Social experiences of people with disabilities in playing (in)accessible digital games

Jennifer Beeston

Doctor of Philosophy

University of York

Computer Science

August 2020

Abstract

Digital games are increasingly accessible to people with disabilities, yet players still report difficulties and further problems arise from playing socially, such as experiencing hostility or obstructive behaviour. Previous research addresses game accessibility, adaptive technology, social play, and play using alternative controls, however experiences of social play for players with disabilities is largely unexplored. This thesis, therefore, leverages the social model of disability as theoretical grounding to investigate the social aspects of gameplay as a potential contribution to inaccessibility.

Initially, a large survey developed with The AbleGamers Charity, to gather demographic data and preferences of players with disabilities, showed that many play games alongside other players using adapted technologies and options. To explore how adaptations interact with social gameplay, two interview studies conducted with players both with and without disabilities about their experiences. For players with disabilities, playing with adaptations can interact negatively with the expectations of other players about how games should be played, and may also risk disclosing their disabilities unintentionally. Player perceptions of skippable content in single-player games revealed that even when a feature does not directly impact other players, the social community surrounding gaming influenced its acceptability. A case study of the neurological care context indicates the possibility for people with neurological disabilities to enjoy games but this is strongly influenced by the organisational environment.

This thesis demonstrates that the social context of gaming can present barriers for players with disabilities to accessing valued player experiences and social benefits of play. Findings suggest that prevailing stereotypes and perceptions of people with disabilities extend into digital gaming. Access to play with adaptive features seems misunderstood in this environment due to how they interact with competitive play dynamics. It is, therefore, not only game accessibility but care environments, financial and social support, that create barriers to play.

List of contents

List of tables

List of figures

Acknowledgements

My first thanks must be to IGGI for providing this opportunity and to the wonderful community it has provided throughout this journey. I would like to dedicate this thesis to my Mum who bestowed me with the persistence and resilience to get through this and who I miss deeply, and to the family members I lost throughout the PhD – Granny, Nanna, and Autumn.

Thank you to all my family, friends, and colleagues (you know who you are!) who have supported and encouraged me, but especially Andy and Jo who have kept me grounded and believed in me, even when I did not. Thanks also to Walter (my cat) for providing distraction and snuggles.

I would like to thank Chris for his empathy, enthusiasm, excellent supervision, and thanks for his introduction to the wonderful folks at AbleGamers. Which leads me to say how grateful I am to have been able to work with AbleGamers and their incredible community!

Huge thanks everyone that took part in my studies and to Katrina and James for providing helpful feedback on draft parts of this thesis. Many thanks also to Helen for her helpful advice and guidance in TAP meetings throughout the PhD process.

Thank you to my examiners Assistant Professor Kathrin Gerling and Professor Stephanie Wilson, whose critique of my work I greatly value and has helped me to make vast improvements to this thesis.

Finally, immense thanks to my supervisor Paul for his exceptional mentorship, consistency, constant support, and encouragement, and for sneaking Marvel gifs into his feedback on my work. I feel extremely grateful to have been accepted by Paul as his student five years ago!

Declaration

I declare that this thesis is a presentation of original work, and I am the sole author. This work has not previously been presented for an award at this, or any other, University. I conform that all sources are acknowledged as references.
Some of the material in this thesis has been previously published and is declared here:

Beeston, J., Power, C., Cairns, P., & Barlet, M. (2018, July). Accessible player experiences (APX): The players. In *International conference on computers helping people with special needs* (pp. 245-253). Springer, Cham.

Beeston, J., Power, C., Cairns, P., & Barlet, M. (2018). Characteristics and Motivations of Players with Disabilities in Digital Games. *arXiv preprint arXiv:1805.11352*.

1. Introduction

The work presented in this thesis takes a unique context-based approach to understanding how disabilities interact with the experiences of people in playing mainstream digital games. Digital gaming describes the act of playing games mediated through a variety of interactive devices, ranging from smartphones, personal computers, consoles designed specifically for this purpose. There are a broad variety of genres and play styles to suit many tastes and preferences in media, for example, you can play with hundreds of other players at any one time in online, team-based multiplayer games simulating war-like combat scenarios, or by yourself in a single-player, narrative games designed to scare you like a decent horror film would. As such, digital gaming is an immensely popular hobby, played by around 2.7 billion people worldwide (*Newzoo's Key Numbers*, n.d.) supporting a flourishing economy for game developers and technologists that are innovating in order to encourage expanding audiences of players. The World Health Organization estimates that about 15% of the global population have disabilities and that these people face a variety of physical, social, and financial challenges in their everyday lives (*WHO, Disability*, n.d.). It is currently unknown what portion of the population of people with disabilities are taking part in digital gameplay, or how many people wish to take part but cannot for whatever reason. There is, however, growing evidence that people with disabilities are accessing some mainstream digital games through various communities and online social spaces (e.g., subreddits[1]: r/blindgamers, r/deafgamers, etc). In acknowledging this, the accessibility of mainstream digital games has been a growing concern for those that research and make them, with many resources now available to provide useful design considerations (Barlet & Spohn, 2012; Guidelines, 2015). Despite developments in adaptive technology, such as controllers designed to support one-handed use, for example, and in-game accessibility (e.g., menu options for colour settings, subtitles, UI customisation), game designers still struggle to produce games that are accessible

[1] Reddit is a social website and app. that is a large collection of community-driven discussion boards about various topics of interest. A subreddit is the name given to a discussion board about a specific topic.

to all types of players (Porter & Kientz, 2013a). Although work is continually underway in understanding what constitutes player experiences (e.g., challenge, uncertainty, immersion, etc.), this research field is yet to provide definitive descriptions of *exactly* what experiences digital games can and do provide, therefore, it is very difficult to say what an "accessible player experience" should look like or how it can be provided.

Over the past two or three decades, it has been recognised by researchers and game developers alike that there are elements of digital games that can pose a variety of difficulties for people who have various conditions that are considered to be disabilities (Barlet & Spohn, 2012), but that it is important to support equal access for these players (Powers et al., 2015). Understandably, research in this field has mainly focused around game accessibility[2] (Aguado-Delgado et al., 2018), creating and evaluating innovative technologies to support play (Colman & Gnanayutham, 2013; Kaplan et al., 2013), adaptations to control mechanisms (Armstrong, 2018), and creating bespoke games (Grammenos et al., 2006; Miller et al., 2007) for individuals with specific types of disabilities. However, these approaches do not fully account for the socio-cultural aspects of disablement and how the social context of gameplay can impact the effectiveness of adaptations and accessibility in creating inclusive digital games. Whereas previous work considers supporting disability in digital gameplay and other work considers social aspects and experiences in playing with others independent from (dis)abilities, a core contribution of this thesis is the investigation of the social experiences of people with disabilities in digital game worlds, whether playing with others or playing alone.

It is worth noting the relationship of this topic with regard to the rights of both children and adults with disabilities. Article 30 of the UN convention on the rights of persons with disabilities (Manca, 2017) outlines the right to participate in cultural life, recreation, leisure, and sport. And Article 31 of the UN convention on the rights

[2] Game accessibility refers to the extent to which barriers to playing digital games can be overcome using options or adaptations present within the game menus or included with the platform on which as game is played. An example of a game accessibility option would be an option to use subtitles and visual cues in a game to replace audio.

of the child (Convention on the rights of the child, 1989) states the right to leisure, play and culture. This highlights the importance of the access to the hugely popular activity of digital gaming both in solo-play and playing in multiplayer games with others. Where previous research has focused on adapting games to improve accessibility, the potential for the social aspects of play have not yet been examined as a potential barrier to access for those with disabilities. The argument for the focus of this thesis on the social aspect of play will be presented in the following sections.

A note on academic voice and framing

In certain areas of this thesis, I will switch to speaking directly from my own personal perspective to avoid academic detachment when the subject requires a personal and reflexive approach. To answer the question of why the social context focus, I must first explain my concerns as a researcher when embarking on this topic. I felt that by focusing on disabilities as something that must be catered for and adapted for, though arguably helpful, perpetuates the notion that disability is "other", that it is not the normal way to be, and risks stereotyping individuals based on their physical or cognitive abilities. As Krumer-Nevo & Sidi (2012a) pointed out, researchers focusing on social groups can inadvertently objectify and de-contextualise the experiences of their participants. However, there did not seem to be a straightforward way to approach the exploration of the social experiences of people with disabilities without making some distinction between people playing games that do not consider themselves impacted by a physical, cognitive or psychological condition and those that do. In order both to explore how otherness might create a barrier within digital gameplay, and to avoid de-contextualising individuals, approaching the topic by focusing on the social framing of digital gameplay seemed most suitable. In line with the suggestions of Madyaningrum (2017), reflexive, qualitative research methodologies are a way to approach topics of diversity with sensitivity, and, as reluctant as I am to make that distinction between those with and without disability, I will do so throughout this thesis (as I will explain further in section 1.3) for the necessary purpose of speaking with clarity about the differences experienced in digital gameplay (both playing alone and with others).

To return to the question of why my research should focus on the social context: I argue that developing accessibility options and adaptations for people with disabilities is an incomplete solution to this issue because gameplay does not take place in a vacuum. The social model of disability proposes that the barriers in everyday life for people with disabilities are socially constructed, and discrimination and othering occur as a result (Swain et al., 2003). If this is the case, can we expect to see these barriers permeate into digital gaming as they do in other social contexts such as education, employment, or sports? This is particularly important where there are distinct social structures within games, such as competitive and cooperative teamwork, with dynamics that rely on assumptions about an individual's physical, cognitive, and social capabilities. It is therefore important to explore the social context of gaming and perceptions of people with and without disabilities in play. Perceptions of players are important to investigate since how players appraise their own and other people's skills and abilities in meeting the challenges that games present, may impact whether they respond with prosocial (inclusive) or excluding (such as verbal hostility, exclusion from a team) behaviours in play. If these elements are considered as sources of inaccessibility in gaming, this may present opportunities for new approaches to creating inclusivity in gaming alone or with others.

As well as being the context within which people play digital games, it has been demonstrated that the social elements *within* gameplay are valued by players (Cairns et al., 2019). Indeed, social play has been associated with increased well-being (Nacke et al., 2013), and research suggests that games provide and support a variety of social benefits, such as social support (Trepte et al., 2012), relatedness (Ryan et al., 2006), and a sense of community (O'Connor et al., 2015). Consistent with this thesis, Stenros et al. (2009) argue that games are social in nature even when they are played alone. When someone plays a game alone, they are likely still aware that the game is being, or has been, played by other people. In some cases, games may include leader-board mechanics, badges, achievements, statistics that can be displayed publicly after play which creates a sense of competition or performance despite not actually interacting with other people within the game. It is in acknowledging the social context and framework within which games are played, and

the knowledge that other individuals are playing the same games, that it becomes evident that accessibility of digital games cannot be merely about accessing the physical and cognitive mechanics of gaming because play itself cannot happen in the absence of that social context. This supports the framing of this thesis in the social context of play as it supports that even solo play is influenced by social factors despite not having explicit social interactions within play as multiplayer games do.

The social elements of play come to the fore in multiplayer games where there are known problems around social behaviours. Multiplayer games are explicitly social such that there are other players present in the game-space whether synchronously or asynchronously. Researchers have found that within these types of games, players can experience negative social interactions and toxicity (Kwak et al., 2015), such as verbal aggression expressed through voice or text communication within the game. Work by Shores et al. (2014) suggests that negative social interactions in multiplayer games can result in players disengaging with them entirely, suggesting that the negative social interaction could constitute a form of disablement for some players.

Player experience research provides some suggestions about how certain ways of playing games can influence how they are perceived by other players which matters because a negative perception could be what results in higher chances of negative interactions. It has been found that types of controllers used (Birk & Mandryk, 2013) and adaptive game design (Baldwin et al., 2014) can impact elements of players' experiences and how those using them are perceived by others in social play. Where such research suggests that changes to the game mechanics or controls can impact players' social experience, it is unclear whether these impacts apply to people with disabilities who may need to use adaptive technologies or options to help them to access multiplayer games. How other people view these ways of playing is important because of their impact on this social dynamic surrounding play. If differences in play style or using adaptive features results in negative interactions with other players, this may provide support for the social model of disability framing where disablement is a consequence of the environment and social environment of digital gameplay.

There is minimal existing information about people with disabilities who are playing mainstream digital games for leisure and about how disabilities impact various aspects of their play. Without evidence of how access to digital gameplay might be different (or not) for them, it is difficult to infer what specific social barriers may be of highest concern. This lack of information about accessibility problems in mainstream games was addressed, in part, by Porter & Kientz, (2013b) who gathered demographic information about players' disabilities and what they play. However, no data existed to show what adaptive technologies and options players with disabilities were using to access play (if any). This information is vital to ground further research into the broader experiences of play and social inclusion in digital gaming communities. In addition, it is not known whether people who use accessibility options or adaptations disclose their use (and why) to other players, whether in play or out of play, and how others react to this information. This is important to understand because features and options that are designed to create accessibility have the potential to result in social exclusion if their use is seen as unacceptable within a certain frame of play style, for example, a competitive game where implicit rules of fair play are in action.

Acknowledging that there are people with disabilities engaging with mainstream games, there are still likely to be people for whom gaming is difficult to access at all but who cannot be forgotten about as a population of potential players. These are potential players for whom their disabilities determine their social environment such as those needing assistance with everyday living, such as being resident in hospice or palliative care facilities. In cases where this means an individual lives within a facility for extended periods of time, their access to recreational activities (such as digital game play) would be subject to support and facilities available. It is, therefore, important to investigate this social environment as directly influential on the access people using these assisted living services have to playing digital games and the kinds of experiences they may have. In other words, if the environment does not support the activity effectively, this may be a source of disablement.

An example of potential players are people with complex neurological disabilities are shown to struggle to access mainstream gaming (Annema et al., 2012; Lange et al., 2011) due to the incompatibility between the broad range of movements, cognitive

and executive functions that games generally require and the complex effects of these types of disability. Previous researchers have approached games for people with neurological disabilities with aim of supporting types of physical or cognitive rehabilitation (e.g., Kloos et al., 2013a; Lange et al., 2011). Although games are shown to be beneficial in these applications, there is the risk that employing games within a framework of therapy or rehabilitation could be seen to de-normalise the activity and turn a leisure activity into something towards an end goal rather than an end in itself (Carr, 2004). Because much of the research in this area has focused on therapeutic applications of games, little is known about whether people with neurological conditions may be able to engage with some aspects of games that could be beneficial or enjoyable even if some practical barriers may exist to playing in the same ways as players without disabilities.

In summary, little is documented about the experiences of people with disabilities in playing mainstream[3] digital games for the sake of leisure rather than as a therapeutic application. Although progress is being made regarding improvements to accessibility of mainstream games and developments of new adaptive technology to support play, the social context of play has been neglected as a potential barrier, in particular, a barrier to the successful integration of accessibility and adaptations for enabling the broad range of experiences digital games can offer.

1.1 Research questions

To address the problems above, this thesis addresses an overarching research question, that encompasses four sub-questions (RQs 1, 2, 3, 4).

How do the social dynamics and context of digital gameplay interact with disabilities and the adaptations used to enable access to both single player and multiplayer styles of play?

[3] Mainstream refers to digital games that are commercial, off-the-shelf, games that are widely available on PC, smartphones, or gaming consoles. In contrast to "bespoke games" which refers to games tailored and designed to support play for specific users – a game made to support a type of physical theory, for example.

- RQ1. The players: Who are players with disabilities, what are they playing, and what adaptations do they use to enable play (if any)?
- RQ2. Social play with disabilities: What challenges does the social context of single player and multiplayer games present for people with disabilities and those using adaptations or accessibility options within those game environments?
- RQ3. Social play alongside those with disabilities: How are the mechanisms that players with disabilities use to enable them to play, perceived by other players?
- RQ4. Complex disability in a social context: How does the social environment of a care home influence the ability of people with complex neurological conditions to engage with digital games?

1.2 Outline

To provide the groundwork to address the research questions, the literature review (Chapter 2) outlines social aspects of play, alongside the current state of research into game accessibility and how the interaction between the two might present barriers for people with disabilities as a result of how they access games. Chapters 3 and 4 answer RQ1 by participatory design of a survey and data collection process to gather detailed demographic information from individuals that identify themselves as having a broad variety of disabilities. The survey collects details of what technologies and options they use to play, the effects of their disabilities, what they play and who they play with. Despite there being a sizable market potential of people with disabilities, previous research has not gathered substantial information about this current demographic of players. The opportunity to work in collaboration with the AbleGamers Charity (collaboration explained in detail in Chapter 3) made it possible to gather information about players with disabilities through the joint creation of the "Player Panels". The Player Panels is the name the AbleGamers Charity have given the players that have volunteered their information to the demographic survey. Gathering comprehensive information about how and what these players play, who with, how long for, and why, laid the foundation to then explore their experiences in play. Details and analysis of this work is presented in Chapter 4.

A primarily qualitative approach was taken for the rest of work in this thesis to capture personal experiences with nuance and rich, detailed accounts from the participants involved, and to avoid objectifying participants through aggregation or categorizations. RQ2 and RQ3 are addressed by Chapters 5 and 6 which present interview studies that probe the experiences of people with disabilities and those without when playing multiplayer games. This provides insight into direct social aspects of play and explores how the social framing surrounding this type of play interacts with the ways in which people with disabilities may be accessing these games. Taking into account the *indirect* social aspects of play, Chapter 8 indicates how accessibility in a single-player game may influence the acceptance of players using accessibility features into the broader gaming community, where discussion surrounding the game takes place outside of play.

Chapters 3 through 8 focus on the experiences of people with and without disabilities who already choose to play digital games and have the means to do so. This does not, however, account for the potential audience of players with disabilities who do not yet play games or are in a position where mainstream games may be considered inaccessible to them. Such individuals may include those with complex neurological conditions, such as Huntington's, Parkinson's, Traumatic Brain Injury (TBI), that may come with co-occurring cognitive, physiological, and psychological symptoms that require assistance with daily living. As will be discussed in Chapter 2, digital games are often considered as potential tools to support therapeutic purposes, to promote improved well-being and health outcomes. In addition, assisted living environments commonly support recreational therapy or leisure activities which present an opportunity for those using such services and who may be living in care environments for long periods away from family or friends. Taking part in digital gaming activities could present an opportunity for people to benefit from playing as well as a pathway to connecting with others outside of their living environment. However, due to the nature of the conditions of this potential audience of players, the ability to engage in this activity is heavily influenced by the assisted living environment and the social structures therein. RQ4, therefore, aimed to investigate whether the social framework and context of a care environment for people with disabilities impacts the option for these potential players to engage should they wish

to. Although being quite different to the other parts of this thesis, this question aimed to capture the breadth of differences in disabilities and how they impact people's experiences. Chapter 9, therefore, presents a case study conducted in a charity-run assisted living facility that provided palliative care for people with neurological disabilities, where residents were supported in playing digital games on equipment available in the home. The main unit of analysis in this case study was therefore the neurological care home environment as this determined the extent of access that the individuals living there had to the digital gaming activity.

Overall, the thesis combines the collection of descriptive demographic data about a population of people identifying themselves as playing games with disabilities, with qualitative methods to obtain rich, detailed accounts of individuals experiences in play. This thesis demonstrates that the social context of playing digital games informs the acceptance/tolerance of the use of adaptations that make digital games accessible and therefore, a lack of acceptance could be considered a barrier to access for players using them.

1.3. Research discourse and methodological reflexivity

Ongoing discourse in disability research shows that there are still conflicting views on the best ways to sensitively and appropriately approach this domain (Barnes 2003), as such, I will endeavour to unpick the reason why I have taken specific methodological approaches throughout the work in this thesis. There are known concerns that conducting research with a socially constructed group of people, in this case, individuals with disabilities, is perpetuating the notion of disability as other by categorizing individuals by this attribute. It is therefore necessary to explain the approach taken in this thesis to discuss the topic as sensitively as possible whilst acknowledging that it is not ideal. The very distinction between people with and without disability is, in itself, in line with the grouping of individuals by attributes that are out of their control. That there is, however, even the concept of disability indicates that there are aspects of life that are different because of how culture and society is constructed.

The term "disability" is used throughout this thesis to refer to people who "have a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities". This comes from the UK government definition of disability under the Equality Act, 2010 (Equality Act, Gov, 2010), where "long-term" is longer than 12 months or more. Further discussion of disability terminology follows in section 1.3.2.

This thesis takes the social model as a frame for disability because this positions the responsibility for change and innovation on society rather than individuals because an individual's condition is out of their control. Working within the social model framework of disability has been proposed as one of the ways of conducting "emancipatory" research to reduce stigmatisation of participants by Stone & Priestley (1996). They propose further principles such as imploring researchers to take a qualitative approach to allow the participants to present their views in their own words to give context and depth. Additionally, Stone & Priestley (1996) suggest that researchers conduct studies that are of tangible benefit or value to people with disabilities and to remunerate their time and contribution to the research. Although this approach has evident benefits, it should be noted that an emancipatory approach is not without criticism. Danieli & Woodhams (2005), for example, suggest that to adopt an emancipatory research approach is to dismiss research conducted with other approaches and leads to a bias towards the social model of disability even when this model is still under debate by disability researchers (Haegele and Hodge 2016). Although this is a reasonable argument, an emancipatory research approach is broadly used and accepted, it seems sensible to work within the scope of the principles above whilst acknowledging that the approach has limitations.

As described in section 1.2, I employ primarily qualitative research methodologies in all but one study where the collection of demographic data was undertaken to lay a foundation for the qualitative work that would follow. That said, Chapter 3 outlines how the collection of demographic data included participants in the design of the survey which is in line with participatory action research as described by Balcazar et al., (1998), where researchers are encouraged to involve people with disabilities in the process of designing and conducting research that they will take part in.

Additionally, throughout the thesis, no specific individual or groups have been approached and requested to take part in research. This allowed people to identify themselves as having disabilities and volunteer to take part in research which avoided categorisation or labelling of individuals. In Chapters 5 through 8, I have presented the voice of participants through direct quotation as much as possible in reporting findings, however I recognise that my selection of quotes may not be without personal bias in interpretation. The qualitative research paradigm allows for reflexivity on my part as the researcher and therefore I note where I suspect my own world view may impact the results of my research. In being open and honest in this way, I acknowledge that my findings may be challenged but that this can serve to create avenues for beneficial further work.

1.3.1 Inclusion

To allow for the broadest possible participation in this body of work, no specific condition has been focused on. Many disabilities have many effects or symptoms which may span more than one of the typical categories of disability (physical/motor, cognitive, visual, hearing, psychological). Focusing on one category or type, I felt, would be akin to exclusion and would not be in alignment with my concerns about further grouping people by attribute beyond what I have already had to. In addition to this, technologies and adaptations developed to improve accessibility of digital games may be used by people with varying abilities, for example captions/subtitles, which create accessibility for hearing impaired players, may be used by anyone. Therefore, the focus should be on the adaptations and the social context in which they are used rather than the individual's condition that may require adaptation use.

1.3.2 Terminology

This thesis is framed with the social model of disability that distinguishes impairments from disability (Shakespeare, 2006). Impairment is the term used to refer to the condition or physical difference an individual has or suffers from, such as a visual impairment or neurological condition. Disability relates to the environment that means the individual with an impairment faces barriers to living or accessing

services or activities. As such, it would be in line with this model to talk about people with impairments as "disabled people", due to the mismatch between the impairment and the environment that disables them. Although this terminology fits the model, it can be seen to position the identity of disability as before the person (identity-first), which can be argued to diminish the person and categorise them by their condition.

I have chosen to take a person-first approach to discussing people with disabilities as this is used by the UN Convention on the Rights of Persons with Disabilities and the charity AbleGamers who I work with as part of this research. This terminology is to position the person before the disability and primarily is used only for consistency in reporting and to make the distinction between people who have identified themselves as having disabilities and those that have not. I have chosen to avoid using the term "impairment" throughout this work, additionally, to keep the focus primarily on the social context of digital gameplay and how the game environment may create barriers to access and experiences.

It is worth noting that, outside of the need to report this thesis, it is most important to allow each unique individual to decide and express how they wish to talk about themselves and their disabilities. As discussed by Dunn & Andrews (2015), it is conventionally accepted that person-first terminology be used but that it is increasingly acknowledged that individuals may choose to describe themselves as other ways, such as identity-first (a disabled person) or characterised by the specific condition e.g. Autistic or Deaf. The limitations of the social model approach will be discussed in Chapter 10.2.

In some cases, specifically in Chapter 5, individuals were not recruited with respect to whether they identified as having disabilities but only on the basis that they played multiplayer games. In this case, I have distinguished these individuals as separate from those that volunteered themselves as participants with disabilities (as in Chapter 6), however, some of these individuals could have chosen to disclose disabilities if they so wished.

Frequently used terms throughout the thesis

There are several terms and phrases used frequently through the thesis which are defined here for convenience and clarity.

Adaptations – used interchangeably with *adaptive technology* this refers to hardware devices that are designed to support customized play for people with disabilities. Some examples include a console controller that is designed to require only one hand to use, eye gaze or head tracking that can be used for handsfree direction of a cursor, or a screen reader.

Accessibility features or options – this is used to describe options provided to players *in-game* to allow them to adjust aspects of the game or gameplay to suit their needs and preferences. These are typically presented to players at the start of a digital game and are found in the games' menus. Some examples include captioning or subtitles, the option to change which actions are controlled by different keys on a game controller, mouse, or keyboard, colour settings, visual alerts that represent/replace audio, auto-aim, difficulty settings, or options to bypass content.

Assists – An assist is used to describe where elements of a game that are designed to take over or aid certain actions being undertaken within play. A common example of this is auto-aim or aim-assist which is most often used in console games to help direct projectiles, movement, or melee attacks towards a target. Assists can also refer to features in some games such as driving games that allow the game to steer or automatically move the player in-game without them needing to control this themselves.

Balancing – balancing or player balancing is used to describe features in games that aim to balance the skill or score of players in order to create a balance of challenge for players. Often balancing takes the form of matchmaking in multiplayer games, that aims to match players of similar rank or skill level. In some cases, such as team-based multiplayer games, balancing features can mean that players are swapped between opposing teams to even out the number of players in each team. Other forms of balancing include ways to match the "skill" of non-player opponents closer to that of the player. An example of this is the "rubber-banding" in driving games where the player races against computer opponents that will adapt their speed to be

within a similar range to that of the player. This is aimed at matching the game's difficulty to the current performance of the player.

1.3.3 Positionality statement

As part of qualitative methods, research findings are unavoidably filtered through the researcher's world view and interpretation. For transparency and to position the thesis in acknowledgement of this, an outline of who I am, how I view the world and my relationship to my research projects, is given here.

At the time of conducting the research presented in this thesis, I am in my early to mid-thirties and the first in my family to pursue doctoral research. I have been playing digital games since I was very young, first on a Sinclair ZX Spectrum, then on consoles and eventually to PC games and playing with others over the internet/Local Area Network. As a life-long gamer, I am inclined to see the benefits of playing digital games and how games can support friendship in the long-term. Not only in playing with others directly, but even when playing alone and apart, gaming has been a way to connect with like-minded people to discuss experiences of play and share and compare strategies.

Just prior to embarking on this research, I was a reasonably regular viewer of the Capcom Pro Tour[4] which is a broadcast, international e-sports tournament featuring games such as Street Fighter[5]. This highlighted to me the social aspects of gameplay were not just limited to within play but extended beyond into an audience that viewed digital gameplay in a way that they might view other traditional field sports. Viewing this tournament, I came to be aware of a player under the handle of Brolylegs[6] who plays Street Fighter professionally but using his face to manipulate the controls. I would consider Brolylegs to be a major inspiration for my research as watching him play and take part in tournaments raised many interesting questions

[4] https://capcomprotour.com/

[5] https://streetfighter.com

[6] https://capcomprotour.com/brolylegs-carving-out-success-as-a-street-fighter-pro-with-disability-2/

about playing games differently. As Brolylegs was in the public eye and involved in e-sports where there are rules regarding fairness, his experiences were especially interesting to me, not least due to the reactions of viewers. Brolylegs was/is highly respected and seen as a highly competent player regardless of how he plays. This led me to wonder about players who are not in a public forum and those for whom it is not evident to other players (because they are not visible and likely anonymous) that they may be playing in different ways due to disability.

In my own experiences of playing games over the internet with strangers as well as friends, I was aware that the anonymity that this can provide lends itself to bad behaviour from others (commonly described as toxicity by many gamers). Having heard comments and slurs made about gender, sexuality and race within gameplay, characteristics that are largely invisible to others, I wondered whether disability was a characteristic also took the form of slurs from others. Additionally, could intersectional characteristics compound experiences of toxicity in play which could create a further barrier to equal access to the potential enriching world of digital gameplay. I found it particularly interesting to see how the reaction to Brolylegs as a player was highly positive and considered whether the salience of his method of playing influenced how competent he was seen as a player. Through my research, I hoped to disentangle the interaction between experience of play, playing in different ways, and disclosure of disability to co-players, competitors, or audiences.

Although I do not identify myself as having disabilities, I am aware that I have mental ill health conditions that fall under the definition of disability (Equality Act, Gov, 2010). To an extent, I do consider myself to have some commonality with some of the participants in my research, however, I do not experience physical/practical barriers to playing games beyond the remapping of keys on my keyboard for game controls and using subtitles to keep sound levels low. At times I have found games to be beneficial for managing my mental health and yet been repelled by some online, multiplayer games by the unpleasant behaviour and communication from other players. I am aware of my own privilege in being able to switch to other social, recreational activities when I have a negative experience in games, whereas people

without the option to socialise outside of digital gaming due to disability may be more negatively affected by poor social interactions in play.

The final addition to this position statement that I feel it is important to express is that I believe there are aspects of society and our world that create disablement for everyone as we are all different in myriad ways. As I mentioned in section 1., (*A note on academic voice and framing),* I continually feel discomfort in describing people as being disabled or having disabilities as required for this thesis. My overarching hope is that all of those who took part in this work found the methods appropriate and their experiences are accurately and sensitively represented.

1.4 Ethics

Research conducted as part of this PhD underwent the ethical review process required by the University of York Physical Sciences Ethics Committee. University ethical guidance and data management principles have been adhered to and shall be maintained accordingly for the length that data is stored. Data collected has been securely stored on university managed cloud storage for up to ten years, apart from demographic data collected for the study reported in Chapter 4. In accordance with the collaboration with The AbleGamers Charity, the demographic data is managed, maintained, and securely stored by the charity.

Details of specific ethical considerations are presented within each relevant chapter of this thesis and additional information about data storage is included in the Appendices.

1.5 Contributions

To summarise the key contributions,

1. This thesis provides evidence that people with disabilities are currently playing mainstream games, and that they play multiplayer games online. They value the social benefits that playing games with others can bring and enjoy taking part in the broader community surrounding the gaming hobby. This strongly suggests that bespoke games are not the norm for players with disabilities, and that people with a range of different abilities play the same games.
2. Findings from two interview studies regarding the experiences of people with disabilities in playing multiplayer games provide a thematic framework for understanding key aspects of social experiences that could be considered as areas for innovation in games accessibility. The studies show that players with and without disabilities greatly value the social benefits of playing multiplayer games. They both manage, to some extent, the expectations of others in play to manage their potential exposure to the known issue of toxicity using methods such as avoiding certain games and only playing with friends. Players with disabilities are unique from other players in that they use advocacy and strategic disclosure of their disabilities to help manage how other players view them and to avoid further toxicity as a result of intentional or non-intentional disability disclosure. An overall desire for inclusivity and improved access to the experiences that games can offer was prevalent in the results of both studies.
3. Further work in investigating the perceptions of the use of accessibility functionality in games can influence the way players may be received by communities of other players outside of the game space. A study was conducted that looked a content skipping as an accessibility feature in single player games that does not directly impact anyone other than the player who may use it. This study indicated that social barriers exist both within games and outside of them in the wider gaming community.
4. Finally, although games may be enjoyed by people with complex neurological disabilities, significant societal and organisational barriers exist that prevent full, supported access to mainstream games.

2. Literature review

Digital games are widely recognized as a popular, enjoyable, and even beneficial activity from which players can derive a sense of well-being (Granic et al., 2014; Jones et al., 2014). Therefore, it is important that access to games should be universal and should not exclude people with disabilities. Most players view games as an end in themselves that provide experiences that are intrinsically valued (Juul, 2011). However, rather than thinking about how players with disabilities play mainstream games that everyone plays, games are often positioned as a means to an end, particularly for rehabilitation and accordingly research is often focused on creating bespoke games (Grammenos et al., 2006) or adapting and creating novel controllers that lead to particular rehabilitative outcomes (López et al., 2017). Where games for purposes such as rehabilitation or education are valuable areas of research, there is evidence of growing numbers of players with disabilities playing mainstream, multiplayer games. Those players' experiences are little understood and may present a space for innovation in accessible design. Digital games support inclusion but little is known about ways players are gaining access to games and the experiences they have when they are playing, whether valued or not.

It is understood that the social context of games is a crucial component of why people play games by functioning as a way to connect people (Frostling-Henningsson, 2009), a way to feel social support and community (O'Connor et al., 2015), and is valued by players (Cairns et al., 2019). It can be said that the enjoyment of games comes, not only from playing games themselves, but from the rich social community that surrounds the hobby, since sociability in play is not always direct but happens outside of the game-space in online discussion forums and social media channels (Stenros et al., 2009). This may be of particular importance to people with disabilities, some of whom may feel isolated from social activities that those without disabilities take part in. The ability to participate in gaming may also open up a community that can allow them to feel "ordinary" (Sacks, 1984) and meet the need for social connections where they may not otherwise have been able to.

To understand how digital gaming might deliver social benefits for people with disabilities, this body of work takes a stepwise approach to explore a number of factors that may influence players' experiences. The review of literature presented here begins with a discussion of current understanding of how the social aspect of playing games is important to players and how these fits into the broader understanding of why games provide benefits to well-being. As literature to-date provides little towards understanding the experiences of people with disabilities in multiplayer games, previous research into player experiences of online multiplayer games is covered in general. This is aimed at providing the groundwork to identifying aspects of this type of play that may create barriers to players with disabilities. In particular, the use of adaptations, customized controls are explored in this context, with a view to how these may influence player experiences and how they are perceived by other players.

Unlike in real life, people with disabilities can remain anonymous in online environments unless they choose to disclose themselves and their disabilities to others. Whether players' disabilities are disclosed in online games is important as the anonymity of gameplay can be seen as positive as it can remove the chance of judgments or discrimination based on disability. However, aspects of social games may remove some of that anonymity if voice is used to communicate, for example. This review will therefore consider existing research into disability disclosure. Since literature into disclosure in online games is minimal, disclosure of disabilities in other environments, such as workplaces and education are considered as ways to infer how this may play out in multiplayer game environments. This review also explores whether there are aspects of the design of games that may influence social inclusion or exclusion, such as team structures, styles of play, reward, or promotion of altruistic behaviours.

For two studies, review of relevant literature is covered within the corresponding Chapters 8 and 9. These are separate to the main literature review as they are directed towards informing specific aspects relevant to those studies.. Chapter 8 includes a review of literature that refers to ways in which content can be skipped in games as a tool for accessibility, and how this may impact player experiences in the

social context of play. Chapter 9 includes literature that informs research into digital games within a care home environment and how research into games for health and rehabilitation can provide useful insights into how players with neurological disabilities may play digital games.

2.1 Why digital games?

Currently, video games represent a significant part of our everyday modern lives, with UKIE (*The Games Industry in Numbers | Ukie*) estimating that between 2.2 and 2.6 billion people play digital games worldwide. Previously, it had been thought that people with disabilities find it too difficult to play many digital games, either due to physical constraints or a lack of accessibility features that might make games playable for them however, it is becoming evident that this is no longer the case. From online activity on social media, Twitch[7] and player communities, we know that players with disabilities are part of what is a dynamic and growing community of digital game players. It can be seen through large game developers conferences such as GDC (*Game Developers Conference (GDC)*) and Develop (*Develop Conference*) that accessibility of games has become more widely recognised as important, not only for economic reasons but also to support inclusivity and social justice. As digital gaming continues to grow as a source of entertainment for people of all ages, worldwide, with it grows the need to understand how and why it is beneficial to people, and the potential for gaming to support social flourishing due to its inherently social nature.

Research from positive psychology may go some way to provide an explanation as to why games can help make people feel good. This is based around theories about what elements contribute to a person's well-being and how games can provide some of those elements. It is possible to see that there are commonalities in the components of well-being among literature in this field; Ryff (1989) proposed that there are six components that form the basis of psychological well-being, these are: self-acceptance, purpose in life, personal growth, positive relations with others,

[7] https://www.twitch.tv/ - a streaming channel used by gamers.

autonomy, and environmental mastery. Later, Seligman (2004) proposed that Authentic Happiness is a combination of having a Pleasant life, a Good life and a Meaningful life. He develops this further with the PERMA model (Seligman, 2010), where well-being is generated by: Positive emotions, Engagement, Relationships, a Meaningful life, and Accomplishment. A review of literature by Jones et al. (2014) uses Seligman's PERMA model to evaluate the well-being benefits of existing digital games, finding substantial evidence that digital games can contribute to well-being and “flourishing mental health". This suggests that games are more than just fun, they could generate well-being or Authentic Happiness. For individuals with disabilities who may be isolated and or have experienced negative changes in their health and situation, the ways in which games might generate well-being or happiness is meaningful. Positive social relationships feature in these models of well-being as well as accomplishment or mastery, which are both elements that can be found in digital game playing.

Overall, there appears to be some agreement that positive social interactions, perceived competence, and purposeful actions are generally important for well-being. It is worth noting that researchers have long struggled to pin-point an exact definition of human well-being (Dodge et al., 2012). They note that there are so many different elements that may influence well-being, however, there is a social aspect included in the majority, if not all, definitions of well-being, as such, this strongly supports that this is a vital factor. Indeed, Baumeister & Leary (1995) propose that the need for social belonging is a fundamental human need.

Other researchers base their understanding of well-being around the meeting of physical and psychological needs. Researchers Deci & Ryan (1985,2000) propose the Self-Determination Theory, whereby people are intrinsically motivated to meet the need for autonomy, competence, and relatedness in order to achieve psychological growth and therefore, well-being. Based on Self-Determination Theory, Ryan et al. (2006) suggest that people are dispositionally motivated to play games because games provide opportunities for players to meet those needs. There seems to be a clear link between the kinds of interactions that digital games encompass and promotion of well-being (Jones et al., 2014). This thesis will focus on the social

elements of well-being, such as social connectedness, belonging, and social support, with respect to digital gaming as this seems to be one of the primary reasons why people play digital games (Cairns et al., 2019; Nacke et al., 2013).

In addition to promotion of well-being, researchers recognise digital gaming as a way to alleviate some of the more unpleasant aspects of life, such as depression (Berjaoui, 2013; Li et al., 2014), pain (Das et al., 2005), and stress (Russoniello et al., 2009) all of which may be beneficial for individuals disabled from accessing other sources of relief. A review of literature into the benefits of leisure activities by Kleiber et al. (2002) suggests that leisure may help people cope with stress and can even act as a buffer for coping with negative aspects of life. Their findings suggest that leisure may go beyond being just a distraction, but can also lead to hope, reconnecting with, or establishing a new self. Digital games as a leisure activity have been found to not only help people to cope with stress but also to reduce it. Russoniello et al. (2009) measured the EEG brain activity related to stress and relaxation of participants after playing casual games for 20 minutes. They found that those who played showed a reduced stress level compared to the control group who did an internet search task instead. However, it is not known whether other variables or the methodology of the study could account for the differences in stress levels. Though, such sources indicate that games have the potential to help with these issues, other sources suggest otherwise (e.g., Mentzoni et al., 2011) noting that games may aggravate mental health conditions in some ways). For people with existing mental health conditions, which are often found to be comorbid with other disabilities, this presents a gap for further consideration where one should ask: how do players access the beneficial effects of games whilst avoiding less favourable effects such as addiction or problematic use?

2.2 Social play

Where positive social connections, belonging, and support are found to be aspects important for human well-being, this section presents evidence of how these factors might be facilitated and sustained by playing digital games in social ways. Social play can take the form of online play in multiplayer game types, social play that is local/

played in the same location in a multiplayer game or a single player assisted or observed by another. Social play may also be indirect such that play sessions may be solitary, but the player engages with gaming communities through other means such as online forums or community spaces.

Research by Granic et al. (2014) and Kaufman et al. (2014) suggests that gaming can promote the formation of social connections by aiding in the formation and maintenance of friendships both online and offline. This shows that games can create cross-generational connections, and thus alleviate loneliness and isolation for those that cannot physically be in a social location. A study conducted by Kowert et al. (2014), found that playing games online allowed emotionally sensitive, shy people to gain positive social and emotional experiences and make friends. This suggests that games have the potential to allow people, who may be anxious or self-conscious about their condition to partake in a hobby where they can control how much they reveal about themselves (disclosure discussed further in section 2.2.4).

Researchers who studied FPS (First Person Shooter) games also found that the social aspects and interactions with others when playing these games are important to players and are motivators to play (Frostling-Henningsson, 2009; Jansz & Tanis, 2007). Additionally, researchers who have investigated MMO (Massively Multiplayer Online) games have found that this style of game facilitates bonding, a sense of social support, and formation of communities of players (O'Connor et al., 2015). Formation of communities in games can also be seen in work which shows that players of these games form clans or guilds, where players group up to play through parts of the game together (Ducheneaut et al., 2006; Seay et al., 2004). Other positive social outcomes from playing multiplayer games such as altruism and helping behaviours have been found (Velez & Ewoldsen, 2013). More recently, in a study exploring why digital gaming is important to players with and without disabilities, the value of connection is clearly articulated (Cairns et al., 2019). Through extensive research into the importance of the social aspects of playing digital games, it is recognised that this is not a solitary activity as it was once thought to be.

Researchers note that there are layers of social elements in digital gaming (Bryce & Rutter, 2002). In a discussion about sociability in gaming, Stenros et al. (2009) suggest that playing a single player game can be social too, in an indirect way, due to the assumption or knowledge that other people will play the same game. This means that, by playing the single player game, despite being essentially solitary, a player has an experience in common with other players that they can talk about. Wright et al. (2003) go so far as to suggest that people's experiences in using technology are actively constructed by them "through a process of sense making". They discuss how a part of that is done by recounting their experience to others and that, how it is recounted may change how they reflect on it and so on. It is not known if this is true in the context of gaming, however, it suggests that further work may be needed to investigate whether the ability for players to take part in gaming communities could be important and could alter, broaden, or deepen the rewarding experience of the game.

Regardless of whether play is discussed, simply knowing that other people are playing (perceived social presence), either co-located, online, or in another room may have an effect upon the experience of play (Cairns et al., 2013). Further, Stenros et al. (2009) also suggest that play can be a performance or a way of attaining status. Not only are games social but rewarding and potentially motivating too. Single player games can also be played in social environments, such as arcades and more recently online platforms which upload play statistics publicly online, have leader boards and high score rankings displayed within the game or the game platform. This allows players to indirectly socialise, publicise or even compete in their game playing without having to directly communicate with others at all. As such, there is the potential for the social experiences of players to be influenced by features included in single player games that contribute to the sociability of the community surrounding the game. This poses questions about whether player rankings or leader boards accurately reflect the abilities of players, whether they take into account accessibility features used, whether the way this information is displayed could impact players feelings of inclusion or exclusion within those gaming communities, and whether this has any impact on player experiences as a result.

2.2.1 Online multiplayer games

Online multiplayer games encompass social dynamics and additional potential opportunities, beyond simply accessing play, for barriers to present themselves for people with disabilities. Unlike the social elements that are indirect from single player games, such as those described by Stenros et al. (2009), e.g., leader boards and performative play such as public posting of ranking and achievements, online multiplayer games support more direct interaction with other people. In contrast to other social online spaces, such as chat rooms, message boards, forums, and social media, there are the additional dynamics of competition and cooperation, as well as meeting goals within the game. It is currently unclear whether people with disabilities who may have access to play are able to compete in the same ways that people without disabilities do. In other words, they can access these games, but are there aspects of the ways in which they play (using assistive technology, for example) that mean they cannot match the skill level of other players that are expected in order to compete on a level playing field? Previous research recognises that competitive styles of digital game play present players with exposure to toxic behaviour from others (discussed in section 2.2.2 and 2.2.3). This may be much harder to avoid in online multiplayer games as many of these require players to engage in teamwork and therefore to communicate with each other. This section examines what specific potential barriers competitive and cooperative online game environments might create for individuals with complex disabilities, different ways of playing, and a backdrop of assumptions about their abilities to be effective in play.

Online spaces may provide people anonymity, in the sense that physical appearance and voice can be hidden from other people, this may provide people with disabilities an empowering and equalising space in which judgements are not made about them due to any physical or vocal evidence of their condition (Bowker & Tuffin, 2002). However, in general, it is recognised that this sense of anonymity may result in disinhibited behaviour (Suler, 2004), and therefore the risk of a more hostile environment than real life competitive environments such as sports. Since many social, online spaces require individuals to be able to see, read and type, tools such as screen readers, alternative inputs such as eye-gaze tracking, and dictation tools may

be adequate to allow people with disabilities to take part without disclosing their disabilities to those they interact with online. In multiplayer digital games, however, there are mechanics and dynamics within the game's design which may thwart a person's ability to remain anonymous and to keep disabilities undisclosed to other players. For example, using an alternative controller to play a game might result in slower actions than those made by people using standard controls. Since other players may not be aware that the player is using alternative controls because they are online, the other player may attribute the slower action to be due to a lack of ability or skill in the game. A lack of understanding about disability and how this affects may leave people vulnerable to the negative social aspects of multiplayer games even if the games are deemed accessible and playable for them. This is important because game developers may feel that they are producing an accessible and inclusive game but not be aware that elements of the game's design may promote the social exclusion of some players. Where a game is accessible in a practical sense, it may be inaccessible with respect to positive social experiences. This demonstrates that there are still important factors for game developers to consider beyond options to support access and is further discussed in section 2.2.4.

2.2.2 The problems within multiplayer social environments

The majority of research into the social aspects of multiplayer games focuses on individual genres or types of multiplayer games, such as Massively Multiplayer Online Games (MMOs), team based First Person Shooters (FPS), or Multiplayer Online Battle Arenas (MOBAs). Despite the variation, both research and anecdotal evidence highlight common themes regarding hostile behaviour present in these games. Examples include: sexism (Salter & Blodgett, 2012), toxicity (Consalvo, 2012; Kwak & Blackburn, 2014), verbal aggression (Balci & Salah, 2015), and 'griefing' (Chesney et al., 2009; Rubin & Camm, 2013). Of particular interest, researchers Eastin & Griffiths (2009) aimed to study how players expect to be exposed to some level of hostility when playing social (multiplayer) games, suggesting that this is so common to this type of play, that players come to assume it will be part of the experience. Their review of previous research into what elements contribute to this negative outcome of social play suggest that competition, the size of the group/team,

and also gender could influence likelihood of aggression in play. They found that larger group size of players leads to greater hostility and, therefore, verbal aggression as a result of social play. However, this work focused on the First-Person Shooter (FPS) genre of game which is inherently competitive. As such, it remains to be seen whether the same effects apply to other styles of multiplayer games, or if specific elements of the FPS game-type might influence the hostile behaviour.

Work by Przybylski et al. (2014) suggests that even an element that is found to be a strong motivator to play digital games, namely competence, can simultaneously result in greater aggression when impeded in play. That is to say, if a player is made to feel that they are not good enough or that they are not performing to the same subjective standard as others, they may be more likely to respond with aggression. Given the various adaptations available for people with disabilities to use that enable them to play, it is unclear whether players may perceive adaptations, such as a customized control pad, as something that gives the player using it an advantage even if it is not. This may be most likely if this becomes salient to other players but is not justified as being used for accessibility. This finding, in particular, suggests that if something within a game creates an unlevel playing field or mismatches player skill, this could put some players at risk of being targeted with verbal aggression.

Although many multiplayer games now have some voice-based communication methods embedded, this is not always a channel for players to exhibit hostility towards other players. This may mean that even if a player does not use voice communication methods, the dynamics of competitive or competitive play can inherently allow people to act in exclusionary ways that do not involve any direct verbal interaction or explicit aggression. A study by Birk et al. (2016) explores how exclusionary behaviours might exacerbate negative social interactions by creating hostile feelings in those who have been made to feel excluded. The authors suggest that feeling excluded could influence a player's perception of their own competence, or impair their performance in play, and therefore cause a player to assume that other players "are acting with hostility". The researchers conducted an experiment with Amazon Mechanical Turk who they asked to play a small game which simulated social exclusion. Social exclusion was built by repeatedly and deliberately skipping one of the players in-game turns. The researchers measured "availability of hostile

cognitions" by assessing how many negative/hostile words were provided by participants in the word completion task after being socially excluded. This was compared with a control condition where the participant was not excluded and had an equal number of 'turns' as their co-players. The results showed that players who had been excluded used more hostile or negative words in the task after play than those who hadn't. The authors speculate that this could result in more aggressive actions towards other players in-game. The researchers acknowledge that it is not clear whether certain elements of playing a game could protect against feelings of social exclusion in comparison to real-life. Since the study was conducted only to simulate social exclusion, it is not known whether their finding applies to commercial multiplayer games. The findings do, however, suggest that inclusion and exclusion can occur at the level of in-game mechanics. Should this be the case, there may be room for game developers to think beyond voice communication and consider how to adjust mechanics to prevent or dissuade players from social exclusionary behaviours, and in turn, prevent any resulting hostility that the exclusion may have promoted. However, it may also mean that there are mechanics within existing multiplayer games that are creating exclusion, hostile behaviours, and toxicity that researchers and developers are yet unaware of.

2.2.3 Toxicity

As mentioned above, there are unique elements in multiplayer games which combine the social dynamics of things like competition and cooperation which may have been evident in sports, education and employment previously. However, in online multiplayer games, this is combined with the potential for people to choose anonymity as they might in other online social spaces. Anonymity has been found to result in antisocial, aggressive interactions which would not be present between individuals interacting in person, known as the online disinhibition effect (Suler, 2004). The negative outcomes of combining these dynamics in multiplayer, online games are often described using the term "toxicity". In digital gaming, research suggests that a major factor of why toxicity exists in digital games is the online disinhibition effect (Kordyaka et al., 2020).

