: Senua's Sacrifice each bring awareness to their chosen area of mental health in their own unique way. Limbo uses artistic techniques and visual elements; life is Strange uses narrative and Hellblade fully immerses the player into the suffering of the character. They also raise awareness in different ways. Limbo showed that mental illness can be spoken about in a very ambiguous way with the use of abstract art and that it doesn't take a very large game or even a large company to have an impact on the community. Life is Strange brought awareness to not only the gaming community but also to the general public with the use of a relatable story. Finally, Hellblade brought awareness to the gaming community but also to the medical industry with the use of its ground-breaking techniques and incredibly realistic, researched portrayal. Three different games, very different in playability, mechanics and complexity, were able to increase awareness of mental health and illness. There are many more examples of games that have also increased mental health awareness but these three are good examples of the many different ways and techniques. These three games that have been discussed suggest that it is easy for a developer to utilise the video game medium to improve knowledge and understanding of mental health and mental illness, much more so than it is to treat mental illnesses.

The impact that these types of video games have on the members of the gaming community could include health benefits through improved self-awareness as well as better empathy skills. Through an increased knowledge on mental health and illness, gamers can better look out for their fellow gamers, and if they recognise the symptoms in one of their friends or members of their community, they can help them seek help and prevent their mental health from deteriorating even more than it may be. Awareness can help create closer communities and safer spaces for people suffering from poor mental health.

Conclusion

Video games have benefits with regards to mental health and illness through treatment and bringing awareness, with the latter having a bigger impact at the current time. One of the only games exclusively used in the medical industry is EndeavorRx which is used as a therapeutic device to help treat ADHD. Its existence truly shows the effect that video games can have and how beneficial they can be when utilised in the right way. Within the entertainment sector, PTSD and depression have been found through studies and clinical trials to be able to be treated by the game Tetris and the action genre respectively. Although at the current time, all the games discovered through research are more therapeutic devices that can aid with the treatment but not solely treat the mental illness. The games are not made to replace traditional medicine or current practices, but rather to accompany them. With many studies explaining the benefits of specific genres, games or mechanics on mental health, the possibility of a video game being the sole treatment for a mental illness cannot be disregarded yet as, within the timeline of research in this area, it is still very early. Discussing the awareness brought forward by the video games *Limbo*, *Life is Strange: Before the Storm* and *Hellblade: Senua's Sacrifice* as three examples of many more games that exist that also bring awareness, prove that there is plenty of potential for video games to be used as tools to talk about topics like mental health and that they can increase knowledge, understanding, empathy and improve the opinion of video games within the general population. At the current time, the best way to use video games are as tools of learning and spreading information, looking at how it is possible to build the relationship between video games and mental health, especially as the video game entertainment industry is growing at such a fast rate with help from the Covid-19 pandemic and national lockdown in the UK. Video games are reaching larger audiences than ever before, meaning that the topics of discussion brought to light by games will be accepted by more people. Much more research needs to be conducted with regards to video games and their ability to treat mental health and illness, but as said before it is very early, and if larger developers or more developers generally choose to bring more awareness to the subject, then that will, in turn, provoke more research and more responses into that area. All the positive effects of video games found help paint video games in a better light and reduce the stigma around them.

More knowledge and research into video games and mental health shows that it isn't as simple as all video games have the same effect, but that different genres and mechanics affect the player differently. For example, the action genre having the ability to help treat symptoms of depression or mixing sensory stimuli with motor challenges affect the brains attention functions. With that concept in mind, it suggests that there is the potential for certain mechanics or genres to have negative effects on a player's mental health and wellbeing and may even cause mental illness in extreme cases. There are areas of video gaming that are associated with and have been proven to have negative effects on mental health. The media in the past has portrayed video games to have negative mental health effects due to political manoeuvres to blame video games (Timm (2019)) or the lack of research in this area. However, in the past chapters of this thesis and with the video gaming industry growing, more knowledge and research into these topics has been composed. Scientific studies have been carried out exploring the impact of the game genre Massively multiplayer online role-playing games (MMORPG) and its association between addiction, self-control and mental disorders which had negative results (Son *et al* (2012)) as well as MMORPG's and anxiety and problematic internet use in adults which showed the type of player playing these games had negative motivations (Cole *et al* (2013)). This small amount of scientific research helps support the point that video games cannot be generalised to be either beneficial or not towards mental health and illness and that greater research must be carried out into which parts of video games are having

the positive effects and which parts are having the detrimental effects. This research will continue to help the medical industry in utilising the video game medium to help treat mental illness. If the mechanics providing benefits increase and more awareness is brought to them with an active effort to implement them into games and an active effort to reduce negative effects is taken, then video gaming as entertainment has the potential to have better effects than it does at the moment, however, that is not likely as the monetary benefits of things like addiction or obsession are high and more un-moral companies will not want to stop that.

The topics and research discussed in this thesis can provoke further conversation into who is responsible for the mental health of players and to what degree. Is it the government, the companies, or the individuals themselves? China has taken an active approach to say that the government is responsible for children's health affected by video games (Ni (2021)), however, the west gives more responsibility to parents and then the individual adults themselves. Mental health and illness are increasing alongside the growth of the video game industry. With the help of individuals, game developers, the medical industry, charities and potentially governments, research and increasing awareness, the video game medium will be able to have a great positive effect on mental health and the treatment of mental illness.

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