Both players and researchers often use the term “toxicity” to describe certain types of anti-social behaviours either in-game, such as intentionally exploiting rules to disrupt play or for personal gain; or anti-social behaviours that are external to but during, or as a result of play, such as verbal aggression, racism or sexism, towards other players. Players who habitually partake in these behaviours are themselves described as “toxic”. Previous research by Shores et al. (2014) suggests that certain types of multiplayer games or game modes may have a higher prevalence of toxicity than others. They found that games played competitively or ranked play contain more “toxic” players. Therefore, it may be expected that some game communities, such as those based around more competitive game play like esports games, may come with a higher risk of exposure to toxicity. This suggests that toxicity might present a further barrier to positive experiences for people with disabilities and could potentially deter them from taking part in more competitive elements of multiplayer games.

According to previous research into toxicity in multiplayer game environments, there are some factors that can result in a greater presence of toxic behaviours (Adinolf & Turkay, 2018; Kwak et al., 2015), or characteristics of players that are more likely to be targeted by toxic players (Consalvo, 2012; Kordyaka et al., 2020). This is important where games are to be made increasingly inclusive and accessible to diverse audiences, such as for people with disabilities who are already marginalised in everyday life. One such factor that may contribute to toxicity in play is the increased prevalence of the use of voice chat in multiplayer games. This, consequently, means that some of the anonymity that people obtain from online environments may be reduced (Wadley et al., 2015). A person's voice may indicate something about their ethnicity, what gender they may be, their age, or even whether they have a disability. Toxicity can also occur simply as a result of players being perceived to be ineffective in the game by others, or if they are seen to be playing in different ways than expected. This may be of particular concern for people who may appear to be playing in different ways because they are using adaptations such as assistive technology or accessible game features to enable them to play. There is a gap in existing literature here where it is important to explore how such adaptations interact with mainstream online gameplay. In a similar way to the use of voice chat in

games, playing differently may draw attention to a player even if they don't disclose the reasons for their differences to other players.

The following section further explores disclosure of disability within multiplayer games and how players' social experiences of play might be influenced by whether they choose to, or inadvertently let other players know about their condition.

2.2.4 Disability disclosure

In digital gaming, where players can mostly control their anonymity, very little is known about whether people with disabilities choose to disclose this information in multiplayer game environments. Additionally, like other online environments, there are factors that may cause a person's disability to be disclosed accidentally or without their choosing. Since present research has not yet explored disclosure of disabilities in online gaming, literature that investigates disclosure in other domains is considered. Foley & Ferri (2012) discuss how, online, different types of disabilities may be more salient than others as opposed to in real-life situations. They note that a learning, or cognitive impairment may be more evident by how it affects their communication, whereas a physical impairment may not be evident as it is not visible. In digital games, it is possible that both physical and cognitive impairments may be involuntarily disclosed; a player may struggle to execute in-game actions, or they may communicate differently over voice chat. It is currently not widely understood whether this is noticeable to other players in multiplayer environments or whether other players attribute these differences to be due to disability or assume that differences may be due to a lack of skill, for example. This may be problematic for those with disabilities if they choose not to disclose; if other players judge their differences in play or communication to be due to a lack of competence, this may result in them being targeted with verbal aggression from some players.

Blockmans (2015) studied the disclosure of disability among Belgian university students (average age: 23) with physical impairments with the aim of understanding what reasons they may or may not disclose or discuss their disabilities with staff and peers. They found that individuals chose to disclose their disabilities for the following reasons:

- to get practical assistance,
- to be taken seriously,
- to provide perspective on potentially non-normal behaviour,
- to bond with friends.

In digital games, this suggests that players might be inclined to disclose that they have disabilities as a way to explain to other players why or how they might be playing differently. Blockmans also found that their participants refrained from discussing their disabilities:

- to avoid appearing "not normal",
- to protect themselves when they anticipated negative implications from disclosure,
- or when they perceived the other to be unfamiliar with the disability being disclosed.

In an online gaming environment, this may apply particularly in the case of disclosing to people they do not know, as they do not know what the implications may be (due to the stigma surrounding disability), or whether the other players may be familiar with the disability. However, dynamics of university life may account for some of the reasons found in this study as more may be at stake when obtaining an education than playing a digital game in leisure time.

Foley and Ferri also propose that the use of assistive technology or adaptations for people with disabilities may cause unexpected or unintended social exclusion. They explain that, although assistive technology is often perceived to be beneficial and enabling, there may be negative social consequences for those who use them. Within multiplayer games, social exclusion may take the form of toxicity from other players as described above, or negative perceptions from others based on whether the assistive tech/adaptation provides a perceived equal competence in play or an advantage. Foley and Ferri note that if an adaptation/assistive technology is perceived to provide a user with an advantage over others in some way, then people are more likely to react with hostility and prejudice towards the individual using it.

In sports and education contexts, the use of adaptations which enable a person with disabilities to carry out an activity is described as an accommodation or a reasonable

adjustment and is, in many situations, required by equal rights law (House of Lords - The Equality Act 2010: The Impact on Disabled People - Select Committee on the Equality Act 2010 and Disability). In these contexts, the accommodation, and sometimes the reason for it (disability), is usually visible to others. However, in online games, use of assistive tech/adaptations are not usually visible unless this is disclosed by the individual using them or unintentionally disclosed. Either way, these findings suggest that there is a "safe" window within which the use of adaptations or adjustments is perceived as acceptable by other people. That is when an adaptation is judged not to provide any unfair advantage to the user and also does not cause a person to appear to be acting in unexpected ways or incompetently. It is clear that there are a variety of consequences dependent on whether a person decides to disclose their disability to other players and whether to disclose whether they use adaptations to help them to play, since this may impact both their social experiences in play and the experiences of others around them due to how it may impact the perceptions of fairness in play, particularly in competitive games. As such, this is a gap in current literature that would help provide a deeper understanding of disclosing disabilities in the context of social play.

2.2.5 Player identity

To add to the complexity of the social environment within which people with disabilities may wish to integrate is the way in which people identify themselves as a part of the broad gaming communities. There is the potential for how players identify themselves to influence their social experiences in play, both from their perspective and how others treat them. How players identify is one way that people are seen to form groups. In social psychology literature, this would be called a *common-identity group* where the members of the group form an attachment to the group (identity) as opposed to direct attachment to other members (Prentice et al., 1994). Players often refer to themselves and others as "Gamers" and, within this, "Hardcore" and "Casual" are some of the main terms often used to refer to types of "Gamer". This suggests that within the overall gaming community there are groups of player types that ascribe to particular values and habits in reference to how they approach playing digital games. In the social psychology discipline, this is known as

group entitativity (Campbell, 1958). In addition to self-identifying as a particular type of player, players are able to make assessments of other players they encounter based on how they behave in game, their style of communication over voice chat, their gaming profiles, public achievements and stats.

The term "Hardcore Gamer" is often used in reference to players who commit substantial amount of time to the hobby, are highly skilled and have a tendency towards completionism (Fritsch et al., 2006; Jacobs & Ip, 2003). "Casual Gamer" often refers to players who display a lower commitment to the hobby as Hardcore Gamers (Bosser & Nakatsu, 2006). Juul (2010) posits that is not so much the time a player puts into the hobby but rather, the flexibility towards a game's requirements is what determines whether a player is Casual or Hardcore. He suggests that Casual players are inflexible in committing to whatever the game requires whereas Hardcore players are very flexible. Both players' own identity and how others perceive them to be approaching play are likely to impact which other groups of players they might be socially accepted by and thus, the kind of social experience they might have as a result (Tajfel, 1974).

Although research suggests that Hardcore or Casual players may have different goals and reasons for gaming, it is not entirely clear how the interaction between their identity, their personal in-game goals, and the goals of their team (if in team-based play), could impact how aggressively or altruistically they behave within play. Theories from social psychology about how people behave in groups suggests that if you have groups of players (e.g., a team) who are competing for the same goal (to win or to capture a location or a resource in the game, for example), then players are more likely to act aggressively towards the other group. This is called Realistic Conflict Theory (Sherif, 1966). This theory also suggests that the relationship between groups can improve if the groups have to cooperate in some way to achieve a goal that can be of benefit to all parties. This has been seen to occur in games, where playing cooperatively improved attitudes towards the perceived out-group (Adachi et al., 2016). To apply Realistic Conflict Theory to multiplayer games implies that how the game is designed, whether it is cooperative, competitive, team-based, player versus player, or player versus enemy, influences the likelihood of the presence of aggression in play. In terms of player identity, then, it would be useful to

discern how they consider themselves and also which type of game they tend to choose to play, to reveal what kind of social experience they might experience in play and, perhaps more importantly, why and *if* they actually choose this identity.

How a player identifies respect to the gaming community is another characteristic that they might wish to keep undisclosed. This is because it could lead to judgements from others about whether they fit within certain groups of other players or be stereotyped or considered to be out-group (Tajfel, 1974). As discussed above, research suggests that the style of gameplay may have a significant impact on social behaviours of groups of players which may be negative, resulting in aggressive interactions for example. Like disabilities or other characteristics, this is something which can be disclosed unintentionally but can lead them to being categorised or perceived in certain ways, nonetheless. And, as such, impact the social experiences within play and potentially lead to further social exclusion.

2.3 Games accessibility and adaptations

It is increasingly important that game developers improve the inclusivity and accessibility of the games they make. It is not only in their economic interest to do so, to broaden their audience and therefore, market, but also to meet an inevitable legislative requirement that games are equally accessible to players of a broad range of abilities and needs. Beyond accessibility, it is increasingly important to consider access to experiences (Power et al., 2018). Games provide experiences, so even if people with disabilities gain access to games, it is not yet known if they can access experiences in the same way as other players. Given the intricate dynamics that could alter the experiences of people with disabilities in the social gaming environment, it is important to address what kinds of adaptations may be being used to help people to play and what the present domain knowledge is regarding the accessibility of digital games is for these players. A deeper understanding of the kinds of hardware and software adaptations people might be using can provide useful insights into the kinds of impacts, as discussed in the previous section, people with disabilities might experience. This section presents the current position of research into people with disabilities' methods of playing digital games and discussion of research into accessible games

There is acknowledgement within the research community that there are not only barriers to playing digital games, but also accessibility concerns within the games themselves for those with individual and complex needs (Aguado-Delgado et al., 2018). Much of the work in research in game accessibility focuses on removing the barriers from games that prevent players from getting around the player-interaction-loop (Schell, 2014b). Indeed, many of the papers that conceptualised accessibility in games leveraged, rightfully, the work done in other interactive technologies such as the web to iterate the possible barriers to players with sensory, physical or cognitive disabilities (Archambault et al., 2008; Miesenberger et al., 2008; Ossmann et al., 2008). More recent work continues with this type of framing of accessibility, with a focus on either changing the controls or presentation of the information, advocating for simpler controls, and even conceptually simplifying the storylines within games (Garber, 2013). However, it is important to consider that players of digital games value and are motivated to play them due to aspects such as challenge, art and connection (Cairns et al., 2019; Sherry et al., 2006). If making games accessible focuses on simplification strategies, there is the real risk that such elements of games could be seen to be lost. Therefore, there is a fine line between providing better ways to access games for individuals with complex needs and retaining what players find meaningful. This section discusses the ways research to-date has explored game accessibility.

Previously, researchers have focused their efforts substantially on how technology can be adapted to enable them to play (Archambault et al., 2008), and on creating bespoke games to investigate how games can be made playable for people with varying disabilities (Grammenos et al., 2006; López et al., 2017). Within this domain there is substantial breadth of work directed towards using games for health and therapeutic purposes however, it is acknowledged that there is complexity in the symptoms of disabling conditions that it is difficult to create games that are suitable for all. Therefore, one approach has been to find ways to match suitable mainstream games with players for therapy (Putnam et al., 2016) rather than create bespoke games for this purpose. This may be helpful for carers supporting people with disabilities to select games for them, though this approach does not account for the

autonomy of the person with disabilities in being able to choose the game they most want to play.

Elsewhere, several charity organizations (e.g., The AbleGamers Charity, Gamers Outreach, SpecialEffect) and advocates of disabled gaming have established community and support for players with disabilities and created information to guide game developers to make adaptations and improvements (Barlet & Spohn, 2012). With the increase in developers desire to create more accessible games, multiple sets of accessibility guidelines have been compiled to provide information about how to adapt and design people with varying abilities and needs (Barlet & Spohn, 2012; Game Accessibility Guidelines, 2018). These guidelines were based on the experience of organisations facilitating accessible gaming for players with disabilities around the world. They provided a catalyst for discussing game accessibility with developers to raise awareness that players with disabilities want to play games with everyone else, and that small adjustments to gameplay could have an impact on the numbers and diversity of players who buy commercial digital games. More recently, there is active work to incorporate even more guidelines from other domains (Westin et al., 2018). However, while within this guideline approach there is a notion of game designers being able to pick and choose particular guidelines that are appropriate for their game, there is little in the way of systematic study or data regarding what options players use, and which options or adaptations help players get to the experience they want to have in games.

Following on from this work, the successful integration of accessibility into many commercial titles means there are many people with disabilities playing online amidst players without disabilities. However, little is known about this audience and their player experiences, and how and why they choose the games they do. It is currently unclear what, if any, technology, and accessibility options are being used by players with disabilities. Some academics have found various methods that can be used to enable play such as controllers (Birk & Mandryk, 2013), skill assistance (Depping et al., 2016), and difficulty adjustments (Baldwin et al., 2016). These studies suggest that these features may impact the experience of play for those using them, and for other players when these features are being used. It can be argued that

gaming is an inherently social hobby (Stenros et al., 2009; Xu et al., 2011). For players with disabilities who may use adaptations and non-standard peripherals to play, it is important to consider what effect this has, not only on their experiences in games, but also the social elements of the gaming hobby. Section 2.3.1 discusses further how adaptations described above may impact the social experiences of people with disabilities playing alongside non-disabled players.

Within the research literature, there are a number of examples that solve specific barriers that impact a particular group of people with disabilities, for example, for barriers to control in games by players with disabilities, early work by Archambault et al. (2005) presented a game station for children with visual impairments that was a combination of commercial off-the-shelf hardware and specialised assistive technology. Istance et al. (2009) evaluated the use of eye gaze for access to massively multiplayer online games such as *World of Warcraft*, for purposes of giving access to players with physical disabilities who could not use keyboards. Fanucci et al. (2011) provide an example of a customised controller for players with low mobility in their hands. Providing a more broad solution to the issue of control remapping, Gerling et al. (2013) created and validated a programming API for replacing motion controls with key-presses. Going beyond controls of games, Vallejo-Pinto et al. (2011) proposed a set of ear cons for use in game environments for players with visual disabilities.

These examples all present solutions to specific barriers. Beyond these, there is a collection of works that specifically build games for players with disabilities, or reimplement a particular genre of game. For example, Miller et al. (2007) created a finger dancing game for people who were blind, with Kim & Ricaurte (2011) providing a similar game on mobile, while Yuan & Folmer (2008) adapted the popular music game *Guitar Hero* to use haptic cues. There are multiple implementations of space invaders for the general audience of players with disabilities (Grammenos et al., 2006), and specifically adapted for individuals who use switch interfaces (López et al., 2017). There are also universally accessible games and game worlds that have been created to ease development time and provide broad opportunities for accessible development (Trewin et al., 2008; Westin, 2004).

To move research and practice beyond questions of basic access and enablement (Power et al., 2018) it is important to know more about players in the game space to begin to understand their accessible player experiences (APX). Porter & Kientz (2013b) provide a useful starting point with a survey of 55 players with disabilities collected age, gender, impairment class, platforms played on, and types of games played and was also supplemented by interviews. Within this study, the players identified a number of issues that spanned their player experiences in games, from conflicts between different pieces of assistive technology to challenges of engaging in multiplayer. The data did not show a lot of the options that are traditionally thought of as important, such as clarity of text, subtitling and button remapping. The authors note, this could be a sampling bias that is influencing these results. Further, even if it is the case that these issues are being addressed, there are a myriad of designs that could be helping, and as such does not clarify which options are helping. The authors further interviewed six game designers, where there are hints of a cost-value trade off, with discussion of the ease with which some colour vision deficiency options are implemented. When combined with the reported need of in-house expertise in the interviews, this points to the need for better data for developers regarding what options to prioritise. Importantly, this motivates work to provide a more comprehensive understanding of players with disabilities to inform and extend the focus of subsequent research and practice into accessible games.

2.3.1 Perceptions of the use of adaptations/assistive tech

To inform investigation into how the use of accessibility features and adaptations sit within the social context of gaming, one approach is to explore how other players perceive those features. Although the use of adaptations may not directly impact these players, how they react to their use may provide some insight into aspects of the social framing of play that present a social barrier to accessibility. In previous research around the perceptions of people with disabilities using alternative controls, assistive technologies, and accessibility options in games, it has been found that such perceptions are not always positive and may also impact the experience of play for

those not using the adaptations. How positive or negatively players view the use of adaptations to be seems to be related to whether they are made aware that the adaptation is in play, and how much it is perceived to improve the "skill" of the person using it.

Unlike in education, employment, and sports (Gov, nd), there are no official guidelines or rules about the use of assistive technologies/accessibility options in games. The use of assistive technology or accessibility options can be considered to act as accommodations or adjustments for equal access to digital game play. However, although the gaming media is required to be made inclusive, there is little understanding about what this means for games and game rules. As such, the values of individual game communities and the social frames in operation surrounding game play (competitive, cooperative, team play etc), are left to work out what is considered to be fair use of accommodations and features that are designed to make games accessible for people with disabilities.

In digital games, the accommodations are invisible to other players unless disclosed, whether intentionally or not. Colella (2001) investigated how co-workers perceived the use of accommodations by people with disabilities in a workplace environment. In this case, they found that co-workers were more likely to make judgements about the fairness of accommodations if they were salient and relevant, and whether the accommodations were perceived as "needed". In other words, whether the accommodation use was noticeable, whether it affected them in some way, and if the accommodation use was deemed to be legitimately required. They note that people are more likely to notice someone is different to themselves, therefore, if the accommodation caused someone to appear different, such as having custom equipment to carry out a task, then the accommodation was more likely to be subject to fairness judgements. Colella's work also suggests that co-workers might consider the use of accommodations to be less fair if the person using the accommodation performed well or better than others and receives benefits or rewards as a result. For example, if they outperformed their colleagues on a work task whilst using an accommodation. A study was conducted by Paetzold et al. (2008) about the perceptions of fairness of accommodations used in an educational environment, such

as more time allowed in an exam for someone with dyslexia. Similarly, they found that accommodation use was seen as less fair if it was perceived to provide a competitive advantage or be a "perk" to those using them. Accommodation use was seen as least fair when the person receiving the accommodation "excelled" or outperformed others.

In digital games, these findings suggest that the more noticeable to other players the use of adaptations are and the better they are seen to perform with them as a result, the more other players might perceive this to be unfair and become upset or hostile. If a person using adaptations performs very well in a game this may intensify the negative perceptions from others.

Is it a level playing field?

One of the primary concerns of players in many team-based online games is that of fairness in play and maintaining a level playing field which can be seen in the prevalence of match-making systems in games to place people of a similar skill level together in play. Research findings from studies by Cox et al. (2012) and Denisova & Cairns (2015) suggest that closeness in player skill increases perceived challenge and improves the overall experience for players, which follows game design principles (Schell, 2014a) that balancing the skill levels of players promotes greater enjoyment of these social games.

While creating balance among players is a positive outcome, some of the features that game developers use to create this "balance", such as adaptive difficulty, auto-aim, the option to use alternative input devices, and automated control assists, may have other, unintended effects upon player experience (Baldwin et al., 2014; Vicencio-Moreira et al., 2015). In the context of this work, this is an important consideration as such effects may have implications as to how players perceive other players who may be subject to, or using, these balancing features. Additionally, how the balancing features affect players perceptions of their own competence and agency in play. This may be of particular importance for players who may rely upon these features to enable them to play.

Hofmann & Hlavacs (2015) suggest that the ability to balance player skill could be "empowering" for some players, such as those with disabilities because it could increase their competitiveness. They propose that deploying artificial intelligence in games as a way to detect actions that players are unable to do, then to adapt the game to assist or substitute these actions, as one way that could help to create this balance in play. It is not yet understood whether this is desired by players or what effects this might have in social play. Harris et al. (2016) propose that balancing players may not be necessary to create a positive player experience for those with different abilities in multiplayer games. They suggest that this can be done by using an asymmetrical design such as offering different roles and the options to do different tasks within the game that suit their abilities and preferences. This kind of design can sometimes be seen in some mainstream team based First-Person Shooter games. There is the option for players to select a role to play in the multiplayer game that requires them to carry out different duties or actions, such as "medic" or "engineer". Though a choice of role is arguably positive, there could be unintended consequences whereby people with disabilities may feel restricted to only certain types of in-game roles. And if recognised by other players, this risks segregation and potentially the perception that certain roles are all that they are good for.

Other features that designers use to create balance in games are "assists". One example of an "assist" is the auto-aim feature where the game helps to guide the crosshairs of a player's gun onto an enemy that they are aiming towards to help them to get an on-target shot. This can be useful if a player is using a gamepad controller with analogue joysticks which can make it difficult to line up an accurate shot quickly. Or alternatively, if a player has restricted use of the hand they would need to carry out that action. This kind of adaptation can be very effective in fast-paced multiplayer games but it may be considered something that can give an unfair advantage if only some players are using it (see (Baldwin et al., 2014, 2016; Hofmann & Hlavacs, 2015). However, Depping et al. (2016) studied how players felt about the disclosure of skill assistance use in a multiplayer first-person shooter game and found that disclosing the assistance did not have a significantly negative effect on player experience. In their study, an expert player was paired with a novice player

in a one-on-one deathmatch game scenario. Conditions included a control, with no assistance; concealed assistance, with assistance hidden from players; and disclosed assistance, with players told that the weaker player was to be assisted and when it was happening. This suggests that it is not necessary to hide the use of this feature from players. It is unclear whether the finding applies when players do not know whether the other player is novice or expert. In online multiplayer, a player may not be aware that someone is new to the game if they do not say so which may impact on how their use of "assistance" is perceived.

A study by Gerling et al. (2014), considers the use of skill balancing more specifically for players of different physical abilities and how this affects player experience. The authors used a similar game to *Dance Dance Revolution* (a multiplayer physical dance game) to study the effects of balancing input, time, and score, compared with no balancing at all. Their first study looked at players who had no physical disabilities. They compared the use of a handheld gamepad controller with a dance mat to control the game and investigated the effects of balancing the game for weaker and stronger performing players. In their second study they provided an adapted version of the game so that a player with a mobility disability could control the game using their wheelchair to compete with a friend (with no disability) who is using the dance mat. They also implemented hidden, combined time and score balancing in the game. Some of their results suggest that feelings of self-esteem were reduced for both players when they could see that their co-player was using a different controller (gamepad or dance mat). However, if players were unaware that the game was balancing time between players, this had a positive effect on self-esteem.

In the study with the wheelchair controller, the wheelchair users reported enjoying playing against their physically able friends and did not mind losing even when they were assisted by the balancing in the game. Interestingly, some of the physically able players expressed that they felt that it was an unfair competition, especially when they won against their wheelchair user opponent. They were concerned that there was not a "level playing field" in this game scenario. The authors speculate that the reason for some of the differences in the player experiences with balancing

techniques could be due to how players attributed their overall perceived success or failure in the game. They propose that how much control the player felt that they had and how much they attributed their own abilities as responsible for the outcome, could be the cause in the changes in self-esteem. This implies that balancing for a player's physical abilities could cause a mismatch in how positive their social experience is. This work also implies that in co-located multiplayer games (playing together in the same location), if one player is visibly using a different control mechanism, that this can also impact the experience for both players.

In summary, research suggests that balancing for players in multiplayer games can have an effect on player experience and the perceptions of players subject to balancing. It also seems that a player's knowledge of whether a co-player has a disability can also affect how they perceive the levelness of the playing field within games.

2.3.2 Can accessibility create exclusion by changing key components of a game?

In the interest of making games more inclusive, it is possible that there is also a risk that the opposite could occur. In a similar way that inaccessible games may exclude some players, accessible games could exclude certain types of players as well. This may be due to the perception that some accessibility features could alter elements which are considered key to what distinguishes a game from other types of media. Accessibility features could be seen to either dumb down or lower the challenge in the game and result in some players believing that the game is not for them. Therefore, awareness of this perception may deter game designers from adding in certain accessibility features due to a concern that this might change players' perceptions of who the game is for and whether a game is still a game in the way that players value it to be.

Schell (2014c) suggests that the unique nature of digital games is derived from the feelings it induces for example, freedom, responsibility, accomplishment, and

friendship. Essentially, games are different from film and screenplays as they give the audience agency, the ability to interact and change the media. Part of Juul's (2011) definition for games, states that "*A game is (1) a rule-based formal system". Essentially, games have rules, where other media such as film and music do not. Juul proposes that there are "borderline games*", which do not contain a sufficient number of game-like features to be called a game. The gaming community has their own terminology used to describe "borderline games", for example "walking simulator". This can be seen on the *Steam* [8] gaming platform which allows users to "tag" games in the store with their own descriptions and genres. On *Steam*, "walking simulator" is a popular user tag given to Adventure or Indie games, e.g., *The Long Dark* and *Gone Home.* If an accessibility feature is seen to be resulting in gameplay which is lacking in rules, there is potentially the concern that it can result in games that are no longer games, but "walking simulators".

An example of an accessibility feature that could cause such an issue is that of content skipping. Little is known about whether providing the option to skip past certain types of content in games, such as a puzzle or a game level, is seen as acceptable by non-disabled players even if it provides a way for some players to play those games when they would not have been without the option to skip past certain types of content. If skipping enough rule-based gameplay could result in something which is perceived as no longer a game, this could potentially change the experience it provides. Games are seen as something that are and should be challenging so that a player can experience feelings such as accomplishment (Schell, 2014c) and flow (Csikszentmihalyi, 2007). Previous findings indicate that a lack of challenge in a game results in a less enjoyable experience for players (Juul, 2009; Sweetser & Wyeth, 2005). Controlling content could affect a player's perception of their own performance and subsequent satisfaction experienced when gaming. However, Klimmt et al. (2009) found that players both rated their own performance higher and enjoyed a game more in a lower difficulty/easy setting than in medium or hard, despite a reduction in challenge. Thus, the relationship between game challenge and player experience is not straightforward.

[8] https://store.steampowered.com/ - a platform from which to purchase, store, and play games.

2.4 Conclusions

This review of previous work illustrated that the social aspects of playing games, such as connection, sense of belonging, support, and positive interactions, are important to people. In addition, literature strongly suggests that positive social relationships are facets of well-being and personal flourishing. As such, games could go some way to providing access to those human needs, particularly for people with disabilities for whom social well-being may be harder to obtain in everyday life due to restrictions that their conditions place on them. However, research suggests that there are known issues with toxicity and hostile interactions in direct social (multiplayer) styles of digital games and that the source of this is partly the competitive nature of these games, expectations about who and how these games should be played. How players identify themselves within the gaming culture appears to have some influence over how they engage with the social dynamics in play, such that those identifying as "gamers" may adhere to stereotypical, aggressively competitive behaviour in game, and be protective over games as they perceive them.

Players with disabilities may be using a variety of mechanisms to enable themselves to get into games, such as the various accessibility options that are recommended and sometimes used for inclusion. Research indicates that it is still not well understood how accessibility options or adaptations, such as alternative controllers, may impact player experiences of people using them and their co-players. This highlights a gap in existing research that warrants investigation to deepen the understanding of play experiences with accessible features. Where the use of adjustments/accommodations to support people with disabilities in other areas of life such as education, workplaces and sports is explored, this suggests that if other people are aware of these adjustments being made, they are more likely to make judgements about whether their use is fair. If the use of adjustments is seen as unfair, this may present a social barrier to the acceptance of their use and therefore undermine the purpose. This is especially the case if the reason for the use of adjustments is not known and where they might be seen as providing the user some tangible advantage over others, for example, additional time allowed to complete a school exam. Such findings suggest that disclosure of accessibility or adaptation use

in games might also be judged by other players if use becomes salient in play or is directly disclosed. Since the use of accessibility adaptations may not be understood by many players, there may be disruptions to fairness in play and therefore could provoke hostile reactions from some players in social play.

Overall, it is clear that player experiences are not fully understood with regard to social experiences and there are significant gaps in knowledge about accessible player experiences, therefore, what constitutes equal access to these experiences is unknown.

3. Participatory design of a demographic survey

To lay the foundations for investigations into the social context of digital gameplay and its impact on the experiences of players with disabilities, it was important to first understand who these players are. This chapter addresses RQ1. The players: Who are players with disabilities, what are they playing, and what adaptations do they use to enable play (if any)? In particular, this was aimed at discovering whether these players are using adaptive technologies and accessibility features designed to enable their play, and specifically, whether they are playing mainstream games socially alongside everyone else. As discussed in Chapter 1, however, abstracting this information for players with disabilities from the rest of the gaming community could be considered perpetuating the othering of these players. However, to fill the gap in knowledge about these players and to be able to identify where there may be barriers (social, physical, or otherwise) for them, it is important to collect this information. In light of the necessity, a participatory approach (Balcazar et al., 1998) was taken to ensure that participants felt that the type of data collected was appropriate, suitable, unintrusive, and considered useful information for them to share. This chapter is separate from the demographic survey report to fully detail the participatory approach taken to gather the demographic data and to explain how this translated into a community of enthusiastic research volunteers, called the Player Panels which is supported and maintained by The AbleGamers Charity. Additionally, this chapter also outlines the process created as a way for others to recruit participants for future work in game testing and player experience research.

The chapter is structured to outline the following stages of demographic survey development and the process through which the database would be used as a basis for further research participant recruitment:

- Initial registration survey
- Initial interviews
- Demographic survey pilot
- Refining and finalising the demographic survey

- Developing a recruitment process whilst protecting participant information

3.1 Working with AbleGamers

The development of the demographic survey was conducted in partnership with AbleGamers, as the AbleGamers Charity are recognised internationally and support an extensive, existing community of players that identify themselves as having disabilities. The AbleGamers Charity helps to provide custom assistive technology to people with disabilities to help them get into gaming. The founders of AbleGamers are also recognised through their outreach and engagement with game developers and for their accessibility guidelines known as Includification (Barlet & Spohn, 2012). As such, they often receive requests from game developers and researchers for advice on game accessibility.

The collaboration with the University of York and the work in this thesis aimed to provide AbleGamers with an informed approach to creating an initiative to respond to such requests and to help the connect players with those who wished to work with them. The initiative is known as the Player Panels and the survey developed as part of this thesis would be used to create the database of demographic information about the players with disabilities that volunteered to share their voices as part of the Player Panels. This section outlines the nature of the collaboration and the process of the demographic survey development. The collaboration provided access to this community and a platform from which to advertise this research. Further benefit of the partnership is access to the expertise in how disability is supported in gaming that AbleGamers could provide and advice and mechanisms for safeguarding any potentially vulnerable individuals. Section 3.3 provides further detail about how AbleGamers protect participant data and ethical concerns.

To support this collaboration, AbleGamers provided access to a dedicated email address account and Google Drive storage, managed by the charity. This provided a shared space to share drafts of the demographic survey as it was developed so that a member of AbleGamers staff could provide feedback and suggest changes.

The following steps were taken to develop the survey alongside AbleGamers. Each step states what the contribution was of the researcher and AbleGamers. These steps are then explained in detail in section 3.2:

- *An initial registration* - to gauge the level of interest and willingness of people to provide feedback on the next step of survey development. Registration form hosted by AbleGamers website but designed by the researcher. Feedback from AbleGamers was obtained on drafts of the registration questions.
- *Initial interviews* - to see how people talked about gaming and why they wanted to take part in further research. AbleGamers selected potential participants from the initial registrants to contact and ask if they wanted to take part in providing feedback on subjects to be included in the demographic survey. The researcher conducted the interviews independently having been provided with the contact details of volunteer participants from AbleGamers.
- *Development of demographic survey and conducting a pilot* - to see how people respond to the types of questions asked and ask for feedback. Demographic survey was developed independently by the researcher using feedback provided in the initial interviews. AbleGamers provided feedback on drafts of the survey both before and after the pilot was conducted. AbleGamers sent a call for volunteers to initial registrants via email to take part in the pilot questionnaire.
- *The development of a process for researchers and game developers to use to contact AbleGamers to recruit possible volunteers for research or playtesting.* The researcher developed a form (a short questionnaire) that would be used to place a request to AbleGamers to recruit volunteer participants from the Player Panels. A draft of this was discussed with AbleGamers to check that the information it gathered would be appropriate to allow them to filter suitable possible volunteer participants from the Player Panels database. The researcher designed a pilot study to test this recruitment form, and to collect feedback on the process.

The survey development initially began with a short demographic questionnaire that functioned as a registration (expression) of interest in being part of the Player Panels. In order to register for the Player Panels, players needed to access the internet, the AbleGamers website, and be able to complete the registration form. The demographic questionnaire was available to be completed by persons of age 16 and above, and with any form of disability that doesn't prevent them from completing the online questionnaire.

3.2 Process of demographic survey development

Stage 1: Registration and initial interviews

The initial registration questionnaire (which can be viewed in section 11a.) was located on the AbleGamers charity website and gathered registrants contact information, age, current gaming platforms used, game genres played, and why they were motivated to register. This initial registration questionnaire did not request information about registrants' disabilities. This omission was because the request for disability was a topic that was to be discussed with participants to inform the design of the full demographic survey. The call for registration was placed on various social media platforms (Twitter, LinkedIn, Facebook) and was picked up by a number of games news websites which directed readers to the AbleGamers website. Registration was open for two months initially as this was felt to be sufficient time to allow for responses before contacting any registrants for the next stage of survey development. It is worth noting that because people were continuing to register at this point, AbleGamers kept the registration open.

At this stage, there was no specific theoretical strategy for selection of participants and so AbleGamers suggested that location be used as a way to choose a sample from the registrants. There had been 23 registrants from the California (USA) area and so these respondents were contacted to ask if they would be willing to take part in a telephone interview that would last around 20 minutes. The purpose of this initial interview was to trial some demographic questions and explore what information participants wanted to share and how participants expressed themselves regarding their gaming habits, how their disability affects their play, and why they wanted to be

part of the Player Panels. The semi-structured interview schedule for this stage can be found in section 11b., but broadly covered the following topics:

- Gaming preferences - what games they play and prefer to play, how long they play for, and whether they would describe themselves as "gamers" and why.
- Multiplayer games - whether they play them, who would they play with, what kinds they prefer and whether they use any voice or text communication within them
- Options and adaptations - whether they use any assistive technology or accessibility features/options to enable their play and whether there are things that they believe could help them to play more effectively.
- Social - whether they engage in the broader gaming community such as game-specific forums, news, reviews, or media channels.

This initial set of topics was chosen based theoretically on the literature review conducted as part of the thesis and information that was felt to be missing from previous research on this demographic. Previous research typically focused on gaming preferences and mainly specific options and adaptations to see how effective these were. The aim here was to discover the range of options and adaptations currently being used.

There were ten applicants who responded to the call for participation in the initial interview stage, of which, seven took part. The remaining three either were unable to use the phone or Skype or did not respond to emails to arrange the interview. The interviews were not transcribed but notes were taken to document suggestions and ideas for the development of the full demographic survey. Participants in these initial interviews were provided with Amazon voucher codes ($25) in remuneration for their contributions.

The interviews indicated that participants were open about the details of their disabilities and were keen to explain how this impacted their play. They talked about why they wanted to participate in research and to help game developers find ways to improve inclusivity in their games. Of these interview participants, many were active in social gaming communities and explained that they used social media or streaming

platforms such as Twitch to advocate and document their experiences of playing games.

Stage 2: Demographic questionnaire pilot

Following the seven interviews, a further draft demographic questionnaire was created based on the discussions that took place with the interview participants and expansion of the initial interview schedule. As part of the participatory design process, insights gathered from these interviews lead to several additions to the demographic questionnaire. These included sections allowing participants to explain why they play games, a section allowing for participants to indicate how their disabilities affect their lives, with an open text field for any further information they wanted to give about this, a section to explain why they wanted to participate in further studies, and options that allowed them to express what types of study they would like to take part in. This last addition was because some respondents explained that their disabilities meant that they were able to take part in certain styles of studies and not others. For example, not taking part in telephone interviews due to hearing impairments.

The resulting version of the demographic questionnaire was sent back to the 10 Californian applicants that responded to the initial call for participation. A brief section was included at the end of this version of the survey to allow participants to provide feedback on the questionnaire. A questionnaire was chosen for this part of the study to transition the questions to the format they were to take in the full demographic survey.

The following feedback questions were at the end of the pilot questionnaire:

- How easy did you find the process of filling out the form? - Please select one
- Within the form, how clear did you find the instructions, language used and headings? - Please select one
- How confident were you that you filled out the form correctly? - Please select one
- Did you have any additional feedback or suggestions to improve the survey?

The first three questions were likert-style questions with five options (e.g., extremely easy, easy, somewhat easy, etc) and the final question was an open text field.

Of the ten surveys that were sent out to elicit feedback, five responses were obtained. It is unclear why only five responses came back although it is possible that the participants recognised the questions from the previous interviews and felt they had already answered them. Other possible reasons may be due to other obligations and other activities taking precedent over taking part in the survey. Simultaneously, feedback on this initial draft was obtained from AbleGamers staff. Feedback obtained from participants was generally positive with only one participant stating that they felt that they were not confident that they had filled out the form correctly. This participant had filled in all questions as asked but did indicate that they used a screen reader which suggested that the form may have caused some issues in being converted to speech from text. AbleGamers staff provided positive feedback but suggested that the form may take too long to fill out. It was possible to check how long participants took to fill out the form within Qualtrics and the participant using a screen reader took 44 minutes to complete the survey. However, the other participants took between 10 and 20 minutes to complete. Having discussed this with AbleGamers staff, an open text question about why participants played games was removed to slightly shorten the form as this question was felt to be covered by a closed version of this question. As a result of this trial and feedback, an additional *optional* question was included to allow participants to include social media or gamer tags, and examples were added to the game genres question as clarification.

A final draft of the demographic questionnaire was sent to AbleGamers staff for proof-reading and checking for accessibility before sending out to all of the registrants that had applied at that time. It was important to check that AbleGamers were satisfied with the final questionnaire as it would be distributed through their mailing lists. The full final demographic survey can be found in the Appendix, section 11c. The detailed results obtained from the demographic survey are presented in the following chapter.

Stage 3: Creating a process for others to recruit participants

Stage 3 is a dual-purpose stage that creates a process to be used for further work in this thesis and to remain in use by AbleGamers. As stated in section 3.1, one of AbleGamers' aims in the Player Panels initiative was to construct a way process through which opportunities for further research could be distributed to individuals who have expressed interest in such activities. This stage forms part of this thesis as it lays the foundation for participant recruitment for the interview study presented in Chapter 6 about players with disabilities experiences in multiplayer games. Therefore, a process for participant recruitment was constructed alongside the demographic data collection. The reason for this was to cross reference information that may be useful for recruitment as well as valuable demographic information for further understanding participants' access to and subsequent experiences in play. This process for participant recruitment was then able to be used to identify suitable possible participants for studies as part of this thesis.

An additional questionnaire was created to be used as a method through which games developers and researchers could send a request to AbleGamers to work with participants from the Player Panels. This form can be seen in section 11d. This form was designed to collect details of the study or activity that are being recruited for and to specify characteristics, such as type of game, that could help locate suitable possible participants to contact. The form allows the recruiter to select characteristics that have been gathered by the demographic questionnaire in order to effectively match up potential participants. Examples of such characteristics include disability type, typical playtime, assistive technology used, games played, and what kinds of study/activity they are willing to take part in.

To pilot the recruitment form, nine postgraduate students studying digital games research at the University of York were recruited to provide feedback on this process. These participants were selected because they represent the kinds of individuals that may be likely to use this recruitment form in future. Further work as part of this thesis would use this process to recruit participants for an interview study. Postgraduates as participants in this pilot study both represent researchers such as myself and, due to their PhD research topics, some of them may go on to work in the

games industry following their programmes. The postgraduate students were given one of three sets of recruitment criteria to use to populate the form. Supplementary feedback questions regarding the effectiveness of the form and the ease of completing it were added to the end of the form. Adjustments to the form were made according to any feedback provided. The following sets of criteria were provided to the trial participants:

The three recruitment scenarios that were given to the postgraduates as part of this pilot study were the following. Each scenario represents a possible study or playtest and contains information that can be used as criteria to fill out the recruitment form. Scenario 2 which aims to recruit interview participants was included to represent as similar piece of research to that conducted in Chapter 6. Each participant was given one scenario, meaning that each scenario was used by three separate participants.

> 1: You need to recruit 10 play testers for a developer of a new 2D fighter game which is to be released on console. The developer would like to test the compatibility of the game with a few third-party controllers which have been adapted for players who have the use of only one hand to play games with. The developer has asked for gamers who have experience with 2D fighters and that currently use this type of technology.
>
> 2: You are recruiting interview participants. The aim of the study is to explore the experiences of players with anxiety disorder when playing online with strangers or people they have not met in real life before. They are looking for at least 15 participants who are between the ages of 18 and 40. In particular, they would like to talk to players of online multiplayer games such as FPSs, MMORPGs and MOBAs.
>
> 3: You are recruiting at least 40 visually impaired players for an experimental study into the effectiveness of using eye gaze tracking to play a short PC puzzle game. The investigator has specified that they would prefer players who usually play for at least 1 hour at a time in their normal play sessions and that have experience of playing puzzle games on any gaming platform.

The participants generally found that the form was easy to fill out, but some felt that the recruitment scenarios provided didn't provide enough detail for those responding to the recruitment to be able to provide. Additionally, it was noted that there was no option to say that there was no maximum number of participants intended to be recruited (the form allowed up to 200 participants only) and that the form provided 1900 as a possible start date of the study. One participant also stated that the difference between a playtest and an experiment should be made clearer.

Based on the feedback generated from the participants in the pilot of this recruitment process, a final version of the recruitment form was created to reflect the practical parts of the form that caused issues. The minimum and maximum number of participants requested was changed to an open text field, and the start and end date of the proposed study was also changed to open text rather than drop-down fields.

3.3 Ethics, data fidelity, data ownership and protection

In partnership with AbleGamers, it was decided that beyond the work in this thesis, AbleGamers would take ownership of the demographic database, the registration process, and ongoing maintenance of data collected. The demographic database, at the time of writing, is still open to new registrants and is active, living data. As such, only the demographic data presented in Chapter 4 is covered by the University of York data protection and storage requirements (details can be found in Appendix, section 11h).

In addition, agreement with AbleGamers was made that the demographic data reported in Chapter 4 should only include registrants over the age of 18 and excluded those that indicated that they have a cognitive disability. AbleGamers requested that those who have indicated cognitive disability should not be recruited initially. At the time of reporting, AbleGamers were still in the process of working on a procedure to ensure that fully informed consent could be informed or that a legal guardian could be involved to ensure that potentially vulnerable individuals could be safeguarded.

A common concern with self-report data is that individuals may not provide truthful information and, as such, hangs a question mark over the validity of the data

gathered. AbleGamers staff provide a useful statement that it seems fitting to mention, as it explains how, although untruthful data is possible, it is unlikely. The full statement is provided in Appendix, section 11e. They state that it is inappropriate to ask participants to provide proof of their disabilities as, not only is this intrusive, but disabilities can also be temporary. They also explain that, although there is a chance that individuals may not report the truth, there would seem to be little benefit to them to do so. Participants took the time to fill out the demographic information and often provided very detailed information about their disabilities, as well as providing social media tags that can be viewed to show who these individuals are.

3.4 Discussion

Using a participatory approach to create a demographic survey of this kind seems to have been an effective approach. The positivity, enthusiasm, and willingness to participate from those that registered suggest that participants see the benefit of the survey and of the Player Panels initiative. This process met the aims of AbleGamers in creating the Player Panels demographic database, whilst also making sure this is information that the players wished to share. The process also provided information to inform and support the aims of the overall thesis in gaining an understanding of who these players are, the ways they play, and whether they play social games. The collaboration with AbleGamers throughout the process has undoubtedly been beneficial as they have provided their feedback and expertise in working with people with disabilities through their experiences in helping these people to play. It is essential to recognise however, that a limitation of this approach may mean that anyone who was unable to access the internet, register, or fill out the demographic survey is not included. Beyond this research, further effort should be made to reach out to such individuals to increase access to the Player Panels initiative.

A further significant limitation of the collection of data in collaboration with AbleGamers is that this creates a bias in the sample. As mentioned, the approach relies heavily on potential participants access to the internet and, importantly, knowledge or exposure to the AbleGamers Charity through their website or social

media channels. Additional bias applies at any stage where feedback was obtained from AbleGamers staff or from participants selected by AbleGamers as possible study recruits. As the development of the Player Panels and the promotion of the initiative was to take part in research and playtesting to help make games better and more accessible, this also likely attracted advocates of improved game accessibility and those confident in sharing their experiences and ideas. Acknowledging these limitations, the collaboration provided the expertise and experiences of AbleGamers staff and subsequently, access to a largely understudied player-base.

The recruitment process, as outlined in this chapter, that was developed for researchers and game developers to use to potentially recruit players from the Player Panels, was effective for the participants in the pilot. It is not possible to report whether this has been used effectively by those it was intended for as the requests go directly to AbleGamers. Additionally, requests from game developers may be confidential due to games in development often being covered by non-disclosure agreements.

4. Characteristics of players with disabilities

Chapter 3 presented the method of the development of a large-scale demographic survey that would be used to collect information from players with disabilities about what, how, with whom they are playing mainstream digital games. This chapter continues to address RQ1 as stated at the beginning of Chapter 3. This chapter presents the results of this survey which, the time of reporting, had collected information from 543 players with disabilities. This information was collected to direct future research as to the diversity of this distinctive population of players, and to inform design in terms of the range of technologies that are currently being used in digital games. The survey specifically asked questions about multiplayer games and game communication to lay the foundation for the study presented in Chapter 6 where players are interviewed about their social experiences in playing these games. This chapter dives directly into the results as the method of the survey development was outlined in detail in Chapter 3.

4.1 Results

The demographic survey developed for this thesis is still currently open to collecting information from players with disabilities. It was opened in December 2017 and continues to elicit responses from new participants. For the purpose for reporting the findings for this chapter, the information from the total respondents at the end of June 2019 are presented. Therefore, demographic data from 543 players that have self-identified as having disabilities are organised under headings that correspond to the primary topics covered in the survey. The structure will be as follows:

1. Who the players are - age, gender identity, typical length of play sessions, and information provided about their disabilities?
2. What kinds of games are they playing - gaming platforms used, favourite games, single or multiplayer, use of assistive technology and accessibility options?

3. Who are they playing with - whether they play with friends or strangers and in which styles of multiplayer games they play?
4. Communication methods - what sorts of communication platforms they use if they play in multiplayer games.
5. The reasons players give for why they play digital games.

The results will be followed by a fuller discussion of the findings generated by the demographic questionnaire.

4.1.1 About the players

A breakdown of the demographic information gathered is presented here, followed by information about disability presented in Table 1.

Total number of respondents: 543

Gender identity:

- Male: 364
- Female: 124
- Non-binary: 30
- Preferred not to say: 25

Mean average age of respondents: 31

Length of a typical play session (in one sitting), number of respondents:

- 5 hours or more: 119
- 2 to 4 hours: 244
- 1 to 2 hours: 122
- Less than 1 hour: 35

Respondents were asked to select as many of the items in Table 1. to describe their disabilities as required. It is worth noting that 'Other needs and preferences' was an open text item. This mainly seems to have been used to provide a more detailed

description or the medical terms for their disability. To retain confidentiality, this information is not provided here.

Table 1. The number of respondents identifying that they have a particular disability as requested in the full demographic survey. Note: participants could select more than one option.

Disability	Respondents
Autism	52
Hard of hearing	44
Deaf	16
Upper limb physical disabilities	309
Lower limb physical disabilities	269
Mental Health Difficulties	121
Learning Disabilities (e.g., dyslexia, SLP, ADHD, language etc.)	83
Blind	49
Colour vision deficiency (e.g., red-green colour blind)	18
Low vision	64
Other needs and preferences	59

Many of the respondents identified themselves as gamers (319) and consider it to be their primary hobby (295). There were an almost equal number of people who considered themselves to be hardcore gamers (211) as those who identified as casual

gamers (180). Very few people did not consider themselves a gamer (68) or only played games when they had nothing else to do (38).

4.1.2 What are they playing?

The gaming platforms rated as being used 'very often' by respondents were PC (314), followed by PlayStation (174), phone (171), Xbox (106), Nintendo Switch (85), and tablet (70). Out of those platforms, Nintendo Switch scored highest in the 'do not play' category, followed by Xbox, tablet, PlayStation, Phone, and then PC. It is quite possible that Nintendo Switch was least played since it was the newest gaming console listed in the options at the time of reporting.

The game types selected as played most often were Single Player (410), followed by Online Multiplayer (273), Cooperative Multiplayer (183), Competitive Multiplayer (164), One vs. One Multiplayer (100), and then Local multiplayer (63).

Respondents were asked to provide their top 3 current favourite games. There were 329 different titles provided. Where games received more than one entry, a top favourite games list was created to show which were the most popular games.

Table 2. The top ten games as shown by the respondent's favourite games as requested by the demographic survey.

Rank	Top favourite games	Number of respondents
1	Destiny 2	17
2	World of Warcraft	15
3	Overwatch	14
4	Player Unknown's Battlegrounds	10
5	The Elder Scrolls V: Skyrim	10

6	The Legend of Zelda: Breath of the Wild	9
7	Grand Theft Auto V	9
8	Super Mario Odyssey	9
9	Rocket League	9
10	Stardew Valley	8

Although the number of respondents for each of these games does not seem high because of the huge number of different games reported by these players, the top games reflect games that were very popular at the time of reporting (ESA Essential Facts, 2019).

4.1.3 How are the players accessing games?

Participants were asked to indicate whether they used any items from a selection of assistive technologies (hardware) and accessibility options (software) or could specify in separate textbox if they used something not listed. Of the assistive technologies, 24 respondents provided information in the 'other' box. Items such as on-screen keyboard and using a converter to use keyboard and mouse on console were mentioned. One respondent mentioned that they used a handheld magnifying glass, but they did not specify exactly what they used this for. Customized controllers or alternative PC mice were also selected as often used assistive technologies. Popular accessibility options items used were subtitles (108 participants) and key remapping/bindings used by 117 respondents.

Of the 543 participants, 333 people indicated that they did not use any assistive technology, 176 people did not use any accessibility features, and 106 people did not use any assistive technologies or accessibilities features to play with. No response was provided by 21 people for these items.

Table 3. Assistive gaming technology and in-game accessibility options shown by the number of respondents that selected these in the demographic survey. Participants could select more than one item.

Assistive Technology	Respondents	Accessibility options	Respondents
Eye gaze tracking	12	Text to speech	43
Customized controller	65	Speech to text	39
One handed controller	16	Subtitles	225
Screen reader	48	Colour blind options	27
Alternative PC mouse	22	Contrast or colour changes	90
VR headset	8	Mouse cursor enlargement	56
Alternative controller	22	Text enlargement	107
		Auditory or screen alerts	80
		Key remapping	244

4.1.4 Are they playing alone?

Only five people indicated that they did not play single player games, therefore the majority of participants play alone at some stage. To ascertain what portion of participants played with others, five items were provided to indicate what kinds of multiplayer (MP) games were played; Local, Online, Cooperative, Competitive, One vs. One. This gives some indication of preference; however, it is worth noting that many multiplayer games are a combination of these categories. The most useful items for comparison here are, single player, local multiplayer (co-located play) and online multiplayer. Only 66 participants indicated that they did not play any online multiplayer games compared to 163 who said they did not play local (co-located) multiplayer.

Table 4. What types of multiplayer games are being played by respondents of the demographic survey with players with disabilities.

Game type	Do not play	Sometimes	Very often
Single player	5	95	410
Local multiplayer	163	285	63
Online multiplayer	66	171	273
Cooperative multiplayer (team vs. game)	113	183	183
Competitive multiplayer (team vs. team)	139	164	164
One vs. one multiplayer	191	219	100

4.1.5 Who are they playing with?

Understandably, local multiplayer games were mostly played with real life friends of participants, though some people played these games with online friends and strangers. This could perhaps indicate that these games might be played in a public setting, such as a gaming centre or an arcade. Online multiplayer games were mostly played with online friends, and almost equally with real life friends and strangers.

Table 5. Table showing who players with disabilities play alongside for each style of multiplayer games.

Game type	Real-life friends	Friends of friends	Online friends	Guild or clan members	Strangers
Local multiplayer	314	92	79	32	47

Online multiplayer	292	192	351	162	283
Cooperative multiplayer (team vs. game)	258	160	276	118	183
Competitive multiplayer (team vs. team)	237	150	264	115	232
One vs. one multiplayer	202	96	189	56	185

4.1.6 How are they communicating in play?

The participants who played any form of multiplayer game were asked to specify which communication platforms they used during play very often, sometimes, and not at all. The most popular communication platform was the games own provided chat/voice comms (156) followed by Discord (143) PlayStation Network Chat (67), Xbox Party Chat (64), Skype (36), TeamSpeak (22), Mumble (4), and Ventrilo (4). All of these communication platforms were most often used on PC with the exceptions of PlayStation Network Chat which was mostly used by those who used PlayStation 'very often' and Xbox Party Chat, used by Xbox players. Of the participants, 30 said that they didn't use any of those communication methods listed. Since we did not offer an open text entry on this item, it is not clear whether they simply did not use communication in game or whether they used some other platform, such as Facebook or WhatsApp.

4.1.7 What are players' reasons for gaming?

The most popular reason provided for why participants play games was to have fun. All but 40 participants selected this item. Relaxation, challenge, socialising, and escapism were also commonly selected reasons for play. Interestingly, health-based reasons - stress and mental health management were more common than

competition for this sample of players. Just under a third of participants indicated that one of their reasons for playing games was related to pain management.

Table 6. Reasons for playing games as reported by respondents of the demographic survey of players with disabilities.

Why Play?	Respondents
To have fun	503
To help me relax	436
To challenge myself	372
To escape reality	341
To socialise	338
To aid in my stress management	331
To be part of a community	279
To aid with my mental health	202
To compete with others	192
To aid in my pain management	144
Other reason	78

4.2 Discussion

The results show that this sample of players with disabilities all indicated that they play mainstream, commercial games. Many of their favourite games at the time of reporting are aligned with popular games played across the common gaming platforms. This strongly suggests that the gaming preferences of these players is no

different from digital game players who do not have disabilities. While this aligns with Porter & Kientz (2013b) and Flynn & Lange (2010) regarding the desire of people to play mainstream AAA[9] titles, this sample shows that more than half of respondents to the survey say that multiplayer games are among their favourite games. Whether this is due to sampling bias, or due to a shift in demographics since that previous work, these results provide compelling evidence that players are engaging in both single player games, and online, community-based play.

The demographic survey results show that there are some adaptations that are commonly used among this sample, such as customised controllers/PC mouse, subtitles, and key remapping. This suggests that even such minimal adaptations provided in games can help to enable play for many people. PC was the most used gaming platform by participants, which is consistent with common wisdom that up until recently, PC gaming was more accessible than consoles as accessibility is more mature on that platform (Juul, 2010). It will be important to revisit this in the near future now that a number of consoles are integrating middleware solutions for accessibility. PlayStation, closely followed by smartphone were the next most used platform by respondents which may be due to the ubiquity of the smartphone in modern life which is something that people are likely to own anyway rather than a separate platform for gaming. The popularity of PlayStation may simply be because PlayStation (PlayStation 1st generation released in 1994, Xbox 1st generation released in 2001) consoles have been available for longer than Xbox and the survey did not specify a particular version of the product as it did with Nintendo Switch. This is, of course, a limitation of the survey that could be later adjusted to see if certain versions of a console are more often used by these players.

Many of these players consider themselves to be gamers, and a substantial portion say that they are hardcore gamers which suggests that they identify deeply with the gaming hobby and invest substantial time and effort in it (Bosser & Nakatsu, 2006). If this is the case, there are social aspects to consider for these players within gaming,

[9] AAA is typically used to informally refer to very popular, high budget, top selling digital games made by major games publishers/developers.

too. As discussed in Chapter 2, section 2.2.5, how a player identifies within the gaming community may influence how they experience the social aspects of play and how they are perceived by other players. That many of these players identify as hardcore players warrants further investigation to see how this interacts with how they are playing, as such, this is further explored in Chapter 6.

Many of the participants indicated that they play a range of different forms of multiplayer games and as such, are gaming with others at least some of the time. Since very few people indicated that they *did not* play any online multiplayer games, this supports that gaming is a social hobby for players with disabilities. The results suggest that there is a preference for cooperative multiplayer over competitive multiplayer games, though only minor. This could indicate that this sample of players are less inclined to play for competitive reasons, this appears to be supported by the results of participants' reasons for gaming. Competition did not appear to be one of the main motivations for this sample to play games. Typically, competitive multiplayer games have some element of cooperative play within, such as working in a team to compete with the opposing team to complete an objective or to score more highly. That players indicated a slight preference for cooperative play, may be meaningful as this could suggest that there is something about competitive play that is less appealing for this demographic of players.

When participants were required to specify who they played with from a number of options, those who played online multiplayer games played with both real-life friends and strangers about equally, but primarily with online friends. It is not clear whether this is due to the formation of online friends through gaming for gaming purposes or simply having fewer real-life friendships that extend into gaming. Xu et al. (2011) consider a 'game as a medium of social relationships' in their work on social relationships in First Person Shooter (FPS) games and, in particular, within the game *Halo 3*. They conclude that although players had a significant number of real-life friends in their 'friend list', players often 'friend' other players that they have met online through games. That this friendship occurred as a result of playing successfully together multiple times and communicating during the game. Xu et al. (2011) also suggest that additional friendships form to include friends of friends

through the game by either player introducing their friend to work together in the game. Szell & Thurner (2010), in their study of social dynamics in multiplayer gamers, suggest that the expansion of friendship groups to include friends of friends is evidence of triadic closure, which refers to how social networks develop between groups of three people. This may go some way to explain the number of online friendships indicated by our sample. Szell & Thurner (2010) also propose that their findings suggest that online virtual communities within multiplayer digital games work as a kind of model for human society. This is particularly interesting because if this is the case, it suggests that the social framing and the dynamics of human social networks may be seen on a smaller scale in this type of game.

The results also show that, when playing cooperative games, people played with a higher number of real-life friends than strangers, however, when playing competitive games there was little difference between the numbers of real-life friends and strangers. In addition, people who played cooperative games, overall, played with less strangers than those who played competitive. This is worthy of deeper exploration to determine whether this trend is linked to their gaming goals, preferences, and abilities or rather more influenced by the types of games that they are choosing to play. It is not possible at this stage to determine which games players have in mind when thinking about cooperative (team vs. game) and competitive (team vs. team). The type of game and the way that individual teams are formed within the game may have some influence on whether players are more or less likely to play with strangers. As an example, a game like *Overwatch* (team vs. team) may allow for more random formulation of teams due to its matchmaking system related to player skill and thus, mean that players end up playing more with strangers. Whereas, when playing a game such as *World of Warcraft* (team vs. game, though not always), teams may be formed over time between players who meet and bond and form friendships (Nardi & Harris, 2009).

4.2.1 Communication

Among players that use voice chat communication within games, the communication platform used seems sensibly linked to the gaming platform that they play on. For

example, people playing on PlayStation mostly used PlayStation Network Chat. Interestingly, on the most popular gaming platform PC, players used Discord[10] to chat more so than the voice chat that is provided by individual games. Freeman & Wohn (2019), in their study of E-sports players, also found that platforms such as Discord and TeamSpeak[11] were preferred for social interactions with co-players. There could be a number of possible reasons for these findings. Discord is a communication platform for gaming, and it has overlay functionality so that it can be used in most popular PC games. It allows users to create specific channels which any person with the channel link can join. Within a channel, smaller subchannels can be created for specifically voice communication and chat. It arguably creates an optimal platform for the creation and maintenance of gaming communities, whereas a game's own communication platform may be temporary and limited to individual play sessions. Another possible reason why players may be choosing a third-party voice communication platform is that it allows users to more easily control who they voice chat with. Wadley et al. (2015) worked on a grounded theory towards understanding the use of voice chat in online play. They found that voice chat was not always preferred over text-based chat and that 'griefing' among players was felt to be worse in voice chat. They suggest that, although voice chat can be positive for players to build on social connections with other players, it may 'interfere with pseudonymity'. This is because voice chat allows other players to learn things about the speaker through their style of communication and things like nationality or location that could be guessed through the sound of their voice. A reduction in pseudonymity could potentially be an important factor for players with disabilities to allow them to avoid any potential discrimination that they may feel they could face in social play. Further, a platform such as Discord allows players to establish and maintain online friendships and speak to others during play for strategic communication but also may act as a buffer against 'aggressive' communication that could come through other in-game voice channels.

[10] https://discord.com/new - a voice and text chat application used by game players

[11] https://www.teamspeak.com/en/ - a channel-based voice communication service used by players.

4.2.2 Reasons for play

The primary reason selected by participants as to why they play games was to have fun. This suggests that participants are motivated to play for the sake of enjoyment and leisure, much like players without disabilities. Personal challenge, being part of a community, and escaping reality were also commonly selected reasons. This is not dissimilar to the findings of Sherry et al. (2006) who found that challenge was a main reason given for play. They also found that competition was a significant motivator to play, however, our findings do not match this. Respondents indicated that they played for health reasons, namely stress management, and as an aid to mental health over competition. It is not clear whether this is related to their disabilities or not. Where some participants have offered other reasons in the text entry, however, a common theme within these comments was that people were playing for therapeutic reasons. Anonymised examples include:

> To help maintain mental sharpness and clarity
> Physical therapy for hands
> Combat depression
> To slowly work through issues/empathy

This supports that playing games is not only a means to an end for these players, but beneficial for other health-related reasons. This supports previous enquiry into the efficacy of games for supporting health (Stetina et al., 2012) and well-being (Nacke et al., 2013). Not only this, it means that some players are also playing games for this reason of their own volition.

Playing to be part of a community and playing for challenge were rated equally as reasons from gaming. This supports that social aspects of play are important to our sample. But that challenge is an equally motivating, core component of game play for these players much like other mainstream gamers (Cox et al., 2012; Denisova et al., 2017) Further investigation would be needed to find what community means to these players and whether they are referring to gaming communities in general or, more specifically, communities based around play with disabilities. Some further

comments by participants give some indication that this may be a community of players with disabilities, examples include:

> To try to help others to find ways a person with a disability can play and enjoy gaming.
> To show other people that it's possible and build a community for other disabled gamers.
> To advocate.
> To inspire.

This finding may be a result of the participant's choice to belong to and support the work of a charity advocating and facilitating play for a community of players with disabilities. Nonetheless, this is evidence that the gaming hobby revolves around, and serves to establish communities and this supports that gaming can be treated as a social activity.

More importantly, even though there will likely always be a need to address the implementation lag of new technologies to provide accessible options (Power et al., 2018), the results of this survey show that commercial mainstream games are reaching a point in the research domain where there is the opportunity to move beyond simply providing access to games. This foundation of knowledge of how players with disabilities access games, opens the door for research into what it means to have accessible player experiences (APX) and to situate these players within the broader social context of digital gaming.

4.3 Conclusions

The demographic survey shows that participants are integrated in the wider population of players. They are playing mainstream games, they play online, and play multiplayer games with both friends and strangers, they identify as 'gamers', and give substantial amounts of their free time to the hobby. Since previous research has focused on using games for therapeutic uses and rehabilitation, this work shows that, although this may motivate some people, players with disabilities are also playing for

similar reasons as players without disabilities, for fun, relaxation, challenge, and community. Additionally, there may still be issues with control mechanisms for players with disabilities and therefore mainstream games may not be entirely accessible, however despite this, there are still players with disabilities who *do* have access and *do* play popular mainstream games. Therefore, game designers and researchers can assume that people with disabilities want to play mainstream games with everyone else and will attempt to find a way to play. In terms of game design, since many of these players have reported using adaptations such as auditory alerts, key remapping, subtitles, alternative controllers, screen readers, and so on, this suggests that these minimal additions and modifications to games can accommodate a substantial audience of players. As such, it is becoming increasingly important for researchers and designers to consider not only the effectiveness of these adaptations but how they impact their overall APX of digital games and, consequently, their social experiences in playing games with others.

Chapter 4 provided a foundation from which to base further research into this diverse player base. This work provides the broader games research and games development communities valuable information about the types of games played by this demographic and what, if any, adaptations and accessibility features they currently use to access mainstream games. As this demographic survey, at the time of writing, continues to gather responses, the contribution of this work will continue to grow and provide avenues for further research. Chapter 10 further summarises the contributions and the limitations of this work.

5. Social experiences and player perceptions of accessibility adaptations in multiplayer games

Having data gathered in Chapter 4 to ground further study and a process to recruit participants using the Player Panels initiative described in Chapter 3, it is therefore appropriate to return to the focus on the social context of multiplayer games to gain insight into how disability may interact with this framing. Chapter 5 (this chapter) and Chapter 6 are designed to work as a pair of studies to allow for contrast and comparison between players' perceptions of and experiences with disabilities in social play. A joint conclusion for these studies is presented in Chapter 7. This chapter focuses on the social play experiences of players not explicitly identifying as having disabilities. The aim is to illustrate the social environment of multiplayer games more generally. The presentation of players with disabilities experiences in Chapter 6 and not first, is not intended in any way to indicate that their experiences are secondary. The structural choice is to provide context for the experiences of all players and to provide a basis for comparison for any additional or differences in barriers to inclusion for those playing with disabilities.

Multiplayer games were chosen as the contextual focus of studies presented in Chapters 6 and 7 because this provides insight into a directly social form of play. As Chapter 2 (sections 2.2.2 & 2.2.3) presented evidence from previous research that toxicity is a known problem within multiplayer games, this suggests that diversity may not be entirely supported by this kind of game. This study aims to begin by exploring how players without disabilities view players with disabilities and how they perceive the use of accessible features and technologies that might be needed by these players to play. It also explores what factors people consider to be constructing positive and negative experiences in these games. In addition to providing insights of players into inclusive social play, this study is intended to contrast with the subsequent study which similarly investigates social play but from the perspective of players with disabilities (Chapter 6).

This study explores players' perceptions of several aspects of playing multiplayer games through interviews. This is motivated specifically towards building a picture of the kind of social environment that players with disabilities might find themselves in when they play multiplayer games. This chapter addresses primarily RQ3. Social play alongside those with disabilities: How are the mechanisms that players with disabilities use to enable them to play, perceived by other players? The chapter also provides some grounding for RQ2 by illustrating the social context of playing multiplayer games.

It is unclear how the use of adaptations might have an impact on player experiences in social play, therefore, this interview study uses open questions about players' general experiences of social play in multiplayer game environments. Where this thesis uses the social model of disability as a theoretical frame for the work, the basis of this study is to illuminate aspects of this environment that may mismatch with the varying ways that people play. This aims to allow for emergence of other areas of interest that may broaden the understanding of the dynamics of mainstream social play. This is followed by specific questions about accessibility options and players with disabilities.

The specific aims of this study are summarised as follows:

- To establish what a selection of players like and dislike about multiplayer games to allow for comparison with the likes and dislikes of disabled players. Any similarities may highlight potential improvements game developers can make for all.. What aspects players enjoy and do not enjoy is useful contextual information to show what pulls players to continue playing this type of game and situate the findings within existing literature on player motivations and values. (Addressing RQ2).
- To determine how current inclusive features and tech are used by non-disabled players and their opinions about how they impact the social environment of multiplayer game play. (Addressing RQ3).
- To contrast with players who may need to or are currently using accessibility features or adaptations to help them play because of a disability. (Addressing RQ3).

5.1 Method

Since there are so many factors and dynamics at play in multiplayer environments, a qualitative approach was necessary to obtain a depth of understanding grounded in context of play, societal, and individual factors. The Thematic Analysis method was followed according to Braun & Clarke (2013) whereby data collected from semi-structured interviews was iteratively coded, cross-referenced, and organised into patterns or themes

Method rationale

Thematic Analysis was chosen as the qualitative analysis approach to this study and the study presented in Chapter 6. Although Thematic Analysis is limited in terms of its scope for interpretation, it was felt that it provided a flexible way to explore players' experiences with respect to a set of specific questions and topics. To this end, the Thematic Analysis is primarily theoretical as it is guided by the social model theory of disability and existing findings around social player experiences (as discussed in Chapter 2). Analysis methods such as Interpretive Phenomenological Analysis (IPA) (Smith et al., 2009) were considered as possible approaches for this work, particularly as IPA is a context-focused method, however, although used to make sense of peoples' experiences, this technique relies heavily on the interpretation of those experiences by the researcher. IPA has the benefit of allowing the researcher a structured way to explore experiences, such as players' social experience in play, but Thematic Analysis has the added advantage of allowing for deeper exploration of those experiences through the lens of existing theories to generate themes. The themes can then be used to inform the directions of further studies following on from this step. Grounded Theory (Charmaz, 2014) was also considered as an approach but was unsuitable as this technique is used to investigate concepts that are not yet understood, to generate a working theory. In the case of this research, existing concepts surrounding player experiences and social play provide the theoretical lens.

Recruitment

Ethical approval gained through the University of York Physical Sciences Ethics Committee to recruit 20 participants using social media platforms, Facebook and Twitter. Recruiting 20 participants for a detailed interview session was considered to be an appropriate sample to generate a set of well-supported themes for the aims of this study. The participants were required to be over the age of 18, able to provide informed consent. The participants were all residents of the United Kingdom at the time of interviewing. The participants were not screened prior to taking part regarding their attitudes towards disability or other characteristics. The primary inclusion criteria were to be regular players of any mainstream, commercial multiplayer games.

Any quotes used from participants are provided using a pseudonym to retain participants anonymity. The pseudonyms partially reflect the gender of participants in some cases but are left ambiguous where possible to avoid disclosure of identity. Age is also kept separate from quotations for the same reason. As much as it would be good to provide detail of the participants' backgrounds, this is omitted as this could be used to de-anonymize the data and may compromise the ethical requirements of protecting the identity of participants.

Although this study did not aim to recruit participants that identified themselves as having any sort of disability, a couple of participants disclosed this during the interview process, namely autism and mental health conditions. Their data have been retained in this study since they indicated that these did not have any major impact on their play in multiplayer games.

Procedure

The participants took part in a 40-60-minute semi-structured interview either through an online video platform such as Skype or face-to-face when possible. Each interview was audio recorded and subsequently transcribed for analysis. Participants were given an I.D. code that would be used in place of their personal information to anonymise their data and so that the participant could opt to withdraw their data at a later time.

The following section outlines and explains the rationale for the semi-structured interview schedule. The full interview schedule can be found in the appendix, section 11f. The schedule was used to prompt the participant to cover certain areas of interest within the study, however, it is worth noting that participants were encouraged to elaborate and talk freely if any other thoughts arise whilst they were discussing each topic.

Interview topics

The guideline questions generated to be used in the interview were designed to cover several areas of interest surrounding the social environment of multiplayer games in order to infer how players with disabilities might be affected by such environments. The study aimed to focus on certain topics such as game accessibility and their perceptions of players with disabilities, but additional topics were included to provide a broader view of their experiences, to prompt participants to think about several aspects of play. The following subject areas were used to form the guiding questions, included is a short explanation of the reasoning for their use:

- *Demographics (age, preferred platform, typical play length, who they play with, etc.)* - To establish what kind of player they are and what their multiplayer preferences and habits are. The demographics collected here are designed to be consistent with those asked of players in Chapter 4 as the next study (Chapter 6) uses the demographic data gathered in Chapter 4.
- *Do they identify as a gamer?* - As noted in Chapter 2 (section 2.2.5), how a player identifies themself within the broader gaming community may give an indication of their values in play, their own perception of inclusion in this community and how they relate to other digital game players.
- *Competitive or cooperative* - To see if one style favoured over the other and why since previous research suggests that competitive play may feature more negative social aspects such as toxicity.
- *Use of voice chat functionality in games* - This aimed to identify how players engage with others, if they do at all, and may suggest how comfortable players feel with this since it may result in a loss of some of the anonymity that online environments may provide (Chapter 2, section 2.2.4).

- *Favourite games, disliked games* - To determine what elements of multiplayer games are preferred or avoided.
- *Inclusive game features and tech (appropriateness/acceptance of)* - To explore how features such as accessibility options and assistive/alternative hardware is viewed by these players and whether they believe it affects their play experience.
- *Players with disabilities* - This may indicate whether players with disabilities have disclosed this information to them and how they have reacted to this.
- *Social inclusion and exclusion* - To learn about experiences in game that have caused them to feel left out or to feel connected and part of a team
  Miscellaneous, game improvements and other thoughts - To allow participants to indicate any other thoughts about multiplayer games.

Analysis method

This section outlines the steps taken by the researcher to conduct the analysis of the dataset. The analysis was conducted solely by the researcher and author of this thesis. A position statement including information about the background and perspectives of the researcher is outlined in Chapter 1, section 1.3.3.

The stages of Thematic Analysis as described by Braun & Clarke (2013) are steps 1 to 7. Further detail is included about how each step was approached.

1. *Transcription* – Each interview was transcribed verbatim from the audio recording into a word document (Google Doc) by the researcher. Any identifying information, such as names of other people mentioned by the participant, were omitted from the transcripts to preserve anonymity.
2. *Familiarisation, note taking* – During the transcription stage, sections were listened to several times and notes were added as comments to the documents to highlight items of interest, for example, direct answers to questions and items emerging that were not directly asked about.
3. *Complete coding of entire dataset* – Each interview transcript was coded sequentially with data-derived codes. The codes consisted of short phrases or words that describe participant responses that corresponded to the interview

topics described (page 90) and any further topics that arose beyond the core topic list. Once each interview had been coded once, a re-coding was conducted to capture any items that corresponded to new codes as they developed.

4. *Searching for themes* - The full code list was first theoretically organised using the topic list (page 90). This was then re-categorised without the topic list as a theoretical guide. The two sets of categories were compared and checked for axial codes which could link topics together and highlight recurring concepts. The two sets of categories were merged in this way to create themes.
5. *Review themes and look for links, subthemes and create a thematic map* – the themes generated in stage 4 were analysed for any further links. This stage generated higher level themes (categories) that highlight clusters of related topics and concerns of note to participants. The theme lists, at this stage, were discussed in detail with the supervisors of the researcher, this discussion made it clear that a distinction needs to be clarified between which themes related directly to the interview topics and which emerged from the data.
6. *Define and name the themes* – The high-level themes created in stage 5 were given definitions and associated subthemes as created in stage 4. The high-level themes are used as section headings (categories) in the results and the subthemes are given as sub-sections. These are given in a summary table at the start of section 5.2.
7. *Final analysis and writing up.*

In summary, each individual interview was reviewed after during the transcription phase and a set of initial notes were taken during this stage. After all 20 interviews had been completed and transcribed, the initial notes were reviewed and any similarities of points of interest were recorded - this stage formed the complete coding process. Some of these codes represented items that directly answered questions asked, such as a player explaining whether they preferred cooperative or competitive play styles. Other codes synthesized an account or explanation given by a participant, such as a player explaining that they dislike and avoid certain games because of the verbal aggression they have witnessed in them. The full set of codes

was reviewed to look for any commonalities, contradictions, similar concerns, that would be pulled out as themes. These themes were then checked back against the code set to look for areas where there were connections between themes that warranted pulling out as a category within a theme. A thematic map was started using the themes generated in this study which was then updated to represent the joint findings after the study in Chapter 6 was analysed.

5.2 Results and discussion

As the interview study covers several topics, discussion and reference to literature is largely included within the results to form a coherent picture of the findings as sections relate to one another. Since the Thematic Analysis in this case is theoretical and specific topic areas are addressed, it was expected that themes generated would be related in some cases. Where the themes reflect this will be stated clearly within the relevant sections. Themes arising that are not directly asked about are described as emergent themes.

Section 5.2.1 presents the demographics of the participants, and the following sections are organised under headings that line up with the high-level themes, with subheadings that describe each subtheme from the Thematic Analysis process.

Use of quotations in this section

Direct quotations from participants are presented as part of the results in this chapter (and in Chapter 6). For each subtheme, an explanation of the theme is given followed by a selection of quotes from participants that are illustrative of the subtheme as present in the data. Many quotations are presented as fully as possible to preserve the context and depth of explanation given by participants, as such, they are presented in list following each subtheme description with elements of discussion where relevant.

Table 7. Table providing a summary of the themes created as part of the Thematic Analysis of 20 interview participants regarding multiplayer gaming experiences.

Theme Summary	
Category (Theme)	**Subtheme**
Identities in play	• Gamer is a loaded term • Gender
Benefits of playing with others	• Positive social experiences • Communication tools and game design can be a barrier • Cross over with another hobby
Disability and accessibility	• Positive attitude towards inclusion • Customisation is helpful • Acceptance if it levels the playing field • Fairness in play • Transparency leads to vulnerability • Poor implementation may undermine usefulness
Expectations of others	• Being good enough • Strategies to avoid toxicity

The results broadly show that players see multiplayer games as beneficial due to the social element of these games. They discuss how they value positive social interaction in play such as effective teamwork and enjoy games that connect them to other players that have similar interests and hobbies. The participants explained that they did not usually expect people with disabilities to disclose themselves in multiplayer games and expressed their concern that players with disabilities might be met with

negative reactions from other players in these games. Despite this, their views of accessibility and improved inclusiveness in multiplayer games is generally positive, however, there is some concern for how accessibility features may interact with how fair a game is perceived to be. This seems to be tied to how players feel that there are correct ways to play, a standard to which players should meet in terms of their skills, and the expectation that these unspoken rules should be adhered to by all players regardless of their abilities or disabilities.

5.2.1 Player demographics

The age and gender identity of participants are shown in Table 8 below. The participants in this study were primarily young adults below the age of 30. The participants ranged in gender identity but just over half recruited were male.

When asked how long they typically played for in any one play session, the most frequent session length for participants was 1-3 hours. The majority of participants stated that they preferred to play with their friends, either friends they know in person or those they have online, and when their friends were unavailable, they would be fine playing with strangers in the game. Mainly players indicated that they enjoy playing both competitive and cooperative styles of multiplayer, though many noted that they preferred a team format which involved cooperation between team members to compete with another team. Where team games are noted as preferable, players said that less than ten players on a team are optimal, with many preferring less than that if allowed. Since people prefer to play with their friends, it is worth noting that participants found smaller teams that contain mainly, if not all, friends were most desirable. This was attributed to the ease of working with and coordinating a team of people with whom some form of established relationship was already present at the outset.

Table 8. A table showing demographic information for the 20 interview participants recruited to discuss their experiences in multiplayer games.

Age	No. of participants	Gender (identity)	No. of participants
18 - 25	8	Male	12

26 - 30	10	Female	5
31 - 35	1	Other (e.g., non-binary)	2
36 - 40	0	Prefer not to say	1
41 - 45	1		
45 +	0		

5.2.2 Identities in play

This theme focuses around the identify of "gamer" as this is discussed in literature and seen as a way that players talk about themselves within the broader gaming community. This theme captures how the participants felt about this identity that players of digital games give to themselves and how others may refer to players within gaming communities. Participants expressed mixed feelings about the gamer identity, with those that reject the label explaining that this is because it holds negative connotations and may mean different things to different people depending on what it interacts with their own identity outside of play.

Gamer is a loaded term.

This subtheme reflected participants views about how the label implies certain characteristics about them. In some cases, those were seen as positive and some less so. This theme is linked to the questions asked of participants on whether they identified with the gamer identity. Over half of the participants said that they identified themselves as a gamer and one person said that they had previously identified as such but no longer did. Out of the gamers, one participant specified that they consider themselves to be a hardcore gamer. Those who identified as gamers ascribed this to how much time they give to the hobby of gaming; how many years they have played, how much time they currently spend playing, how many games they have, and the drive to continue playing.

> I would very much identify as a gamer. Erm, I guess the main reason I would feel that way is just because I really enjoy games like I actually don't really play as many games as I want to these days, but there's always a drive there and a passion, I think, for playing games. I also identify a lot with kinda gamer culture, like I feel quite comfortable with a lot of like, current I guess kind of jokes or kind of memes as well as they happen and like, gamer cultures spread out quite far like in places like reddit and other online forums. *Monica*

> I'm a gamer 'cause I game a lot and it's part of my identity and it takes up a lot of time, well it used to before I had a job. *Luke*

> I definitely do identify as a gamer 'cause I grew up playing video games and continue to do so at this time, for a significant amount of time. *Will*

> I would say I'm a gamer. I've been playing video games since I was er, probably about 4, 5 years old. Erm and then I've continued the hobby sort throughout my life. *Vince*

Participants descriptions of themselves as "hardcore" or "casual" players seems to be in line with findings of previous research on gamer identify (Bosser & Nakatsu, 2006; Consalvo, 2009; De Grove et al., 2015; Fritsch et al., 2006; Shaw, 2012). Those who said they were gamers, attributed this to how much time and worth they gave to the hobby and how far back in their lives that hobby went.

Reasons given for not identifying as a gamer also corroborate observations of De Grove et al. (2015) and Shaw (2012), as interviewees expressed that although they played a lot of games; they stated that they did not identify with the attributes of those that do call themselves gamers. This finding suggests that although the gaming hobby is popular, there are still assumptions of negative traits associated with the gamer identity.

> I identify myself as someone who plays games and is in gaming, is into gaming culture but I do not identify myself explicitly as a gamer. Erm because that title seems to have gotten some negative connotations, both within the community and outside of the community in recent years. And, although gaming is part of my life, I don't want to define myself by the fact that I play games and I talk about games and stuff like that. So, I prefer to think of myself as someone who just happens to play games. *Eric*

> I think I fit all the criteria, but I purposefully don't identify myself as a gamer, I think it has a lot of sort of negative connotations and I'm not comfortable with that. *Pat*

> Gamer just conjures up an image of like somebody, it's not somebody who plays lots of games, it's someone who goes and argues with random people online about video games and it's just yeah, it's like such weird… Like, as much as I play games and I'm not shy talking about what I play […] it's like I don't want to have people going on about gamers. It's just the word I think *Natalie*

> Er, well. I guess because of the types of people who like to call themselves gamers, basically. *Tracy*

It is clear that within multiplayer games, there are different types of players with different attitudes towards play and the gaming community that takes part in them. The findings here suggest that the term "gamer" has different meanings to people which are related, perhaps, to players' feelings surrounding controversies such as Gamergate. Gamergate is a term used to refer to ongoing pushback from some individuals in the gaming community and industry against the diversification of the player base of digital games (Salter, 2018; Todd, 2015). It speaks to the protectiveness of some players of what it means to identify as a gamer which historically was adopted to describe the primarily white, young, male audience of digital games. Where gamer is felt to refer to long-term commitment to the hobby, it is seen more as a positive description, whereas the desire to dissociate oneself from

the term is attributed to negative or toxic behaviour of other players identifying as gamers.

Gender

The theme of gender reflects how this was mentioned by players who did not identify as male. Although gender identity was asked about as part of demographic data collection, this emergent theme captured participants expressing how their gender interacted with their experiences in multiplayer games.

Some of the female interviewees expressed an unease about disclosing their gender. Though commonly held beliefs about a lack of female presence in games have long since been refuted, there still appears to be reservations about revealing this in online play. Those who brought this up did not say that this was something that stopped them from playing but that it did affect their experience of multiplayer games. Also, that they were apprehensive about using things like voice chat or having online names and avatars that might give away their gender.

> I think people are a lot better than they used to be. [...] particularly if you had a microphone or anything and you know I think that kind of thing, as a woman, you know you're so easily targeted or latched onto with games, you know it's kind of, if you're on the microphone it's, you know 'oh are you a girl?', like 'oh, since when do girls play games?'
>
> [...] like there's nothing about my gaming tag that suggests my gender but obviously my avatar was female so if they would spot that then you would get messages, you know, just like 'oh, are you a girl?' [...] it's more just a general irritation and guys that are kind of generally just harassing people, you know, rather than erm, you know, like feeling sort of left out [...] but erm, that's definitely something that's impacted my gaming experiences. *Sarah*

That female identifying players are concerned about revealing their gender in these games is in line with the work of Kuznekoff & Rose (2013) who found that female voices in digital games attracted negative reactions from other players and messages or queries three times more than their male gaming counterparts. Like participants

in a grounded theory study by Cote (2017), female players tended to attempt to camouflage their gender in play to avoid harassment, avoiding female avatars and the use of voice communication was common. A large scale review of literature on the topic of the male gamer stereotype by Paaßen et al. (2017) demonstrated that despite the stereotype being largely inaccurate as there are now almost equal numbers of female players, video gaming culture is still hostile towards female players. They suggest that the female identity is primarily incompatible with the typical gamer identity which corresponds with the views of Bertozzi (2008), whereby masculine cultural norms are at play in online gaming. They suggest that there is a persisting perception that to be female is to be weaker and less aggressively competitive and that women avoid defeating men in competition for fear of being perceived as negatively dominant. Although the ability to openly display feminine gender in online play is evidently still a problem in this domain, there are some exceptions such as *Monica,* a participant in this study that identifies as both female and a gamer.

However, where female or non-male identifying players may be employing avoidance strategies, this suggests that certain characteristics can result in a potential lack of access to particular aspects of play. Voice chat is seen as useful for players to directly speak to others to convey tactical information or commands. Avoiding the use of this functionality may arguably put players not using them at a disadvantage. Voice chat is often seen as a way of deepening developing relationships on online spaces (Wadley et al., 2015). This was not just a concern of female interviewees and people often indicated that voice chat was a source of 'toxicity' and exposure to that was something they would like to control. Conversely, private voice channels were seen as positive and frequently used. Therefore, further work may be needed to explore this issue.

5.2.3 Benefits of playing with others

One of the primary findings, and therefore theme, from this study is that players strongly value positive social experiences in playing online games with others and is

seen as a main driver for play and often these games function as a social space for friends that are geographically separated to spend time together and to maintain friendships outside of co-located real-life socialising.

Positive social experiences

Players very often spoke of enjoying positive social experiences in multiplayer games, as such, this subtheme captures these instances.

> So, if I give you an example of my all-time favourite game from all my history of gaming, was *Battlefield 1942*. And on that, it was absolutely fantastic, people used to work together in a team, you used to get squads, not even, not even putting themselves in an official squad but people working together that use vehicles and achieve objectives. *Guy*

> Definitely *Overwatch*, I think. That's a game that I go back to time and time again. Erm, mainly, because it's a really good team game, but also, I can really enjoy it playing by myself. Erm so some games I sort of enjoy more when I'm playing with other people, erm but with *Overwatch* I have just as much fun playing with people I don't know, than I do people that I do. *Sarah*

> I'd say the *Overwatch* was a big game [...]. And the social interactions are usually positive on there, so that's what I quite enjoy about it as well. *Colin*

> The interaction with other humans, definitely, one major factor. *Guy*

Trust, altruism and team cohesion in a multiplayer game were revealed as contributors to feelings of inclusion and social connection in play. Working towards shared goals and exhibiting helping behaviours in typically combative settings helped create trust and often lead to connections or friendships being established.

> *Day Z* where you bump into people and [...] you're just and you kinda respond so warmly to the fact that someone in that game is not trying to kill you that you wanna cling to that person. *Natalie*

> People tend to trust you, if you like, save their lives or something and they're like 'oh my god thank you'. *Ted*

> Yes, I actually find it quite satisfying to have a good team, actually achieve something together. *Peggy*

While the social elements were important to players in terms of positive experiences, in contrast, the social elements were referenced as a deterrent to certain multiplayer games. This suggests that the social experience in play is a key determinant of how much a game is liked and influenced whether they continued playing a game or would be inclined to abandon it.

> The things I've found with it is that it just got so negative and you got such a negative experience with some of the people online, trolling and stuff like that [...] and usually, you know, it's some 10 year old, er having an emotional breakdown online with you. *(Referring to Call of Duty) Edward*
>
> ...because it was free to play, the community was just trash…
>
> JB: ...so you think because it was free to play it attracted people who wouldn't normally be interested in that game? Was that why you think it was?
>
> Yes. Entirely. Because a pay wall keeps 10 year olds out. *(Referring to World of Tanks) Luke*

Many interviewees mentioned that they played multiplayer games with their friends and considered the game to be a platform on which to socialise. They tended to use communication platforms such as Discord or the console network (e.g., PlayStation Network[12]) or party chat to talk during play. A number of interviewees mentioned how such platforms helped to maintain friendships and connections and resulted in continued play with those that were in their 'channels' of communication.

> It was also a nice backdrop to hanging out with people and chatting and doing stuff *Susan*

Interviewees indicated that many of the members of those channels were real life friends but that occasionally an online acquaintance would become a friend by being added into those communication channels. This was not the case for all interviewees,

[12] https://www.playstation.com/en-gb/playstation-network/

however. One person stated that they deliberately did not 'add' people as connections as it often led to them feeling pressured to play with those people and receiving backlash if they chose not to.

Communication tools and game design can be a barrier to positive social play

This subtheme reflects where players talk about how useful communication channels are for facilitating play with friends and teammates, in some cases the design of such channels sometimes presented a barrier to the social benefits. An example of this is where a number of interviewees mentioned that the 'party chat' size limit was incompatible with the team sizes in the game, leading to them not being able to verbally communicate with their team members.

> PlayStation Party Chat is terrible. It has an 8-player limit on the party chat which is ridiculous 'cause we're tryina do, we were tryina do 6 v. 6 erm custom games in *Overwatch*. [...] But yeah, the other 8 people were in the party chat and then they invited me to the game. I was like, sure? And I'm just there running round and it was nowhere near as fun *Arthur*

Again, this suggests that participation in voice communication is a mechanism for social interaction and positive experiences but that barriers to its use can be detrimental and lead to feelings of exclusion. A similar issue was mentioned with regards to team sizes. Where games had a required team size, a player might be placed in a team that was composed of another unknown group of friends who were communicating through their own chat platform. This leads players to feel excluded and even untrusted within that team.

> You generally have a chance to end up with like a group of 4 and you're just a guy that's hanging on the side. And you just do the stuff that you don't care about [..] when you're queuing with er strangers they don't [...] understand that you actually know how to play, or they don't trust you to do anything important. So they just avoid er giving you anything vital to do. *Ted*

This final quote from *Ted* hints towards there being an element of trust in groups of established players that may be built over regular play and that a new group member is not trusted to complete in-game tasks sufficiently well until their ability has been demonstrated. This may be one reason that people playing multiplayer games tend towards playing in teams with people they know rather than strangers.

Cross over with another hobby

This emergent theme describes how another players state that a benefit of playing multiplayer games with others is that some provide a cross over with another type of media or hobby that they enjoy. This element of familiarity gives players an indication that they have something additional in common with the other players of those games which can help establish deeper connections by providing implicit talking points.

> *Rocket League*, it's full of cars, I like football, I like video games, why wouldn't I like that *Arthur*

> I love horror films and I love all the old cheesy slashers like Friday the 13th, Nightmare on Elm Street all the, you know, Scream and all that. *(Talking about Friday the 13th) John*

As multiplayer games are seen as spaces to facilitate social interaction through teamwork, shared goals, altruism, shared interests, and a backdrop to socialising with friends, participants' general attitude is one that aims to obtain positive social interaction and avoid negative types. As such, participants openly supported the assertion that people with disabilities are entitled to take part in these games also.

5.2.4 Disability and accessibility options

It is not surprising that this is a primary theme within this dataset as this was a topic that was asked about in the interviews and therefore reflects the summary of terms used in the interview topics. There are, however, subthemes that fit under this heading that organise the findings into distinct topics of discussion. Participants

mainly noted that being able to customise play through the use of options is beneficial for all players and expressed a positive attitude towards inclusion and diversity in play. The acceptance of players using accessibility features seems to be tied to how this impacts players' perceptions of fairness in play and their value of keeping a level playing field. These are discussed as separate concepts as fairness in play refers to players' sense of whether accessibility features provide an advantage to those using them or whether this may be considered as cheating, whereas the concept of the level playing field refers to how players prefer playing alongside and against other players of a similar skill level. This section also discusses players' concerns about how players using accessibility features may not wish for this to be disclosed to other players and how the implementation of accessibility features can sometimes undermine the benefits they provide in supporting access to play.

Positive attitude towards inclusion

More than half of the participants said that they were not aware if they had played alongside a player with a disability in a multiplayer game. Many of them stated that it is not something they would expect to know due to the anonymity that the internet provides. This subtheme captures how participants expressed clear positive attitudes towards the development of more inclusive games and towards players with varying abilities in play. Of the participants that said they had been aware that they were playing with someone with a disability, some offered that they themselves had a disability, but that it wasn't something that affected their ability to play digital games.

Where interviewees had become aware of playing with someone with a disability, they stated that they either knew the person in real life, had asked the player after hearing something about it mentioned during play, or found out after having played with that person for a number of months. This suggests that players are unlikely to disclose whether they have a disability to other players in an online multiplayer game, unless it is to someone who has already disclosed their own disabled status, or after establishing a connection or friendship after playing together for a while.

In general, participants expressed a positive attitude towards improved inclusivity in gaming, and that this is a good thing. However, there were comments reflecting a need to protect players with disabilities and aren't sure that their use of accessibility features should be disclosed to other players. Participants were asked how they viewed the use of adaptations such as customized controls, the use of accessibility options provided by games, the players that may be using them, and if they used any themselves. Results suggest that players consider disability to be a legitimate reason for certain accessible game features to be used but that they were concerned that revealing that reason in online play could leave those players vulnerable to verbal abuse or aggression as a result. This may indicate that there is a conflict between what is fair use of some game features and whether it is helpful or detrimental to players to reveal usage and the purpose of the usage to others online.

> I mean I don't think, generally people give that sort of information away. People don't really ask, I guess. Erm and I think there's two reasons for that, one, the anonymity on the internet is a fantastic thing and second, the judgmental, ill behaviour of people, when that anonymity is removed, is pretty well, a huge deterrent. *Guy*

Customisation is helpful

Many interviewees mentioned that they appreciated being able to customise their play to suit their own preference and skill level. This subtheme captures participants statements surrounding the various ways they found it useful to customise their experience or setup of play. The ability to remap or rebind keys on both controllers and keyboard and mouse was acknowledged as important and, in some cases, vital. Most interviewees considered this as a common place feature and not seen as specifically there for accessibility, and they did not consider these kinds of customisation to be something that provided any kind of unfair advantage over other players.

> Now if someone was to set up their keyboard differently I think that is fine. [...] I think because everyone has the option to. *Vince*

Acceptance if it levels the playing field

The majority of interviewees knew of features such as aim assist (auto-aim), player balancing and dynamic difficulty adjustment, and could give examples of where and why these might be used. This emergent theme highlights how accessibility features are accepted in play when they are seen as correcting for disadvantages some players may have due to effects of disability. Many participants stated that they considered aim assist and player balancing to be commonplace and quite often the default in many multiplayer games. They also indicated that aim assist is mainly a feature of console games and is accepted as a standard, even required, for playing games such as First-Person Shooters when using a console controller. This is attributed to the lack of accuracy that one can achieve with the analogue sticks on the controller compared when compared with using a PC mouse to aim. As auto-aim is often the default (even though it can be turned off), many interviewees consider this to be an acceptable feature because it is available for everyone to use.

> As for erm aim assist, like being a console gamer historically, yeah that's been on for everyone, so I guess it doesn't matter if everyone's aim assist is the same as and to the same level. Er, so then it's an even playing field. *Vince*

Interviewees frequently refer to how features like aim assist can affect whether there is a perceived level playing field within the game scenario. The features which contribute to this are considered acceptable and even beneficial. Along with aim assist, player balancing is thought to work towards this, such that players of similar 'rank' or 'level' are matched together in teams to compete.

> The idea of an assist is that you're trying to, [...] level the playing field to begin with [...] There's like a [...] really famous picture that is [...] 'treating people fairly doesn't necessarily mean treating them equally'. There are these 3 kids looking like they all get a box to look over a fence at, like a baseball game. [...] there's 3 boxes, [...] the smallest one had 2 boxes and the middle one had one box and the tallest had none, they could all see because they'd all be the same height, but if you gave them each one box then the smallest one still wouldn't be able to see because he's not tall enough to see, even with that. So it's kinda like, to be fair doesn't mean that you give everybody the

> same help [...] I think if you get in competitive [play], you then start to have trouble with the idea that, well, is there a competitive advantage? *Brian*

What is interesting about the digital gaming environment is that it is not possible to see what a player may be doing to compensate for any barriers they experience, or, with respect to Brian's' analogy - "how many boxes someone is standing on" or why. In the sense that standing on a box equalises the abilities of players then this is seen as beneficial. However, simply because players cannot see who is standing on boxes or why, they err on the side of distrust and may assume that people who do not need assistance in becoming equally able in play may be using these to gain an advantage over others. This is a particular issue in competitive styles of play and relies on players being honest about what assistance tools they use (such as auto-aim) and why, and additionally, competitive play where prizes are at stake may not even allow assists and, as such, may entirely exclude any player that would need them to access the game.

Fairness in play

This subtheme is connected to the previous but is distinct from in how it relates specifically to concerns surrounding fairness. Where the previous subtheme applies to accessibility features and adaptations that are seen as removing a perceived or actual disadvantage, this subtheme reflects the concern regarding features as providing a perceived unfair advantage.

Interviewees explain that any feature that 'assists' or could give an advantage to players may not be as acceptable in more competitive play settings, such as esports competitions or ranked play as opposed to casual play.

> I think the only time I would ever be like 'oh maybe you shouldn't use that is if you were literally playing as your job. If you were competitively playing, that seems super against the rules but anything below that, no, I think it's fine. [...] If it makes the game fun for you, you should do it. *Pat*

> I think in casual play it's probably ok to use those however you want. Erm, in match play [...], well basically everyone should be on a level playing field. [...] I think when it comes to tournament play or ranked play or whatever, as long as everyone has the option to do exactly the same then it doesn't matter. [...] If only certain people are allowed to use it then I'm not sure if that's a level playing field. *Vince*

> If you add an aim assist option, that would probably rub the hardcore gamers the wrong way, even if they don't have to use it in their servers or have anyone access to it. Because the *Dark Souls* effect where, if you're not as good as us, then you're not supposed to be with us. *Will*

If a feature is perceived as providing some kind of advantage to some players, then it could be considered to be akin to cheating (Consalvo, 2005). This appears to be considered to be the case if a feature is used where not all players can or are using the feature, or they use it when they don not *need* to use it. Again, this would be a disruption of the value of the level playing field that players appear to have. It also seems to be due to the individual players perception of their own skill proportionate to their co-players. This suggests that an element of trust may be required in play with features such as aim assist or using a customized controller. Players must be trusted to use them only to level play and not to give them an advantage.

> It potentially gives them an advantage over me because, as I said, I'm terrible at aiming in FPSs and if somebody else is bad at FPS, at er aiming in FPSs but has an aim assist on then they are going to have an advantage over me. *Susan*

> If it makes you overpowered then, yeah, it's inappropriate. If it keeps you at the level you would be without them then yes that's fine. But if it makes you too hard to beat because you're now like Superman then no.[...] As long as you're just as good as a good player rather than someone who's just cheating. *John*

When speaking about features in multiplayer games such as skill or player balancing and assistive features such as auto-aim, participants convey concern about how these features impact the fairness of play. There is evidence that players value effective teamwork, achieving goals in a cooperative way, and having a sufficiently challenging match. Further, there is an expectation that within this team- play paradigm players should adhere to rules of fair play. Whether use of assistive features provides a perceived advantage seems to legitimise or de-legitimise their use in a multiplayer (competitive) setting which is dependent on why a player is using it. Players understandably have concerns about players exploiting game features to gain an advantage over other players, an example of this is how a number of interviewees raised the issue of how some players manipulated in-game ranking systems to their own gain. For example, it was mentioned that in one game, some players would deliberately play badly so that the game would rank them lower. This would result in them being placed in matches with lower skilled players so that they could more easily win and therefore level-up on their character.

> [...] so there are ways to cheat these systems. So, for instance, the ranking system, [...] usually there's a deranking system for when you quit games. So if you then are finding it too difficult and want to beat people of a lower rank you can quit a load of games and derank yourself. And then essentially go against, and you are a much higher skill level for that level. *Vince*

This suggests that ranking systems are useful for creating a level playing field but where players are motivated to level- up their own characters, as opposed to helping their team to win, a conflict is created resulting in players having to choose to play for their own gain or for the enjoyment of other people in their team. One interviewee confessed that when they witnessed other players manipulating ranking in this way and playing for themself, they began to do this as well. This suggests that although there is a sense that games should be played fair, players acknowledge that where there are ways to gain advantages, some people will use them, which can create a less than level playing field for anyone still adhering to arbitrary rules of fairness.

Participants mention that players who play for themselves can be harmful to the dynamic of team play and can even demotivate them from playing for the team goals. This implies that when games are designed to allow players to level-up their characters, to achieve higher rankings or to gain unlocks, not only could this be seen as cheating (Consalvo, 2005; Yan & Randell, 2005), it could undermine the motivation of players to work towards team goals. Additionally, Kwak et al. (2015) hypothesized that lower-team cohesion due to knowledge that some are playing unfairly, could result in lower team performance which then could trigger toxic behaviour in some players, further damaging the social experience. It appears to come down to whether other players become aware that any other player is using some sort of assist, or a feature seen to provide an advantage over others. This supports discussion in Chapter 2 (section 2.2.4 and 2.3.1) of how judgements of fairness where adjustments are available for people with disabilities are made when they are salient to others or are seen to be providing some advantage and the reason for use is not known (Colella, 2001; Foley & Ferri, 2012; Paetzold et al., 2008). If a player is seen to be using an assist like auto-aim they could be perceived as playing for themselves (to gain an advantage), thus playing in an unfair way, and potentially threatening the team-play dynamic.

Transparency leads to vulnerability

Many participants said they would appreciate knowing whether adaptive or accessible features are in use during play, as it would help them to choose whether to play in games or matches where these features were active; for example, a game indicating which players had aim assist switched on. However, interviewees also question whether showing this information could lead to those players using them to be accused of cheating or playing unfairly even if this is not true. This subtheme reflects this concern for the vulnerability of disclosing the use of assistive features.

There is currently no way to adjudicate what are perceived as legitimate uses or not. Therefore, showing whether players are using assistive features in game may lead to other players assuming that the feature is being used unfairly and, as such, target that player in an abusive way, or report the player for cheating. This suggests that

there is a complex interaction between players feeling the need to protect others, but also to protect the fairness of play.

> I'm going back to the Mario Kart thing with the move assist. When somebody has this control assist thing on where they can't fall off the map, it means that they have a slight disadvantage because they have slightly less control over where they move the car, so they can't go through secret routes and that sort of thing, so they've got a slight disadvantage. So, I would like to know if somebody's got an aim assist or something similar because then I know what they can and can't do. *Susan*

> I think you need to strike a really fine balance between the people who are using it because that's their preferred method and people who are using it to get a leg upon people. [...] there's the whole level of people who have disabilities that use them and that's why they're using them. And [...] I don't think these people should have to out themselves as disabled to use it. [...] if you have to kind of have that barrier of legitimacy in there, that's where it can get very complicated - should people have to disclose that? Should people have to be diagnosed with that [...] the burden of proof could get tricky *Jackie*

> As soon as you start telegraphing say, for example, if someone with reduced mobility had to use a mouse and keyboard to play on a console, then by pointing out 'hey this person has to use mouse and keyboard' may bring unwanted negative attention against them. Erm, both in that other players may say 'oh you're only good because you're using that' and also if you have particular needs, erm, which are due to your physical limitations, then perhaps you don't want that being broadcast to the world at all points. *Eric*

Participants clearly express concern that disclosure of the reason for using adaptations will lead to negative reactions from other players as a result. This suggests that players are very aware that the environment for potentially vulnerable people in multiplayer games may be particularly intolerant to people playing in ways that are seen as different to the expected ways of playing.

One interviewee sums up why they feel that transparency of the use of assistive features and the reason may mean that some users are vulnerable to hostile reactions from others:

> Well, people are dicks, basically. They're dicks, there are dicks on the internet now and there were dicks on the internet in the past, so (laughs) nothing's changed. *Brian*

Poor implementation may undermine usefulness

This theme reflects instances where participants felt that certain types of features in games, that can be seen as helpful for accessibility, are frequently poorly implemented in games and end up creating further problems for players using them. This is important because where a feature might be included as a way to increase accessibility for some players, they can be so poorly designed that they can be detrimental to success in play when using them. As many interviewees discussed the use of auto-aim features, some participants were concerned about where the aim was drawn to. For example, the crosshair automatically aiming to the chest or abdomen of the 'enemy', was seen as making the feature less useful because typically the score is dependent on the difficulty of a shot. However, this person also stated that the feature would be unfairly useful if it aimed at the head, suggesting that being able to get headshots is an indicator of a highly skilled player. Other implementation concerns about auto aim include how the crosshair can be drawn to avatars passing in front of the player trying to aim at someone in the distance. This seems to have improved over the years, but this participant notes how auto-aim can be problematic.

> On *Halo* [...] but quite often, especially in the old versions, [...] it would actually hinder you. So, say you were shooting someone that was 200 meters away and you'd be aiming at them, shooting at them, nearly killed them. Someone might run across your cross hair at 50 meters and it'd shift your aim to them so then, suddenly you'd start missing shots against the person that you were originally shooting at and many-a-times I've missed out on killing that person by stuff like that happening [...] Erm, which is really frustrating." *Vince*

Interviewees additionally raised concerns about features such as dynamic difficulty adjustment (DDA), where the game alters the challenge in response to how well a player has been performing. Though this is primarily a feature in players versus game/monster styles of multiplayer, participants noted that a game adapting its difficulty in response to player actions did not always result in a better game play experience. Particularly, a sudden reduction in challenge could be seen as patronising and as such, interrupt the motivation and determination to rise to a challenge and consequently the satisfaction gained from overcoming it.

> I pride myself on being good at games, obviously I was dying at a point, but I'd rather it be the same difficulty coz then I've over-ridden the challenge. You know, overcome it rather than it, I don't like a helping hand really, so I didn't want anyone to just kind come and be like 'oh, we made it easy for ya'. It's a bit patronising (laughs) *John*

> It kind of defeats the point in the game. [...] It feels like a hollow victory. If you try, try at like a hard bit of a game where it is difficult to overcome, say, a boss or whatever, and then suddenly you notice it getting easier and easier and easier but notice that you're not making any less mistakes and you're not changing your strategy or whatever and the game is just making it easier for you, it kinda cheapens the victory, I think. *(talking about Dark Souls) Vince*

In many multiplayer games, players are assigned to teams based on their previous or current skill ratings in playing the game with the aim of matching players of similar skill together. This is commonly called player balancing or matchmaking. Some participants noted that this can undermine team play and their consequent motivation to be loyal to a team. This suggests that the implementation of player balancing is important for its perceived usefulness in creating a level playing field. If a player contributes to the success of a team over a number of rounds or matches and then is moved to the other team to even out the skill of each team, this can be detrimental and disruptive to team cohesion and social presence (Hudson & Cairns, 2016)

> *Red Orchestra*, after each campaign used to swap the teams to make them all different scoring, higher scoring people got mingled, I think. So people used to absolutely hate it. 'cause if you're playing on a team and you've just won as Germany, you wanna keep playing them and if it swaps you to Russia, who you've just been fighting against, yeah, it's annoying. [...] So if you're helping your team win these 10 games and you get suddenly changed then you're gonna feel like you've wasted time. *Luke*

Other game mechanics were seen to be detrimental to the social play experience due to how they were implemented. One such example is when "unlocks" are included in multiplayer games. Unlocks are commonly used in games as a way to establish progress and reward achievement or sustained play. Things like items, weapons and levels are often 'unlockable'. Some interviewees indicated that this was undesirable to them in multiplayer games and it is seen to give advantages to players who have managed to achieve these "unlocks". Therefore, this may put newer players or those without the time at a disadvantage to others and may be seen as a deliberate barrier to access to certain features in the game. It can be seen as encouraging players specifically to level-up their character and to therefore, unlock new items. This can also be seen as detrimental to teamwork because it encourages players to play for themselves and not for the betterment of the team, which further undermines the social experiences in play.

> The constant like, that kinda grind to unlock stuff. Like what I felt was like pointless unlockables. [...] I don't really get that trend of 'oh, you unlock better stuff when you level up your multiplayer character, it's like adding a layer onto a game because you felt like you needed another layer because actually your multiplayer wasn't good enough to sustain itself [...] I haven't been here from the beginning so I don't wanna spend the next 15 thousand hours getting shot in the head before I can even manage to get a kill. *Brian*

> [⋯]where your access to the game is restricted by how much you unlock. [...] the better weapons require more input into the game, so you're required to spend more time to achieve certain objectives and so on. [...] that frustrates me, erm and it's not only frustrating from the sense you can't have access to a

> game that you've paid for and want to experience to the best of its ability, but it's also frustrating in the way that it has forced people to focus simply on themselves and not others. I mean I'm the sort of person who would pay money now, pay to win. I pay gold-whatever just because I want to have access without grinding. *Guy*

To summarise this section, there appears to be several complex dynamics surrounding the perception of how and by whom assistive features are used in social play. Primarily, improved accessibility for people with diverse (dis)abilities is seen as positive but that the anonymity of these players should be respected and, with that, if players with disabilities are using assistive features to help them play, this should not be made apparent to other players. Reasons given for this are to protect those using these features for what are considered to be legitimate reasons from inaccurate accusations and hostile reactions from other players who might see the use of these features as a way to gain an advantage. This points to how overcoming challenges presented by others in multiplayer games is important to many players and that there are underlying expectations around how the game should be fair and that there is a need to control this.

5.2.5 Expectations of other players

There are unspoken, yet unenforceable, expectations that players should play in ways that are considered fair and that team-play on a level playing field provides the most positive social player experiences for all. Within this, there are expectations within teams that players should adhere to those values and not just play for personal gain. This overarching emergent theme contains two subthemes referring to how players discuss the need to be good enough to play multiplayer games, followed by how players talk about avoiding the toxicity that players may encounter if they do not meet the expectations of other players.

Being good enough

Throughout the study, the sense of whether one was "good enough" was referred to throughout. Although there does not seem to be an explicit definition of what exactly "good enough" means, participants make judgements about their own abilities with respect to the game they are playing, or want to play, and their perceptions of how good other players of that game are. This subtheme did not apply in discussions regarding perceptions of players with disabilities but does appear to indicate that players perceive the need to feel competent in play as somewhat universal. In some cases, one's sense of whether they are good enough influenced whether they persisted with a game or not. Part of this is with respect to the initial stage of learning the game as a new player. If players felt the time and effort, they were willing to put into learning the game was not enough to achieve this arbitrary level of good enough, then they may not bother. This seems to be the case particularly for more established games and games communities where players may have had years to build their skills and strategies for the game. Some contributing factors to what can put a player off a game are: whether players of the game are willing to assist new players, whether the game supports the learning phase of new players, and whether other players verbally berate new players for being of a perceived lower skill level.

> I play games for fun; I don't want to learn (laughs) *Will*

> I really hate feeling like I'm bad at something. Which is often quite a big issue for multiplayer games that are quite popular 'cause there's quite a high level of skill like already present in the player base. So *Overwatch* is a really good example, [...] I struggled a lot with getting into it, because I felt like I wasn't, like, it's kinda do or die. [...] I find that I either have to persevere and just accept that I'm going to be dying a lot, until I start to get the hang of this, or I don't play it as much. *Monica*

> I did very briefly play *League of Legends* and I really didn't get on with it. Erm, partly because the community is just horrendous (laughs). [...] but the thing is with that community being horrible there's also kind of this expectation that you all know all these kinds of intricate tactical details already, even when you've just first started [...] but because the community is

> so hostile, you can't just be like, 'what would you guys suggest? what's a good build for this bit?' You just get, you know, flamed at that point (laughs) you know and so it's partly, I think, a combination of the complexity of mechanics which would be fine on its own if the community wasn't so horrendous. *Jackie*

Some participants mentioned that they wanted to play particular games because their friends did; they wanted to take part in the social experience. However, they felt that the effort that they would need to put in to become "good enough" outweighed the gain of the social experience. This suggests that players have an internal model of how good a player should be to be able to play with others in the public domain. It is not currently clear whether the barrier to them playing is entirely self-derived: they have low confidence in their ability to become competent at the game (to live up to their internal model), or whether it is the game mechanics, controls, jargon, or community conventions of how to play, that are too difficult or time consuming to learn. As Jackie states above, more established players may model what is perceived to be good enough but berate newer players when they don't appear to be at the same standard. This is something that people wish to avoid. It may be inferred then, that if a game has an established player base and has been commercially available for a substantial amount of time, the overall skill level of the player-base for that game is likely to have risen. Whatever the skill level is that the players of that existing game have reached seems to be the threshold for "good enough". The higher that skill level is, the more effort a new player must expend to reach it. The willingness of existing players to help new players to learn and improve could theoretically raise or lower the good enough threshold. To summarise, this suggests that some games either do not provide adequate resources for players to learn how to play a game or that the barrier is social, whereby existing players attempt to prevent newer players from integrating until they are perceived as good enough.

> I feel like I'm missing out on something [...] I can see all these people having this awesome fun time with what is obviously a good game. [...] I feel like I'm just on the periphery of that and I want to understand it but the barrier to getting into it is so difficult for me, right now, [...], I wish I could get into it I guess is the phrase to use there. *Monica*

> Everyone plays Overwatch and it's super popular, but just, it's been out for long enough, and there's so many characters, [...] and whenever anyone talks about that game, I have no idea what they're talking about. And it just makes me feel like [...] I don't know how I could ever play this game because it's just like 'wow' [...] just all this jargon of like all the abilities and things and strategies for certain characters and it just goes completely over my head. Despite being familiar with the genre and shooters and stuff, [...] I don't know where I'd even start with that game. *Natalie*

With respect to being good at games, feelings of being judged can put participants off playing certain games. This seems to align with the above finding that being a beginner, not feeling skilled enough, or knowing enough about a game can deter players from particular games, additionally, that part of the gamer identity is to be "good" at games.

> When you put yourself out there online, it's almost like a group presentation, you know you're out there and everyone like is watching you and analysing you and you know you feel like [...] you're being judged on your gaming skill. Especially as someone who's played games all their life, they count themselves as a good gamer and quite a long-time gamer, for someone to criticize that it's kind of like a core part of your personality. *John*

This sense of efficacy in playing online multiplayer games seems to substantiate findings by Ryan et al. (2006) that players seek the need to feel competence in digital games. However, findings in this study indicate that multiplayer environments seem to generate an additional expectation that you must be of a certain level of competence to play in the public domain. So, not only do players seek to feel and be competent, but they are also expected to be so by others, to not "let the team down". In coexistence with this, players appear to place significant value on having or achieving a "level playing field" or perceived fairness in play with others and acknowledge that this is important for a positive social experience.

Both of these motivations appear to manifest in players carefully choosing either, who they play with, or what kind of play mode they enter in order to avoid other players making negative judgements about their abilities. For example, if they do not

feel that they are especially competent at a particular game, they might only choose to play in the “casual” mode, where less emphasis is placed on a player's skill or game “rank”. Players have also expressed that they choose to play with friends to avoid backlash or verbal beratement from strangers in play in reference to their competence and ability in the game.

Players explain that if one is playing “just for fun” it is expected that they avoid playing in “ranked” or competitive game modes. Because of the greater emphasis placed on competence or perceived skill in “ranked” games, there is elevated attention to the fairness of play. This seems to result in players feeling both responsible for being adequately competent/good and for adhering to rules for fair play.

Overall, participants appear to be employing strategies to manage both their own expectations of themselves based on their perceived skill, as well as finding ways to manage how other players perceive them. Further, this appears to be predominantly aimed at avoiding the threat of undesirable social experiences in play.

Strategies to avoid toxicity

Any kind of verbal or text-based aggression or abuse was expressed as something particularly undesirable to the majority of the interviewees. This subtheme refers to the methods and strategies participants gave for avoiding unpleasant behaviours of other players. Many acknowledge that this is commonplace in multiplayer games but that it is something that they attempt to avoid, supporting discussion in Chapter 2 (section 2.2.3). Some even stated that this has caused them to discontinue playing certain games. Some players mentioned being told to leave the game as they were not good enough. This was not always in public voice or text channels but sometimes via direct messages. This supports that there is a desire from certain players of multiplayer games to actively try to exclude other players based on their own values as to what they consider to be good enough.

> I don't like the complete disregard everybody else has for each other. [...] that gets to me. And then sometimes you get people who are just completely aggressive over chat and so on and that gets to me as well. *Guy*

One of the main strategies for avoiding toxicity stated by participants was playing with existing friends. And, combined with this, many interviews said that they did not use in-game voice communication functionality, but instead used platforms like Discord for space to talk with friends outside of the game space. Turning off voice chat functionality in some cases was a way to limit the opportunity for other players to be verbally aggressive towards them. Existing friends provided players with a kind of social buffer against hostility for players and, due to their already established relationships, expectations of skill seem to be less of a barrier as friends provide support and advice. This may partly be because people are using the multiplayer game as a backdrop to socialising. It may also mean that the goals of the game are secondary to enjoying the social interaction with friends and, as such, players are less affected by attacks from others about their ability to play. Additionally, players who play with their friends report more frequently using external voice chat platforms, such as Discord, and can enjoy the benefits of voice communication without affecting their anonymity by speaking over public in-game voice channels. It also seems that players trust their friends to provide social support if they do become exposed to toxicity in play. Shores et al. (2014) found that playing with friends improved player retention in a multiplayer game irrespective of the toxicity of other players in the game space. This suggests, then, that the positive experiences of playing in a social way with friends could outweigh the negative effects of exposure to toxicity.

When interviewees were asked to speculate how multiplayer games could be improved, many of the suggestions focused on promoting a better social environment in the game, again, showing how important this is to players. They mentioned that they would appreciate better ways to encourage positive social interactions, such as providing in game avatars with gestures for communication as opposed to allowing voice chat. It was suggested frequently that they would appreciate better reporting systems to allow people to document instances of aggression or negative behaviour from other players. However, where reporting

systems are already included in some games, players were not always satisfied that these worked effectively and therefore did not use them as they did not trust that they did anything.

> […] taking greater steps to deal with sort of toxic, er toxic players. Erm, you see a lot of that with competitive games *Hugh*

> I think better tools for, better tools with better feedback for erm flagging players as good interactions or bad interactions. [...] I think it's good to have better feedback for players on when they say that a player, they've interacted with has been pleasant or not pleasant for whatever reason, that they know that what they're saying actually means something and that's it's actually contributing to the, potentially the matchmaking and the reputation of that player. *Colin*

Participants noted that some multiplayer games seem to contain more toxic behaviour than others, suggesting that there may be something about the social dynamics they facilitate that determines player interpersonal behaviour. Particular games or game types are mentioned as being more "toxic" than others, for example, *League of Legends* or *Dota 2.* Participants expressed the desire to avoid toxicity and, in cases where it could not be avoided, participants explain that they use "coping" methods in response to it. These include being overly friendly or only responding positively regardless of how much verbal aggression they receive. Additionally, games that are structured into smaller rounds (shorter matches) seem to be preferred as ways to avoid or cope with toxic behaviour more easily. The length of the match is mentioned in reference to exposure to negative comments from other players.

> So if you're doing really badly and losing and being berated by the other people in your team or even by the other team, you've gotta sit there for 45 minutes of it which is horrendous as it turns out. *(Referencing League of Legends) Pat*

Work by Shores et al. (2014) suggests that longer matches and therefore, longer exposure to "toxicity" such as verbal abuse from other players, can cause players who are less toxic to cease playing a multiplayer game.

Having shorter matches is also deemed to be convenient and allow flexibility of play to accommodate out of game activities, such as taking care of children or working.

> The best thing about it is that an average match takes about 15 minutes so it's the type of game which you can sort of come on, play a couple of games and then sort of move onto other things. So I don't have to stick with it. *(Referring to World of Tanks) Edward*

> So it's short rounds which is really great when you've got kids coz, you know, 30 to 40 minute rounds if you win, which means that actually, you know, you're not sort of having to invest multiple hours to get anywhere. *(Talking about PLAYERUNKNOWN'S BATTLEGROUNDS) Brian*

> I like it for that because it's a team-based game with relatively short rounds. So you can jump in and jump out and not feel like you have to plan your life around it. Erm and it's a game which is very forgiving for people with different levels of skill and different sort of play styles *(Referring to Overwatch) Eric*

Shorter 'rounds' are considered beneficial for players of varying levels of skill. This seems to be in reference to how, when learning a game or being less skilled at a game, a player may suffer losses or failures. Shorter matches mean that the player does not need to endure those losses or failures for very long because they can soon begin a new game.

> I'm playing a lot of Overwatch and what I do think I quite like about that is they are encapsulated matches. Erm, so for example, if you're losing, you're losing for the whole of about 10 minutes. *Jackie*

Despite games becoming more inclusive to audiences beyond the stereotypical "gamer", there is still evidence of a concern among players that if you do not fit that stereotype then you may be targeted with toxic behaviour if you are playing in the public domain (in multiplayer games). Due to the anonymity of players in multiplayer games, it is arguably difficult for other players to identify whether or not another player is also a "gamer", whether they share similar values in how and why they are playing. This may explain why some of the methods that players use to avoid

exposure to toxicity is to not use in-game voice communication methods. This could potentially remove some of the anonymity of a player and therefore expose them as being an out-group (not a stereotypical gamer), which could in turn make them vulnerable to toxicity.

5.3 Conclusions

An in-depth discussion of conclusions between this study and the corresponding study is presented in Chapter 7. What follows is a brief overview of the findings from this study only.

This sample of players provides an outline of core aspects of the social environment within a variety of different multiplayer games and how these impact their overall experiences of play. Not all of these players considered themselves to be gamers, despite dedicating substantial time to gaming and to playing online with others in cooperative and competitive play. This implies that multiplayer games are not exclusively for the "hardcore" gamer who typically fully embraces gaming culture and values. Different types of multiplayer games and different modes with some of these games accommodate for players who want to commit varying amounts of time and effort into any given gaming session. Among the interviewees for this study, players expressed a strong preference for positive, inclusive, and supportive social interactions in play. Though this could partly be attributed to social desirability bias, the results support previous researchers' findings that a supportive social environment in multiplayer games is important to players.

This work also finds that players are motivated to play many multiplayer games by the enjoyment of working in teams towards shared goals, to overcome challenge, and of the positive social interaction that comes from social support, team cohesion, altruism, and inclusion. Play experiences that focus on good teamwork generally result in greater enjoyment of play, bonding, trust, formation of friendships, and motivation to continue playing. Participants expressed a desire to avoid toxicity and for games designers to implement better systems to prevent this negative aspect of play. Currently, though some players may be exposed to toxicity such as verbal abuse,

the results suggest that coping methods such as playing with friends and or using external voice communication systems are effective ways to mitigate the negative social aspects of multiplayer game environments. Participants expressed positivity towards improved inclusivity and accessibility in play but highlight that some games and game communities may not be as inclusive as others. There is still concern from some players that disclosing information about yourself, such as gender, use of assistive or balancing features, or newness to the game, can leave people vulnerable to being berated by other players. Not only this, but some players may hold back from playing certain games, or joining new games based on their perceptions of their own ability or competence at the game, and how they feel that will be perceived by others. This research revealed that players may feel that they are expected to be "good" to be worthy of playing in the public domain. This finding is a valuable contribution to the research community as it highlights that this is a key concern for players and may be tied to the overall sense of challenge games provide. How players decide what is "good enough" to be efficacious in a social game would form interesting future work. Overall, this study suggests that social exclusion is found to exist in these games for all players but may be worse for certain types of players that do not fit within persisting stereotypes of who would play and how to play these games.

6. The experiences of people with disabilities in playing with others in multiplayer games

Chapter 4 has shown that players with disabilities are playing multiplayer games alongside their friends and with others online and that some of these players use adaptations to enable their play. Chapter 5 suggested that, although many players seek the positive experiences of social play, evidence suggests that players must find ways of avoiding or coping with the still prevalent toxic behaviour in these games. It also indicated that these games have an implicit set of rules and expectations that players attempt to adhere to. Not meeting these expectations seems to put players at a higher risk of negative responses from other players. Such expectations seem to apply to all players however, people with disabilities may find it harder to meet those expectations. These chapters provide a grounding from which to examine how this social context interacts with disabilities. This chapter addresses Research Question 2. Social play with disabilities: What challenges does the social context of single player and multiplayer games present for people with disabilities and those using adaptations or accessibility options within those game environments?

Access to the social benefits of playing multiplayer games should be equal for all types of players, yet certain barriers created by the social dynamics of these games may present a further barrier to players with disabilities even when they are able to access the game using adaptive equipment.

This study corresponds to and follows directly on from Chapter 5 in which players without disabilities were interviewed about their perspectives on this topic. Interviews were conducted with a cohort of players with disabilities to provide their unique perspective to allow for comparison between player cohorts and to get a holistic view of the social barriers that may be present in multiplayer games for both. The specific aims of this study are:

- To identify broadly how players with disabilities experience the social landscape of playing alongside players without disabilities by discussing what

players like and dislike about these games and the tools they use to enable their play.

- To discuss how adaptations that players use to enable play impact their experiences in play and how other players respond to their use.
- To investigate whether players choose to disclose information about their disabilities and how they play to other players, the reason for their choice, and how other players react to them. Chapter 5 suggested that players do not expect people with disabilities to disclose this information in play, therefore the aim is to see if this is the case.

6.1 Method

The method and analysis technique used for this study matches that described in Chapter 5. A semi-structured interview, transcription, and Thematic Analysis was conducted to allow for contrast and comparison with the study presented in Chapter 5.

Participants

To recruit participants with disabilities, a request for volunteers was placed with The AbleGamers Charity to work with people who are part of the Player Panels using the process described in Chapter 3. The data gathered for the Player Panels (as presented in Chapter 4) allowed for identification of players that stated that they already played some form of multiplayer games. and were willing to take part in interviews. In requesting Player Panel recruitment, it was possible to approach participants who identified themselves as having a range of different (dis)abilities and methods of accessing games. Participants recruited from the Player Panels are assumed to have self-identified as having disabilities as this was inclusion criteria for being part of the Player Panels. The limitations of this approach are noted as part of Chapter 3 and further discussed in Chapter 10. Participants recruited from the AbleGamers Player Panels are international as is the reach of the Charity's work which resulted in the recruitment of participants in the UK, USA and Canada. As the participants in Chapter 5 are UK-based, this may present a limitation in comparing the results due to socio-economic, cultural, and environmental differences. However,

it is worth noting that multiplayer digital gaming is a hobby that is international where some games may have players from several locations in the world at any one time (time zones permitting). As such, the experiences of players, no matter their physical location are considered valuable to explore as part of this work.

An initial call for recruitment with details about the study was sent out to 20 potential participants as identified using the Player Panels database. The aim had been to recruit 20 participants to match the number of participants in the study reported in Chapter 5. However, only 17 responded initially, and agreed to go ahead with an interview. After 17 interviews were conducted and transcribed, there was the opportunity to recruit further participants, however, initial coding and analysis showed the current data was sufficient to proceed without need for further interviews. As with Chapter 5, careful consideration was taken regarding how to report participant demographic and background information to maintain their anonymity. To this end, only information provided in direct quotations of participants is maintained. Direct quotations are given with pseudonyms and the connection with the pseudonym and demographic or background information is kept separate as connecting this information could risk de-anonymisation.

Interview procedure

Semi-structured interviews were carried out via telephone or by Skype which lasted between 30- 60 minutes. To ensure that the interview process was accessible and comfortable for the participants, they were each asked several days before the interview if they felt anything would be helpful to them when taking part. One participant requested plenty of advanced notice of when the interview would take place so that they could control their anxiety. Another participant requested that the interview questions were also typed in the text chat part of Skype so that they could make sure they had heard correctly.

At the beginning of each interview, further information was given about the study purposes and information regarding consent. Verbal consent for each participant was obtained, the interviews were recorded, and participants were reimbursed for their participation with a £15 (or equivalent) Amazon voucher. Each interview was transcribed in full and analysed thematically.

Analysis

The same steps were taken for the analysis stage as in Chapter 5, as such, they will not be included again here but can be found in full in section 5.1.

The fully transcribed interviews from all 17 participants were initially coded without references to the themes generated in the previous study. It was, however, expected that some similarity would occur due to the questions that were asked corresponding to those asked in Chapter 5. After the initial coding was conducted, these were organized and grouped into possible themes. These initial themes were then compared to the themes generated in Chapter 5.

Interview topics

Several areas of interest were covered by the guideline questions for the interviews. These were intended to provide the perspective of players with disabilities on the social and practical elements of playing multiplayer games. The topics are equivalent to topics discussed about multiplayer games in interviews with players without disabilities (Chapter 5) about their experiences in this style of game and about their perceptions of players with disabilities in these environments.

An interview schedule was created for this study by cross-referencing the schedule used in Chapter 5 and motivated by previous research to meet the goals of this study.

In contrast to the interviews with mainstream players, these interviews did not collect demographic information about players or whether they identify as a gamer; this information was available through the Player Panels recruitment for the players interviewed. Notes are added where a subject area is also covered in Chapter 5 and if there are differences.

The following subject areas were used to form the guiding questions, and included is a short explanation of the reasoning for their use:

- *Competitive or cooperative* - is one style favoured over the other and why (covered in Chapter 5)
- *Favourite games, disliked games* - To determine what elements of multiplayer games are preferred or avoided (covered in Chapter 5).

- *Use of voice chat* - how do players engage with other players if they do at all (covered in Chapter 5).
- *Inclusive game features and tech (appropriateness/acceptance of)* - to explore how features such as accessibility options and assistive/alternative hardware impacts play for these players if they use them (Chapter 5 focused on the perspectives of other players about these features, whereas this explores the perspectives of those using them).
- *Disclosure of disability* - do players disclose this information to others, under what circumstance and how other players have reacted to this (intended to correspond with the question asked in Chapter 5 about how players viewed disabilities in play).
- *Social inclusion and exclusion* - to learn about experiences in game that have caused them to feel left out or to feel connected and part of a team (covered in Chapter 5).
- *Miscellaneous* - a chance for the participant to talk about anything they feel may be relevant to the discussion and for the interviewer to ask for further information or clarification on any information given.

The full interview schedule is provided in the appendix, section 11e.

6.2 Results and discussion

This section presents an initial overview of the results followed by presentation of the findings of the Thematic Analysis. Discussion is included as part of this section to situate this with each theme. However, the main, deeper discussion and conclusions developed from cross-referencing and analysing both interview studies about players' experiences in multiplayer games are presented in Chapter 7. The results discussion in this section will refer to the findings presented in Chapter 5 in acknowledgment that players in both studies are discussing the same kinds of social gameplay environments.

Overview

There are some clear themes present in how players with disabilities feel about their experiences in playing multiplayer games. There are concerns that are very similar to those of players without disabilities as discussed in Chapter 5, such as appreciating effective team play, playing alongside friends, wanting to have fun, and avoid negative or "toxic" verbal interactions with others. They also enjoy variety in types of gameplay and appreciate friendliness and helpfulness in other players. In addition, many of the participants place value in finding and maintaining a strong sense of community and supporting other players with disabilities through advocacy and information sharing. They also stress how important accessibility features and adaptability in games is for them and how this can be a deciding factor in choosing and maintaining play. In some instances, however, accessibility and adaptations can prove to be inadequate and still cause problems for them in play. Particularly where adaptations might cause them to play in ways that seem unexpected or unusual to others, this can mean that their disabled status is unintentionally disclosed to others and sometimes results in questions from other players, or worse, accusations of cheating or not playing well enough.

The results show that players with disabilities usually prefer to disclose their disabilities to trusted groups of friends, followers, or communities where they feel less likely to be met with verbal hostility from other players or, if they are, then they have social to the awareness of the negative perceptions of disabilities that people may have and are aware that other players may view them as less capable as players. Though, players may occasionally talk openly about their disabilities, to advocate and to explain how it impacts their play as a way to raise awareness. In some cases, players use humour as a way to cope with stereotyping by using their disability to playfully mock people if they play particularly well.

Despite any of the problems that they might experience with accessing games or with other players, the participants strongly emphasized how beneficial they felt that multiplayer gaming was for them; both in terms of developing and maintaining supportive communities, and as a way to cope with the symptoms of their disabilities.

Gaming helped some players overcome isolation, mental health problems, and even replace work to an extent.

Themes

The results section is organised under headings that encompass the main themes present in the data. With each theme are subheadings indicating key topics contained within each theme. This section is organised using the categories as section headings and the subthemes as subsections.

Table 9. Table providing a summary of the themes created as part of the Thematic Analysis of 17 interview participants with disabilities regarding their multiplayer gaming experiences.

Theme Summary	
Category	**Theme**
Benefits	• Game as a social medium • A way to get out of my head and into the world
Accessibility	• Importance of options • Features can cause problems • Alternative ways to play
Expectations of others	• Playing "wrongly" elicits toxicity • Managing exposure to toxicity • Learning to play well enough
Disclosure	• Disability is seen as a disadvantage • Disbelief • Only within a trusted group • Disability as an explanation • Disability as a punchline
Community	• A source of help and support • Reputation as a deterrent • Seeking out other players like them • Discord to support access to communities
Advocacy	

Use of quotations

All quotations used in this section are presented under pseudonyms. Although information of participants' disabilities is available through the Player Panels recruitment system, this information is also kept separate from quotations as unique combinations of disabilities and their effects could be used to identify participants. Exceptions are where the participant openly states their disability when speaking. A summary of the range of disabilities is provided in the demographics section but kept separate from other demographics.

Direct quotations in this section are given as illustrative of each theme as described in Chapter 5.

6.2.1 Player demographics

The demographics of the 17 participants are presented in Table 8. The participants varied in age, but the majority were 35 or younger. Much like the previous study, more than half of participants identify themselves as male. Most participants played over 2 hours in a typical single play session.

Table 10. A table showing the demographic information for the 17 participants with disabilities that were interviewed about their experiences in playing multiplayer games.

Age		**Gender**		**Typical session length (hrs)**	
18 - 25	3	Female	3	>1	0
26 - 30	4	Male	10	~1	0
31 - 35	6	Other	4	1 - 2	4
36 - 40	2	Prefer not to say	0	2 - 4	11

41 - 45	0			>5	2
45 +	2				

Participants' disability information

This additional information is included to show the variety of disabilities that these players identify as having. This information is kept separate from other demographic information and from quotes to retain the anonymity of the participants. It is worth noting, however, that some participants talk openly about their disabilities in the interviews and this information is reported in quotations where relevant to the discussion. Participants recruited for this study report the following types of disabilities: deafness, hard of hearing, upper or lower limb disability, mental health conditions, low vision, blindness, autism, colour vision disabilities, and learning disabilities.

6.2.2 Benefits

This theme reflects how players strongly value the social benefits of playing multiplayer games. In many ways, this finding corresponds with previous research demonstrating the importance of the social aspect of playing games. Participants in this study also expressed how games provided them a way to escape from their current reality and into the virtual world and, in doing so, connect them with other people that they could not reach in everyday life. This seems to represent a kind of bridging between the sense of escapism that games can provide and the social connection, whereby the social connection is part of the sense of escapism.

Game as a social medium

Multiplayer games appear to be a medium for social interaction with friends and gaming communities for these players. They provide a "place" for socialising; a shared activity that provides either the backdrop or a focus to interactions. For some

players, the motivation to socialise with their friends overrode their preferences for the game, such that they would play a game they were not fond of, just to play with their friends.

> I would say the game is just the medium for social interaction, right? *Dominic*

> [...] to be honest it was something my little sister enjoyed playing and we have 11 years difference between so at the time I was very much just looking for some way for us to connect. *Emma*

> I just think that you know online games are like any other social thing we do in the world, they're just as impactful to hang out with your friends or you know, spend time, just having fun and talking like any other activity. *Jenna*

> Erm and I guess what drew me to it was, it was a new game to play and I was really excited it was something I could play online with friends 'cause, especially for blind people, we have really nothing we can play erm with other people and so it's nice when you have something that you can do socially. (in reference to the game *Crazy Party*) *Robert*

> It's just that all my friends play and I don't wanna leave them so I'll just end up buying the games to play with them. *Stephen*

These findings suggest that players see games as a tool for, or facilitator of connection. In Chapter 5, it was also shown that players acknowledge this benefit but expressed a further value of positive social encounters. The difference here may be that people with disabilities may find games to be a channel to social interaction that they may not be able to obtain in everyday life, whereas people without disabilities may already be able to meet their needs for connection outside of games and therefore the social benefits they obtain from games are one level up. This is to say that players without disabilities are not simply seeking connection but instead are

focused on optimizing those connective experiences in looking for positive experiences in team play.

A way to get out of my head and into the world

For people with disabilities who may be at higher risk of isolation, depression and or inactivity, multiplayer gaming seems to help support them. As well as providing distraction or escapism, participants talk about how multiplayer games allow them to meet people beyond what their physical situation might allow. One player even talks about how multiplayer gaming replaces work for them. For a person with disabilities who may not have access to employment opportunities, the flexibility and variety of gaming fulfils the needs of this person to feel productive and useful. This supports the importance of human need for meaningful work and to be a productive member of society or their community. It is possible that the game fills that need to some extent by connecting players with communities and social systems within games.

> I think that for me, and for a lot of people, it's a coping mechanism, it's a way to escape, it's a way to get outside of depression or whatever, what's bothering you, it's kinda like you know, they call it a pastime for a reason because it helps you pass time without you having to worry about whatever's going on. *Nick*

> [...] Playing MUDs [Multi-User Dungeons] has allowed me to really open up and meet people in other parts of the world that I would never meet otherwise because I don't travel and that, I keep telling people this all the time, you know they keep saying to me "why don't you get out very much?" I say, "because honestly, these characters in my muds and in my video games lead more interesting lives than I ever will" *Chad*

> Keeping in touch with my friends through gaming kept me sane, I mean and that is no joke. I mean it really kept me sane and now, I mean I've been in therapy for years but my therapist is like "yay gaming!" because it's like a

> great distraction, it distracts you from concentrating on the things that make you depressed or the things that boost your anxiety and it forces you to concentrate on something else. *Laura*

> I've found personally that it replaces work for me, in a way that it makes me feel productive, see every multiplayer game that I've been involved in I've done something with, like in *Last Chaos*, I ended up running a guild which is like it's very work intensive. With minecraft I ended up running servers for my friends, doing videos, doing tutorials, doing all kinds of stuff for that. [...] And then with *Ingress*, I've gotten involved to the extent where they're putting me in a leadership position because of the power that I have, so it's replacing work for me. Whereas I can't hold down an actual job because I can't keep regular hours whatsoever but this fits into whenever I'm available. *Laura*

This is an interesting benefit that was found in the corresponding study with players without disabilities. It seems that games are not only providing social connection for players but are also meeting the need to feel useful by providing a flexible environment unlike typical jobs. Additionally, these findings support previous work that explored games as a way to help people to cope with mental health conditions and to distract from everyday worries (see Chapter 2, section 2.1).

6.2.3 Femininity is unwelcome

This theme describes how gender still seems to be something that incites comments and or harassment from other players if revealed through avatar, gamer handle, or voice chat. Indeed, the results suggest that female identifying players expect to receive a negative response if their gender is disclosed in multiplayer game environments. Supporting discussion can be found in Chapter 5 (section 5.2.2) whereby it is evident that there are persisting assumptions that typical players of multiplayer games are not and should not be female or feminine.

> Other than maybe just as well as erm disability, I think my gender plays into a lot. Erm, as soon as people kind of hear that I've got a feminine voice then that kind of throws people off the deep end. But erm I think I share that experience with a lot of people (laughs). *Rayne*

> Yeah, as somebody who is both a woman and queer, I don't feel particularly welcomed by a lot of people in the gaming community. I've definitely experienced harassment because of both of those things in the online community, and particularly after enduring Gamergate it has been really mean. *Taylor*

As Gamergate is mentioned here as with participants in Chapter 5, this speaks to the impact that the controversy has had on those who feel that they do not fit the stereotypical young male gamer. This reiterates the current complexity surrounding what it means to a diverse player and the gamer identity.

6.2.4 Accessibility

Participants explain that accessibility options are important to them, in some cases vital, but also helpful to customize how they play. Some features, however, evidently cause some problems and players find that they do not function as they would hope, or that other players will not respond when asked to use them. In addition, players talked about playing in different ways as a form of accessibility, for example, taking on different roles to suit their own abilities allowed them to play a game even when they felt they could not play in the same way as other players.

The importance of options

When discussing game options, such as those within game menus or on hardware that allow players to customize their input or control mechanisms, participants stressed that availability of options is very important and could determine whether they were able to engage with a game at all. In some cases, the inability to play a

game due to its lack of useful options meant that a participant was unable to play the game they wanted to play with their friends. This suggested that the physical barrier or not having the options to enable them to play resulted in a barrier to socialising in the way they desired.

Participants spoke of sticking with games that provided the options that they most appreciated, such as being able to customize key binding or having a "pinging system". A pinging system is a feature in some games that allow players to click on a certain area of the game map or game environment which creates a "ping", either audible or visual - such as a flash of colour over a location, to alert other players. Games that provide a variety of ways to play were also appreciated by players, such as being able to choose from a selection of characters that can be played using different key bindings, or that rely on different ways of playing. *Overwatch* was a game noted as particularly effective in providing this.

Other options that often were deciding factors that participants considered in choosing and sticking with a multiplayer game was the ability to control their exposure to other players in the game. It was considered very important to some players that they were able to mute, block or avoid voice communications from other players.

Games that use a combination of controls such as those that require the player to use a keyboard and mouse or that used too many keys were problematic for some participants such as those playing with one or no hands. In these cases, the ability to rebind keys to either the keyboard or the mouse or to an external controller were make or break.

The types of options required/desired are very diverse. For example, one player might like a game which allows fine control over the audio settings if they have visual disabilities:

> If I had to say, the types of games that I dislike are probably games where I don't have many options for communicating with my friends [...]. Oftentimes

> if I'm talking within the games in game voice, I basically lower all the volume of, any of the background music and a majority of the background noises so that way, what is prominently featured in the audio is er my teammates voices. Er but, not many games tend to have those features. [...] so if it's in-game chat and you just adjust audio and you really can't do much with it, those tend to be games I really dislike as they're not very accessible to me. *Simon*

Whereas another player may value control over the pace of the game. Therefore, the more customization control options there are for these players, the more they will feel catered for and included, both physically and consequently socially.

> Physically I feel that every time I tried any kind of popular game or any game I've been told is fun, it's all far too fast paced and there aren't really very many options for changing something to slow down or allow for less immediate responses and if you don't make that immediate response, you die. *Emma*

Features can cause problems

For games that include features intended to make a game more accessible for players of differing abilities, or where a player uses a piece of technology to enable them to play, the resulting experience is not always positive. Often the reasons features/adaptations are perceived as negative are due to the perceptions of other players, or because the player is made to feel ashamed or patronised for using them. For example, a player explains how they feel patronised by the way in which a game presents difficulty settings. Difficulty settings are usually present to allow a player to choose what level of challenge they experience from a game. In a multiplayer environment or where other players are spectating game play, someone may wish to appear competent and effective at a game regardless of what setting they choose. The player describes how the settings are presented make the player feel embarrassment or shame for choosing a “less challenging” setting.

> Like where you can set a difficulty to multiplayer [...] the one that particularly stands out to me in the multiplayer aspect, because it's you playing a set of players, but *Wolfenstein: the new order*, the way they set up their difficulty setting where the easy setting is the character wearing a baby's hat and a bib [...] I find it very disrespectful. Or [...] turning on some of those features, they call it professional or it's like you're not a very professional or a very good player er if you don't use those features, I find those very condescending because like it means to say "oh if you need these for whatever reason, either skill or disability or whatever reason, like we are gonna go out of our way to make you feel bad about that" *Simon*

Another player explains how other players have reacted negatively when they have disclosed that they use adapted controls to enable them to access play. In this case, it seems that the joystick extensions the player uses on their controller are considered by other players to provide an unfair advantage and, as such, the player is accused of "cheating".

> Yeah, I get accused of, I've been told that it's cheating and things like that. Or that I have an unfair advantage like for using stick extenders even though anyone can get them if they want them (laughs). [...] Yeah usually the response is cheating or that it's not fair. *Rayne*

A number of participants talk about how, even though they have an adaptation that they use to help them play, this does not always help with every game or with, for example, one player discusses how they use a customizable mouse so that they can play games using one hand, but that some games require so many buttons to be mapped to the mouse that can cause easy miss-presses that end up disrupting their play.

Similar to the findings in the previous study (Chapter 5, section 5.2.4), how accessibility features are implemented seem to influence both how useful they are to

players and how the use of them is perceived by other players. Indeed, when no reason is apparent for why someone may be using accessibility features, options, or technical adaptations, players appear to make assumptions about the reason for their use, further, that these assumptions tend to be unfavourable, such as a player not being good enough to play with or without certain options, or that adaptations provide unfair advantages

Alternative ways to play

For many of the participants who feel that they cannot play in the same way as players without disabilities, or to the same standard in a multiplayer game, they explain that they find ways to adapt their play style in order to fit in. Players wish to spend time with their friends but also to be effective in play. Several participants spoke of how they adapt the way they play to play to their strengths or to minimise the effects that their disabilities have on play. Some explain that they do this by taking on a different role in the team or by employing alternative strategies, such as social manipulations to be successful, when they have reduced capacity to "fight" in play in standard ways.

> A lot of the gaming with disability experience, sometimes, is like not even like necessarily like changing the features of a game but it's more of like trying to figure out different ways to play the game to still be successful at it. *Pete*

In games that have a variety of things that players can do that aren't action or combat related, some participants spoke of taking advantage of these as alternative ways to play that felt more suited to their abilities. This appeared to allow these players to enjoy the social elements of play without worrying that their disabilities would prevent them from participating in other types of play that may have been more physically or emotionally difficult for them.

> In *Star Wars: The Old Republic* and *Elder Scrolls*, I would help my guild craft different armour that you know, different guild [...] Different furniture and

> stuff for the guild homes or workbenches for us to use, for different things like that. *Jonny*

One player explained that they used misdirection and social manipulations in games as alternatives to combat strategies since they found these physically challenging due to their disabilities. They described how they would "play dead" to avoid getting into combat with other enemy players in a team-based FPS game, for example.

Interestingly, playing in alternative ways, in some cases, can cause other players to play differently in response. A participant who plays an Augmented Reality (AR) game *(Ingress)* on their mobile phone, explains how they use their wheelchair and car to get to locations in the game. Since, they have been open about how they play with other players, they explain that the opposing team has begun to adapt how they play by placing markers in the game in locations that they know the player using their wheelchair cannot physically get to.

> [Ingress] gets me out but I can't play like a normal person. I have to come home and lie down a lot. [...] No group is ever all jerks but there is always one and they've told me that they've had to change their whole strategy because of me, specifically, and what they're doing now is they're hiding all the anchors in parks where I can't walk. So either like they're hiding them miles deep in the woods (laughs), or like they're hiding anchors way outta town and then throwing fields from in town where I can't drive that far out, I can't go get it. *Laura*

For some participants, playing in alternative ways can cause other players to react badly. This seems to be either because they do not understand why the participant is playing a certain way or because they felt that the participant was not playing well enough. The following example, which also fits under the subtheme of *Expectations of others,* shows how a negative social experience in play can result when a player with disabilities plays in an alternative way that does not meet the expectations of other players:

> [...] Especially the way that I build my character and give them certain talents over others, it's because they help me play better, it's more, if I'm like this I can move quicker, while the more hardcore [players] might choose a different talent to help their damage or their healing and I know I've been called out before a lot, for having the wrong talents [...] and people still seem to think there is only one way to play the game they don't understand it sometimes, you know if you're playing a little different physically, you have to make adjustments for that. [...]. One time in particular, my guild had brought along someone's friend to a raid [...] and I died quite a bit, [...] and I don't always move as quickly as I can because of the way I have to play, and he called me out on it, [..] I lost my temper and attacked him right back and said well "you know, I'm playing with one mouse button and you know, you're dying almost as much as I am". *Jenna*

Although a combination of adaptations, accessibility features, and alternative ways of playing provide access for these participants to multiplayer games, these findings imply that there is an assumption from many players that there are correct ways of playing, certain sets of norms and expectations about conduct in play. Any deviation from these ways of playing garners (mainly unwanted) attention.

6.2.5 Expectations of others

This theme reflects the strong sense that there is an expected way that multiplayer games should be played and what skill level is appropriate. As this theme was also present in Chapter 5, this reinforces that this is a core feature of the social play environment.

Playing "wrongly" elicits toxicity

Participants often spoke of toxicity within certain games. In many cases they felt that the source of the toxicity came from the expectations of other players and, in

particular, expectations of skill or expectation that they should be playing in a certain way that other players believed to be better.

> I think a lot of people, erm, not the people I enjoy playing with, but people that I don't enjoy playing with, it tends to be that they make assumptions about what they think other people should do and don't focus enough on themselves and erm they blame everyone else for any kind of failure, [...] I think they do think that if you're playing this role then they think you play it exactly how they think you should play it. If you don't play that way, then you're wrong. *Rayne*

> Everybody thinks that there's one cookie cutter way that everything should be done and when you use a different strategy or a different routine, you know it disrupts them so bad that they have to attack. *Jenna*

Evidence for this was also found in the previous study (Chapter 5, section 5.2.6) but this seems to be of increased concern for players with disabilities for whom playing in standard ways may not be possible or optimal for them. Not meeting expectations often resulted in "toxicity" from other players in the form of verbal aggression. This confirms the concerns of players without disabilities as was found in Chapter 5, that players were at risk of being targets of toxicity from certain players. In one particular case, disability was used as an insult when one participant was not meeting expectations in play, even without them revealing their disability.

> So last year in *Overwatch*, it was a ranked game and we were losing and there was this one guy who was like "we have a bunch of wheelchair kids on our team". He kept saying it and [..] that felt like a direct attack toward disabled people. Because we were losing, he labelled it as wheelchair kids, which was ironic because I ended up gaining player of the game [...] that was probably the worst experience and it wasn't directed toward me because he didn't know, but it showed that erm, disabled people playing games aren't like as accepted as they should be. *Stephen*

Managing exposure to toxicity

This theme demonstrates that players generally wish to avoid being targeted with toxic behaviour from other players and will actively look for ways to escape this. At the same time, they acknowledge that these games are known to house this sort of behaviour and therefore employ coping mechanisms and ways to manage their exposure to this.

> I dunno, it's a game where the rounds are so short, erm that it's not overwhelming to jump into a bunch, like if you have sort of, you know, crappy group of people or it's sort of toxic and everyone's being a jerk, it's erm like 15 minutes to like 20 minutes time. Erm 'cause that was the problem i ran into with *League of Legends*, [...] where you would like go and try and play with randoms and then be stuck with them for 45 minutes and it would just be miserable. So yeah, I think *Overwatch*, it's that really nice sweet spot of not too long, not too short. So like a goldilocks zone of playtime. *Dominic*

Some participants said that they avoid using voice communications in games specifically to avoid the toxicity they feel they may receive from other players, or because this has happened in the past.

> I did use the voice chat briefly but not for long because that sort of immediate verbal backlash that you get and I found that very very difficult, I can deal with it a little more in text just because I can ignore it (laughs). *Kel*

This player alluded to their voice having given away something about them to other players that led to a negative reaction from other players. This supports work by Wadley et al. (2015), as discussed in Chapter 2 (section 2.2.3), such that using voice communication may reveal characteristics of a person's demographics, in this case, giving away their disabled status. Section 6.2.6 further discusses disclosure of disability in social play environments. These findings are very much in line with the

findings of the previous study in which shorter play times are preferred and avoiding the use of voice communication in games

Learning to play well enough

In the social play environment, players may feel that learning how to play is an uncomfortable experience and one that may prevent continued play. This seems to be due, again, to the expectations of other players. It seems that it is expected that a player must have a certain level of skill regardless of whether they are new to the game or not. Often there is little patience for those who are new to the game and who may not play optimally during their learning process. This can apply a lot of pressure to a new player due to a fear of verbal attacks from other players. This pressure and expectation appear to be felt in some gaming communities more prevalently than others: mainly those that are highly competitive such as team-based FPS games and MOBAs.

In some cases, the player's disability can exacerbate this as it may slow the learning process - if the community places expectations of skill on a player in the multiplayer environment, then this can be a barrier to positive social interaction in play.

> I was trying to learn how to, you know, play the multiplayer experience and I wasn't doing very well, and I got like a private message within 5 minutes, from, probably some 13-year-old boy that was like "please kill yourself" like "you're terrible at this game, I don't know why you're on my team" (laughs). I mean, you know, like I wish that I could say that that never happened again but it got to a point where like no-one wanted to team with me and like, I would try to send people private messages and be like "hey, listen, I have cerebral palsy, I'm just trying to like, learn the game, like if you would please let me just be on your team and I will do the best I can" but you know, it kinda got to a point where like it was impossible to even engage in the gaming community because there just wasn't a lot of patience. *Pete*

Where games have been designed with the learning process of new players in mind, such as pairing up players who are new to the game so that they can learn with others at the same skill level, it is clear that some players manipulate this to deliberately target new players.

> So, obviously when you're new to a game, erm, you just don't have the skills because you need to practise to be able to get good at it. Erm, so the way that they do that in *Overwatch* is they'll match-make you with accounts, like if you're a brand-new account, they'll match-make you with other new accounts. Which makes sense, right? But what some experienced players will do, they'll make new accounts just for that weekend just to harass new players. It kinda breaks the matchmaking I guess so that really experienced players are fighting against people who are just brand new to the game. *Rayne*

This is particularly noteworthy because even a feature designed to generate positive experiences in play by matching players of similar experience/skill level in order to create a level playing field, these findings demonstrate that some players go out of their way to manipulate these systems for their own gain and to perpetuate toxic behaviour (Kordyaka et al., 2020; Yan & Randell, 2005).

6.2.6 Disclosure

This category describes data related directly to the questions that were asked of participants about their experiences in disclosing their disabilities or their choice not to. The theoretical category of disclosure captures several subtheme as a result of these discussions which suggest that these players were very conscious of how their abilities may be perceived by others and expressed awareness of how disability is typically seen as a barrier to playing these games effectively.

Disability is seen as a disadvantage

Many participants explain that they choose not disclose disability because they feel that other players might consider them a disadvantage to play alongside. Though this is not a first-hand experience in every case, a number of participants clearly feel deterred by bad reactions of others. There seems to be an underlying assumption that players with disabilities are unable to play to the standard of other players by default which results in the social exclusion of those players. Participants show their awareness of this assumption.

> I've had people from DeafGamersTV where they've run into similar instances as well where the moment that other players find out that they have someone with a disability on their team, they feel that now they're at a disadvantage and that player can't really contribute. So, either they'll get booted off or they'll begrudgingly work with them, or they'll have 'em on the team but er, they'll try the minimal effort to include that person. *Simon (DeafGamersTV is a Deaf gamer that streams their gaming online to various social media platforms and a community of followers has emerged around this streamer)*

This, again, points to this underlying expectation of how skilled someone should be before they play in online games. Like other characteristics such as femininity, disability is seen as creating a weaker player. Because this is often the case, this is considered a rationale for avoiding disclosure of disability to other players.

> Er 'cause [...] a lot of gamers are (laughs) privileged people, shall we say. People who have the privilege of not having to deal with x, y and z. So that's what often makes something toxic, so it's the reactions to people who are not the same as they are [...]. Erm but gaming isn't somewhere that I'd generally feel safe erm expressing a lot of stuff I'd express outside of a game. *Kel*

Disbelief

In some cases, when players have chosen to disclose that they have disabilities, they explain that they have been met with disbelief. This is perhaps further evidence of the pervasive belief that players with disabilities are ineffective players, and even when they demonstrate that they can and do play. Alternatively, it could be the belief, not that players with disabilities are ineffective, but simply that games are still thought to be inaccessible for these players. The following is from a player who explains that people are quite curious when they find out that they can play games and, often, initially disbelieving.

> Usually I'm very open about it, erm my Xbox profile mentions that I'm blind, I make it really clear and you know some people are really confused by it, other people think that I'm faking it and I did an interview with Polygon a few years ago and one of the questions was, they asked me "what kind of response do you get" and I'm like "well you know people usually think that I'm faking it and honestly I'd rather fake something that's cool, I'm like, I don't really wanna fake being blind, it's not really something that's, you know you get up and go let's be blind today", erm but some people just don't get it and I have to answer a lot of questions about how I use a computer and how I do simple tasks.... *Robert*

Only within a trusted group

Many of the participants said that they usually only disclosed their disabilities within a trusted group of co-players or a community of people in which they felt they could trust to be supportive. The reasons given are often related to feeling uncertainty over whether they would receive a negative response as a result. As such, many participants explain that they disclose that they have disabilities once they have gotten to know the people they are playing alongside or when they feel they are in a supportive environment, such as a specific Twitch or Discord community.

Yeah, I tend to just keep that in my friendship group. Occasionally, they will invite their friends to play with us if we don't have enough people for a full team or whatever, and so I often meet new people that way. And I tend to just not really talk about myself very much, erm and just kind of like get a feel for the person first before. Like quite often I think if they're friends with my friends, they're usually pretty good people but occasionally there's someone that doesn't really get it. *Rayne*

I think over the years I've got more comfortable outright just telling people about it and then since it's a community of nothing but disabled gamers, I've been very open about it and just accepting of it in terms of telling people about my situation. *Stephen*

I didn't wanna deal with the people and it, like aside from them being annoyed, it put a lot of anxiety on me because I was constantly in a state of "oh no, I'm gonna mess this up and my hands aren't gonna hit the button when they're supposed to because occasionally I lose the ability to control my hands and I'll just drop the controller" and so the anxiety of doing that occasionally lead to that actually happening and then anxiety over people yelling at me, I was just "nope, I'm done, I'm only gonna play with people I know" *Emma*

Disability as an explanation

In some cases, disclosing their disabilities helped other people to understand why they might be doing things differently within a game. This suggests that in some situations, providing a reason for playing in different ways that makes sense to other players can lead to more positive and supportive reactions from co-players.

They were completely supportive and they understood a lot better why, like when we would raid and stuff, if I died in the raid everyone else would run

> back to the base and I never would, my boyfriend would wait and he would run back and raise me so I could have a break and a rest, while everyone was running back and it didn't make sense to them why I would never retreat and, you know, run back like everyone else was and you know, little things like that that, in the game, then it started clicking to them "oh that's why she does that". *Jenna*

Disability as a punchline

In contrast to those participants who were hesitant about disclosing their disabilities to other players, there were some who said that they did so in such a way that it could be described as "sporting banter", for example, if they "beat" another player or played particularly well, they would mock the other player by telling them that they beat them one-handed. Although, it is worth saying that this could also be seen by some players as a toxic behaviour. This appears to be playing on the perceived assumption that playing with a disability is a disadvantage and, therefore, to beat an "able" player with a disadvantage is exceptionally good. Additionally, some participants disclosed their disability in a kind of self-mocking way. Participants used this as a way to help break the tension where the other players know that this person has disabilities; by disclosing or talking about the disability in a humorous way, it seems to allow the players to move past the issue without it becoming a serious point of contention.

> I tell 'em they just got beat by a quadriplegic. I'm playing with my mouth, erm. [...] I don't tell 'em until I beat 'em. If they beat me, I just let them go on, you know I'm like 'alright' but if I get the upper hand I'm like "well you are getting beat by a guy that can't use his hands" *Nick*

> I'm a very good gamer, at the games I play at least and er, even compared to a lot of my peers who have full control over their hands or whatnot, I'm often better and as a result of that people, are often flabbergasted, at er, you know,

> in a literal sense I am able to beat them in a competitive setting, beat them with one hand behind my back. *Rhi*

> I have a friend of mine who's fairly erm competitive and wired into the rocket league community and he has some people like, his regulars as he calls them, that he plays high ranked competitive matches with, and I'm terrible at rocket league, but the people that he hangs out with - if we ever play with them and it's come up that I have a disability, the running joke is that I drive the wheelchair better than anything I could in *Rocket League* [...] it's not ever a secret or anything, if it comes up it comes up but it's not something that I feel, like depending on the situation, I will absolutely use it as a punchline I guess, as it comes down to. *Dominic*

6.2.7 Community

Many players mention being part of game communities, both in the game and external to the game environment such as in communication platforms like Discord or game-related online discussion forums. For the most part, being part of a community of players enriches the gaming experience for these players. Community seems to mainly refer to groups of people that play a particular game. Players also use community to describe their groups of friends and extended friend groups which are maintained through platforms such as Discord. Though it is not explicitly stated, being part of a game community seems to imply that, alongside playing the game, a person actively engages in social interaction with other community members and seems to do so for a sustained period of time.

> I think that being a part of a community of whatever game it may be and just interacting with other players, it just kinda is what makes me like games more. Er so if there's an active community, if there's a lot of people playing the game that are erm, you know, people that communicate, you can go on a lot of multiplayer games that no-one ever talks on microphone and stuff [...]

like everybody kinda chats in it, so that's what I like about multiplayer games in general. *Nick*

Oh goodness the early *Minecraft* community was excellent, I mean absolutely wonderful, I've met so many friends that are lifelong friends now. [...] it's not anything specific, but it's the whole sense of community, how we have stuck together all these years. *Laura*

I usually play with randoms but I have joined a community. I play with others that are also interested in the game because it's really deepened my enjoyment of the game because I can like coordinate a little bit better you know, so the *Splatoon* community just seems like less toxic overall than the MOBA, things like *League of Legends* or *Fortnite*, but it's a better experience. *Matt*

A source of help and support

Many participants explained that they mainly played with friends or said that they had friends observing through a streaming platform (Twitch). Participants spoke of playing with friends in a number of ways, mainly to enjoy spending time doing an activity whilst interacting with them. However, additionally, participants spoke of feeling supported when their friends were present, as though their presence provided a comfort of sorts. Friends provide social support for these players in multiplayer games and, in some cases, a buffer to toxicity when they feel vulnerable due to playing differently.

Sometimes if they [other players] don't like what you are doing, you'll start getting text messages calling you names and telling you what they think of you which is very pleasant! (laughs), things I don't particularly want to repeat but you know, things that toxic gamers come out with, so you've got the racist stuff and homophobic stuff and just generally calling you stupid and things like that, just because you haven't done what they wanted you to do. [...] So if

> that's being directed at me because I've done something so and so didn't want me to do then it's very difficult if I don't have somebody else in a conversation with me, to reassure me. *Kel*

> I learned really quickly that multiplayer was a hostile place and so yeah, for a long time it was a very negative thing to me and I avoided it at all costs and I still have a lot of anxiety around it, like I still get anxious even playing with my friends because, even though I don't think my friends are gonna treat me badly, like it just, there's, it still has created this kind of internal kinda conflict, whether I want to engage in it or not, erm in multiplayer in general, so I've definitely found community now, but the negative aspects, I think, have definitely had a lasting effect. *Rayne*

Reputation as a deterrent

Not only do participants talk about game communities that they feel comfortable and supported in, but they also explain that there are some communities that have a reputation for being unpleasant. This deterred participants from trying particular games. They explain that this is not necessarily due to or related to their disabilities.

> There's a lot of games that are popular that I just won't even try because I've heard that their communities are not particularly friendly. *Taylor*

> Well not necessarily because of disability, but because of either toxicity or talk and yeah, and I've been around long enough to know that the CoD [Call of Duty] community is really toxic, and the WoW [World of Warcraft] community can be either or depending on who you group up with and what server you're on. *Laura*

> Communities, I mean like I know League of Legends that's like the number one most toxic gaming ever. *Matt*

Seeking out other players like them

Participants often mentioned seeking out other players with disabilities or players with similar attitudes towards gaming as them, for example, seeking others who do not like to play in very competitive ways. Part of seeking others with disabilities also helps players to share information about effective ways to play and to find games that are suitable/playable for them. So, not only is the community about a shared game preference but also, in some cases, common ground and understanding about the disabilities they have. This is similar to findings by Obst & Stafurik (2010), suggesting that being amongst others with a shared understanding of disability promotes a sense of social support and therefore, well-being.

> I seek out people like from DeafGamersTV. They focus on having an actual group of people who stream them playing video games and they're all deaf. Those are the type of people I would always try to seek out and if I get a chance to play with them, I always do it because we have that similar experience, and we know the kinds of things that we can do to facilitate communication. I er, and I think when you do that, you can find people who can recommend games er that are accessible, like if someone asks me what's a good game that is that is very accessible for this type of player, I tend to take the time to research because that's what I pick up and learned from the deaf community where you always have someone that can provide that support for you. *Simon*

> I think other people with disabilities, whether it's erm physical or mental health disabilities, I find tend to be a lot more accepting. Erm and a lot of my friends, even if they don't have physical disabilities, they'll have things like anxiety or other things that limit them, kind of in life in general. Erm and I feel like 'cause we have a lot of common ground then, even if it's not the exact same thing and they tend to be more compassionate people as well, just like a little bit more laid back. I don't really like angry gaming; I find that really upsetting and stressful. So generally, I look for other people like me, people

> that aren't gonna get too upset or angry when things don't go to plan because like that's part of gaming. *Rayne*

Discord to support and access communities

The majority of participants who said they used some kind of voice chat when playing multiplayer games tended to prefer to use Discord instead of the in-game chat that many games provide. Participants explain that they use this to talk to their friends who they are playing with in the game, and they also mention that it provides better control than many in-game chat options. Not only did many participants use Discord as a chat platform, a number of participants said that they used it to find and join communities of players of particular games or communities with disabilities. This allowed players to maintain contact with like-minded and trusted players, unlike in-game chat options which often only support temporary contact with unknown players and for the duration of play only. Discord was generally considered to be the best communication for players that use voice communication on PC games for all but one player said that they were unable to use Discord due to its inaccessibility and that it was difficult to use effectively with a screen-reader.

> I met a bunch of people on discord, I went to the reddit, I don't really like reddit but they have a community for *Splatoon 2* and I saw a link to it, the Discord that was associated with that community and I just liked people there and I met a few people there through the Discord. *Matt*

> No, in fact Discord is not accessible at all, it's just not. *Chad*

6.2.8 Advocacy

Since the participants were recruited through a charity that supports and advocates for the inclusiveness of digital games, this theme may be related to the sampling. Participants who spoke of advocacy hinted that there are wider communities of players with disabilities who advocate beyond themselves. It is, therefore, unclear

whether this is a result of the sampling and could benefit from further investigation. The participants who raised advocacy, often did so up front at the beginning of the interview or when explaining their activities within the broader gaming community. Several of the interviewees explained that they regularly streamed/broadcast their play sessions online or recorded them to later upload them to YouTube to share publicly. Their given reasons were that they wished to help other players to see that it was possible for a player with disabilities to play, to explain how they played and the techniques and technology they use, or to show that they could match or exceed other players in their play skills. Advocating appears to empower players with disabilities and allows them to build supportive communities of other gamers through streaming. The multiplayer environment seems to allow players to show that, not only can they play the game, but they can play effectively alongside others.

> That's what I'm passionate about I mean, I'm really on a mission to get people with disabilities to be more visible in the gaming community and also, for people to have a better understanding that we can bring a really wonderful amount of experience into the gaming community. *Pete*

> Like right now, I've been taking formal classes at school to learn sign language. Erm and because of that I've kinda embraced that deafness and I'm happy to own up to - I am deaf and I've been advocating for better accessibility for it. *Simon*

> And the other thing is just advocating for people so they know what's out there and they, you know, can have some hope that if they do like playing games or just going back to work and they want a job and they know that they can use a computer or whatever, it's just nice to know that you can kinda share that with people. *Nick*

> I have a whole bunch of stuff on YouTube, a lot of my stuff is audio-based but [...], but there's some visual stuff, I've got some stuff up and I'm gonna work on some more like visual things like I'm working on a series called "can I play it?" and it's where I pick a game, maybe like an old arcade game like a run

> and gun or something and we see, can I actually play it and what my experiences are like with the game. Most of the games I won't be able to play but I wanna, you know, make a kind of fun series to kind of be like “hey look, blind people enjoy games too even though we can't see the screen, we still have fun”. *Robert*

> A lot of the people that are either just starting out with the game, or their disability has changed, and [I will] help them find solutions to make it more accessible so they can play better, or they can play longer. And every time I get an email back that “oh this helped me, I can do this now”, you know, it's really satisfying to get those back. *Jenna*

The advocacy described by these players seems to take two key forms. First, to share information with other players about ways to get around accessibility problems. Second, as a way to seek interest from other players and game developers in supporting accessible game design.

6.3 Conclusions

The findings provide strong evidence for the social benefits and sense of community that games bring to players. At the same time, there is the need to manage the expectations of other players to avoid negative or toxic behaviours. Of the participants in the study, many of them use some kind of assistive technology to play, make use of accessibility options in games, or will play in ways that best suit their abilities. Those differences, though extremely varied in their impacts on play and how they may appear to others, play a substantial part in the communities that players with disabilities choose to surround themselves with. Participants in this study express how they seek to form or become part of communities who they feel supported by and have an understanding and tolerance for the effects that their disability has on how they play. There seems to be an assumption among players with disabilities that the wider communities of mainstream players may not be tolerant, understanding, or welcoming of the ways in which they play. This assumption is

based upon past personal experiences of intolerance or hearsay of toxicity directed at other players with disabilities. This study found that players feel that they may be viewed as less competent by other players and, as such, let the team down so to speak. Or that mainstream players are unaware that a player with disabilities can play at the same level of competence as others or, in some cases, even better.

Players with disabilities have a variety of ways in which they manage and cope with these external communities of players and are aware that they may find themselves more vulnerable to exposure to the more unsavoury aspects of social play, such as toxicity. Their own communities provide a kind of socially supportive buffer against toxic behaviours of others. Where players with disabilities may be using features and adaptations to provide them with access to the game, this study supports previous findings that other players may not always be accepting of the use of adaptations in play This is primarily the case if they do not know why they are being used and if they are seen to provide a competitive advantage. As such, the results of this study show that players with disabilities are cautious of whether they disclose their use of adaptations in play, often for fear of being accused of cheating, as they state they have witnessed or experienced previously themselves. Of the participants that said they willingly disclosed their disabilities to other players, they said they did so in order to advocate for other players like them to be able to play games with others, and to educate others about the ways their disabilities impact their experiences in play. This, combined with surrounding themselves with supportive communities of trusted players, empowers them to cope with the more negative social aspects of online play. In doing so, they provide themselves with a kind of social agency and resilience by managing the expectations of other players

7. The social framing of accessible play in multiplayer games

This chapter outlines the joint conclusions from Chapters 5 and 6. This is represented as a combined summary using the categories and themes generated in the analysis of two sets of interviews investigating the experiences of players in multiplayer games with a focus on accessibility. This chapter explains how the socially constructed framework surrounding multiplayer games generates intersecting concerns that apply to all players. The two sets of results are combined as the social landscape both contains and applies to players from both studies. This chapter addresses RQ2 and RQ3 as outlined in Chapter 1. Each study generated its own distinct themes but requires comparative discussion to conclude these studies. Analysis of interview discussions with players identifying themselves as having varying abilities about their experiences in multiplayer games, generated three emergent categories (beneficial, expectations in play, and advocacy) and two theoretical categories that arose from the specific topics of discussion (accessibility and disclosure), with each category encompassing several subthemes.

Figure 1. provides a visual representation of an overall thematic map generated using themes from both studies. The central column depicts the overall categories and the subcategories that applied to both players identifying as with and without disabilities, the left column shows categories that applied primarily to players without disabilities, and the right-hand column shows the subcategories that were unique to players with disabilities. The categories and subthemes given in the figure are renamed from those given in Chapters 5 and 6 to summarise related themes.

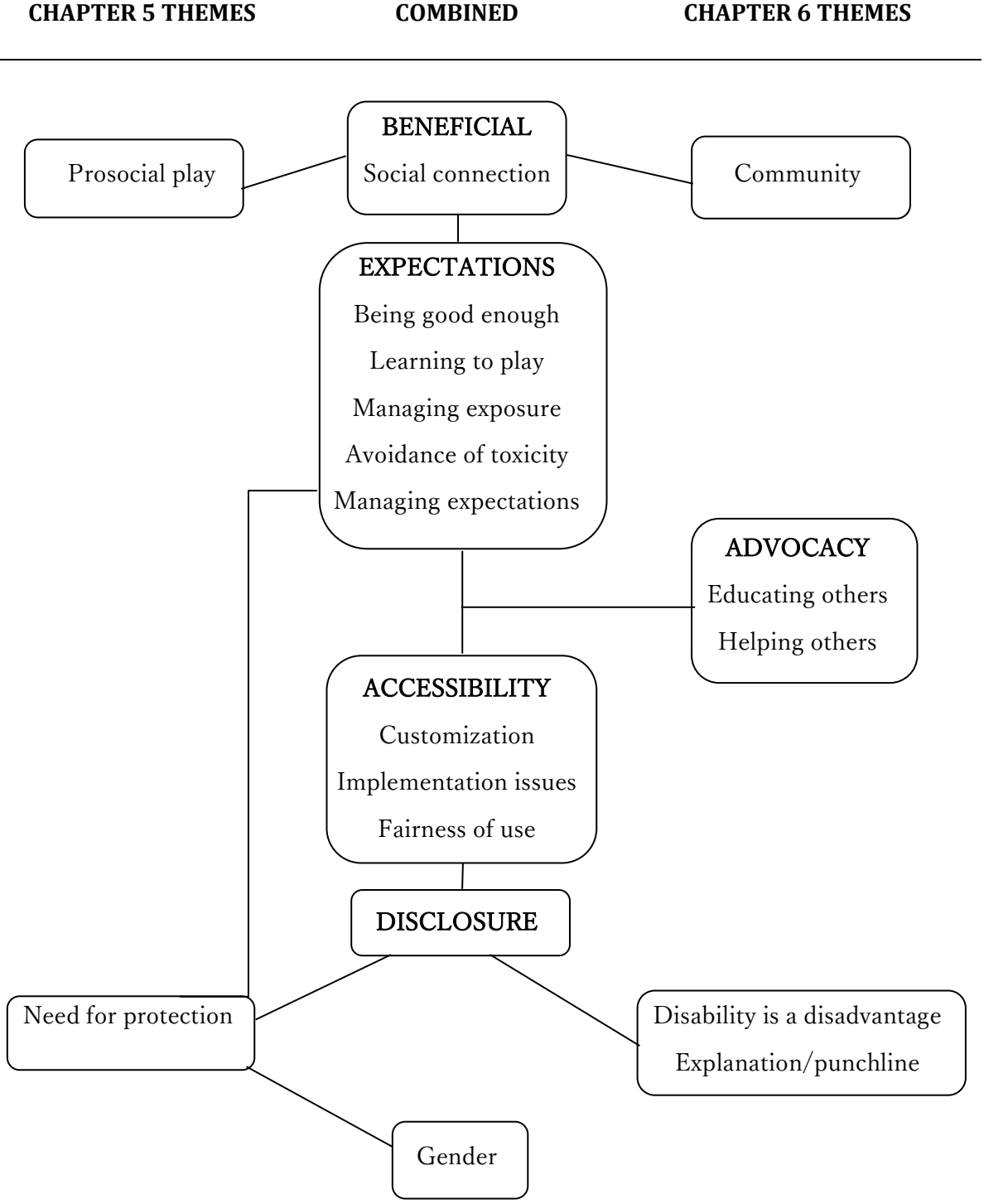

Figure 1. Thematic map generated by analysis of results from two interview studies about players experiences in multiplayer games. Both headings represent overarching categories. Items listed below headings are subthemes generated by merging themes from Chapter 5 and 6.

7.1 The themes

This section discusses themes created through interviews with players in both Chapter 5 and 6, and what this means for multiplayer game accessibility in the context of social, multiplayer games. Theme lists for both studies were positioned together, and related items were merged together to create the combined categories in Figure 1. Themes that stood out as independent – relating to either Chapter 5 or 6 are kept separate.

This section does not explicitly cover the category of *Accessibility* but pulls this through *Expectations in play* and *Advocacy* and *Disclosure* because it is important to explain how the accessibility in games is tied to both of these aspects. *Accessibility* is also further covered in section 7.2 with reference to practical implications in game design.

7.1.1 Beneficial

Combining the findings from studies supports that social play (multiplayer games) is valuable and considered a significant benefit of play. Reasons provided by players for this are that this style of play allows for the development of new social connections and a way to maintain existing relationships, such as those with friends and family. Interestingly, players identifying as having disabilities emphasised the value of the community aspect of multiplayer games, that this provided them with a way to feel connected to, and a valued part of a group. Such communities developed around particular games, existing friends or, in some cases, a community of people with a similar disability, for example, a community of Deaf gamers that help each other to find games to play. And, although community was acknowledged as beneficial to players without disabilities, they tended to focus on the aspects of prosocial play that they found to be beneficial, such as playing effectively as a team, altruism, and encouragement from others. The difference in focus may indicate that the function of multiplayer games is different those with disabilities such that community is seen as more of a benefit because this may be something that is absent from their lives outside of play. This would seem to support findings by Cairns et al. (2019) such

that games provide enablement, specifically enablement in obtaining needs that people without disabilities may satisfy in other areas of their lives because they are not restricted by their disabilities. For people without disabilities, it could be suggested that, because they may be meeting their need for community and belonging outside of games, they are less likely to focus on this beneficial element and can therefore focus on the social dynamics as generated by team dynamics or competition in multiplayer games.

7.1.2 Expectations in play

It was evident through the results of both studies that there are a set of overarching expectations about the proper way to play that surrounds the context of multiplayer games, and, in particular, games that are primarily competitive and team based. It seems reasonable to argue that implicit expectations form part of social framing of multiplayer games and that they apply to all that play them. The strongest concept coming through was that of a need to learn how to be "good enough" to play alongside others. The learning phase to reach that undefined standard of good enough seemed to present a barrier to accessing play regardless of disability. In other words, if either the game or the existing community within that game do not support new (learning) players, this may prevent growth of the player-base for that game because it is simply too daunting for players to reach the level of the existing players to feel good enough to play. It means that there may be room for game designers to make improvements that support learning to play, skill and strategy development, that allow players to feel competent enough to play before they join public play. Additionally, how good players consider themselves to be seems to be tied into how they identify themselves within the broader gaming community, for example, a player that says they are not very good at multiplayer games is more likely to identify themselves as a more "casual" player. Although, participants did not fully explain how they assessed their own ability to determine when and if they were good enough to play, the manner in which this was discussed seemed to suggest that players are aware of other players assessing their skills and competence during play. Negative feedback and the risk of negative feedback, such as verbal aggression and toxic interactions with other players, seemed to influence, to some extent, how they may

have approached making judgements about their own efficacy in play. This indicates a need for a deeper investigation to unpick what it means to players to be good enough to play certain games, but currently, this is reported primarily as a concern expressed by players and an acknowledged source of toxic experiences in play. In other words, players expect that they will receive negative responses from other players if they do not play at a certain standard.

The results of both studies show that disabilities bring in attributes that interact differently with the expectations that form part of the context of multiplayer games. These attributes include playing in alternative ways that suit their individual abilities (explained in section 6.3.5 and 6.3.6), taking different roles within a team, and using assistive controls to enable play. So, although players without disabilities also function within the expectations in this context of play, disabilities appear to add additional elements that need to be managed in order to avoid negative interactions that are commonplace within these game styles. The results of Chapter 5 (section 5.3.5) also show that, to an extent, players are aware that disabilities may not be compatible with multiplayer game-types, and express concerns that playing with disability may not be tolerated. This may be because previously, it was not generally believed that such games supported access for people with disabilities. This finding suggests that common perceptions that disability is akin to inferior applies in the digital gaming context, so even if a person with disabilities does access play (through adaptations or accessibility features) and plays well, if others become aware of their disabilities, they may still be seen as other and as less competent than their non-disabled counterparts. Since disability refers to such a broad range of conditions and characteristics, it is understandable that how disabilities may impact people's competence and manner of play is not well understood by everyone that plays digital games. This work revealed that people with disabilities have taken the initiative to openly manage other players' expectations of how they should and do play by how they disclose this to others and by educating other players through advocacy.

7.1.3 Advocacy and disclosure

Both studies demonstrate that there is some level of social management being employed by participants. Social management refers to how players use various methods to avoid their exposure to the toxic elements of multiplayer games, such as using voice communication platforms external to the game, playing with trusted groups of friends or like-players, choosing casual game modes and so on. However, participants with disabilities discussed other aspects of social management that are necessitated by their use of accessibility/adaptations to play and the effects of their disabilities on what they can comfortably do in play. Participants were asked whether they chose to disclose their disabilities or their use of adaptations to other players which makes it unsurprising that this formed a key theme in the analysis of results. But what was surprising was the way in which this disclosure was managed by many of the participants. Disclosure of disability formed part of how these players advocated for inclusivity in digital gaming. This suggests that these players are very aware of the existing stereotypes and notions of how disability is misaligned with the expectations that exist in multiplayer game environments and feel some level of responsibility to push back by talking about their experiences. Despite this burden of responsibility, participants that talked about their advocacy, expressed how this was part of how they formed their communities - their communities were individuals that responded positively to the advocacy. In a way, advocacy and disclosure of disability were players with disabilities efforts to merge their communities into the broader gaming community by creating awareness of how they are playing and their subsequent experiences. Awareness is an established way to reduce intolerance of individual differences in society at large. This research shows that this is happening on a smaller scale in the digital gaming community.

7.2 What does this mean for accessible game design?

These studies reinforce the assertion that improved accessibility and options to customize play are beneficial for all players. Players with disabilities value access to play to obtain the benefits of social connection and community provided to them through this hobby. Both players with and without disabilities respond positively to

the inclusion of options within games that can be used for accessibility or to customise gameplay, for example, options to rebind keys or buttons on a keyboard or game controller or the option to have an automatic aim for in-game weapons. However, participants expressed the concern that certain accessibility options or features could be seen to disrupt the sense of fair play that exists within competitive game-styles. This is the case primarily when the use of these features is made salient to other players, either through noticeable changes in playstyle, apparent skill, and unexpected actions, or is directly disclosed by the player using them. Players interviewed in this study noted that they viewed the use of accessibility features as positive and saw the benefit of these features for those players who may need them, however, express concern that if no reason is given for the use of these features, some players may make negative assumptions such as that the features are being used to cheat. For example, using auto-aim may be seen as providing an unfair advantage over other players, but if viewed as providing access to the game for someone who needs this feature to play, it is seen as acceptable. Therefore, though options and features essentially provide accessibility in games, it may be helpful to game designers to consider how such features are framed when presenting them to players.

What the findings suggest is that, because the social aspect of play is a motivation to play this kind of game, social management or social agency may be an appropriate focus of future accessibility considerations as this could benefit all players. Effective management of players' expectations is influenced in part by how much *social agency* the game facilitates, such as the ability to form teams with selected friends or the choice to not engage with voice communications, for example. Research into toxicity discussed in Chapter 2, section 2.2.3 noted that toxic behaviours are channelled through communication mechanisms such as in-game chat or voice communication and is strongly connected to the online disinhibition effect created by online multiplayer gaming (Kordyaka et al., 2020). Research by Shores et al. (2014) also suggested that certain games and game types are more likely to contain players that exhibit toxic behaviours, such as competitive play or games that are played in esports events. This literature highlights mechanisms through which players manage their exposure to toxicity but this work suggests that because toxicity is still an issue, there

could be further room to improve how players can manage their social interactions in play. Overall, there is a great deal of room for further research and innovation to improve ways in which players might access the social aspects of play that they most value or feel comfortable with, whatever their abilities.

8. User perceptions of content skipping in digital games

Along with previous literature discussed in Chapter 2 (section 2.3), Chapters 5 and 6 provide evidence that the use of some accessibility features and adaptations, that enable play for people with disabilities, are not well understood by other players. Chapters 5, 6 and 7 discuss how the key concept of expectations of others in play influences the experiences of players who are noticed for playing in ways that do not match those expectations. In multiplayer games, as other players are present and therefore able to witness and play alongside those who may be playing in unexpected ways, responses from those other players are likely immediate and directly impact experiences within the game-space. To view this through the lens of the social model of disability, a lack of tolerance for and hostile responses can be argued to be the environment constituting the disablement of players who may be playing in unexpected ways. In other words, if it becomes known that adaptations are in use within social (multiplayer games), some players may assume that these features provide an unfair advantage to those using them if they are not aware that disability is the reason. This assumption can lead to accusations of cheating and hostile reactions directed at people using accessibility adaptations.

In an environment where toxicity is a known issue (Chapter 2, section 2.2.3), this positions people using these features at greater vulnerability to toxic behaviour from other players. In single player games, there are no other players within the same game space to directly feel they are impacted by the ways in which a player chooses to play. The social model of disability perspective considers the environment as a source of disablement, and in a single player game, the immediate environment is the player, the game, and their location of play. However, as the gaming hobby is seen to be social in indirect ways, there is the potential for toxicity to occur beyond actual play, such as within online discussions and in online communities that use voice platforms such as Discord. The broader gaming community communication platforms can and should therefore be captured by as part of the environment in

which play takes place. This study, therefore, aims to investigate whether using an accessibility feature in a single player game may influence a player's social experiences with external gaming communities.

A feature that could improve accessibility in single player games is content skipping. This received attention in popular media in 2015 due to its inclusion in the popular game of *Call of Duty: Black Ops 3;* in the single player campaign part of this game, it allowed players to access any level of the campaign without having the need to have completed proceeding levels before. This is one such example of content skippability but this also refers to the ability to allow players to bypass cutscenes, puzzle or action sequences. Audiences are becoming increasingly accustomed to skipping in other media, for example, on demand television (such as Netflix, BBC iPlayer), movies, eBooks, and digital music platforms, not to mention good old-fashioned reading the last chapter first in traditional books. However, single player digital games have generally not allowed players to freely skip to any part of the game they wish. Though this may seem reasonable for some games, where there is a strong narrative or where the skills of a later level build on those of earlier levels, this argument does not really bear up when compared to other media. If a player wishes to "spoil the ending" of a game, then that is their choice. For those with disabilities though, there are clear advantages to content skipping (see page 33 in version 1.7 of Includification (AbleGamers)). Some portions of games are simply impossible for someone with a disability and so they are automatically unable to progress in the game even if they were perfectly able to enjoy the later levels. Furthermore, for those without disabilities, skipping or even reduction in difficulty (Schell, 2014c), can improve the player experience. Pinelle et al. (2008) proposed skipping non-playable or frequently repeated content as a heuristic for improving usability. Barlet & Spohn (2012) point out that making things easier to use for some is a form of cognitive accessibility for others and this perhaps resonates with the notion that in some situations, usability and accessibility are the flip sides of the same coin.

In addition, Guidelines, (2015) recommend the following as an intermediate level accessibility option:

> Offer a means to bypass gameplay elements that aren't part of the core mechanic, via settings or in-game skip option.

This notion leads us to question what constitutes a core mechanic of a game and, in any case, why are core mechanics sacrosanct when games often rely on a wide variety of player skills and resources to constitute good gameplay? At the same time, depending on what content was skipped, games with skipping may be poorly received by the gaming community because of the perception of what constitutes a good game and what is perceived, rightly or wrongly, as core to the game. In particular, challenge is perceived as a core component of a game that is both valued by players and key to what makes a game (Denisova et al., 2020). Content skipping that allowed players to simply bypass any or all challenges might be perceived to be barely a game at all by the wider gaming community. If this resulted in such games becoming a ghetto for those with disabilities, then the target of inclusivity has been missed. Previously, Chapters 5 and 6 showed that players value a sense of fairness in play and have certain expectations about how multiplayer games are played, why, then, might players react negatively to a feature that does not directly affect their play? It is increasingly recognised that even individual play takes place in a social context (Stenros et al., 2009) and that all players, with or without disabilities, should be included in the sociability of games to gain the experiences that digital games have to offer. This work is motivated towards understanding how content skipping, as just one example of an accessibility feature in single player games, is influenced by the social context of the digital gaming hobby. The study uses Grounded Theory Methodology (Adams et al., 2008; Charmaz, 2014; Strauss et al., 1990) to study community discussions about content skipping in digital games. This method does not require the sample to be representative of all accessibility features or all players, rather the strength of the findings comes from the theory grounded in the data as a basis for further exploration.

Data collected were existing(found online) discussions on skipping of different types of content including cutscenes and combat and also considered specific games, for example *Call of Duty: Black Ops 3* as it was the first in that series of games to include the option to skip any of the levels. Analysis identified what current

perceptions are of content skipping in games, what audiences might want, what the consequences might be, and what effect this could have on the future of games as recreational media. This Chapter addresses RQ3. Social play alongside those with disabilities: How are the mechanisms that players with disabilities use to enable them to play, perceived by other players? Pertinently, the findings present a theory based on the environment of single player gameplay as a potential source of social barriers to using a type of accessibility feature. This is to build a fuller picture of potential sources of disablement surrounding the social context of gameplay beyond directly social multiplayer game types.

8.1 Background

This section contains additional, relevant literature to the topic of content skipping because this is a specialised feature and is not covered under the broader topics of game accessibility discussed in Chapter 2. Findings from the main literature review (Chapter 2, section 2.3) provide further basis for this work.

8.1.1 Current and past forms of controlling access to content in games

Players of digital games have arguably been controlling the content they experience in video games for many years. These methods include cheat codes, level warps such as in early *Super Mario Bros* games, level unlock codes before it was possible to save games e.g. *Faxanadu* for the NES [Nintendo Entertainment System] console, walkthrough guides, game modifications such as quest unlocks, skips, removal of enemies, additional items or weapons made available, downloadable save files and so on (Kücklich, 2008).

Modding, which refers to the modification of existing games and their content, is another way in which gamers have changed the way in which content is accessed in games, in some cases, changing the game entirely. There are many reasons why a community might modify a game, in some cases, just for fun, but also sometimes out

of necessity, such as to add in a new language translation. Kücklich (2011) describes modding as "an important part of gaming culture as well as an increasingly important source of value for the games industry." with some mods becoming successful independent releases, for example *Counterstrike*, a mod of *Half Life*. If content skipping undermines the nature of a game, it may also remove the engagement that leads to valuable modding practices.

Cheats are another form of content access evidently desired by many gamers, such that they are often included in the game by the developers. Cheats allow the player to do things such as instantly kill enemies or become invincible. Cheats often come in the form of codes, which are specific, ordered key presses on a console controller or a PC keyboard. (Kücklich, 2008) mentions that cheats and cheating conventions are genre specific and as such are "part of the definition of game genres" and even, "to some degree expected by the game community". If cheats are expected by the game community, this suggests that various forms of content skipping may also be acceptable within certain genres.

Content skipping can provide players with disabilities to enjoy games by allowing them to bypass unsuitable content (AbleGamers). There are some forms of content skipping that do not immediately stand out as a way to bypass content, such as modding and cheats. These are often considered part of games and are actively supported by communities of players and developers as tools that players can use to adapt or customise their experiences of the game; in some cases, these can be used to allow players to skip past sections of the game they have previously played, obtain access to high-power items that allow them to easily defeat enemies, or skip cutscenes or tutorials. However, there are arguments about maintaining the "game-ness" of games by not having control over content which restricts the potential to improve the experience for players who most need it.

It is not known how complete content skipping would be viewed by the players. If it is perceived as diluting good games, there could be a backlash from players. Alternatively, if it is perceived as an acceptable way to increase inclusion in games then it is possibly a bonus both for individual games and the games industry. As

content skipping features in single player games are in their infancy at this stage, it may be that the more games include them and the more opportunity the gaming community must appraise them, they could potentially become more acceptable and normalized over time.

As part of the study aim to consider perceptions of content skipping as a way of understanding the broader social context and community acceptance of the this feature, the study considers different types of content to capture the extent of the feature as a tool for accessibility. Though the study is motivated by the relevance to accessibility, the focus has not been here on players with disabilities but the general gaming community in order to understand the social and cultural context in which content skipping would need to operate.

8.2 Method

This study focused on users' subjective experiences of the current forms of content skipping in digital games for which little existing literature considers, therefore, there was to guide this study. Content skipping is only one feature that can be included to improve accessibility of a single player digital game which limits the extent to which the findings could be applied to other features. To this end, it is beneficial to build a theory from which to base further work on the influence of the social context (game community) on the use of accessible features in solo play. The theory, then, opens the investigation for further features beyond content skipping to be considered. The focus on content skipping is therefore theoretical sampling rather than aiming to representative of all accessibility features and all player communities.

To this end, exploring user-generated data was an effective way to gather a large body of textual data on the thoughts and opinions of gamers without influencing them with direct questions. A selection of existing online discussions, forum data and news article comments were collected as material to be analysed. To clarify - 'existing' refers to content that was not generated specifically for this study but was found in online articles and social spaces where users generate their own discussion and commentary about a topic. Ethical approval for the collection of this data was

obtained as described in section 1.2 in the Chapter 1 of this thesis. In addition, data was extracted from online sources using a copy and paste method to store collected comments in a Google Doc, stored on the University managed Google Drive. No tools other external tools were used to extract comments. Comments collected did contain user "handles" but no personal, identifying information such as their real name or email address.

Grounded Theory methodology was used to analyse the data, as it provides an effective systematic approach to coding textual, discursive data. This was chosen over content analysis due to the intention to study a large data set and gain more causal insights into user perceptions, rather than closely analyse the choice of specific terms used. It was also felt that grounded theory methodology would be more suitable than thematic analysis to allow for clusters of concepts to emerge from the data and to build an overall theory rather than a set of connected themes Although thematic analysis is a flexible methodology, the theory grounded in the data gathered from this study can be used as an analytical tool rather than an interpretive thematic framework. .

8.2.1 Grounded theory

In grounded theory, qualitative data is coded in a number of stages as outlined by (Strauss et al., 1990), (Charmaz, 2014), and (Adams et al., 2008). Initial open coding allowed recurring concepts to be identified within the data, which could then be axially coded. This is the process of grouping and relating concepts to one another. These concepts could then be compared with and validated against further data. This further data would be theoretically sampled based upon findings from the previous data and thus iteratively were used to test the emergent theory.

Limitations of the grounded theory methodology are such that the validity of the results may be subject to researcher bias, subjective selection, and interpretation of the data. To account for this, a reflexive approach was taken to reassess findings and to continually question what was being seen in the data. Part of grounded theory is the process of checking for evidence that the emerging theory is valid and informing

the search for additional data to eventually reach saturation of the findings. The study also uses found data, which means that other factors cannot be accounted for, such as, background, age, preferences for games and so on. Future work in this area would aim to take these into account.

8.2.2 Data selection

Data was sourced primarily from gaming community forums, namely reddit[13], whereby a topic is posted and left open for discussion by other users. This study investigates the perceptions of players of digital games, and therefore user discussions were chosen over critic reviews or articles. The individuals using the gaming reddit threads are assumed to be players/gamers and as such expected to provide a less mediated (by editors and publication) discussion of opinion than journalistic articles.

Limitations of using found data

In acknowledgment that there are limitations of the approach taken to data selection in this study, using found data was chosen as it meant a lack of influence on the discussions from the researcher. Although there is subjectivity as part of the selection, interpretation and analysis of the data, there could be no risk of leading participant responses and for participants to respond in ways they felt were expected by the researcher. The intention was to gather unfiltered discussion of the topic at hand. That said, with any public discussion, their will likely be social acceptability bias. Further limitations include the choice of platforms from which to capture discussions. All platforms used in this work are in English language and there is little to no information about the location, cultural background, age, gender, etc. of those involved in the discussions. As this information is not available to the researcher, little can be accounted for in the interpretation of the data with respect to those characteristics.

[13] https://www.reddit.com/

As reddit was used to comments for this work, it is worth noting that this platform comes with some unique limitations that may influence or bias the data. Reddit is a collection of community discussion boards which allow anyone who has created an account to post anonymous comments on any thread. Individual threads can be set up by users to discuss a specific topic of interest, an example of which is /r/gaming. Comments can be upvoted or downvoted by other users which can alter the organisation of comments on the discussion board and allows the viewer to reorganise the comments based on the "popularity" of comments made. Additionally, some reddit threads are subject to moderators who can remove posts or users based on rules they have set for the board. This all takes away control from the researcher of what is posted by and by whom. However, despite these limitations, the platform, alongside comment sections of games news and review sites, do provide access to natural and uncontrolled discussion around the topic of interest which reflects the natural state of gaming community platforms. Without the researchers influence the data has high ecological validity.

For the initial analysis, the first 60 comments from three reddit discussions were initially open coded. The three discussion topics were chosen as many games feature these three components.

These are:

- Combat/action as game play.
- Levels as environments and structure.
- Cutscenes as an element of narrative.

To analyse user perceptions of level skipping, initial coding focussed on a discussion relating to the single player campaign mode of *Call of Duty: Black Ops III (CoD: BO 3),* which was specifically chosen as part of this study as the level skip function is a novel feature for a game of this type, and also because a level bypass means that both elements of action and narrative can either be skipped or experienced in a non-linear way. Both the action and cutscene skipping discussions were more general discussions on the topics themselves as opposed to specific games.

Following initial and axial coding (described in section 8.3), a further eight discussions were gathered as part of the theoretical sampling process and the first 60 comments (where 60 were present) of these were coded using the original initial codes. These included:

- Two reddit discussions on content skipping (/r/pcgaming: You can skip straight to the end of Call of Duty: Black Ops 3's campaign, /r/Cynicalbrit: Skipping content probably won't bring on the apocalypse)
- A discussion about two specific games which include content skipping features. (*Alone in the Dark* discussion from neogaf.com and *La Noire* Metacritic user reviews).
- Two sets of comments taken from articles on the topic of content skipping. (/r/KotakuInAction: games should let you skip combat, rockpapershotgun.com, article – why can't I skip ahead in games?)
- Comments taken from an article about skipping story elements in a game. (us.battle.net, discussion topic – we need a skip button for all story content, r/Gaming: Why are unskippable cutscenes still a thing in modern games?)
- Comments taken from a further article about *CoD: BO 3* level skipping. (eurogamer.net, article – you can play the last level of Call of Duty's next campaign first)
- A discussion about content control and accessibility features in games. (gamerswithjobs.com/forum, thread – Games should let you skip to the end)

These discussions were selected because they were directly relevant to the topic. The additional material about *CoD: BO 3* level skipping was chosen to explore the topic more thoroughly. Discussions related to two games which contained content control features, *Alone in the Dark (AitD, 2008)* and *LA Noire*, were chosen as they were mentioned by users in the initial reddit discussions as examples of content control in action. Both offer the option to skip episodes and action sequences. A total of 8 discussions were sampled with approximately 480 user comments coded for the purpose of this study.

8.3 Results

The results suggest that acceptance of skipping is intimately tied to how it is implemented and presented to players. Unless carefully presented as an alternative for people who otherwise could not achieve the goals of the game, it is seen as weakening the value that gamers derive from completing games and a threat to player identity. If game designers wish to increase inclusivity using skipping, then they may have to consider carefully how to integrate options into the overall game play or risk alienating a portion of their audience.

To summarise the theory developed as a result of this work:

> The perception of the acceptability of content skipping within a game is influenced by whether a player's motivation and approach to the game is to undertake a challenging or an interactive immersive experience. As such, a player's perception of content skipping seems to be influenced by how the core elements of gameplay are altered, such as creating a sense of reduced challenge or quality (The Game). Inclusion of such features, despite being optional, could potentially undermine or devalue some players' sense of satisfaction, achievement, and identity within gaming communities. This seemed to be dependent on what a player wants/needs from the gaming experience, either personally or socially (The Player). It also seems to be important to players to know the purpose and intention behind the inclusion of these features.

The analysis shows diverse views around content skipping in games. It appears to be dependent on the sort of content being skipped and that there are some circumstances in which skipping is acceptable. Coming through strongly is a concern for what games are and what it means to be a Gamer. Games should provide challenges that engage and entertain the player but at the same time retain fairness and be part of an overall trajectory through the game. True Gamers should face those challenges and any game that permits avoiding the challenges is not for Gamers or it is not a proper game and has been dumbed down. Where the nature of games and Gamers is not being protected, there seems to be a more laissez-faire attitude where

people are free to play how they like as much as they are free to read books or watch films how they like.

Also running throughout is the notion of responsibility of the game designer to produce a good experience which includes manageable learning curves, good quality content and also a degree of authorial intent. Where the designer is not doing a good job, content skipping is seen to redeem this.

What is important in terms of inclusivity is whether the protected notion of a Gamer is able to accept people with disabilities. If it is, then some sort of accommodation needs to be made and one that does not carry any stigma of inferiority with it. Content skipping does not seem to be an acceptable form of accommodation in this context, at least not currently.

Following the process of initial coding, axial coding, and clustering of the data, two core categories were created to organise the clusters to form the basis of the grounded theory. The two overarching conceptual categories that form the theory are presented with the axial codes that form clusters related concepts. The axial codes are used to organise each section of the results section 8.3.1 onwards. Each axial code is presented with an example or two of initial codes (ICs) for context.

These two categories identified, that form the basis of the theory, capture aspects that seem to affect how players perceive content skipping features:

- The player - referring to how players approach games and see themselves as part of the gaming community
- The game - referring to the interplay between the designer's intent for the game and the ways content skipping features have been implemented.

The axial codes for each category are as follows.
The player:

- Ownership and control – ICs: I paid for it; customize the experience.
- Convenience – ICs: skip after play through, interruptions.
- Player motivations and needs – ICs: meet challenges, get the valued parts.

- Player identity – ICs: hardcore/casual, skipping challenges signals low skill.

The game:

- Challenge and gameplay – ICs: dumbing down.
- Quality – ICs: missed content, concern for lost experience.
- Genre – ICs: suitability to some genres.
- Development and design – ICs: tool to cover up poor design, questioning purpose.
- Inclusivity – ICs: enabling fuller experience of game, not forced to use it.

Unlike in previous chapters, demographic data was not available to be presented here as this information was not shared explicitly by people posting their views online where providing that information is required. Quotes lifted from online sources are presented without any identifying information attached, such as online handle/tag, this is to preserve the anonymity of those whose comments were analysed. As with previous chapters, profanity is retained within quotes to preserve the voice of the poster.

8.3.1 The player

This overarching heading represents how the players talk about their approach to games and how this influences their perceptions of features within them. Part of this is how players manage the gameplay by fitting it around their lives and how they view themselves within the broader gaming community. As with previous chapters, player identity seems to be a key, recurring topic surrounding the social side of digital gameplay.

Ownership/control

The data suggest that players perceive features which increase choice and customisation of play as generally positive. This included being able to control their experience of a game narrative:

> Personally, this is a great way to see a story in a different way compared to everyone else.

Perhaps this is not only the addition of choice, but also providing the opportunity to experience a usually linear game in a more personalized way, which may deepen the perceived level of interactivity.

Comments imply that owning a game entitles players to choose how they experience it. This also applies to games that have been previously owned or installed on another platform. Comments often referred to other forms of media as a basis for comparison and a justification of the facility. For example:

> You can skip to the last part of a DVD/Blu-ray/VoD stream, you can flip to the last chapter of a novel... if it's the purchaser's prerogative to skip to the end of a story, who cares? What is wrong with a developer giving them that choice?

Convenience

The data suggests that convenience may be important to how players perceive content skipping features. This seems to be most prevalent in terms of skipping cutscenes. Cutscenes are a conventional way in which many games present narrative to the player. Comments suggest that cutscenes are important but having control over viewing them was considered useful.

Some comments highlighted concerns of uncertainty and inconsistency with how the skipping had been facilitated.

> I always feel like I'm taking a gamble when I try to pause a cutscene. Is pressing start gonna pause it or skip the whole thing?

Cutscenes seem to be considered a valuable part of the game experience, but commenters discussed how it would be useful to be able to pause or skip them while they attended real life interruptions:

> Inevitably I am right in the middle of a cutscene that only appears once in a 50-hour game and the phone will ring (which I ignore) or the wife will want something (harder to ignore). Let me pause it, or at least have some kind of gallery off the main menu where you can go back and view the cut scenes.

Comments suggest that there is a clear distinction between the desire to skip the cutscene and to just pause it, with an overall preference for the pause function.

> My heart jumps up into my throat when I hit 'start' during a cutscene, desperately hoping that it'll pause and not skip the cutscene entirely.

Pausing retains the content and experience, whilst allowing it to be interrupted as opposed to bypassing it entirely. Bypassing the cutscene entirely seems to be desirable when it has already been seen, perhaps when replaying the sequence.

Convenience also seems to be related to the desire of players to have fun and, more importantly, to get to the fun parts more quickly.

> I'm always cheating my way past anything that irritates or frustrates me. [..] I want to get to the fun bits. Recently I've been giving myself extra ammo in *System Shock 2* in order to get past an endless stream of respawns. I'm sure purists will be outraged but for me the fun comes from exploration and advancing the story, not battling Cybernannies over and over.

It is frequently suggested that content skipping was being used to make up for sections of poorly designed gameplay, with the implication that the developers added the feature as an afterthought or out of laziness.

> Design your games properly and don't add "features" so people can just skip wherever the devs did a shite job with the game design.

This does not specify which parts of the game design they are referring to, however it implies that they perceive the developer as responsible for their experience and that, if it is bad, it is the fault of the developer and not the individual. This contrasts to the following comment, which highlights that some players are aware that others will place the blame on the designer when they experience a problem with a game.

> Gamers need to take responsibility for how they approach a game, accept how big their own part is in the enjoyment of a game.

This pair of comments highlight a couple of different aspects of the community's understanding and tolerance of content skipping. If players perceive that content is being skipped only because developers have produced sections poorly, it may be difficult to convince them that such controls may be necessary to allow different players to play. Conversely, if it is the gamer who must take responsibility for their own enjoyment, they would benefit from the option to customize their play. Content skipping could be implemented for a number of reasons, but how it is received could be dependent upon the mismatch between perceived obstacles of the game and the player's needs and preferences.

Players' motivations and needs

The data seems to suggest that people have differing motivations to play games and that inclusion of content skipping may have a different impact upon their experience. The following illustrates this point:

> This is a 'games as sport/games as story' issue, right? And, as with most intractable problems, it's down, not to the game itself, but the players' attitude towards it. If you approach games as sport – as a thing to test oneself against – removing the challenge is lunatic as you are simply removing the game. It is 'cheating', it is for 'noobs', and so on. Yet for those who approach games for an immersive interactive experience, the game mechanics are there

> purely as a means to an end to get attached to the world and to feel the experience more keenly. To have that experience stopped by some random bit of game mechanic seems loopy and seems like bad game design.

Players who approach a game as a competitive activity may value challenging elements, such as combat and puzzles and take pride in completion of such tasks. Such a player, might be more inclined to skip story elements, such as cutscenes:

> Games are an interactive media; the whole point is you putting in your inputs we skip cutscenes because we aren't doing anything in them.

Alternatively, a player looking to experience the story element of a game, may value experiencing the narrative in full and be more inclined to skip challenging action sequences in order to do this. To view games in such a binary manner might go some way towards revealing why players consider content skipping as potentially detrimental to the gameplay experience, dependent on the game genre.

There appears to be an allusion to some underlying truth about games and what it means to be a Gamer. A Gamer should accept a higher level of challenge and to bypass or reduce it would be to give up the right to be classed as such.

> Gaming is here to challenge us. If the player is fickle to the point of where when the game finally challenges you to play better and they just say "no" I want to skip this cause I want to see what happens next then they truly are not gamers. Now again I don’t want games to be impossible I want games to be easy enough that everyone can get through them, but people who want a free pass shouldn't be playing games.

The comment also raises the concern that allowing players to skip content means that it may be lower quality or incorrectly balanced in the context of the game.

Player identity

> Fucking casuals.
>
> Screw casuals if they can't figure out puzzles. If you get stuck get a walkthrough bloody idiots.

Casual has been used to describe a player who plays games of a casual nature and players who dedicate a smaller amount of time and commitment as opposed to Gamers or Hardcore Gamers (Bosser & Nakatsu, 2006). Games commonly considered to be casual include mobile games, puzzle games, social network games, free-to-play games, and so on. The comments could be interpreted as being used in the derogatory sense to express that they consider players who wish to bypass combat as uncommitted or considered less credible as a Gamer. Comments suggest that from the perspective of the gaming community, a Gamer is motivated by challenge in a game and a Casual is looking for a different experience, an activity to pass the time for example. There appears to be some conflict between the two preferences for play which is potentially determined by choice of game genre.

The data suggests that content skipping may have some impact upon what it means to be a Gamer as perceived by the gaming community. Comments seem to suggest that overcoming challenges and difficult sections of games may form the foundations of the Gamer identity. Including content skipping may be perceived as threatening or weakening that identity and that to maintain it, there is a need for some way of distinguishing who has used the features and who has not.

> If I had the option to "skip" the hard part's then what was the point of playing in the first place to be such a fair weather gamer?
>
> Oh great. This is a brilliant idea. I hope every game allows me to start openly sobbing about how hard the big bad monster is or how confusing the puzzle is. Then the game will pat me on the back and say "There there, little wuss. You don't have to stop playing me anymore, you can now skip this hard section and still claim you beat the game." Joy! /sarcasm.

8.3.2 The game

This section represents how people talked about aspects of the game and the game design as impacting their perceptions of content skipping options. In addition, how content skipping features interact with the authorial intent of the designer and why such features may have been included.

Challenge and gameplay

Alongside the notion of what different players want and what it means to be a Gamer, the data also suggested concern for what it means for a game to be a game. There was a concern that content skipping could "dumb down" games, typically with regard to action/combat content:

> Sigh.. Then it's not a fucking game.
>
> $60 movie

This concern of dumbing down of the game was also found with reference to *LA Noire* even though the game is promoted as story based.

> Wow, and we are actually questioning if games are getting more and more dumbed down?? They call it making a game more "accessible"...

However, it also appeared in the discussion of *AitD 2008*:

> As long as the game itself isn't dumbed down, why should we care?

Comments suggest that players seem to perceive content skipping as something that will alter the challenge elements of gameplay, but that there are conflicting opinions on what effects this has on the game design.

> People are complaining about this? You realize the alternative is to make the puzzles brain-dead easy, right?

> It does show the lowering of challenge in modern games, but at the same time it's an optional feature, and who knows they may be making the game rock hard.

Quality

The data suggests that if players skip content, the length of the game would be reduced and potentially key parts of the game missed out, with the result being that the game is perceived as lower quality.

> Then you have the issue that if players start skipping big chunks of content, they'll get to the end really quickly and feel disappointed in the game

This seems to be countered by the positive outcomes of bypassing some content for example, frustrating puzzles or combat, which may improve the experience of players and consequently their opinion of the game quality.

Genre

Genre and the context in which content skipping features were implemented was frequently mentioned, as a determiner of whether they were considered acceptable. Arguably, content skipping could be relevant to most game genres provided it is implemented in a suitable manner. It appears though, that commenters consider skip features to be both most unacceptable and acceptable in games which are linear:

> How would you design a difficulty curve when you let players just jump to whatever part of the game? If you only skip having your ass kicked so you can get it kicked even worse, then why is there even a skip function? Better selection of difficulty levels is the solution, not a "skip ahead" button."

> "Arcade-style-games, where I really just go on in linear levels (e.g. *Serious Sam*): yeah, give me a skip-button so that I can just skip that one frustrating and mildly unfair boss so that I can keep on shooting stuff.

These conflicting statements suggest that while one might wish to skip a difficult section in order to proceed, this might diminish their subsequent gameplay experience.

Development/design

Commenters expressed the concern that to allow players to choose their own experience, or skip content, would erode the artistic intent of the game developers/designers. The counter argument is that other forms of media, such as books, cannot control whether a reader chooses to read the last chapter first, but that this does not necessarily mean the authorial intent is threatened.

It was suggested that some game content, which is perceived as less fun, lower quality or frustrating, is unnecessary and considered to be "filler-content", for example, repeated random enemy encounters in an RPG. The option to skip this content may improve players' overall experience. This could allow game designers to improve their future game design by observing which content is most bypassed or to avoid adding so-called "filler content" in the first place.

Some commenters propose alternatives to content skipping. This suggests that content skipping could be seen as a drastic measure, being used as a cover up bad game design.

> All games should have god mode as a feature. Problem solved.

> I agree with the overall sentiment, stopping players from progressing doesn't help anyone, but having an almighty skip button seems like putting a plaster on a bloody nose. Developers just need to work on difficulty balance and giving enough hints for players to help them figure things out for themselves.

> I'm thinking of *Pure*, where the AI is so brilliantly balanced, it always provides a challenge, but never feels unfair.

Another alternative to having control over content suggested by commenters was adaptive difficulty, as another way of providing a way for progress through a game.

> Now, is it me, or has there already been games where the overall difficulty adapts to how well you fare in the game? Because that could be an angle to try and offer a way to beat hard areas / bosses in a game, without having to resort to cheating: try a couple times, and each time or every once in X times, the game dumbs down the difficulty for that specific passage.

This would seem sensible, however adaptive difficulty could potentially have other undesirable effects upon gameplay and does not necessarily improve the experience for those players who might skip sections due to physical difficulties.

Commenters acknowledge that content skipping features may be costly for developers and designers to include. Despite potentially improving accessibility and playability for wider audiences, commenters allude to this being a great deal of effort for little benefit in terms of game sales.

Inclusivity

Comments show that the gaming community seems to consider content skipping as positive if they know it was implemented to improve inclusion.

> Indeed. An option like this would be useful for someone like my next door neighbour's son, who is severely disabled. He enjoys gaming but doesn't have the hand coordination to perform complex combat functions.

Interestingly, one commenter directly addresses many of the concerns seen in the data so far:

> No one is saying, "Let's remove difficulty from games" or, "Let's dumb games down." What we're saying is `Give those of us with disabilities the option to at least get some of the experience.' Like I said before, the guidelines aren't intended to force developers to compromise their vision in the name of accessibility. Something like a level skip would have no place in, say, *Demon's Souls*. That said, did anyone complain when that same feature/ability was present in 'Splosion Man? Did it ruin the game for you, even though you could ignore it and try again anyway? I think it's funny that other gamers are getting so defensive over that one, small part of the article. Your games aren't being threatened, and any accessibility feature focused on difficulty would be something the player would have to opt in to get, just like button mapping, just like turning on/off subtitles, just like turning on/off color blind mode. That's the entire point. Options for all, but nothing forced on anyone unless it's part of the core experience.

8.4 Discussion and conclusions

Throughout the data is the notion of what it means to be a Gamer and how playing or not playing certain features contributes to that identity, which shapes how the gaming community then perceives a player. Gaming communities could be described as a “virtual society” (Brooke et al., 2004), within which people are brought together by digital gaming. Players of any kind of digital game, single player or multiplayer can be part of this community. Stenros et al. (2009) propose that solo players are social by way of play as performance and play as a source of status even if they are not with others during play. Gaming communities use platforms which allow public posting of play sessions, screenshots, anecdotes, and high scores. Many facilitate public display of gaming accomplishments, such as Steam Achievements and Badges, PlayStation Trophies and Xbox Achievements, indeed from the earliest arcade games, public leader boards have been part of gaming. Like any community, the gaming community has its own set of ideals and values, to which members accept

and to an extent, conform to. The perception of content skipping features seems determined by how they fit in with those values

In addition to games themselves providing motivation for people to play (Ryan et al., 2006), being part of the gaming community provides its own motivators and influence upon player identity (De Grove et al., 2015). Playing digital games can be considered both intrinsically and extrinsically motivated. Ryan & Deci (2000) define intrinsic motivation as "the inherent tendency to seek out novelty and challenges, to extend and exercise one's capabilities, to explore, and to learn." In terms of playing games, this would encompass how a player approaches a game based on their own personal desires and expectations of play. Ryan and Deci also state that extrinsic motivation is "the performance of an activity in order to attain some separable outcome". To be considered a Gamer might itself be a motivator including the feelings and sense of status players might have when posting a new high score or an image of a newly discovered area in a game. The results suggest that for certain players there is value in achievement and overcoming challenges in games. However, for this to be sustained, it needs to be attained in such a way that is considered fair.

The option to skip content in games seems to be perceived as confusing what players consider to be a fair way to complete a game. This appears as the expression of a need to make visible whether content skipping functionality has been used or not. Whether a person has used content skipping features when playing has no effect upon the play experience for others. However, if they wish to partake in posting achievements for example, this could impact the value system of the gaming community and the sense of worth attained from those achievements. Essentially, what happens when two players post about their completion of a game and one of those players skipped multiple sections? Further, what if that player skipped a section due to a disability? Some players proposed that in-game achievements could reduce the perceived threat to the reduction in challenge that content skipping could result in and could be a way of distinguishing who has or has not used the features.

Brooke et al. (2004) state that a "virtual society" is healthiest if it is fair and that "most commonly, for a society to be considered fair, it must make it difficult to cheat

– i.e., to break the stated rules that govern interactions – and has an effective and visible process of detecting and punishing cheating." The notion of fairness in gaming, particularly in a social but single player context seems to come from the gaming community and as such it is the community that is responsible for deciding what is considered fair. If we consider the gaming community to be a virtual society, it is possible to see that problems may arise in governing what is considered fair use of content skipping when it is not always possible to see where it has been used and why. Cheats in games seem to be considered more acceptable than content skipping features perhaps because they can be more easily governed. Currently, some games "punish" for using cheats, for example *Saints Row: The Third* disables in-game achievements and trophies when cheats have been used.

In multiplayer games, findings of Depping et al. (2016) suggest that players may derive more enjoyment when skill level is closer, even with explicit assistance to a weaker player. This makes it questionable whether enjoyment of play is really threatened or whether that threat is speculated by the community because it potentially changes how value and status from gaming achievement is derived. This resonates with the problem in education of determining what is a reasonable adjustment for dyslexic students in examinations (Riddell & Weedon, 2006). The disability is invisible and so is the way in which someone has played a single player game. For there to be a way for gamers to distinguish what is a reasonable use and purpose for content control features, transparency of use may help.

The results of this study seem to support previous research that propose that there are different player types. These different player types therefore interact differently within games and also with the gaming community. In addition, different player types may therefore have different opinions about using content skipping based on what aspects of games they enjoy, for example challenge or narrative. Research into player types mainly focuses on multiplayer games. Notably, Bartle (1996) proposed a taxonomy of player types based on player behaviours and how they interact with other players, game elements and the game world. He suggested that to be successful, the needs of each player type would need to be satisfied by a game. Despite this study focusing on the single player games, it could be argued that there

are similarities between Bartle's Killer and Achiever types and the players that value challenging gameplay. In addition, the Explorers type may be similar to those that value a narrative experience of play. More recent work by Schuurman et al. (2008) on player motivations extend these findings, they suggest that there are "escapist gamers" who are motivated by exploring new worlds. They also suggest that not only are some gamers motivated by competition and challenge (convinced competitive gamers), but also that there are those who consider gaming as part of their identity (overall convinced gamers). This would support the finding that game content skipping could impact varying player types differently, their motivations and for some, their identity as a Gamer.

The results of this study suggest that the gaming community has its own terminology to describe different players: Hardcore and Casual, which highlight in some way, their motivations and style of play. Referring back to Chapter 2, section 2.2.5: The work of Jacobs & Ip (2003) and Fritsch et al. (2006) both suggest that key indicators of a Hardcore Gamer are commitment in terms of both time, skill and a tendency towards completionism. Casual can be juxtaposed against this as players who may be regular players of digital games but will not make the same commitment to play. Juul (2010) goes so far as to say that Casual players are not flexible in committing to whatever the game requires whereas Hardcore players are very flexible. Content skipping can be seen as part of game flexibility and so undermines the Hardcore gaming experience. This flexibility would arguably have the advantage of being more playable by a wider audience, which is supported by comments regarding content control as an important accessibility feature. The adverse effect of this is that gamers who perceive themselves as Hardcore may feel that if content control features are more widely implemented, there will be fewer games which provide the commitment demand that they value and draw satisfaction from. This could lead to the alienation of the Hardcore audience.

Due to this distinction in the identity of what it means to be a Gamer, game designers and developers may need to identify ways to promote content control without risking alienation of either group. Bosser & Nakatsu (2006) further suggest that a compromise could be met to satisfy both player types by rewarding committed

behaviour of Hardcore gamers but reducing frustration for Casual gamers. The use of in game achievements or trophies could be a way of providing that, opening the opportunity to introduce content control in a way that would be acceptable to more resistant members of the playing audience.

The results show that players acknowledge the artistic intent of the developers and designers yet are concerned that content skipping features must be technically consistent to be worthwhile. They also recognise that adding such features would be a costly process and could adversely affect the design of a game if not considered carefully, for example, if a level is skippable in a game, how should the lost content be accounted for to keep the player up to date with progress through the game? It is interesting to note that while players seem to want to protect the games they enjoy and to keep them whole as it were, they mention that some content in games is "filler". This suggests that players postulate the intentions of developers and designers and that each party may have different ideas about what content is fun. This may cause some difficulties for developers when deciding whether to include content skipping features and which content they choose to allow players to bypass. Players could interpret the purpose of content skipping in different ways; a way to personalise their own experience of play, to skip fewer fun parts or filler content, for convenience or for players with disabilities to skip unplayable parts.

The data shows that there is a much stronger acceptance of content skipping when viewed through the lens of improving accessibility in games. Providing options to control which content is played and which is not is seen as generally positive and a good way of allowing people with physical or neurological difficulties to experience games in full. Heron (2012) argued that such people want to play the games that others play in order to feel normal. He also argued that improved accessibility in games can benefit all players, but our results suggest that this is not always perceived to be the case.

In conclusion, the overarching grounded theory based on the data in this study proposes that the perception of the acceptability of content skipping within a game is affected by whether a player's motivation and approach to the game is to undertake a

challenging or an interactive immersive experience. As such, a player's perception of content skipping seems to be influenced by how the core elements of gameplay are altered, such as creating a sense of reduced challenge or quality. Inclusion of such features, despite being optional, could potentially undermine or devalue some players' sense of satisfaction, achievement, and identity within gaming communities. This seemed to be dependent on what a player wants/needs from the gaming experience, either personally or socially. It also seems to be important to players to know the purpose and intention behind the inclusion of these features. Perhaps some transparency about the purpose could aid the gaming community in adjudicating what is considered fair use of the features.

In the short term, players may be concerned about the dilution of the gaming community, by new players attracted by content skipping features as opposed to what are held to be the core values of play. If the features are implemented effectively, in the long term they could become acceptable design characteristics, in a similar way to how save games and features such as aim assistance are now widely accepted as game design conventions in modern games.

9. The impacts of residential assisted living context on access to digital gaming

So far, this thesis has focused primarily on people with disabilities that currently have some access to digital gaming and how the social frameworks surrounding certain styles of play (multiplayer, single player) impact their access to and acceptance within the gaming community. Even though a significant number of people with disabilities are found to be playing games, as demonstrated in Chapter 4, there are people with disabilities for whom gaming may still not be possible because current technology or game accessibility does not yet support play without assistance from others. Although independent access to play may not be achievable just yet, this does not mean that digital gaming should be out of bounds for these potential players. Where previous chapters have focused on the broader social context of games for existing players, this chapter examines how gaming might be achieved in a setting (a care home) where the potential players have little control over how and whether they play, and how this social and physical environment supports access to gaming.

It is not yet clearly understood whether people with neurological conditions can take part in playing digital games as a leisure activity without assistance, but this should not necessarily mean that gaming is off-limits for them, particularly as there is the potential for these individuals to benefit from the social aspects of playing games. Unlike other activities that a care home may provide in their recreational activities schedule, digital gaming has the potential benefit that it can provide a window into the world outside of the care home. Where previous chapters have investigated the social environment of digital games as potential barriers or disablement for players, this chapter considers the compatibility of digital gameplay with a social environment designed to provide assistance for recreational activities for people with neurological conditions. This case study aimed to discover whether digital gaming can be introduced into a neurological care home as a recreational activity for those in long term care with minimal intervention or purchase of specialised equipment.

Much of the previous research has primarily focused on creating bespoke digital games for individuals with neurological conditions since it has been thought that mainstream games present too many barriers to play them. And where bespoke games have been created, they are more often designed with a purpose, such as to have therapeutic effects or for physical or cognitive rehabilitation. Therefore, very little is known about individuals playing games within this context that is not directed towards health or rehabilitation goals. With games that are directed towards a health or rehabilitation goal, it is difficult to assess the potential broader context as a source of disablement as the focus is often drawn to the capability of the game as a means to reach goals, rather than play as a goal in itself. This study focuses on the care home context underlies access to digital gaming as an activity, whether with mainstream or bespoke games. As the social model of disability considers the environment as the source of potential disablement, the environment in this case, is the care home (assisted living facility).

Case study methodology, as outlined by Yin (2003), was deemed to be the most suitable form of ethnography to explore this topic. This approach provides insight into both the environment in which the gaming could take place and accounts for individuals with very different and complex conditions. In addition, case study methodology provides a strategy for organising and analysing the findings from which to infer how the care home environment influences access to digital gameplay. The study focuses on individuals who have neurological conditions and require specific care and safeguarding; therefore, the case study methodology provides a way to create a procedure for the researcher to observe and interact with them in a safe and low-risk way.

As a way to reduce intervention from the researcher and to avoid introducing any risk, assistive technology was not introduced in this study. This also reduced requirements on the part of the organisation in terms of removing the need to conduct risk assessments and PAT testing of new technologies. Additionally, since each individual has unique abilities and needs, they may need different technologies which may not feasible for a charity organisation and residential care home to reasonably provide. Therefore, observations were made of individuals using only

computing/gaming devices already present in the care home, such as a Nintendo Wii, desktop computers and tablets.

The main unit of analysis of the case study is the care home environment since this is often overlooked as an influence upon the access that people with disabilities living there have to digital gaming. This is because the digital gaming activity cannot take place in the absence of the care home as this is where the potential players reside, just as digital gaming cannot take place in the absence of the socio-cultural context. Four embedded cases of individuals, who were interested in trying digital games, highlight the challenges that individuals with complex neurological conditions may have with free digital games that can be found using existing technology in the care home - PCs and tablets.

This study aims to answer thesis research question 4:

> RQ4. Complex disability in a social context: How does the social environment of a care home influence the ability of people with complex neurological conditions to engage with digital games?

In summary, the study findings show that there are several environmental or social conditions that are vital to consider when introducing the activity. These are:

- Availability of personnel to be able to support the activity
- Scheduling of the activity
- Interpersonal conflicts between individuals who may want to take part in the activity

At an individual level, each case highlighted different challenges in the use of the PCs and tablets in the care home. Each person had specific preferences in which games they wanted to play and had different physical abilities that impacted whether they could use the equipment. In some cases, only a cooperative style of play could be achieved where an individual required someone else to use the game controls to allow them to engage with a game. Overall, the study indicates that the primary barrier for people with neurological conditions to engage in digital games is

organisational structures determining availability of personnel to support individuals in playing using the available equipment.

The research approach taken throughout this thesis recognises the broad diversity of disability and has aimed not to restrict investigation into a specific condition. This is both to respect the individuality of people and their abilities and recognising that there is a significant amount of crossover in the symptoms and effects of different conditions. However, this study, through the nature of the specialisation of the care home organisation, focuses on disabilities of a similar type - neurological conditions. Previous studies in this thesis have not recruited individuals identifying as having these disabilities as it was felt not possible to ensure that informed consent could be gained with certainty when recruiting for participants online. People with neurological conditions have so far been an invisible demographic because they may not currently be playing or have been supported in playing mainstream games due to the prevailing sense that they would not be able to engage with these games, as is consistent with the social model framing of disability.

9.1 Background

This review of literature is intended to support Chapter 2 but is included with this study due to its specific relevance. This section covers previous research findings about the kinds of ways that people with neurological conditions may engage with digital games through various computing and gaming technologies, what the experiences are of people playing games in care home environments, and or using games for rehabilitation/health/therapy, and how the design and control mechanisms of mainstream, commercial games might present barriers for this cohort.

9.1.1 Facilitating play

To play games, there are a number of practical elements that need to be considered, indeed for any player, how a game is interacted with or controlled is important. The players in this research have neurological conditions, which could mean that

standard control mechanisms used with games may not be suitable. A player with Parkinson's Disease, for example, may experience tremors or have rigidity in their hands (P. NHS, 2016), so using a computer mouse may not be possible. Similarly, with Huntington's, the player may have uncontrolled movements (H. NHS, 2016), so something like a Nintendo Wii Nunchuk may not be suitable. The following sections will cover various alternative inputs that researchers have investigated for use by people with the kinds of physical and cognitive abilities that the target users in this work may have. Many studies have focused on a particular game console, controller, or bespoke games for users with disabilities and have considered games both for rehabilitation purposes and for recreational use. However, creating specially designed games or hardware for players with disabilities, in itself, can create feelings of exclusion, where these users, though grateful, often just want to play normal commercial games like able-bodied players (Heron, 2012). While research using bespoke equipment or games is relevant, the focus will be on how such technology can be used to provide the most normal engagement as possible with commercial games.

9.1.2 Games for rehabilitation

A substantial body of research has previously been, and continues to be, conducted into digital games to support rehabilitation/health-related goals. This section provides an overview of work in this area since it provides insight into the experiences of people with neurological conditions with various gaming technologies.

Research by Ryan et al. (2006) suggests that people are dispositionally motivated to play games and because video games have such varied physical and cognitive demands, researchers have utilised these as a way to help make rehabilitation tasks more enjoyable and less tedious, for example, in physical therapy to aid with muscle recovery, flexibility, helping reduce the effects of sedentary lifestyles, and for those in residential care, those less mobile and the elderly (Jung et al., 2009).

Gaming technology and consoles such as the Nintendo Wii, Wii U, and the Microsoft Kinect have been investigated as physical therapy tools, partially due to their relative affordability and availability in comparison to specialised rehabilitation technologies. Research into balance rehabilitation for neurological patients such as Lange et al. (2010) and Lange et al. (2011) suggest that there is potential for gaming technology to be applied here, but with the use of bespoke games rather than commercial games. This finding is supported by other work such as B. Lange et al. (2009) and Annema et al. (2012), where difficulties have been experienced when testing commercial games with neurological patients. This is due to the varied complex movements that some games require, the inability of some games to store individual patient's progress, time lost from therapy sessions due to the time taken to set up games, and difficulties in patients being able to perform calibration poses or manoeuvres for gesture-based controls.

Some findings indicate that, although some commercial games may not be suitable for improving mobility or balance in physical therapy, they appear to motivate people to persist with therapy that uses them. Kloos et al. (2013b) studied the use of the game *Dance Dance Revolution* (requiring the performance of movements upon a floor mat in time to music) compared to hand-held digital games over a 6-week period of regular use by patients with early-stage Huntington's disease. They found that, although their performance of the game improved, “functional mobility, balance confidence, or quality of life" did not significantly. The authors speculate that this could be due to the enjoyment of playing. They also found that individuals seemed reluctant to stop playing after the time that they were required to. This suggests that games may not improve patients' condition but may motivate activity and provide enjoyment, which is beneficial in terms of well-being and general health.

There has been research that has identified that playing games can be beneficial to cognition (Strobach & Schubert, 2014; Green & Bavelier, 2006). Green and Bavelier (2006) suggest that gaming can have a positive effect on visuomotor skills, such as hand-eye-coordination and reaction speeds, but benefits were also found in memory function and visual attention. This seems to be supported by the work of Caglio et al. (2009) with games in use by an individual with a Traumatic Brain Injury. In a similar

way to games applied in physical therapy, Green and Bavelier (2006) suggest that for cognitive rehabilitation uses, specially designed games would be more appropriate, for targeting particular functions for example, but further work is required to understand whether doing so may have a negative effect upon other areas of cognition. Even where specially designed games have been deployed with neurological patients, some problems have been identified with their use. Connor & Standen (2012) created a collection of brain training games that can be played by anybody but was studied with participants post-stroke for their rehabilitation potential. Their findings support that the games can improve memory, problem-solving, visual scanning, and mood, however, the work suggests that problems with controls, understanding instructions, the need for caregiver assistance and fatigue may be a barrier to use in rehabilitation.

To summarise, research suggests that, at present, commercially available digital games may not be entirely suitable for physical or cognitive therapy applications and that as such, customizable specialised games are being created and tested for use in this domain. This is due to varied individual needs of patients and the need for caregivers and therapists to both tailor and set up the games, and to target specific functions for rehabilitation. Many commercial games are not fully customizable, accessible, or fast and easy to set up and allow monitoring of progress, which can be frustrating and impractical for therapy. The majority of the research using commercial games, however, note that players enjoyed the activity, and, in some cases, it provided motivation to continue. As such, this work will look at how commercial games are experienced as a recreational activity to promote well-being and improved quality of life. As opposed to how a game can be made for or customised for individuals, it will focus more on how to accommodate for the games that the individual wants to play and how to make it possible to identify suitable games.

Social play in a care home setting

A care home will often provide leisure or recreational activities in a social group setting. In which case, there may be a group of people of varying ages, backgrounds,

interests, and abilities. Research often focuses on the use of consoles as a way of accommodating and promoting social interaction for groups. One example, Voida & Greenberg (2009), propose that console games, such as the Nintendo Wii could serve as a kind of “computational meeting place" to help promote connections between people of various ages, expertise and interests. They suggest that co-located play is strongly motivated by the social interaction provided by the activity and propose how consoles could be better designed to support this. They found that even the different levels of expertise of players did not necessarily negatively affect the co-play experience. Their findings suggest that players who didn’t play games before were motivated by the help and assistance of the experienced players and were more likely to then continue gaming. The participants of this study were family and friend groups brought together to play the console. Therefore, these findings may not apply for care home situations where the players do not already have a close connection to the other players.

However, research by Schell et al. (2015) of older adults co-playing *Wii Bowling*, found that the activity created friendships and increased the likelihood of socialising outside of play due to the shared interest and the connections formed. This study also measured social connectedness and loneliness of participants which were found to have improved after playing *Wii Bowling* over 8 weeks. Not only this, but it was also posited that cross-generational social interaction for older adults playing could potentially improve, as the game provided a talking point, with grandchildren for example. This suggests that gaming could be beneficial for those in care homes to promote social interactions with family members of all ages or friends outside of the home.

Boudreau & Consalvo (2014) propose that online social network games can help bring family members together who are separated by distance without the explicit need to communicate specific information. They conducted an exploratory study into the opinions of users of social network games on playing with family members, finding primarily that playing games with each other gave them a point of communication, both a starting point and a reason to continue talking. Some respondents even reported finding previously unknown family members by searching

for others to play with. However, they found that playing with family members had some negative effects, such as feelings of guilt and obligation experienced when turning down invites to play or when not playing. Some players also reported feeling used by family members. This work suggests that although playing with family members online can help people to feel connected, some people may be put off by the potential to feel like a nuisance or a burden by requesting play. This work does not account for individuals who may no longer have relatives or friends to connect to, nor those who do not have access to social networks or their games. However, work by Kaufman et al. (2014) about the gaming habits of over 55-year-olds seems to support that playing games can help “dealing with loneliness" and developing confidence". This may be of particular importance for people in residential care, who may be feeling alone and disconnected. Such research highlights the potential that playing games can yield to create social connections, between existing relations, to form new ones, and the benefit that they could provide to well-being as a result.

9.1.3 Game controls

Controls for video games, unlike standard computing, often have the added complication of having a variety of different set-ups. In many cases, individual games will have a different control set-up even on one platform. There are some standards and conventions of games that provide some similarities to work with, such as the use of arrow keys or WASD keys on a keyboard for movement in a game. It is easy to see then, that finding a suitable and translatable technology that allows a user to easily learn and play a variety of games might be challenging and potentially costly, in terms of time and equipment.

As previously mentioned, some gaming consoles offer novel input devices as alternatives to the standard handheld controllers, some examples include the Nunchucks or the balance board for the Nintendo Wii, the EyeToy for the Playstation 2, and the Microsoft Kinect for the Xbox. Many of these have been considered potentially useful for physical rehabilitation purposes to varying degrees of success. As an example, Flynn et al.’s (2007) case study of an elderly female stroke

patient's use of the PS2 EyeToy. The study reported that such technology can be good for motivating therapy activities, with the benefit of being low cost and good for home-based use. Despite being research in the context of rehabilitation, it shows that the technology is usable by an individual with a neurological condition.

Some researchers have considered the feasibility of using a person's wheelchair as a controller for playing games. Both Cuzzort & Starner (2008) and O'Connor et al. (2000) linked up a wheelchair to a gaming console for use in physical therapy sessions. O'Connor et al. (2000) found that using the wheelchair controller resulted in an exercise training response. They found that a wheelchair could be effectively linked to a dynamometer to control movement in commercial games such as *Need for Speed II* and *Power Boat Racer*. Cuzzort & Starner (2008) reported that although using the controller did not produce any better therapeutic response than traditional methods, it was found to be much more entertaining. This is an interesting re-framing of a piece of equipment that would normally be a quite serious necessity for some, which may even negatively symbolise their circumstances. The entertainment value discovered suggests the new association that the wheelchair could have with a fun activity such as gaming, might be a benefit, outside of a therapy situation.

For players who have limited motor control, the use of head tracking has been studied for use as a hands-free game control method. The work of Kulshreshth & LaViola (2013) suggests head tracking control could even increase performance in gameplay if used by expert gamers. However, the benefit was not found to be evident in all types of game. They found that with head tracking, performance was worse in fast-paced racing games, compared to an FPS such as *Arma II*, where better survival times were reported. Such work indicates that as well as differences in suitability for individual players, there may be differences in suitability of control mechanisms to different games or game genre. This could be due to the similarity of the control movement to the movement produced by the player's in-game avatar. For example, turning the head to follow an enemy to shoot, in an FPS game. There are also potential problems with the speed required by the game to carry out a movement and the recognition rate of the control mechanism. For example, in Kulshreshth & LaViola (2013) study, the poor performance in fast-paced racing games could be due

to the mismatch between the recognition rate of the head tracking and the speed of movement required by the game.

Another alternative to standard control mechanisms is a Respiratory Control Interface (RCI). Arroyo-Palacios & Romano (2009) designed a mini-game for use with a chest expansion belt connected to Procomp Inniti, which measures expansion and contraction. The mini game required the player to blow up balloons, so the chest expansion and contraction control translated to inflation of the balloons. The action required in-game would be very much like the action required in real life. The study suggests that the control mechanism is a good alternative to sip/puff controllers for hands-free gaming, with the benefit of being hygienic for use by multiple different players. It is not known whether such a control mechanism would be suitable for use with commercial games, but as proof of concept, it indicates that it may have the benefit of allowing a player who may not be able to perform controlled sip/puff actions to play a small fun game, simply by breathing.

O'Donovan et al. (2009) also use a specially designed game to evaluate the use of a combination of controls for hands-free gaming on PC, compared to the use of a standard keyboard and mouse set-up. They designed a 3D first-person game in which players are rabbits navigating through a warren. They compared the use of gaze tracking with voice command versus mouse and keyboard, where participants tried both conditions. They found that gaze tracking resulted in some issues with undesired screen rotation and a substantial problem with collision response to in-game obstacles. As such, performance using the gaze and voice control set-up was found to be poor. Participants reported this gameplay condition to be more enjoyable and immersive. It is not known whether this was due to the novelty of the control mechanism compared to the standard or some other variable, additionally, further work would be required to determine whether such controls could be used to play commercial games, but again, the study shows that the control mechanism can work with games in principle.

A review of research into assistive technology by Colman & Gnanayutham (2013) suggests that much further work is required in this domain. They propose that, at

this stage, many technologies are not developed fully and effectively enough to be used as controllers for digital gameplay. One example they provide is work into the use of Brain Controller Interfaces for use with games, which would require no physical movement at all for control. They suggest that such methods are still difficult to set up and use with games and would benefit from further work. They propose that it would be beneficial for more refined and developed guidelines to be produced to aid the design of control set-ups to improve accessibility in games.

Research into alternative and novel controllers for computing and gaming suggests that there is no one-size-fits-all and that guidance for the most optimal custom setup for individuals may be the best way forward to provide practical and accessible gaming. There are a variety of sources that offer customized or alternative, often modular controls for people to play games with (Controllers, 2007), even virtual, mappable controllers such as those used in work by Lepicard et al. (2007). Additionally, charities such as AbleGamers and Special Effect offer services to assist with control set-ups and facilitating gaming for disabled players.

More recently, a great deal of work has explored the use of VR technology for disabled players (Golomb et al., 2010; Jack et al., 2001), though promising, VR technology is in its infancy at this stage and importantly, is not yet as affordable as many other gaming technologies. It is also not as widely supported for use with commercial games and therefore may be limiting the choice of games for the target users in this work.

In a care home environment where there are multiple different players with different gaming wants and needs, there are a number of considerations to be made to facilitate gaming, such as affordability, setting up, how many users can benefit from the equipment, how many games or games platforms does the equipment work with, would it make users feel self-conscious or highlight their differences? Research into different technologies suggests that a solution could be to provide multiple control options which are ideally customizable. As research in this area often uses bespoke games, this suggests that the technology may not be the only concern and that commercial games may not be made with other control mechanisms in mind. The

following section will look at research into what games themselves do to include different players.

9.1.4 Game design

It may not be entirely the technology, controls, or the audio-visuals that affect how inclusive a game is, but rather, aspects such as content structure, narrative style, linearity, difficulty, or clarity of rules and goals. For players with cognitive conditions, such features may affect which games they can play even if they are able to control the game adequately. For example, a player with memory impairment may not retain knowledge of story elements or skills in linear narrative games but may be able to enjoy an arcade-style puzzle game. Many games, intentionally or unintentionally, rely on a player's understanding or knowledge of certain game conventions. These can be either genre-specific, controls or rule-based conventions. If these are not provided for the player or explained in some way, people new or unfamiliar to such conventions may not understand how to play and could be deterred from gaming altogether. To provide an example, seasoned gamers will likely know that a flashing or glowing object in a scene represents an object that can be collected or interacted with. Juul (2011) suggests that this can be due, in some cases, to “fictional incoherence", whereby clues about the rules do not match or are not provided by the fiction of a game. If such things are not explained via tutorials or instructions, non-seasoned gamers may not be able to understand the game and enjoy playing it as it was intended. If gaming is a new activity for those in a neurological care centre, this may be something which deters people, particularly if they are conscious of their own abilities.

Many types of games aim to create challenge and flow type experiences by using progressive structures, in which a game gradually increases in difficulty (Schell, 2014b). This relies on the assumptions that a) a player will remember how to complete tasks, b) that they will learn conventions and rules, c) that they will get better at the game as they progress through it, and d) that they will follow the

narrative (if there is one). Some would argue that this is what makes a game a game. However, if a player with memory or learning difficulties wishes to play, how might the game accommodate for this? Are there clues about how to carry out tasks? Are there a variety of ways to complete a task? Are there hints or reminders?

At present, it is quite difficult for game designers to know how to make games fully accessible for all players of all abilities, some researchers have looked at how best to select games to suit individuals. In one study, game selection is looked at in the context of therapy, Putnam et al. (2016) focuses on therapists' perspectives of choosing games to suit the needs of specific therapy sessions. For this, they developed a tool for use on a mobile device with which therapists could find and select games. Therapists had stated that they had found it difficult to find useful/relevant information about commercial games that could help them to identify whether a game might be suitable for a session. Interviews with therapists revealed that they found a useful part of the tool was the information, notes, and reviews that other therapists had added to a comments section on each game. A perhaps unexpected benefit of this comments section was that therapists were able to store specialised and relevant information and recommendations to help other therapists to choose games, that was not just reliant on the standard information provided by the tool. Other suggestions reported by therapists that would be useful for future development included the ability to save searches. This would save time when trying to re-find a list of games for a specific patient. This is supported by dos Santos Mendes et al. (2012), who highlight the importance of game selection for rehabilitation purposes for patients with Parkinson's disease. Due to the varying cognitive and motor demands of different games and the concern that the wrong type of game could have adverse effects upon the patient, choosing the right one is particularly important. The above suggests that some sort of selection tool could be applied outside of therapy, perhaps to help care staff to choose which games to have available for the residents. However, Stetina et al. (2012) express the concern that although digital games and virtual reality have been found to have positive effects in a variety of therapeutic applications, there is little ethical guidance about their use. They suggest a multidisciplinary approach to address this concern.

9.1.5 Summary

The majority of literature regarding digital games and players with neurological conditions focuses on therapy and rehabilitation, while such outcomes are beneficial, there is little work that focuses on the leisure, well-being and social consequences of gaming for these players. Much of the work on alternative controls and adaptations for players with disabilities looks at how these technologies can be used for rehabilitation, such as supporting physical therapy. Such work generally finds that games are motivating in this context, but mostly require bespoke games to be effective in targeting particular functions or movements. However, the literature supports that people mostly want to play commercial games and that creating games specifically for players with disabilities could create further exclusion. This is important as research suggests that where games could induce well-being, a substantial part of this is due to the social context in which games are played. Researchers propose that gaming is a social hobby, even when games are played alone, so if people with disabilities play only bespoke games, though they may obtain some benefit solely from playing, they may not be able to integrate fully into gaming communities that revolve around commercial games.

Literature suggests that group gaming, such as may be facilitated in residential care homes, has both advantages and disadvantages. In an environment where people may feel isolated, depressed, and disconnected, gaming in group settings can provide a common activity which may help to facilitate social interaction between people who may not have connected otherwise. Research supports that this may also help strengthen or create bonds with people outside of the care setting. Group gaming may not be ideal for those who may feel uncomfortable playing in front of others, particularly if they are new to the hobby and unsure about how to play or have difficulty in using controls. However, there is a lack of research into whether providing multiple gaming platforms, for simultaneous but individual play, in group gaming could be beneficial and reduce the performance feeling of playing with others present. The literature supports that there is a need for further work into how to make games more accessible and more robust guidelines about what features or

options to include and how these might impact upon play. At present, there is a lack of research into the ethical and legal aspects of accessibility specifically in digital gaming, so it is not yet clear whether there should be a minimum or standard requirement for accessibility in games development. Therefore, while it is not possible to suddenly make every game ever made fully accessible to everyone, a short-term solution may be to explore what games currently offer in terms of accessibility, how to match this to, and choose more suitable games for players based on game elements and game types.

9.2 Method

The case study methodology, as described by Yin (2003) was chosen for this study due to the environment in which digital gaming is to be investigated. Indeed, the nature of the environment and the disabilities of those within the care home left little option for other methodological approaches to be taken safely and ethically. Yin states that:

> A case study is an empirical inquiry that
>
> - Investigates a contemporary phenomenon within its real-life context, especially when
> - The boundaries between phenomenon and context are not clearly evident.

Yin also explains that case study methodology would typically be used where the "contextual conditions" are likely to strongly influence the phenomenon being studied which fits well with how gaming in a care home environment is likely to be strongly affected by this distinctive context. In line with Yin's guide, the research question itself suggests that a case study method is appropriate as it is a "how" question, also indicating that an exploratory approach should be taken since the research question does not specify exactly *what* should be studied. The case study method provides a framework within which a theory can be generated and used to guide data collection of multiple types and from multiple sources and provides a procedure for systematic analysis.

In this particular case, the investigation into digital gaming took place within the care home environment and required cooperation and facilitation by the care home organization to be introduced and maintained. In other words, the gaming activity required the organisation to provide the equipment/technology and time resources of staff and volunteers. Studying the gaming activity in isolation would have not been suitable since these were felt to be the driving factors as to whether gaming could occur at all within this environment. The case study methodology allowed this context to be accounted for. The study was not intended to be generalizable but to provide insight into the experiences of a small number of individuals when trying out digital games in the specific environment in which the activity would naturally take place for them.

The case study methodology was chosen over other methods, such as surveys, interviews or experiments due to the nature of the participant's disabilities and the time and availability of staff within the care home. Due to the varied symptoms of the neurological conditions of the participants, many of them were unable to write or to verbally communicate for sustained periods. As such, the findings of this study are a combination of observation and reflection on engaging with care staff and with residents to find suitable games for them to play and support them in playing.

Role of the researcher - It was agreed between the care home management and myself as the researcher that the safest and most suitable way for me to regularly attend and carry out the case study was to apply to be a volunteer. The care home recruited unpaid volunteers to help support staff with activities sessions within the care home and to provide social support and interaction for the residents. Becoming a volunteer meant undertaking appropriate training, such as safeguarding training and fire safety to ensure a high standard of care was maintained within the care home. The role of volunteer, whilst I was on site, provided a suitable role from which to make small interventions - supporting residents in playing digital games - in the same way that volunteers would support other activities. This meant that, for the residents and staff, the activities were less likely to be seen as “research” and allowed me to observe a more natural activities session.

9.2.1 Criteria for interpreting findings

To provide some way to be able to draw conclusions from a case study, Yin (2003) proposes that researchers should approach a case study with a theoretical basis for interpreting what is found. It is suggested that developing a theory and a rival theory is a way to do this. A theory is like a hypothesis and states what is theoretically likely to be found based on previous literature. This is to be used as a guide but not to restrict the findings. The rival theory functions as a way to propose a different potential outcome of the case study. Both the theory and rival theory taken together indicate possible items of interest, points of data collection, units of analysis (cases), that inform the case study design.

In order to draw conclusions from this case study, the answers to the given research questions were evaluated against the following theory and rival theory:

Theory - The case study will show that digital games can be effectively supported within the context of a neurological care home without the need to purchase specialised gaming equipment.

Rival theory - The case study will also show why digital games might not be appropriate for all patients with neurological conditions in the care home environment, for practical, organizational, and social reasons.

The conclusions drawn from this case study are explained with respect to these theories and to findings from previous literature on digital gaming or similar activities in a similar setting for participants with neurological impairments. Implications of the findings are discussed with regard to the kinds of organizational and social considerations that may need to be made if a residential care home for people with neurological conditions may wish to facilitate digital gaming as a leisure activity.

9.2.2 Study design

To answer the study questions an exploratory, single, embedded case study design was used. Case studies typically take one of three main forms: explanatory, descriptive, or exploratory. An explanatory approach would be taken when looking to identify causal factors in an event or situation, such as looking for the reason a fire may have broken out in a large building block. A descriptive case study would be aimed at reporting what is happening in a situation or context without attempting to identify causes or outcomes, such as describing the changes in an organisation's leadership structure over a period of time. An exploratory approach would be used when looking to identify undetermined outcomes of an intervention, such as exploring how the introduction of a new governmental policy impacts education in a particular region.

A case study can have one unit of analysis, or one case, or multiple. Typically, multiple cases would be studied when the aim is to make comparisons between interventions, organisations, individual people (and so on), or to improve generalizability through replication of the study. Of course, a multiple case design is beneficial as it allows for cross-referencing, further triangulation, and additional evidence to support findings, but this is not always practically possible.

The following sections briefly explain the approaches used for this case study:

Exploratory - For this research, an exploratory approach was taken because the outcomes of introducing digital gaming activities were unknown and there were no specific goals intended by the intervention. The specific organisation, topic, and participants had not been previously covered in research. The study intended to investigate how games could be effectively introduced, in terms of practical considerations, and how aspects of the care home environment impacted the introduction and maintenance of the activity and why.

Single case, embedded - The main case was the residential neurological care home organization, in particular, the recreational activities department. This was chosen as the main unit of analysis because this was felt to be the main determinant as to whether the activity could take place. Four individual residents were investigated as embedded cases. Embedded refers to how each individual is uniquely of interest but that these exist specifically within the main case as to study them separately would remove them from the context that their experiences are likely dependent on. Each resident is an individual with differing abilities, preferences, and requirements in terms of how they might interact with digital games. Studying a number of individual residents in this way was intended to highlight a variety of potential barriers and benefits to see whether gaming is possible for some but not others within the same context. The reason for choosing to investigate individual residents as embedded cases as opposed to multiple cases was that there was no intention to make a comparison between cases. Since the residents are all based within the same care home and the same recreational activity sessions, it seemed more suitable to consider them as individual cases within the single case, the care home environment context.

9.2.3 Length of study and researcher attendance

The study was conducted over a period of 18 months (start: April 2016). The length of the study was initially designed to be 3 years (length of PhD) however, during the study the collaboration disintegrated due to the care home organisation closing down. Researcher attendance, in the capacity as a recreational activities volunteer, was regular and coincided with a weekly, appropriate and agreed upon session. In the initial few months, researcher attendance was more frequent due to training sessions at the care home and introductory meetings with staff and residents.

9.2.4 Data sources

The following sources were used to gather evidence for analysis:

Researcher reflective diary - a reflective diary was kept during the study period to record all observations and notes about the data described below. This was the main record kept throughout the case study. To protect the confidentiality of both staff and residents in the care home it was felt that taking audio or video recordings would be inappropriate and unethical. To give full attention to residents and to remain alert was important for safety and decency whilst being present and observing activities, it was inappropriate to take notes during the time spent within the home. As such, the reflective diary was filled out after visits to the home. The diary not only contained notes about observations of activities but reflections and interpretations of events from the researcher. The diary itself is not included with this thesis as it contained information that could compromise the anonymity of the care home, staff, and residents within.

Direct observation - The role of recreational activities volunteer (explained further in section 9.2.6) provided the opportunity to observe the following:

- Recreational activity sessions that did and did not include digital gaming activities.
- Staff and resident interactions in these sessions and around the care home in general.
- Daily routines of residents and staff.
- Organisational structure of personnel within the home and the available facilities.

Participant observation - Notes were kept about interactions with individual residents in recreational activity sessions. This involved sitting with a resident and assisting with an activity - in particular, assisting with technology used for gaming. For example, installing a puzzle game on a desktop computer for a resident to try and observing and helping when required.

Discussions and meetings with staff - Notes were made about opportunistic, unstructured discussions with other care home staff about safeguarding, residents needs and preferences, and about how staff felt about the digital gaming activity.

This included discussions with recreational activities staff and volunteers, as well as care home management.

Documentation about residents in recreational activities - As a trained recreational activities volunteer, access was provided to individual records regarding their recreational therapy schedules, needs, likes, and dislikes. These were called "activity plans" and were written in consultation with the resident by nurses, next of kin, activities, and care staff. All volunteers were able to view these activity plans in order for them to make sure they were providing tailored assistance to the residents and to understand how best to interact with and treat them. This documentation was consulted during the investigative process but was only available on-site and cannot be included as evidence in this study, therefore, notes were not taken using any of the records to protect the confidentiality of residents they referred to.

9.2.5 Units of analysis

Main case - The main unit of analysis in the single case was the care home itself. The care home was part of a wider group of care homes under one charity organisation. The care home, in this case, was a residential care home which specialised in assisted living and medical care for individuals with neurological conditions, with particular expertise in Huntington's. The home housed and cared for between 20-40 people at any one time. The home had three residential floors, a lounge and dining area, a recreational therapy room, a sensory room, and surrounding gardens. The home itself was situated in a small semi-rural village where many of the staff lived in the village close to the care home.

Day-to-day living centred around a regular routine of mealtimes, personal care and morning and afternoon activities sessions. Different types of activities were rotated on a weekly schedule which would be designed in considerations of which residents were interested and wanted to take part, and the availability of staff and volunteers to assist. There were four members of full-time recreational activities staff and several

volunteers that would intermittently attend. Within the duration of the study, only two other volunteers had been present, individually, at different times.

Embedded cases - Four residents were included as part of the embedded cases for this study, of which, three had Huntington's Disease and one had Parkinson's Disease. The four individuals were suitable cases on the basis that they regularly attended activities sessions and were actively engaged and showed particular interest in the offer of digital games. Some of these residents had previously taken part in some form of digital gaming or computer use previously.

Excluded potential cases - There were three other residents within the care home at the time of study who may have been suitable cases for inclusion, however, these residents did not like to attend the scheduled recreational activities sessions. This was mainly because they felt that the activities on offer were either too childlike for their tastes, or they did not enjoy the company of the other residents that attended. Despite their interests in technology and gaming, it was not possible to spend time with these residents in their rooms, separate from the main activities sessions and group as volunteers were permitted to assist in social recreation. This was to respect resident's personal rooms and to avoid any disruption to others on the residential floors of the care home.

9.2.6 Ethical considerations

As a PhD student on placement, ethical considerations were covered by the University of York for this work. In order to conduct the study with due care for those in the care home, the researcher became an officially recognised, trained volunteer. As such, appropriate training was provided before placement in the home regarding health and safety, manual handling, confidentially, safeguarding, and information training for specific neurological conditions. Additionally, the researcher obtained a criminal records bureau (CRB) check as required by the care home.

Staff and residents were made aware by management that the purpose of the researcher's presence was to conduct an investigation into the use of digital games as an activity within the home. The case study methodology was employed and designed to be of low risk of harm to residents and staff. It was deemed to be low risk because the activity involved minimal intervention from the researcher and minimal disruption to the normal functioning of the recreational activity sessions. Recreational activities sessions were a regular part of the daily lives of the staff and residents and the digital gaming activity being studied would be done using equipment already present or acquired for the recreational activities department at minimal or no cost to the care home. The digital gaming activity could also be done without the researcher's presence. Any potential harm to residents, such as feelings of frustration caused by gaming was felt by staff to be no more harmful than participation in other recreational activities provided by the care home.

Consent to observe and work with individual residents was obtained verbally at the beginning of each attended session. Residents were free to express that they did not wish for the researcher to attend or observe them at any stage. Residents were very forthcoming about asking to be left alone if they wished it and care staff were attentive to residents becoming frustrated or upset and would remove them if they felt necessary.

During the study period, the collaboration with the care home broke down due to key staff leaving the organization and eventually the care home itself closed down. A written report of the case study would have been provided to the care home to review; however, this is no longer possible. To protect the privacy of the care home and the residents, all data in this study has been anonymised including the name of the care home, all residents and staff and any identifying features have been removed.

9.2.7 Analysis procedure

The analysis followed the approach described by Yin where the data was assessed for support of the *theory* or *rival theory* as in section 9.2.1. Each data source was carefully referenced against both theories and any occurring themes or concepts were recorded. The recording of themes and concepts was included to capture any potential explanations or rival explanations that did not connect to the theories proposed. For each data source, along with any recorded themes or concepts, any evidence in support of either theory was recorded and mapped to the main case and or the embedded cases. Researcher reflection forms a large part of the analysis and is therefore reported with the results to contextualise evidence given. The results are organised to reflect the relevance of the evidence to the main or embedded case.

9.3 Results

This section is structured with the main units of analysis in design of this study. The main case is presented first and contains several sections that cover themes that arose within the analysis. Within the embedded cases section, results are organised by each individual person that was investigated as a case. An additional section about communication is included to present a finding that applied to all of the embedded cases. The findings will be presented in first person as they are from direct researcher observation and represent the reflexive approach taken throughout the study. Following the results section will be a separate discussion to tie the findings back to the theory and rival theory as described in section 9.2.1.

9.3.1 Main case

The main case was used to explore the issues and challenges of introducing digital gaming as a leisure activity within an existing structure and context of recreational activities sessions in the care home. The findings in this section will be presented under headings representing different aspects of the care home environment and how they influence the digital gaming activity.

Organisational climate - During the period of study, I witnessed a number of structural changes within the organisation as well as changes to the care homes senior management. My understanding of the reasons for the changes was driven by the umbrella charity's improvements initiatives as well as local improvements prompted by a recent Care Quality Commission (CQC) report. Assessments by the CQC are conducted regularly in the UK to ensure that care services meet governmental regulations for standards of social care (*CQC*, n.d.). These changes brought with them a noticeable sense of uncertainty and discontent among staff. There were changes to staff roles and responsibilities, additional training, recruitment drives, increases in the documentation, longer working shifts, and workload increases. When I spoke to staff about the changes or was present during conversation, they talked about the organisational changes as positive overall. However, they felt they had not been reassured as to how the changes would affect their own job security and whether they had any choice in the changes to their roles.

There were several ways in which the unsettled organisational climate impacted the inclusion of digital gaming within the activity sessions. In the early stages of my attendance as a volunteer at the care home, the activities sessions were separated into two halves, either side of the lunch break (midday). There was a rough schedule of activities that would be open to any resident that wanted to or was able to attend. All of the activities staff would be present, which was usually two or three, as well as one or two volunteers. On occasion, a member of care staff (distinctive from activities staff - activities staff did not typically undertake personal care of residents whereas care staff would) would accompany a resident into the session to provide one-on-one support. Activities on offer included things like floor games, baking, crafts, sewing, treasure hunts, karaoke, tea/coffee tasting, watching films, and so on. These would occasionally change based on which residents attended, the weather (if the activity was outdoors), and whether the right equipment for an activity was available (such as suitable craft materials). Although the activities system appeared to work reasonably well, there would be times when no residents would be present due to other aspects of their daily care that changed their availability. Additionally, often residents who did not get on well together would be brought to sessions as there had been little opportunity to plan around such issues. On many occasions,

there would be so many residents brought into the activities session, that there were not enough staff or volunteers available to feasibly provide enough support for them, which sometimes resulted in disappointment and people being taken back to their own rooms.

From my personal perspective and my interest in supporting digital gaming as an activity, the organisational changes had a positive impact on the recreational activities sessions. The activities staff, however, indicated that they were unhappy with the changes. The main benefit was that the activities sessions were made much more structured. There was a regularity to the days on which certain activities took place and the schedule noted which residents were to be brought into each session. This was planned around the resident's interest in the activity, who they got on with, and their own personal care schedules. This was beneficial from a volunteer point of view because it meant that both me and other volunteers could plan which activities they came in to support regularly. This, in turn, allowed the staff to know which days they would be assisted by volunteers. It also meant that I would know which residents wanted to take part in gaming and therefore, to plan how to support them more effectively. Despite the benefits of the changes, the activities staff were given additional responsibilities of supporting residents with activities in their individual rooms, and providing additional care to them, such as toileting and feeding over lunchtime. As such, fewer staff members would be present during each activities session. During the session in which I would support the gaming activity, I would often need to support a couple of residents simultaneously. This resulted in me being unable to maintain continuous support for sustained periods with an individual resident.

Personnel - It was abundantly clear to me during my attendance at the care home that the staff were compassionate, caring and dedicated to supporting the residents to the best of their abilities and within their means. Throughout the organisational changes described, the primary concern of the activities staff was that the changes meant that they felt less able to provide the care they wanted. Their availability to be present during the activities sessions was thwarted by additional responsibilities, training attendance and the need to keep up with documentation that was now

required. They felt that this took their attention away from the residents and from the activities.

In the latter part of my placement at the home, there had been a number of additional drives to recruit new volunteers to come in to support activities sessions. In talking to activities staff that had been working for the care home, I discovered that in my time there, there were fewer volunteers regularly attending than there had ever been previously. This meant that the activities staff were even further stretched than they had been previously. The location of the care home was in a small village and most easily accessible by car. As such, the majority of the staff and volunteers were residents of the village. However, the location clearly impacted on the potential for volunteer recruitment.

Available personnel had a significant impact on the ability to support the gaming activity within the home due mainly to the expertise of the staff and volunteers. Only myself and one of the activities full-time staff members were able to comfortably support computer use and were able to set-up and support a gaming session. This meant that a major factor in the earlier stages of the introduction of the gaming activity was driven by the availability of specific individuals to support the activity. For gaming to be introduced as a long-term available activity for residents in the home, there would need to be clear and simple guidelines for supporting it that did not require specialised knowledge.

Facilities - The care home had a large room designated for recreational activities. The perimeter of the room was covered in locked cupboards containing various arts and crafts equipment, seasonal paraphernalia, and board games. There was also a large touch screen television with a laptop attached and two desktop PCs on separate desks. In the centre of the room was a large table and chairs. In the first few months of my attendance at the care home, the activities sessions I was present for took place in the lounge instead. The lounge was more suitable for accommodating a larger number of residents in wheelchairs, which would be more difficult to navigate and position in the recreation room. In the lounge was a Nintendo Wii which included a Wii Sports game and the Nunchuk controllers.

As the care home was part of the umbrella charity organisation, the funding for activities and activities equipment was directed by the charity rather than the local management at the care home. I was told by management at the care home that, since providing the most effective and safe care for the service users was a priority, funding for activities equipment would often come from other sources. These included charity fundraising events and external donations. In the time that I was attending the care home, such a donation was made which allowed the activities department to purchase four tablet PCs which were for the residents and activities staff to make use of.

Since there was no funding available to purchase any specialised equipment or facilities for digital gaming, my aims for the study were to observe and assist gaming using the facilities already available within the care home. This allowed me to see if gaming could be successfully achieved for these players without expense in the charity run environment and without any additional intervention on my part by introducing new equipment. As such, my presence in supporting would be no different in terms of ethical considerations, as any other registered volunteer who might otherwise want to support the gaming activity themselves.

I was able to connect the PCs to the internet connection at the care home one at a time. This gave me the opportunity to install several free games on each PC, and have one always connected to the internet, to allow me to access the gaming service Steam, as well as a free gaming website. Both desktop PCs had touch screen monitors which were dated but still functioned to a reasonable accuracy. Similarly, the tablets were connected to the care home residents WiFi and several free games from the Android Play Store could be downloaded for residents to try playing.

The large screen TV with an attached laptop was several years old and the laptop had Windows Vista installed. I was asked by the staff not to attempt to modify the install or detach the laptop from the screen for fear that it may not be possible to reconnect it and have it working as it was. Since this laptop would not connect to the care home WiFi, it was only possible to play pre-existing games on it, namely Solitaire.

Since the facilities available meant that I was unable to introduce custom controls for individuals and was restricted to accessing free games, my observations were primarily focused on the challenges that these presented to residents with neurological conditions. This meant considering how well the residents could use the game controls, how residents felt and interacted with the games in a social environment, and whether they were able to derive enjoyment out of the experience regardless of those factors.

Scheduling - As mentioned, I perceived a major benefit of the care home organisation changes to be the introduction of a more regular and structured activities schedule. As a volunteer and researcher with other commitments, knowing that there will be a set day and time each week in which to support digital gaming made things much easier to plan around. It also meant that I could provide my expertise for that particular activity rather than being in attendance for that intermittently. The regular schedule of activities also allowed a fellow volunteer to plan to come in and support a crafts session each week, since this was her preference and suited her expertise. Additionally, the activities staff would be able to know which days they were most likely to have regular volunteer support which, they said, made them feel a bit more relaxed about fitting in their extra workloads.

The new structure and schedule also contained details of which residents would likely be able to and wished to, attend each activities session. As such, I was able to work with the same individuals over a sustained period of weekly interactions to support them in gaming. There would also be a reduced number of residents in certain sessions based on the amount of support the activity required. For example, several residents could attend a group singing session without needing additional staff or volunteer presence. However, digital gaming and computer use required one-to-one support.

There were a small number of negative impacts that the structured schedule presented from my perspective. At a given time, there would usually be two to three activities staff around but, because the new schedule was introduced alongside other

changes to the workload of the full-time activities staff, there seemed to be a lot fewer overall staff present in certain sessions. This was because one member of the activities staff was required to assist a resident in their own rooms for part of each morning and afternoon session. Usually, one member of the team would be completing the required sessions documentation, and the three staff would have staggered, separate lunch breaks. There were times when I would be the only activities support present in the recreational activities room. This was not an issue if only one resident was in the session, but occasionally, when there were two or more, I would need to split my time between them which resulted in some breaks in gaming. There were also times when, despite the regularly scheduled session, the residents who usually attended would be unable to. This would be due to an aspect of their care, sleeping longer, family or doctor visits, changes in their health, and timing of their medications. On these occasions, there may be no residents present for the digital gaming session. When this happened, I would use the time to install new games on the PCs and tablets to try next session and assist with tidying and organising the recreation room.

Interpersonal relationships - The residential care home activities sessions were unavoidably social. Though many of the residents and staff evidently enjoyed socialising and spending time with each other, there are one or two people who inevitably did not get along with each other as well. The nature of some of the symptoms of their neurological conditions sometimes meant that it was difficult for them to understand or deal with conflict and could increase their stress. These kinds of issues became much rarer after the new activities schedule was introduced as this considered such interpersonal differences.

This caused some challenges in being able to support the gaming activity for the residents that wanted to try it. Two residents who wished to try the activity did not always get along and were generally separated. When they were present for the gaming activity at the same time, I noted that one person would be much more dominant in the session. This played out as them being quite demanding about which game was tried, and them not letting the other person have a go. The dominant individual would get quite distressed if either myself or a staff member

tried to take authority and allow the other resident to try the game. In such situations, it was much better if several staff or volunteers were present and could engage each of the two conflicting residents in different game-related activities.

In the case of one resident who I supported with playing PC games, it became clear that they felt uncomfortable if another resident was positioned so that they could watch. As the person supporting them to play, they did not show this discomfort at my presence and I would regularly ask if they wanted me to leave them to play on their own for a while, to which they would respond with "no". When I observed the resident looking uncomfortable about being watched by another resident, I noticed that they kept turning to look at them and would hesitate to carry on playing. I asked them if they would prefer that the other resident was not watching, and they said "yes". I was unable to discern the exact reason why the resident did not like being watched while they played the game, however, a staff member explained that they were sometimes quite shy and nervous in doing some group activities.

For the gaming activity to be supported best in such a social environment, it is advisable for individual temperaments and interpersonal relationships between those doing the activity to be accounted for. In the case of the care home where the computing and gaming facilities were only available in social spaces, this arguably denaturalises what would otherwise be a solitary activity and brings in the additional concerns of observation and social dynamics of this shared space.

9.3.2 Embedded cases

This section details the observations of four different residents as embedded cases within the main case of the care home environment. Each embedded case discusses the individual preferences and interests with regards to digital gaming and reflection on the resident's experiences of various games tried over the course of the study. To protect the identity of the individual cases, pseudonyms will be used as with previous

studies in this thesis. Firstly, a note on how communication difficulties were resolved and managed in working with the residents.

Communication - The four individuals I worked with communicated in different ways as their conditions impacted their voices in different ways. There were some similar effects that their conditions had on their communication, such as slurring, difficulty pronouncing some words, focusing on one topic or word for periods of time, and frustration or anxiety at making themselves understood. As a volunteer, I was provided with training by the care home in how to best communicate with and understand individuals with these conditions. The training, and spending time talking to staff and carers, allowed me to pick up on the nuances and styles of communication of the residents who I was supporting in gaming. The staff advised that the individuals had the capacity to consent to take in part in gaming within the care home, which I obtained each session and throughout. The most invaluable piece of advice regarding communication I received and employed in my work was that I should slow down and simplify conversation. This meant asking mainly "yes" or "no" questions, using un-complex language, and always waiting for the individual to comprehend and respond to a question before repeating it or making an assumption about the answer. As each individual communicated in different ways, I learned how each most preferred to talk and signal their intentions and wishes.

Adam

Adam is a gentleman in his 50s at the time of the study, he was a long-term resident in the care home and was being treated for Parkinson's Disease. Adam was interested in sports, airplanes and enjoyed tinkering with technology. Adam was a relatively mobile person who would often move around the care home assisted by a specially designed walking support. On occasions when the medication he was taking had not fully taken effect, he would use a wheelchair. Parkinson's Disease caused Adam to have involuntary movements, a side leaning posture, motor impairments, and often fatigue and periods of unresponsiveness. Adam showed a good understanding of everyday conversation but would be able to respond with only one or two-word phrases.

Adam was the resident I spent the most time supporting throughout the study as he showed the most sustained interest in attending the digital gaming sessions and engagement in the activity when present. In the first few sessions with Adam, he seemed most comfortable positioned at one of the desktop PCs. His posture meant that he was leaning to one side, and he would sway somewhat to look at the screen. He was able to use his right hand with moderate co-ordination to reach keys on the keyboard or the touch screen monitor attached to the PC. He would mainly be able to use just one digit at a time; either his index finger or his thumb. Noting this, I searched specifically for one-button games or games that only required the arrow keys. Adam was unable to use the mouse if a game required it due to the involuntary movements and restricted use of his hand. On games that required the use of the mouse, I would assist with Adam's permission to direct the mouse when needed. When Adam wanted to try a game but found it difficult to control, he would direct me to control it for him and watch.

Adam and I tried several games and searched for any that might align with his interests but found that very few free games and web-based games had suitably few control mechanisms. Even fewer had the option to remap any of the controls to different keys to suit Adam's abilities or preferences. There were two games that Adam was able to control to the extent that he could progress in the game. Both games would keep him engaged throughout the whole of the two-hour session that we had available. Both games were available to download and play at no cost from the popular gaming platform Steam. The first game was called *Gems of War* which is primarily a match-3 puzzle game with RPG elements and progression. Adam was able to play this game using the touch screen monitor rather than the standard mouse control. Adam had difficulty in executing accurate tap and swipe movements but was able to use his finger or thumb to make a kind of swirling motion on the screen where he wanted to move gems. This was effective and it was evident that he understood how to play the game by his deliberate choice of where to touch the screen. This was clearly an effective strategy as demonstrated by the game giving higher and higher scores and positive visual feedback. Adam responded really well to this game as he seemed excited by the positive feedback it gave him and he asked to play whenever I was present.

The second game that Adam enjoyed playing was another gem-matching, puzzle game called *FaeVerse Alchemy*. In this game, the player needed to direct "gems" to fall in such a place that matched those already present at the bottom of the game board, much like the popular puzzle game *Tetris*. Unlike *Tetris*, there was no time pressure to position the falling shapes as you could turn and drop the gems when you chose to. Adam used the arrow keys to do this relatively effectively. There were times when he would have difficulty in lifting his finger from a key once he had pressed it which clearly caused him some frustration, which was evident in his increased agitation. Additionally, Adam would repeatedly press one key on some occasions and would appear to have forgotten the objective of the game. I was able to help with both issues by asking him to think about what he wanted to do and directing his attention to other buttons and explaining what to do.

Having tried various other PC games with little success, I introduced Adam to the Android tablet. Having installed and tried a selection of games that required non-complex controls such as tilt only, single swipes or taps, we had little success in finding something suitable for Adam. A tilt-controlled maze game was not suitable because Adam's involuntary movements would accidentally tilt the tablet. A skiing game, in which a tap on the screen would make the skier jump over obstacles was also not suitable as Adam was unable to tap and lift his finger or thumb. He would maintain pressure so the tablet would not register the tap action. Tablet-based match 3 games were much more difficult for Adam to play because inaccurate swipes often resulted in the edge of the screen being moved, or the exit or back buttons would be unintentionally touched. Being restricted to free games and the relatively short sessions in which to install and try tablet games, I felt it best to let Adam play the PC games he most enjoyed instead. Having problems with the tablet games would make him quite agitated and frustrated.

Overall, Adam expressed engagement and enjoyment in the gaming activity, despite the limited choice of games and ways in which he could play. I would continually check that he was interested in continuing to play and if he wanted breaks or to play something else, to which he would say he wanted to stick with his current game

(*Gems of War* or *FaeVerse Alchemy*). Often staff would comment on how much Adam enjoyed coming to the gaming sessions and would ask activities staff if he could play games even when it was not a scheduled activity and when I was not present. He showed appreciation for being assisted when he was having some difficulties and was interested in searching for new games to try. Though he was unable to set up the games for himself, if a staff member or volunteer did so, he was often able to play provided the game was one he had tried before and knew how to play. I believe that Adam could really appreciate some personalised or customisable equipment to support him in getting the most out of games and to search for purchasable games to suit his interests and preferences.

Roger

I was introduced to Roger on my first visit to the home. Roger has Huntington's Disease and uses a wheelchair to get around. He was almost always present for activities sessions during my attendance and would usually happily sit and draw. He really enjoyed artistic activities. The original activities manager directly told me that they felt that Roger would be a great candidate for me to introduce to digital gaming given that Roger was the only resident who enjoyed playing the Nintendo Wii. On my second day of attendance as a volunteer, there was a session in the lounge in which Roger was set up to play with the Wii and other residents were able to watch him or take part in a quiz. The activities staff stated that Roger only seemed to like playing *Wii Boxing*, so that was what he was playing. He seemed to be concentrating on it intently for at least 40 minutes, though he did not seem interested in the rules of the game. This was evident in how he used the Nunchuk controller to repeatedly execute the "punch" action by doing an overarm hitting gesture but did this with regularity and not on cue with the signals the game was giving him.

In my training about Huntington's Disease, I learned that one of the effects it has is to slow down comprehension. As such, if you ask a question it can take up to 20 seconds for the person to comprehend and respond. I wondered if this applied to actions as well as communication and therefore Roger's response in the boxing game was not indicative of a lack of understanding but rather of a delayed response.

Nonetheless, Roger seemed happy to engage in the Wii boxing game and when asked, he would say that he wanted to play it, whereas he was less interested in other Wii sports games. As Roger had controlled use of his hands, I felt that he would be able to effectively control a variety of games on either the PC or tablet if he wished to and may enjoy a self-placed or turn-based game that allowed him to consider each action at his own pace.

When other staff members or I asked if he would like to try a game on the computer, he did not want to try. However, he really enjoyed drawing, so I set up the large touchscreen monitor and laptop to see if he wanted to try drawing on the big screen. He was very keen to do this and would laugh and talk as he was drawing with his fingers. It was the Microsoft Paint program which filled the screen. When he wanted a change of colour, he would get the attention of myself or a staff member by shouting a name or, what sounded like "hey". And a discussion would take place to find out which colour he wanted next. Due to his wheelchair position, he was unable to reach the colour selection bar himself so would need assistance for that to be changed. This did not seem to frustrate him and he seemed to enjoy engaging staff and volunteers in what he was doing.

Noting that he enjoyed drawing in this way, I installed a few different drawing games on one of the Android tablets after several weeks of Roger wanting to draw on the big touchscreen. There were a number of challenges in finding ways for Roger to use the tablet. Firstly, many of the drawing games had some sort of sidebar containing icons that changed mode, such as "brush type", "game mode", "erase function" and so on. Roger was unable to keep his sweeping gestures from straying into the edges of the screen and to these bars, which resulted in confusion as to what was happening and frustration at unintended changes in the game. Additionally, the majority of free games for tablets contain some kind of advertisements. These would pop up at the start of the game, appear in the sidebars, or randomly start during play. Such adverts were very distracting and often impossible to remove without waiting through the advertisement. Accidental swipes or taps onto adverts in the sidebar would also redirect away from the game. All of these distractions made many of these games

unplayable for Roger or generally very frustrating and he would get impatient and disengage.

I would have liked to encourage Roger to try some games on the PC, but during my attendance, his condition deteriorated and left him often unresponsive. And despite being asked in the times he was active and well, he did not want to try the desktop PC games.

Olivia

Another resident, Olivia, in her 40s during the study, expressed her interest in trying digital gaming a number of times when in activities sessions. I was only able to work with Olivia in the early stages of my attendance at the home before the schedule was changed to its new structure. Olivia was not scheduled into the computing and gaming session that I was available to support within the later part of the study. Olivia was able to communicate very clearly but would sometimes get overly excited or fixated on certain topics. Huntington's Disease symptoms meant she experienced physical stiffness and occasional involuntary movements. She had very limited use of her hands and was a wheelchair user.

When chatting about the possibility of digital gaming, Olivia told me that she used to play games on her sister's laptop when she went to visit her. In one early activities session that I supported, there was some free time to choose to do any activity based in the lounge area. One of the activities staff brought us an old laptop to try so that I could assist Olivia in trying a game or two. She explained that she used to play *Solitaire* on her sister's laptop, so I loaded up a game for her to try. Given the limited use of her hands, it was difficult for her to use the trackpad of the laptop or a mouse, regardless of the various positions we tried putting the laptop to her to reach. However, she was able to click the mouse buttons, so I suggested we work together to move the cards to the positions that she wanted them. She was excited by and enthusiastic about this and was laughing while we tried this cooperative technique. It seemed that she was concentrating very hard on studying the screen and then redirecting her attention to the trackpad buttons. After successfully moving around the cards for about 20 minutes, she said and repeated "I can't do it", so we stopped

for a break. After which, she asked me to move the cards and she would tell me which cards to move where: “that goes there”.

Unfortunately, after this session with Olivia, I did not get another opportunity to try supporting her with digital gaming. This was due to the new activities scheduled being brought into action as well as an interpersonal conflict that arose between Olivia and another resident who wanted to attend the gaming sessions. Olivia also preferred to sleep a little later in the mornings, so the scheduling of the gaming session was doubly unsuitable for her to attend. She did attend one digital gaming session very briefly and asked to watch Adam playing a game on the PC. Adam was uncomfortable with being watched, unfortunately, so Olivia was moved to the other desktop PC to look at photographs instead. Given her enthusiasm for the activity, I would have liked to have had the opportunity to assist her in trying other games, but this was not possible in the timeframe of the study. As Olivia’s ability to play games was unrelated to her desire to, this supports that the environment strongly influences access to this activity and created the barrier to play.

Jane

On my second visit to the care home, the activities manager told me that Jane may be a good person to try gaming with as she had previously used one of the desktop PCs to play a digital game version of *Who Wants to Be a Millionaire* (Millionaire). She enjoys all kinds of quizzes in the activity sessions, so it was suggested that I try and get her set up with playing Millionaire again since she enjoyed it so much. I was very keen to assist with this; however, the desktop PCs had been updated to Windows 10 operating system recently and the Millionaire game was only compatible with Windows 98 since it was a very old game. Unfortunately, I was not able to get this original game running via any method I attempted.

Jane, a lady in her 50s and academic by profession (previously), had Huntington’s Disease which presented with some motor impairments, slurred speech, difficulties regulating emotions at times, and fixations on certain wants or needs. Jane would be very enjoyable to support activities with but would get agitated and upset if not given full attention or she was told that something she wanted to do was not possible.

When she was told by activities staff that she would not be able to play Millionaire as she wanted, this proved challenging for me to deal with to keep her from feeling upset. I managed to find several web-based versions of Millionaire and something that looked very similar on one of the Android tablets. Despite the quiz topics having been adapted for American audiences, she seemed happy to play these online versions of the game. I asked her if she would like to control the game, and she said that she could not and would not attempt to try. She was happy to play the game for the session so long as a member of staff or a volunteer was controlling the game for her and reading her the questions. She refused to try any other type of digital game but was enthusiastic about playing Millionaire with others.

9.4 Discussion

The analysis of the main case combined with the embedded case suggests that the rival theory is supported by the results. The *rival theory* as presented in section 9.2.1, is as follows:

> *Rival theory* - The case study will also show why digital games might not be appropriate for all patients with neurological conditions in the care home environment, for practical, organizational, and social reasons.

This discussion section will present why the *theory* as follows was not supported by analysis of the main or embedded cases.

> *Theory* - The case study will show that digital games can be effectively supported within the context of a neurological care home without the need to purchase specialised gaming equipment.

Main case - The findings indicate that there are several factors that influence how successfully digital gaming can be introduced into a neurological care home that is run by a charity organisation. There appears to be a chain of effect that is a result of the broader charity initiatives, which means that safety, quality of personal care, and adequate staff and staff training rank above recreation in terms of where funding is

prioritised. Above this, the broader charity initiatives, and financial status feed into the organisational climate of the local neurological care home. In the case of the care home I worked with for this study, this resulted in changes to senior management which, in turn, created several changes in staff training initiatives, staff workload and roles. As such, changes of these kinds left staff feeling uncertain about their employment future, and in some cases, stressed at the changes to their workloads.

It became clear very quickly that the availability of personnel was a major factor in the early stages of introducing the gaming activity. Individuals with neurological conditions, particularly those in the advanced stages, required one-to-one support in many recreational activities, not just digital gaming, to ensure their safety and well-being. Additionally, there is no guarantee that any of the existing staff or volunteers that support recreational activities have the knowledge and expertise to set up the digital gaming activity initially even if there are facilities available for it. As previous researchers who have worked with care home residents/users have found, individuals may need tailored support or that existing mainstream digital games may not be suitable for them (Annema et al., 2012). There are also challenges in identifying suitable games for individuals that are both compatible with their physical and mental capabilities, preferences, time availability, and within the financial means of the organisation. Previous researchers have considered the use of bespoke applications to assist with this problem and to help care home staff to find suitable games based on a number of search variables (Putnam et al., 2016). Although finding suitable games may be helpful in this setting, it does not remove the need for staff or volunteers to help support gaming, but it may help to save time at the start of a supported gaming session. These findings provide support for the social model of disability in how the social and physical environment hold substantial influence on the access to the gaming activity for the individuals in the neurological care home.

Another challenge in introducing digital gaming into the care home is available technology. Since desktop computers, laptops, phones, and tablets are commonplace, some of these may be already available as platforms for individuals to try gaming on. However, it is clear from the findings of this study, which supports previous researchers' findings, that mainstream games and gaming equipment may not be

accessible for individuals with neurological conditions. This is due to the varied, complex symptoms of these conditions and how these can affect each person differently. Therefore, it is unlikely that one piece of technology or equipment for gaming will suit more than one person. That said, when there are available personnel to support individuals in trying some digital games, there are ways to help them gain enjoyment by working to control them cooperatively, for example.

It is very likely that some additional technologies or different gaming platforms and peripherals may broaden the activity out for residents who may not have been able to use the existing equipment. Again, though, the organisations available funding and personnel to support the activities are still driving factors as to whether gaming could potentially be introduced in this environment. Additional facilities, such as new technology, must also be PAT tested and assessed before being suitable and safe to use for vulnerable individuals, which is also dependent on the organisation itself to undertake and maintain. As the introduction of customised technology to support gaming did not form part of this study due to the need for minimal intervention on the part of the researcher, financial, and safety reasons, future work in doing so could help to draw out further insights into gaming in the care home environment.

Embedded cases - The findings from each of the embedded cases demonstrate that residents in a neurological care home with conditions such as Parkinson's and Huntington's Disease, can derive enjoyment from digital gaming as an activity and continue to want to engage in it regardless of the challenges that they have in controlling the games. One resident showed engagement in the gaming activity but did not want to have any physical control over the game. This indicates that the activity can be enjoyed cooperatively so long as a supporting person can use the game controls.

Each of the four cases was able to have some experience with digital games, but there were limitations on which games they could engage with and how long for. As many previous researchers have shown, mainstream games may not be accessible to people with neurological conditions as they may lack the options to remap keys or to remove time limits or require more than one hand to play them (Annema et al., 2012). The

restriction to free games only compounded this issue, as many free games are web-based and have very few accessibility features to make them playable for this audience.

The results also support findings of Connor & Standen (2012) who found that fatigue may prevent sustained digital gameplay for individuals with neurological conditions (discussed in section 9.1.2). For two of the cases – Adam and Olivia, their condition and motor impairments resulted in fatigue after concentrating for sustained periods of time. This meant that they were only able to play simple puzzle games that required only one mode of control - such as using just one key or mouse button. However, both individuals could engage with and showed evidence of enjoying these games when they were supported by a volunteer or staff member who could set up the game and help when there were problems.

Tablets caused several challenges for each of the individuals that tried games on them. One benefit of tablets was the ability to position them within easy reach of an individual even if their posture or movements differ as a result of their conditions. Involuntary movements and a lack of fine motor control often meant that the edges of the screen, or buttons were accidentally touched which took the game away. This caused frustration and confusion about what had happened and how to get the game back. Also, many of the free games on tablets had adverts which often disrupted play and could not easily be removed. This is another way in which mainstream available games can cause challenges for this audience and prevent them from deriving potential enjoyment from the activity.

Since the gaming activity took place in a care home environment for each of the individual cases, it was evident that the social environment was an important influence on whether the residents wanted to try the gaming activity if they had not tried it before. Although Olivia enjoyed watching Adam play a puzzle game, Adam did not feel comfortable being watched while he played. Gerling et al. (2015) found this to be similar for elderly individuals playing games in a care home setting, whereby some individuals felt self-conscious if they were observed by others while playing. If digital gaming is to be provided for individuals in a social recreational

environment, it should be determined how they feel about being observed while playing by other residents, so as not to diminish their enjoyment of the activity and to be respectful of their preference for solitary or unobserved play.

To summarise, the *theory* used as a basis for interpreting the findings of this case, was not found to be supported. This may be due to commercially available gaming consoles or a typical computing device, such as a PC or Tablet, is unsuitable for individuals with complex neurological impairments to play games without some assistance. The findings provide evidence that the activity requires support from staff or volunteers to assist play if specialised gaming equipment is unavailable. Digital gaming does not seem to be considered an essential leisure activity in this context, despite how enriching it may be for those that do have access to play. The work in this study highlights how access to digital gaming is very much out of the control of the individuals with neurological conditions and heavily influenced by the social context and organizational environment they are restricted to by their disabilities. The findings support that digital gaming can be enjoyable as a leisure activity in the care home context and, in some cases, suggested that the assistance given by staff and volunteers in taking part in the activity may have been beneficial as a social connector. That the care home context was found to present several boundaries to supporting the activity does seem to support that social-environmental factors are a source of disablement, consistent with the social model of disability. Unfortunately, this may reflect the broader societal issues of governmental policy on social care and how care homes can be restricted to prioritising physical and medical needs over recreation because their funds are limited.

10. Conclusions

This thesis set out to answer four research questions to investigate how disabilities interact with the social context of digital gaming and how social play may present barriers in addition to the existing practical accessibility concerns. The four questions are as follows:

- RQ1. The players: Who are players with disabilities, what are they playing, and what adaptations do they use to enable play (if any)?
- RQ2. Social play with disabilities: What challenges does the social context of single player and multiplayer games present for people with disabilities and those using adaptations or accessibility options within those game environments?
- RQ3. Social play alongside those with disabilities: How are the mechanisms that players with disabilities use to enable them to play, perceived by other players?
- RQ4. Complex disability in a social context: How does the social environment of a care home influence the ability of people with complex neurological conditions to engage with digital games?

The following section discusses how the five studies provide answers to the research questions and where key contributions have been made. Section 10.2 outlines the limitations of the work presented here and suggests areas from which to develop future research.

10.1 Answering the research questions

Each research question as posed in Chapter 1 will now be answered with respect to the findings of the studies within this thesis.

RQ1. The players: Who are players with disabilities, what are they playing, and what adaptations do they use to enable play (if any)?

To lay the foundations for the rest of the work in this thesis, Chapter 3 outlined the collaboration and the process of the survey development which demonstrated that players with disabilities were very enthusiastic and willing to share their voices to inform research into accessible play. Chapter 4 presented the results of the demographic survey that, at the time of recording, had 543 responses from players with disabilities. The survey showed that players with disabilities are keen players who like to spend significant amounts of time on the hobby and value games as a support for social interaction with others online. The survey results show that for people who identify themselves as players with disabilities, many report having physical disabilities, but additionally, there were players with mental health disabilities, autism, hearing, and visual impairments. The favourite games reported by the respondents varied widely and thus demonstrate that these players do not feel restricted to certain games or types of games. There is some indication, however, that players who identified as blind were playing some games that had been developed specifically for blind players.

Not all of these players indicated that they used adaptive technology or accessibility options to enable their play, but many common adaptations used were customised PC mice or console controllers. It was seen to be very common for respondents to use subtitles/captioning and options that enabled them to rebind the keys on their controls. This broadly suggests that a substantial portion of these players can access play by using widely available technologies and options. What the results of the survey could not provide was how efficacious these adaptations are in play but provides evidence that they are being used by some players in a broad range of games.

The survey revealed that players with disabilities are playing both online and local multiplayer games with their friends and with strangers, and that they commonly use platforms such as Discord to talk to other players. This finding contrast previous literature which had found only minimal evidence that players with disabilities were

taking part in multiplayer games. The results of the survey also provide support for the findings of Cairns et al. (2019), where players with disabilities were found to have similar values as players without, such as connection, diversion, and games as art. In addition, players with disabilities also play to support their mental health, avoid pain caused by their conditions, and to allow them to feel enabled by being able to do things that they may not be able to do in real life. This, therefore, suggests that disability adds another beneficial dimension to digital gameplay and that access to this is very important for these players.

The key contribution generated by answering this question is therefore:

> This thesis provides evidence that people with disabilities are currently playing mainstream, popular games, and they play multiplayer games online. They value the hobby and the social benefits that games provide. Additionally, some, but not all players with disabilities use adaptive technology and or accessibility options to support or customise their play. This strongly suggests that bespoke games are not the norm for players with disabilities and that people with a range of different abilities play the same games.

RQ2. Social play with disabilities: What challenges does the social context of single player and multiplayer games present for people with disabilities and those using adaptations or accessibility options within those game environments?

The literature reviewed as part of this thesis indicated that social elements of play are important to players and that elements of sociality such as connection and social support are core elements of people's well-being. These aspects of play are felt to be beneficial to all players but may be particularly beneficial to those with disabilities who may be restricted from taking part in other social leisure activities due to their condition or living circumstances. There are known concerns regarding multiplayer games (that focus on social play) where some players behave in toxic and hostile ways for a variety of reasons. This appears to be overridden by players' desire to access the social benefits of play such that they continue to play this kind of game and acknowledge that possible exposure to toxicity is to be expected.

Players in Chapter 5 expressed their concerns about this kind negative social interaction that can happen in these games. Participants interviewed about their experiences in multiplayer games, expressed their concerns about toxicity and explained how they manage their exposure to it. The findings of Chapter 5 suggest that toxicity is tied to how players identify themselves within the gaming community and that there are expectations of players that identify in certain ways. The notion that digital gaming is not for certain people still seems to exist such that players who are seen to be female or have disabilities are considered to be inferior in ability and should not be partaking in the so-called hardcore types of games - such as competitive multiplayer games. Players' awareness of this leads to them taking steps to manage how they are seen by other players, such as non-male identifying participants avoiding the use of voice channels within the game to avoid disclosing their gender. Players in this study were concerned for the anonymity of players with disabilities and how using certain adaptations might be seen as unacceptable in competitive multiplayer games. Indeed, they themselves were unsure about how accessibility features such as auto-aim might interact with perceptions of fairness and a level playing field within these games.

Chapters 6 and the joint conclusions presented in Chapter 7 recognised how the approach to social play was unique for players with disabilities as they explain how they manage their disabilities as well as tackling the perceptions and expectations of other players in these games. Players with disabilities interviewed as part of Chapter 6 explained that the accessibility features and adapted controls that they used to play multiplayer games were not a perfect solution despite allowing them to play. In some cases, the custom controls they used to play, such as a one-handed controller meant that some actions, they did were slower than with standard controls. This difference in play may be noticed by other players and draw attention because it does not match expected ways of playing. Some participants in Chapter 6 explained how this led other players to react negatively and to question why they were playing the game if they could not play how they were supposed to. Such reactions suggest that some players without disabilities may not understand how those with disabilities are playing and react in defensive of how they perceive the game should be played.

Players with disabilities, therefore, carefully manage how they disclose their disabilities and aim to educate other players by advocating for accessibility and support for players with disabilities.

The key contribution as a result of research question 2 is therefore:

> Findings from two interview studies regarding the experiences of people with disabilities in playing multiplayer games provide a thematic framework for understanding key aspects of social experiences that could be considered as areas for innovation in games accessibility. The studies show that players with and without disabilities greatly value the social benefits of playing multiplayer games. They both manage, to some extent, the expectations of others in play to manage their potential exposure to the known issue of toxicity using methods such as avoiding certain games and only playing with friends. Players with and without disabilities showed an overall positive attitude to the improvement of accessibility and inclusivity of digital gaming and generally wanted everyone to experience the benefits of play. The players with disabilities were unique from other players in that they use advocacy and strategic disclosure of their disabilities to help manage how other players view them and to avoid toxicity.

RQ3. Social play alongside those with disabilities: How are the mechanisms that players with disabilities use to enable them to play, perceived by other players?

Chapters 5, 6 and 8 provide insights into how players perceive the use of adaptations and accessibility features and the players that use them. In multiplayer games, the results of Chapter 5 and 6 demonstrated that some features that help to create accessible gameplay, for example auto-aim, or options that "assist" players with movement, may be noticeable to other players if it is not expected within that particular game. If noticed, this can lead some players to question why such features are being used and may become suspicious that they are being used to gain an advantage over other players, particularly in competitive play. This can create a

negative reaction and may result in those using such features to be targeted with hostility.

To some extent, if inclusivity is given as the reason for adaptation use, then it is perceived as mainly positive. Participants in Chapter 5 clearly stated that people with disabilities should be able to play mainstream multiplayer games using the adaptations they need, however, participants in Chapter 6 said that the reaction from other players was not always positive when they explain how their disabilities altered how they played. This could suggest some level of social desirability bias from participants in Chapter 5 or simply that the small sample did not represent all types of players and is therefore a limitation of the study.

Chapter 8 demonstrated that the social framework of digital gameplay applies to single player games supporting the proposition that investigating the social context of play is valuable as even when the activity is solitary, and the game does not involve interaction with other players during the game. Within this framework, similar themes arose surrounding players' values of fairness in play and meeting the challenge of the game in the way the game designer intended. Chapter 8 explored players' perceptions of content skipping in digital games which is a feature that can be seen as helpful for accessibility by allowing players to skip past parts of a game that they cannot or do not wish to play. This showed that even when a feature is being used in a game that is played alone, and therefore does not directly impact any other player, how acceptable this feature is influenced by the social context of gaming. The ability to skip content in games seems to be intimately tied to players' pride and value in completing games in the way the designer intended and therefore how they identify themselves in the broader gaming community. Certain types of content are seen as acceptable to skip, such as narrative cutscenes but elements of the game that present challenge, such as puzzles and action, are seen as disrupting what is seen to be core to gaming experiences. The study did, however, find that when content skipping was seen as being there for inclusivity, to improve access to games for people with disabilities, it was considered positively. This reflects the overall positive attitude towards inclusivity found in other studies in this thesis. This indicates that there is room for further investigation as to how accessibility features

are presented to players influences how they are seen to fit within the social frame of gaming.

The contribution generated from this research question is as follows:

> Investigating the perceptions of the use of content skipping features in single-player games, and players' perceptions of accessibility features and adaptations used in multiplayer games, provided evidence that the use of accessibility in games can influence the way players may be received by communities of players within and surrounding play. This indicates that social barriers exist both within games and outside of them in the wider gaming community.

RQ4. Complex disability in a social context: How does the social environment of a care home influence the ability of people with complex neurological conditions to engage with digital games?

The case study presented in Chapter 9 provides evidence to support that digital gaming may not be an appropriate recreational activity for individuals in the care home environment, due to practical, organisational, and social reasons. In this particular case, during the study period, organisational changes meant that there was a lack of available funding to acquire any new equipment to facilitate gaming and more importantly, changes to staff roles that meant there was less capacity to provide the one-to-one support that individual residents needed to get started with gaming. The introduction of more regularly scheduled activities meant that volunteers and staff could plan more easily how, when and who they could provide the digital gaming activity for.

With the available hardware for gaming and the restriction to free games, it proved challenging to find games which suited individuals' preferences and abilities. There were common problems that reflect a mismatch between how individuals' neurological conditions impacted their abilities, and the capabilities assumed by the design of many games. Examples include: being able to use a small number of keys on a keyboard, not being able to accurately position a mouse, or accurately position

touches or swipes on a touch screen. Free games presented problems such as the inability to remap controls, or adverts that distract and frustrate. Despite the issues, it was possible to set up individuals with a couple of games that they were able to control, for example, Adam with *Gems of War* and Olivia with *Solitaire*. After several sessions of sustained engagement with these games, the individuals expressed a desire to continue playing and staff would comment on how much the individuals enjoyed the activity. This suggested that despite the challenges, gaming can provide some enjoyment for residents in a neurological care home if personnel are available to support the activity, and that providing support would remove a barrier to accessing that enjoyment.

The key contribution of the case study work presented in Chapter 9 is:

> Although games may be enjoyed by people with complex disabilities, significant societal and organisational barriers exist that prevent full, supported access to mainstream games in the care home environment. The provision of funding in this environment may be prioritised to providing high quality personal care and living conditions with little remaining to support leisure activities such as gaming. Either personnel would need to be available to support the gaming activity or investing in customized digital gaming equipment could be explored to support more independent play for these users.

Concluding thoughts in section 10.3 will summarise the conclusions and reflect on the theoretical approach.

10.2 Limitations and future work

Although this thesis presents evidence to support the conclusions and key contributions, it is useful to note how the research approach taken opens up opportunities for future research which can help to address the limitations of this work. Firstly, the social context perspective of this thesis deliberately sidesteps the

more practical aspect of how game accessibility and adaptive technology impact player experiences, therefore, there are clearly further areas for research and improvement in this domain that should be explored to build understanding of this audience of players. Indeed, approaching the work with a social model framing of disability, in itself, presents limitations. Where the social model places the disablement away from the medical, physiological, cognitive, psychological aspects of conditions, and with society, culture, and environment, this draws attention away from looking at customisation options for individuals. As previous research into adaptations to support disabilities in gaming show, this can be beneficial and has led to huge improvements in access to digital gaming. The social model could also be criticised for disempowering individuals by placing the social environment at the centre of the change needed to provide enablement. In this body of work, this is evident in Chapter 9 where a personalised approach in providing technology and accessibility may have helped to reduce the impact of barriers identified, such as reduced need for personnel to be present.

The demographic survey presented in Chapters 3 and 4 form a useful basis from which to further develop a picture of players with disabilities to highlight where improvements in accessibility could be made. It is worth noting, though, that this survey could be expanded upon by reaching out to players beyond the community supported by AbleGamers. AbleGamers has an international reach but is US-based which may limit cultural perspective. Looking beyond AbleGamers Player Panels may help to address the potential selection bias of focusing on this community of players. This survey also did not capture information about potential players or players that do not explicitly identify themselves as having disabilities. This would be very useful information to see whether accessibility features and adaptations are used as options or customizations for players without disabilities. Since this thesis has shown that such features may impact the social experiences of players with disabilities, it would be interesting to discover whether this expands into the broader audience of players. This could indicate that accessibility is not just for players with disabilities and therefore warrants deeper exploration.

The qualitative approach of the work following on from the demographic survey comes with its own limitations which could be addressed by adopting other approaches to support the findings of this research. Thematic analysis, grounded theory, and case study methodologies all demand a certain amount of subjectivity and reflexivity from the researcher conducting the studies. Although this approach is seen as an acceptable way to approach research with people with disabilities, it is worth reiterating that the socio-cultural background and experiences of the research cannot be abstracted from the interpretations of the findings presented. Indeed, Chapter 1 outlines the concerns of undertaking research with people with disabilities and how it may perpetuate existing notions of disablement and stereotypes. Perhaps one way to challenge the findings of this research would be to present the findings back to the communities of players with disabilities to allow them to propose critique and reflect on whether they feel the findings fit with their experiences.

Chapters 5, 6, 7, and 8 raise some questions that could be used to inform future studies within the social context framing of digital games. Example questions could include:

- How do players define what is a "good enough" skill level to play in online multiplayer games?
- How salient are certain accessibility features to other players when used in social play?
- How does the way an accessibility feature is presented to players impact the acceptability of its use?

Chapter 6 presented the findings from 17 players with disabilities about their experiences in playing multiplayer games, which is a reasonable sample but could be expanded upon in further work. The players were not recruited based on their identified disabilities, but it may be worth exploring the experiences of those with similar disabilities characteristics, such as those with visual impairments. This could help to identify more specific game mechanics and game features that most influence the social experiences of play for these individuals. To develop a deeper understanding of how accessibility features in single player games, it may be helpful to take a more direct approach and ask players about their perceptions of these,

either through interview or survey. The grounded theory in Chapter 8 used only found data collected from existing online forum and message board discussions which meant that further detail could not be obtained from participants, nor could demographic data be collected to situate the findings within the broader understanding of digital gaming demographics. The online data sources used for this study present limitations as discussed in Chapter 8 such that direct communication with players on this topic would be beneficial to remediate. It may also be useful to see how players respond to features such as content skipping during play to highlight more specific concerns.

Chapter 9 used a case study approach to explore how a specific care home context could influence access to digital gameplay as a leisure activity. The case study methodology is often criticised for the inability to generalise the findings. This, however, does not mean the approach is without value but does mean that further work could be done to validate the findings, such as undertaking a comparative study of other care homes to triangulate the findings. Due to the nature of the care home environment and the limitations on the types of interventions that could be done for the research, it is difficult to conclude that independent digital gameplay could not be achieved in such an environment, but only that it was not supported in this particular care home. Specifically, the study did not account for individuals in the care home that had their own devices that could be used for gameplay, such as smartphones. Further study could therefore consider individuals in a care home environment that may have access to digital gameplay through their smartphones to understand whether the care home context influenced their engagement in play through this device.

10.3 Concluding remarks

The body of work presented as part of this thesis suggests that taking a context-based approach, in line with a social model of disability, can reveal new insights into digital game accessibility for players with disabilities. This research supports previous findings that certain elements of mainstream digital games present barriers for these players, because of the endless varieties of games available and the varying

abilities required to play them. It is evident that there is still work to be done that is focused on game design and technologies that support playing with disabilities. Moving beyond usability and accessibility in digital games, this work aimed to align with the third wave approach to HCI and explore *experiences* in playing games (Power et al., 2018). This thesis reveals that it is important to consider the context within which accessibility features and technologies are introduced. How features and technologies are perceived by other players and how they interact with competitive game dynamics, may present a further barrier that is social in nature. If using accessibility features or technologies is not accepted by other players because they are seen to disrupt fair play, this burdens those using these features with the responsibility of explaining why they are being used and how they might be seen to play differently as a result. That this is the case, strongly suggests that the framing of digital games, particularly multiplayer games, comes with expectations of how to play them, what is an acceptable level of skill, and implicit rules of what is considered fair. These expectations can be seen to be a significant source of mismatch between disability and access to the social experiences that games are seen to provide and are valued by players. This, overall, indicates that by investigating the social context of digital gaming is an effective way to identify potential barriers to the positive social experiences that players value in play.

11. Appendices

11a. Player Panels initial registration form

Would you like to add your voice to the future of inclusive game design? Want to interact with researchers, designers and developers around the world on the next generation of inclusive technology for games? And maybe even make a few bucks while doing it? AbleGamers wants to get you involved!

To do that, we need to get to know our fans, that we can quickly build squads of people to help out. If you are interested in being a part of this select group of individuals, fill out the form below and we will be in contact with you about the next steps.

Need to know more before you decide?

Every year we have countless calls for help from universities, game companies and other organisations. Sometimes, it is about testing games; other times it is about seeing if a new way of doing things helps make things more inclusive; the best is when they want to talk to gamers with disabilities about how to make games more inclusive. In order to meet this growing demand for involvement with people with disabilities, we want to get a group of people who want to help shape the future of inclusivity in the hobby we love.

We promise – no one will have access to this information but people from the AbleGamers team. We will never willingly share your information without permission with anyone outside of AG.

Name *

First Name Last Name

E - mail *

Address

- Street Address
- Street Address Line 2
- City State / Province
- Postal / Zip Code

Phone Number

Area Code Phone Number

Age *

- Prefer not to say
- 16 - 17
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65+

Where do you play your games? (choose all that apply)

- PC
- Console (e.g. XBox One, Playstation 4, Wii Switch)
- Handheld Console (e.g. PSP, DS)
- Tablet
- Phone

What types of games do you usually play? (choose all that apply)

- RPG
- FPS
- Strategy
- Simulation
- Sports

- Casual
- Other

Why would you be interested in helping researchers and game companies? (choose all that apply) *

- I need assistance in seeing things clearly in games.
- I need assistance in games that use sound and dialogue.
- I need alternate controls or controllers to play games.
- I need more time in games to understand what to do.
- I need more tutorials or training levels to understand how to play games.
- I need difficulty settings that can be adjusted in games.
- I use games to aid in my mental health.
- I use games to be involved in a community.
- Other

11b. Player Panels initial interview schedule

General gaming preferences:

1. Do you identify yourself as a "gamer" and can you tell me why?
2. Which gaming platform(s) do you most prefer and use most often and why?
3. Do you prefer any specific game genres/types, if so, what are they?
4. How long would you usually spend in a normal gaming session?
5. How many days per week do you usually play?
6. Do you usually play single player games, multiplayer or both? If both do you play one more than the other?
7. If you do not play multiplayer games, please explain why. Proceed to question 13.

Multiplayer: (only if applicable)

8. When you play multiplayer games, do you usually play with friends or strangers?
9. Do you usually play online or local?
10. Do you usually play competitive or co-operative multiplayer?
11. Do you prefer team play or playing with a small number of people (1-4 players)?
12. Do you use voice chat functions in games or messaging platforms during play (e.g. Discord? TeamSpeak, Skype, or game specific) If so, which ones?

Inclusivity Preferences:

13. Do you currently use any assistive technology, for example voice command, third party controller, custom controls, eye-gaze tracking etc)? If so, what do you use? Is this for any specific game or platform? If not, why not?
14. Do you use accessibility features that some games provide (in menu/options/settings)? Which ones? If not, why not?
15. Are there any options or tech that you would like to see? What do you think would help you?

Social habits:

16. Do you access online game community resources such as reviews, game news, forums, discussion boards? If so, which? If not, go to question 19.
17. How often do you usually access these per week?
18. If anything, what do you contribute to these community resources?
19. What are your reasons for not using game community resources?

11c. AbleGamers Player Panels demographic questionnaire

About you

Age: _____

Gender:

- Female
- Male
- Non-binary
- Prefer not to say

Email: _____

Twitter: _____

Other social media:_____

Disability Information

Please select all that apply to you

I am a person with/who is …

- Autism
- A cognitive disability
- Hard of Hearing
- Deaf
- A Physical disability - Upper limb
- A Physical disability - Lower limb
- A mental health difficulty
- A Specific learning difficulty (e.g. dyslexia, dyspraxia)
- A Visual Disability – Blind
- A Visual Disability - Color vision deficiency
- A Visual Disability - Low vision
- Other needs and preferences: _____

About your gaming:

How many years have you spent gaming: (selector box 1-20+)

How often do you play on each of these different platforms?

	Daily	A few times a week	Every couple of weeks	Once a month	More than once a month	Do not play
PC	○	○	○	○	○	○
Xbox	○	○	○	○	○	○
Playstation	○	○	○	○	○	○
Tablet	○	○	○	○	○	○
Phone	○	○	○	○	○	○
Other: ____	○	○	○	○	○	○

How often do you play each of the following genres of games?

	Daily	A few times a week	Every couple of weeks	Once a month	More than once a month	Do not play
RPG	○	○	○	○	○	○
FPS	○	○	○	○	○	○
MOBA	○	○	○	○	○	○
Action	○	○	○	○	○	○
Casual	○	○	○	○	○	○
Sports	○	○	○	○	○	○
Simulation	○	○	○	○	○	○
Fighting	○	○	○	○	○	○
Adventure	○	○	○	○	○	○
Puzzle	○	○	○	○	○	○
Platformer	○	○	○	○	○	○
Racing	○	○	○	○	○	○
Sandbox	○	○	○	○	○	○
Other: ____	○	○	○	○	○	○

How long is your typical play session? If the length of sessions varies, refer to your most recent uninterrupted play session:

- Less than 1 hour

- About 1 hour
- Between 1-2 hours
- Between 2-4 hours
- More than 5 hours

How often do you play each of these different styles of game?

	Daily	A few times a week	Every couple of weeks	Once a month	More than once a month	Do not play
Single Player	○	○	○	○	○	○
Multi-Player	○	○	○	○	○	○
Online multiplayer	○	○	○	○	○	○
Cooperative games (team vs. game)	○	○	○	○	○	○
Team Competitive games (team vs team)	○	○	○	○	○	○
One vs one games	○	○	○	○	○	○

(chained off of coop/competitive game question)

Who do you play games with? Please select all that apply

- Real life friends
- Friends of friends
- Online friends
- Guild or Clan members
- Strangers

How do you identify yourself with respect to your gaming habits? (select all that apply)

- I play games but I don't identify myself as a gamer
- I play games regularly and it is my primary hobby
- I would say that I am a casual gamer and don't play that often
- Add title and description
- I would say that I am a casual gamer but I play games very often I play games only when I have nothing else to do
- I would say that I am a hardcore gamer but don't play that often
- I would say that I am a hardcore gamer and play very often

- I identify myself as a gamer

Briefly describe in a sentence or two, why you play games. (Short answer text)

What are your 3 favorite games that you are currently playing? (list of 3)

Please indicate how often you use the following communication methods during a game:

- The games own provided voice or text chat
- Discord
- Ventrillo
- Mumble
- Teamspeak
- Skype
- Playstation Network chat
- Other

About your accommodations and preferences:

Do you currently use assistive technology to play games?
Yes/No

If Yes:

Please select all items of assistive technology (hardware) that you currently use

- Eye gaze tracking
- Customized controller
- One handed controller
- Screen reader
- Customized or alternative PC mouse
- VR headset Alternative controller (sip-puff/ mouth/ head tracking)
- Other_____

Do you use any in-game accessibility options (e.g. subtitles, contrast changes, cursor changes)? Yes/No

If Yes:

Please select all in-game accessibility options you use:

- Text to speech
- Speech to text
- Subtitles
- Color blind options
- Contrast or color changes
- Mouse cursor enlargement
- Text enlargement
- Auditory on screen alerts
- Key remapping (keyboard/mouse/control pad)
- Other_____

About your participation

What would you like to do? (select all that apply)

Play testing

Online Surveys

Post surveys

Telephone/Skype interviews

Text Interviews

Technology testing (trying out new hardware/controls to help you game)

Focus groups (a group discussion about a gaming related topic, guided by a researcher)

Many activities will offer payment for participation. If they do, how would you prefer to be paid?

Direct payment (bank deposit, cheque)

Electronic transfer (Paypal)

Gift Certificate (Amazon, Steam or equivalent)

Donation to AbleGamers

Why would you like to be part of the player panels?

I want to be part of making games better for everyone

I would like developers to make games better suited to my challenges

I can offer development teams insights based on what has worked for me
I want to get involved in game development
I have previously worked with developers (play testing, beta testing etc) and would like to do so again

Is there anything we can do to help? Please let us know if you have any specific requirements that would make it easier for you to take part in Player Panels activities (Open question)

Please let us know if you have any further questions or concerns regarding this survey or working with
us:_____

11d. Recruitment form for the Player Panels - feedback version

To be completed by researcher

Q1 This form is to be completed by the researcher or developer wishing to recruit participants for projects

Q2 What type of activity would you like to recruit participants for?

Questionnaire（1）

Interview（2）

Focus group（3）

Play test（4）

Experiment（5）

Q3 Please briefly describe the purpose and aims of the project

_____

Q4 Please state approximately how long the participant will be required for, how long it will take to complete required tasks and whether they will be needed for more than one session:

_____

Q5 Participant criteria. Please select (all) criteria by which you would like to recruit participants by (further detail will be requested in the next section).

Age（1）

Gender（2）

Disability（3）

Gaming platforms used（15）

Years gaming（4）

Game genres played（5）

Typical amount of time spent playing（6）

Type of game played (single player, multiplayer etc)（7）

Who they play games with（8）

Self identity with regard to gaming（9）

Communication types used in game（10）

Assistive technology used (hardware)（11）

Accessibility options or software used（12）

No specific criteria required（13）

Criteria for participants

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Gender

Q6 Please select gender of players (select all that apply):

Male（1）

Female（2）

Non-binary（3）

Unspecified（4）

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Age

Q7 Please select age of players (select all that apply):

Under 18（1）

18 - 24（2）

25 - 34（3）

35 - 44（4）

45 - 54（5）

55 - 64（6）

65 - 74（7）

75 - 84（8）

85 or older（9）

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Disability

Q8 Please select disability types (select all that apply):

Autism（1）

Cognitive disability（2）

Hard of hearing（3）

Deaf（4）

Physical disability - Upper limb（5）

Physical disability - Lower limb（6）

Mental health difficulty（7）

A specific learning disability (e.g. dyslexia, dyspraxia)（8）

Visual disability - Color vision deficiency（9）

Visual disability - Blind（10）

Visual disability - Low vision（11）

Other（12）

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Gaming platforms used

Q9 Please select platform(s):

PC（1）

Xbox（2）

Playstation（3）

Tablet（4）

Phone（5）

Other（6）_____

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Game genres played

Q10 Please select genre(s):

RPG（1）

FPS（2）

MOBA（3）

Action (4)

Casual (5)

Sports (6)

Simulation (7)

Fighting (8)

Adventure (9)

Puzzle (10)

Platformer (11)

Racing (12)

Sandbox (13)

Other (14) _____

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Typical amount of time spent playing

Q11 Please select length of play session (select all that apply)

Less than 1 hour (1)

About 1 hour (2)

Between 1 and 2 hours (3)

Between 2 and 4 hours (4)

More than 5 hours (5)

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Type of game played (single player, multiplayer etc)

Q12 Please select game type(s):

Single Player (1)

Multiplayer (2)

Online multiplayer (3)

Cooperative multiplayer (team vs. game) (4)

Competitive multiplayer (team vs. team) (5)

One vs one competitive multiplayer (6)

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Communication types used in game

Q13 Please select communication method(s):

The games own provided voice or text chat (1)

Discord (2)

Mumble (3)

Ventrillo (4)

Teamspeak (5)

Skype (6)

Playstation network chat (7)

Xbox party chat (8)

Other (9) _____

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Who they play games with

Q14 Please select who players play with:

Real life friends (1)

Friends of friends (2)

Online friends (3)

Guild or clan members (4)

Strangers (5)

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Self identity with regard to gaming

Q15 Please select identity of play habits:

Plays regularly but doesn't identify as a gamer (1)

Plays regularly and describes gaming as primary hobby (2)

Describes self as casual gamer but doesn't play that often (3)

Describes self as casual gamer but plays very often (4)

Plays games only when they have nothing else to do (5)

Describes self as a hardcore gamer but doesn't play that often (6)

Describes self as a hardcore gamer and plays very often (7)

Identifies self as a gamer (8)

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Assistive technology used (hardware)

Q16 Please select types of assistive technology that players currently use (select all that apply):

Eye gaze tracking (1)

Customized controller (2)

One handed controller (3)

Screen reader (4)

Customized or alternative PC mouse (5)

VR headset (6)

Alternative controller (sip-puff/head-tracking/mouth/chest expansion/wheelchair) (7)

Other (8) _____

Display This Question:

If Participant criteria. Please select (all) criteria by which you would like to recruit participant... = Accessibility options or software used

Q17 Please select accessibility options (software or in-game) players currently used (select all that apply):

Text to speech (1)

Speech to text (2)

Subtitles (3)

Color blind options (4)

Contrast or color changes (5)

Mouse cursor enlargement (6)

Text enlargement (7)

Auditory or screen alerts (8)

Key remapping (keyboard/mouse/control pad) (9)

Other (10) _____

More information about your project

Q18 Remuneration

Donation to AbleGamers (1)

Direct transfer to bank account（2）

Cheque（3）

Voucher（4）

Not applicable（5）

Display This Question:

If Remuneration != Not applicable

Q19 Payment amount

_____

Q20 Please state a date from which registration for the study will start (DD/MM/YYYY):

_____

Q21 Please state a date from which registration for the study will end (DD/MM/YYYY):

_____

Q22 Please specify the minimum and maximum number of participants required.

Minimum（1）_____

Maximum（2）_____

No Maximum（3）

Q23 Is there any additional information that you require?

Yes（1）

No（2）

Display This Question:

If Is there any additional information that you require? = Yes

Q24 Please specify what other information you require:

_____

Feedback section

Q25 Please can you complete the following few feedback questions about the form you just completed. Thanks!

Q26 How easy did you find the process of filling out the form?

	Extremely easy (20)	Somewhat easy (21)	Neither easy nor difficult (22)	Somewhat difficult (23)	Extremely difficult (24)
Please select one (1)					

Q27 Within the form, how clear did you find the instructions, language used and headings?

	Extremely clear (20)	Somewhat clear (21)	Neither clear nor unclear (22)	Somewhat unclear (23)	Extremely unclear (24)
Please select one (1)					

Q28 How confident/sure were you that you filled out the form correctly?

	Very confident (13)	Somewhat confident (14)	Neither confident nor unsure (15)	Somewhat unsure (16)	Very unsure (17)
Please select one (1)					

Q29 Did you have any additional feedback or constructive criticisms you would like to provide about the form?

11e. Player Panels data fidelity statement

The following statement is provided from AbleGamers:

Question: How do you know that Player Panels Data is really people with disabilities and not people lying?
Sub-question: Do you verify the players are disabled?

Answer:
At first it would seem like it should be easy to verify someone has a disability. However, given that there are a variety of disabilities that are not overtly visible (e.g. color vision deficiency, mental health difficulties), and that others are intermittent, it would be almost impossible, as well as rude, to ask players to prove they are disabled. Similarly, many people with disabilities do not use assistive technologies or accessibility options in games, meaning we would have to ask for evidence from doctors, or other professionals, and then certify that document.

So how do we know what we are reporting is real? Well, the data that we have reported in published papers and white papers on our site are from the initial 300 people that have signed up for Player Panels. These players signed up for the program voluntarily, with no expectation of payment or fame. Further, they had to persevere to fill out a 20-minute survey for us about themselves, where many people told us their medical conditions and very detailed information about how they became disabled in open answers, even when we didn't ask for this information!

In other words, in order for someone to come in and deceive us, they would need to sign up, spend 20 minutes filling out a questionnaire, for no discernible benefit to them. Is it possible that some people have lied to get added to the panels? Yes, it is possible. Is it likely that 300 people are lying? We would argue that we are being as faithful as we can be in representing our players.

As part of Player Panels, we ask for feedback from our organizations that work with us, and to tell us if they find that someone has been dishonest, in an attempt to mitigate the very unlikely event that someone has lied to us.

11f. Multiplayer gaming experiences interview questions

(semi-structured interview, example questions and areas to cover)

1. Can you tell me about a multiplayer game that you really enjoy and what it is about the game that you like? What drew you to the game in the first place? Why did you choose to start playing it?
2. Can you tell me about a multiplayer game that you really disliked playing and what about it made you dislike it?
3. Who do you normally play with? Do you seek out certain types of people to play with? If so, why and who?
4. Are you aware of features in some games such as aim assistance, score/accuracy modifications, dynamic difficulty adjustment, player balancing? (give examples if needed) If any, which ones? How did you find out about them?
5. Are you aware of features in some games that allow players to use alternative controllers, remap the keys or use macros? (give examples if needed, eye gaze tracking, voice controls etc) If any, which ones? How did you find out about them?
6. Are there times that you think it would be okay or appropriate to use features like those in questions 15 and 16? And are there times when you think it wouldn't be okay or appropriate?
7. Have you ever used any of these kinds of features or been aware that a game has done these automatically for you? (if applicable) How did you know?
8. (if applicable) Did you find any of the features particularly useful? How so? If not, can you explain what you thought of them?
9. Would you prefer to know if features like this were in use during the game? If so, why and how do you think games could present this?
10. Have you ever played in a multiplayer game with a gamer that you knew had a disability? (if yes) How did you come to know that they were disabled?
11. Would you like to know if a player with disabilities was using assists? (if yes) Can you think of ways in which games might show this information?
12. Recalling the features we just talked about, can you think of ways that these different features might be used by people with disabilities? Are there any other

things that you think games could do to help to make multiplayer games better for everyone?

13. Can you think of any times where you have felt socially excluded or left out in a multiplayer game? (examples if needed) Please explain what made you feel this way? Conversely, can you think of any times when you have felt connected, supported, or close to your co-players? What made you feel this way?
14. Have you developed any friendships or connections (such as online acquaintances that you play with often, or regularly attending a gaming club or event with) due to playing multiplayer games? If so, can you tell me a little bit more about how that/those connection(s) occurred?
15. Is there anything else you would like to tell me about regarding your experiences of playing multiplayer games

11g. Multiplayer gaming experiences with disabilities interview questions

(semi-structured interview, example questions and areas to cover)

1. Can you tell me about a multiplayer game that you really enjoy and what it is about the game that you like? What drew you to the game in the first place? Why did you choose to start playing it?
2. Can you tell me about a multiplayer game that you really disliked playing and what about it made you dislike it?
3. Who do you normally play with? Do you seek out certain types of people to play with? If so, why and who? (if applicable, do you play with mainstream players?)
4. Do you use voice chat in game?
5. (if applicable) Do you normally feel comfortable letting your co-players know about your disabilities in multiplayer games or in online game communities? What are your reasons for sharing or not sharing this information? (Have you ever regretted sharing something or felt like sharing was a positive thing to do?)
6. Can you think of a time when you have had a bad experience in a multiplayer game? What happened and how did it make you feel?
7. Do you share with other players about your use of accessibility features or assistive technology? Do you feel like your use of accessibility features affects your play experience? How do other players react if you share this information?
8. (if applicable) Can you tell me about a time when you have felt supported or appreciated by your co-players? How did you know? Conversely, has there been any occasions when you felt like your co-players were frustrated by you in game? What made you feel this way?
9. Have you developed any friendships or connections (such as online acquaintances that you play with often, or regularly attending a gaming club or event with) due to playing multiplayer games? If so, can you tell me a little bit more about how that/those connection(s) occurred?
10. Is there anything else you would like to tell me about regarding your experiences of playing multiplayer games?

11h. Data storage and transmission statement provided for studies undertaken by researchers at the University of York

In accordance with data protection law, the University of York is the Data Controller for this project. This means that the University are responsible for making sure your information is kept secure, confidential, and anonymous. The University will also ensure that the information is only used in the way you have been told it will be used. Your information will only be accessible in its original form to myself/my student team and our lecturers.

Information from this study will be stored on University of York's cloud storage systems. The University's cloud storage solution is provided by Google, which means that data can be located at any of Google's globally spread data centres. The University has data protection compliant arrangements in place with this provider (see https://www.york.ac.uk/it-services/google/policy/privacy/). The University processes personal data for research purposes under Article 6 (1) (e) of the General Data Protection Regulation (GDPR).

You are very welcome to ask any questions you have about this research, at any stage before, during or after the study. Contact information is provided for the researcher and their supervisor during consent process.

If you have concerns about how your information is being processed, please contact the University's Data Protection Officer at dataprotection@york.ac.uk. If you are concerned about the way in which the University has handled your personal data, you have a right to lodge a complaint to the Information Commissioner's Office (Tel: 0303 123 1113, see www.ico.org.uk/concerns for more information).

11i. Code lists

There are 3 sets of codes provided here that show the initial codes or focused codes for the analysis conducted in Chapter 5, 6, and 8.

Chapter 5

Theme	Codes
Gamer is a loaded term	Big part of my life Hardcore gamer Part of my identity Negative connotations Gamer defines you
Gender	Voice/avatar gives away gender Masculine norm Girls unexpected or unwanted
Positive social experiences	Achieving goals together Altruism Trust Cohesion Social space
Communication tools and game design can be a barrier	Tool is limiting Mismatch between tool and game Connect with right people
Cross over with another hobby	Link to films Link to sports Something in common
Positive attitude towards inclusion	Everyone should be able to play Concern for discrimination and toxicity

	Not needing to know of disability status - right to anonymity
Customisation is helpful	Customisation is commonplace I you can then so can I
Acceptance if it levels the playing field	Tolerance if everyone can use a feature Level the playing field Challenge balancing
Fairness in play	Competitive play should be protected Fairness important to “gamers” Assists in conflict with gamer identity Conveys an advantage
Transparency leads to vulnerability	Assumptions made about reason for use Cheating May indicate disability Disclosure may increase exposure to toxicity
Implementation	Assist not assistive if badly designed Patronising “helping hand” At odds with overcoming challenges Undermine team cohesion
Being good enough	Am I as good as the community? Need to feel competent Feeling judged Expected knowledge and skills Don’t want to let the team down Learning curve too steep Established community is harder to join
Strategies to avoid toxicity	Voice chat bad Competitive play is worse than casual play

	Desire for better reporting tools Shorter play time (matches) good for reducing exposure. Friends are a buffer

Chapter 6

Theme	Codes
Games as a social medium	Connect with family Connect with friends Social space to hang out
A way to get out of my head and into the world	Escapism Coping mechanism Simulates real life activities - work Broaden horizon Be someone else
Importance of options	The more the better Make or break the game Lack of options can block access to social play Options to manage social interactions
Features can cause problems	Patronising Undermine challenge Seen as cheating Incompatibility with tech
Alternative ways to play	Play to strengths Role selection More ways to succeed Social engineering/manipulations

	Other players adapt in response Confusion from other players
Playing “wrongly” elicits toxicity	My way is the right way Losing means you are playing wrong Negative reactions to playing differently
Managing exposure to toxicity	Options to manage social interactions Playing short games Avoiding voice chat Playing with friends
Learning to play well enough	Time needed to learn to play Learning is at odds with expected skill level Not good enough Hindered learning when experienced players cheat
Disability is seen as a disadvantage	Disability = unskilled Discrimination and exclusion blatent.
Disbelief	I don’t believe you can play Disability assumed to be a barrier Accusations of lying - invalidating
Only within a trusted group	Disclosure brings understanding and tolerance Friends or community are safe Expecting negative reactions to playing differently - disclosure helps
Disability as an explanation	This is why I play differently Changes expectations of others
Disability as a punchline	Against the odds Unexpected competence Humorous disclosure to remove tension

A source of help and support	Belonging Protection/buffer for toxicity Long-lasting Community is safe
Reputation as a deterrent	Has a bad reputation for toxicity Unfriendly/unwelcoming
Seeking out other players like them	Similar characteristics Empathy Acceptance through commonalities Us and them (us and the toxic players)
Discord to support access to communities	Tool to connect with players of the same game Facilitates community building Lack of access is barrier to community
Advocacy	Raising awareness Disclosure Showing how I play Information and advice sharing Showing what works
Femininity is unwelcome	Being female invites toxicity Voice signals gender Girls/women unwanted Masculine norm

Categories	Theoretical Concepts	Codes
The player	Ownership/control	Choice as a positive Ownership as a reason to experience content as desired Customise experience
	Convenience	Convenience as a reason to skip (save time) Skip to the fun parts Skip after playthrough
	Player motivations and needs	Reduce sense of achievement A way to remove/avoid frustrating game elements Might improve experience for less skilled players
	Player identity	Features apply only to casuals Skipping is dumbing down How to distinguish between skippers and non-skippers
The game	Challenge and gameplay	Comparing skipping to cheating Implementation of skipping may mess up the difficulty curve Skipping is dumbing down Might improve experience for less skilled players
	Quality	Affect on experience of narrative (compromise designers' artistic vision)

		Negative impact on reviews/overall enjoyment of game due to missed game elements Skipping may reduce quality of the game
	Genre	Game genre influences suitability of skipping Comparing games to other types of media as justification for skipping
	Development/design	Proposing compromise through using game “achievements” How to distinguish between skippers and non-skippers Signals filler content (not worth playing therefore skippable)
	Inclusivity	Good if it is for inclusion Accepted when framed as accessibility feature

11j. Ludography

A list of games mentioned throughout this thesis:

World of Warcraft (WoW) *Blizzard Entertainment* 2004

Dance Dance Revolution (DDR) *Konami* 1998

The Long Dark *Hinterland Studio* 2014

Gone Home *Fullbright* 2013

Halo 3 *Bungie, 343 Industries, Mad Dog Games LLC, Ruffian Games* 2007

Overwatch *Blizzard Entertainment, Iron Galaxy* 2015

Battlefield 1942 *DICE* 2002

Day Z *Dean Hall, Bohemia Interactive* 2013

World of Tanks *Wargaming, Wargaming Chicago-Baltimore* 2010

Rocket League *Psyonix, Panic Button Games* 2015

Friday the 13th *Gun Media, IllFonic, Black Tower Studios, Nighthawk Interactive* 2017

Dark Souls *FromSoftware, Inc., Bluepoint Games, SIE Japan Studio, Virtuos, Shirogumi, QLOC* 2011

Red Orchestra: Ostfront 41-45 *Tripwire Interactive* 2006

League of Legends (LoL) *Riot Games, Airship Syndicate* 2009

Defence of the Ancients 2 (DOTA 2) *Valve Corporation* 2013

Counter-Strike *Valve, Turtle Rock Studios, Hidden Path Entertainment, Gearbox Software, Ritual Entertainment, Nexon* 2000

Alone in the Dark *Infogrames, Krisalis Software, Darkworks, Spiral House, Pocket Studios*

Eden Games, Hydravision Entertainment, Pure FPS 2008

PlayerUnknown's Battlegrounds (PUBG) *PUBG Corporation, KRAFTON* 2017

Last Chaos *Nako Entertainment, Aeria Games* 2007

Ingress *Niantic* 2012

Wolfenstein: the new order *MachineGames* 2014

Star Wars: The Old Republic *BioWare, Electronic Arts, Bioware Austin LLC* 2011

Elder Scrolls *Bethesda Softworks* (1994–1998) *Bethesda Game Studios* (2002–present)

Fortnite *Epic Games, People Can Fly* 2017

Splatoon 2 *Nintendo Entertainment Planning & Development* 2017

Call of Duty *Infinity Ward* 2003

Call of Duty: Black Ops 3 *Treyarch* 2015

Super Mario Bros *Nintendo EAD* 1985

Faxanadu *Hudson Soft, Nihon Falcom* 1987

Half-Life *Valve Corporation, Crowbar Collective, Gearbox Software, Taito, Captivation Digital Laboratories* 1998

LA Noire *Team Bondi* 2011

System Shock 2 *Looking Glass Studios, Nightdive Studios, Irrational Games* 1999

Serious Sam *Croteam* 2001

Pure *Black Rock Studio* 2008

Demon's Souls *FromSoftware, Inc., Bluepoint Games, SIE Japan Studio, Virtuos, Shirogumi, QLOC* 2009

Saints Row: The Third *Volition, Sperasoft Studio, LLC, Deep Silver Volition, LLC* 2011

Wii Bowling *Nintendo* 2006

Wii Boxing *Nintendo* 2006

Arma II *Bohemia Interactive* 2009

Gems of War *Bohemia Interactive* 2014

FaeVerse Alchemy *Subsoap* 2014

Tetris *Alexey Pajitnov* 1984

Microsoft Solitaire *Wes Cherry* 1990

Need for Speed II *Electronic Arts, EA Vancouver* 1997

12. References

2019 ESA Essential Facts. (2019, May 2). https://www.theesa.com/esa-research/2019-essential-facts-about-the-computer-and-video-game-industry/

AbleGamers. (n.d.). *Includification Version 1.7*. Retrieved August 12, 2020, from https://accessible.games/includification/

AbleGamers Accessible Player Experience. (n.d.). Accessible.Games - Home of APX. Retrieved June 29, 2020, from https://accessible.games/accessible-player-experiences/

Adachi, P. J. C., Hodson, G., Willoughby, T., Blank, C., & Ha, A. (2016). From outgroups to allied forces: Effect of intergroup cooperation in violent and nonviolent video games on boosting favorable outgroup attitudes. *Journal of Experimental Psychology. General*, *145*(3), 259–265.

Adams, A., Lunt, P., & Cairns, P. (2008). A qualititative approach to HCI research. *Research Methods for Human-Computer Interaction*, 138–157.

Adinolf, S., & Turkay, S. (2018). Toxic Behaviors in Esports Games: Player Perceptions and Coping Strategies. *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts*, 365–372.

Aguado-Delgado, J., Gutiérrez-Martínez, J.-M., Hilera, J. R., de-Marcos, L., & Otón, S. (2018). Accessibility in video games: a systematic review. *Universal Access in the Information Society*, 1–25.

Annema, J.--H., Verstraete, M., Abeele, V. V., Desmet, S., & Geerts, D. (2012). Video games in therapy: a therapist's perspective. *International Journal of Arts and Technology*, *6*(1), 106–122.

Archambault, D., Gaudy, T., Miesenberger, K., Natkin, S., & Ossmann, R. (2008). Towards generalised accessibility of computer games. *International Conference on Technologies for E-Learning and Digital Entertainment*, 518–527.

Archambault, D., Olivier, D., & Svensson, H. (2005). Computer games that work for visually impaired children. *Interaction et Usages Des Modalités Non Visuelles, Accessibilité Des Contenus Complexes*, 165.

Armstrong, S. (2018). Adaptive Controller is getting people with disabilities back into gaming. *Wired*. https://www.wired.co.uk/article/microsoft-xbox-adaptive-

controller

Arroyo-Palacios, J., & Romano, D. M. (2009). Exploring the use of a respiratory-computer interface for game interaction. *2009 International IEEE Consumer Electronics Society's Games Innovations Conference*, 154–159.

Balcazar, F. E., Keys, C. B., Kaplan, D. L., & Suarez-Balcazar, Y. (1998). Participatory action research and people with disabilities: Principles and challenges. *Canadian Journal of Rehabilitation*, *12*, 105–112.

Balci, K., & Salah, A. A. (2015). Automatic analysis and identification of verbal aggression and abusive behaviors for online social games. *Computers in Human Behavior*, *53*, 517–526.

Baldwin, A., Johnson, D., & Wyeth, P. (2016). Crowd-Pleaser: Player Perspectives of Multiplayer Dynamic Difficulty Adjustment in Video Games. *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play*, 326–337.

Baldwin, A., Johnson, D., & Wyeth, P. A. (2014). The effect of multiplayer dynamic difficulty adjustment on the player experience of video games. *Proceedings of the Extended Abstracts of the 32nd Annual ACM Conference on Human Factors in Computing Systems*, 1489–1494.

Barlet, M. C., & Spohn, S. D. (2012). Includification: A practical guide to game accessibility. *Charles Town: The Ablegamers Foundation*.

Barnes, C. (2003). What a difference a decade makes: reflections on doing 'emancipatory' disability research. *Disability & society*, *18*(1), 3-17.

Bartle, R. (1996). Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD Research*, *1*(1), 19.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological bulletin*, *117*(3), 497.

Berjaoui, D. (2013). *Exploring Active Video Games (AVGS) as an Intervention Promoting Wellbeing as It Relates to Depression*.

Bertozzi, E. (2008). "You Play Like a Girl!": Cross-Gender Competition and the Uneven Playing Field. *Convergence*, *14*(4), 473–487.

Birk, M., & Mandryk, R. L. (2013). Control Your Game-self: Effects of Controller Type on Enjoyment, Motivation, and Personality in Game. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 685–694.

Birk, M. V., Buttlar, B., Bowey, J. T., Poeller, S., Thomson, S. C., Baumann, N., & Mandryk, R. L. (2016). The Effects of Social Exclusion on Play Experience and Hostile Cognitions in Digital Games. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 3007–3019.

Blockmans, I. G. E. (2015). "Not Wishing to Be the White Rhino in the Crowd": Disability-Disclosure at University. *Journal of Language and Social Psychology*, *34*(2), 158–180.

Bosser, A.-G., & Nakatsu, R. (2006). Hardcore gamers and casual gamers playing online together. In *Entertainment Computing-ICEC 2006* (pp. 374–377). Springer.

Boudreau, K., & Consalvo, M. (2014). Families and social network games. *Information, Communication and Society*, *17*(9), 1118–1130.

Bowker, N., & Tuffin, K. (2002). Disability Discourses for Online Identities. *Disability & Society*, *17*(3), 327–344.

Braun, V., & Clarke, V. (2013). *Successful Qualitative Research: A Practical Guide for Beginners*. SAGE.

Brooke, P. J., Paige, R. F., Clark, J. A., & Stepney, S. (2004). Playing the game: cheating, loopholes, and virtual identity. *ACM SIGCAS Computers and Society*, *34*(2), 3.

Bryce, J., & Rutter, J. (2002). Computer and video gaming: academic perspectives, positions and research resources. *Center for Research on Innovation and Com [etition (CRIC), MH The University of Manchester*.

Caglio, M., Latini-Corazzini, L., D'agata, F., Cauda, F., Sacco, K., Monteverdi, S., Zettin, M., Duca, S., & Geminiani, G. (2009). Video game play changes spatial and verbal memory: rehabilitation of a single case with traumatic brain injury. *Cognitive Processing*, *10*, 195–197.

Cairns, P., Cox, A. L., Day, M., Martin, H., & Perryman, T. (2013). Who but not where: The effect of social play on immersion in digital games. *International Journal of Human-Computer Studies*, *71*(11), 1069–1077.

Cairns, P., Power, C., Barlet, M., Haynes, G., Kaufman, C., & Beeston, J. (2019). Enabled Players: The Value of Accessible Digital Games. *Games and Culture*, 1555412019893877.

Campbell, D. T. (1958). Common fate, similarity, and other indices of the status of

aggregates of persons as social entities. *Behavioral Science*, *3*(1), 14.

Carr, L. (2004). Leisure and disabled people. *Disabling Barriers-Enabling Environments*, 183–188.

Charmaz, K. (2014). *Constructing grounded theory*. Sage.

Chesney, T., Coyne, I., Logan, B., & Madden, N. (2009). Griefing in virtual worlds: causes, casualties and coping strategies. *Information Systems Journal*, *19*(6), 525–548.

Colella, A. (2001). Coworker Distributive Fairness Judgments of the Workplace Accommodation of Employees with Disabilities. *AMRO*, *26*(1), 100–116.

Colman, J., & Gnanayutham, P. (2013). Assistive technologies for brain-injured gamers. *Assistive Technologies and Computer Access for Motor Disabilities*, 28–56.

Connor, B. B., & Standen, P. J. (2012). So much technology, so little time: factors affecting use of computer-based brain training games for cognitive rehabilitation following stroke. *Proceedings of the 9th International Conference on Disability, Virtual Reality and Associated Technologies*, 53–59.

Consalvo, M. (2005). *Gaining Advantage: How Videogame Players Define and Negotiate Cheating*. DiGRA Conference.

Consalvo, M. (2009). There is No Magic Circle. *Games and Culture*, *4*(4), 408–417.

Consalvo, M. (2012). Confronting Toxic Gamer Culture: A Challenge for Feminist Game Studies Scholars. *Ada: A Journal of Gender, New Media, and Technology*, *1*. https://doi.org/10.7264/N33X84KH

Controllers, E. (2007). *Evil Controllers*. http://www.evilcontrollers.com/

Convention on the rights of the child (1989) Treaty no. 27531. *United Nations Treaty Series*, 1577, pp. 3-178. Available at: https://treaties.un.org/doc/Treaties/1990/09/19900902%2003-14%20AM/Ch_IV_11p.pdf

Cote, A. C. (2017). "I Can Defend Myself": Women's Strategies for Coping With Harassment While Gaming Online. *Games and Culture*, *12*(2), 136–155.

Cox, A., Cairns, P., Shah, P., & Carroll, M. (2012). Not doing but thinking: the role of challenge in the gaming experience. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 79–88.

CQC. (n.d.). Retrieved August 7, 2020, from https://www.cqc.org.uk/what-we-

do/how-we-do-our-job/fundamental-standards

Csikszentmihalyi, M. (2007). *Flow: The Psychology of Optimal Experience*. Harper and Row.

Cuzzort, S., & Starner, T. (2008). AstroWheelie: A wheelchair based exercise game. *Wearable Computers, 2008. ISWC 2008. 12th IEEE International Symposium on*, 113–114.

Danieli, A., & Woodhams, C. (2005). Emancipatory Research Methodology and Disability: A Critique. *International Journal of Social Research Methodology*, *8*(4), 281–296.

Das, D. A., Grimmer, K. A., Sparnon, A. L., McRae, S. E., & Thomas, B. H. (2005). The efficacy of playing a virtual reality game in modulating pain for children with acute burn injuries: a randomized controlled trial [ISRCTN87413556]. *BMC Pediatrics*, *5*(1), 1.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

De Grove, F., Courtois, C., & Van Looy, J. (2015). How to be a gamer! Exploring personal and social indicators of gamer identity. *Journal of Computer-Mediated Communication: JCMC*, *20*(3), 346–361.

Denisova, A., & Cairns, P. (2015). Adaptation in Digital Games: The Effect of Challenge Adjustment on Player Performance and Experience. *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play*, 97–101.

Denisova, A., Cairns, P., & Guckelsberger, C. (2020). Measuring perceived challenge in digital games: Development & validation of the challenge originating from recent gameplay interaction scale (CORGIS). *International Journal of*. https://www.sciencedirect.com/science/article/pii/S1071581919301491

Denisova, A., Guckelsberger, C., & Zendle, D. (2017). Challenge in Digital Games: Towards Developing a Measurement Tool. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, 2511–2519.

Depping, A. E., Mandryk, R. L., Li, C., Gutwin, C., & Vicencio-Moreira, R. (2016). How Disclosing Skill Assistance Affects Play Experience in a Multiplayer First-Person Shooter Game. *Proceedings of the 2016 CHI Conference on Human*

Factors in Computing Systems, 3462–3472.

Develop Conference. (n.d.). Develop Conference. Retrieved June 29, 2020, from https://www.developconference.com/

Dodge, R., Daly, A. P., Huyton, J., & Sanders, L. D. (2012). The challenge of defining wellbeing. *International Journal of Wellbeing*, *2*(3). https://doi.org/10.5502/ijw.v2i3.4

dos Santos Mendes, F. A., Pompeu, J. E., Lobo, A. M., da Silva, K. G., de Paula Oliveira, T., Zomignani, A. P., & Piemonte, M. E. P. (2012). Motor learning, retention and transfer after virtual-reality-based training in Parkinson's disease--effect of motor and cognitive demands of games: a longitudinal, controlled clinical study. *Physiotherapy*, *98*(3), 217–223.

Ducheneaut, N., Yee, N., Nickell, E., & Moore, R. J. (2006). Alone together?: exploring the social dynamics of massively multiplayer online games. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 407–416.

Dunn, D. S., & Andrews, E. E. (2015). Person-first and identity-first language: Developing psychologists' cultural competence using disability language. *The American Psychologist*, *70*(3), 255–264.

Eastin, M. S., & Griffiths, R. P. (2009). Unreal: hostile expectations from social gameplay. *New Media & Society*, *11*(4), 509–531.

Fanucci, L., Iacopetti, F., & Roncella, R. (2011). A console interface for game accessibility to people with motor impairments. *Consumer Electronics-Berlin (ICCE-Berlin), 2011 IEEE International Conference on*, 206–210.

Flynn, S. M., & Lange, B. S. (2010). Games for rehabilitation: the voice of the players. *Intl. Conf. Disability, Virtual Reality & Associated Technologies (ICDVRAT 2010)*, 185–194.

Flynn, S., Palma, P., & Bender, A. (2007). Feasibility of using the Sony PlayStation 2 gaming platform for an individual poststroke: a case report. *Journal of Neurologic Physical Therapy: JNPT*, *31*(4), 180–189.

Foley, A., & Ferri, B. A. (2012). Technology for people, not disabilities: ensuring access and inclusion. *Journal of Research in Special Educational Needs*, *12*(4), 192–200.

Freeman, G., & Wohn, D. Y. (2019). Understanding eSports Team Formation and

Coordination. *Computer Supported Cooperative Work: CSCW: An International Journal*, *28*(1), 95–126.

Fritsch, T., Voigt, B., & Schiller, J. (2006). Distribution of online hardcore player behavior:(how hardcore are you?). *Proceedings of 5th ACM SIGCOMM Workshop on Network and System Support for Games*, 16.

Frostling-Henningsson, M. (2009). First-Person Shooter Games as a Way of Connecting to People: "Brothers in Blood." *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *12*(5), 557–562.

Game Accessibility Guidelines. (2018). *http://gameaccessibilityguidelines.com*.

Game Developers Conference (GDC). (n.d.). Retrieved June 29, 2020, from https://gdconf.com/

Gamers Outreach | Helping others level up. Video game charity for kids. (n.d.). Gamers Outreach Foundation. Retrieved June 25, 2020, from https://gamersoutreach.org/

Garber, L. (2013). Game accessibility: enabling everyone to play. *Computer*, *6*, 14–18.

Gerling, K. M., Mandryk, R. L., & Kalyn, M. R. (2013). Wheelchair-based game design for older adults. *Proceedings of the 15th International ACM SIGACCESS Conference on Computers and Accessibility*, 27.

Gerling, K. M., Mandryk, R. L., & Linehan, C. (2015). Long-term use of motion-based video games in care home settings. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 1573–1582.

Gerling, K. M., Miller, M., Mandryk, R. L., Birk, M. V., & Smeddinck, J. D. (2014). Effects of balancing for physical abilities on player performance, experience and self-esteem in exergames. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2201–2210.

Golomb, M. R., McDonald, B. C., Warden, S. J., Yonkman, J., Saykin, A. J., Shirley, B., Huber, M., Rabin, B., AbdelBaky, M., Nwosu, M. E., & Others. (2010). In-home virtual reality videogame telerehabilitation in adolescents with hemiplegic cerebral palsy. *Archives of Physical Medicine and Rehabilitation*, *91*(1), 1–8.

Gov, U. K. (n.d.). *Equality Act 2010, s-20*. Retrieved August 12, 2020, from https://www.legislation.gov.uk/ukpga/2010/15/section/20

Grammenos, D., Savidis, A., Georgalis, Y., & Stephanidis, C. (2006). Access invaders: Developing a universally accessible action game. *International Conference on Computers for Handicapped Persons*, 388–395.

Granic, I., Lobel, A., & Engels, R. C. (2014). The benefits of playing video games. *The American Psychologist*, *69*(1), 66.

Green, C. S., & Bavelier, D. (2006). The cognitive neuroscience of video games. *Digital Media: Transformations in Human Communication*, 211–223.

Guidelines, G. A. (2015). *Game Accessibility Guidelines*. http://gameaccessibilityguidelines.com/

Haegele, J. A., & Hodge, S. (2016). Disability discourse: Overview and critiques of the medical and social models. *Quest*, *68*(2), 193-206.

Harris, J., Hancock, M., & Scott, S. D. (2016). Leveraging Asymmetries in Multiplayer Games: Investigating Design Elements of Interdependent Play. *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play*, 350–361.

Helping people with disabilities to enjoy video games | SpecialEffect. (n.d.). Retrieved June 25, 2020, from https://www.specialeffect.org.uk/

Heron, M. (2012). Inaccessible through oversight: the need for inclusive game design. *Computer Games Journal*, *1*(1), 29–38.

Hofmann, A., & Hlavacs, H. (2015). Gaming and entertainment technologies for includification. *2015 3rd IEEE VR International Workshop on Virtual and Augmented Assistive Technology (VAAT)*, 5–7.

House of Lords - The Equality Act 2010: the impact on disabled people - Select Committee on the Equality Act 2010 and Disability. (n.d.). Retrieved June 25, 2020, from https://publications.parliament.uk/pa/ld201516/ldselect/ldeqact/117/11708.htm

Hudson, M., & Cairns, P. (2016). The effects of winning and losing on social presence in team-based digital games. *Computers in Human Behavior*, *60*, 1–12.

Istance, H., Vickers, S., & Hyrskykari, A. (2009). Gaze-based interaction with massively multiplayer on-line games. *CHI'09 Extended Abstracts on Human Factors in Computing Systems*, 4381–4386.

Jack, D., Boian, R., Merians, A. S., Tremaine, M., Burdea, G. C., Adamovich, S. V.,

Recce, M., & Poizner, H. (2001). Virtual reality-enhanced stroke rehabilitation. *IEEE Transactions on Neural Systems and Rehabilitation Engineering: A Publication of the IEEE Engineering in Medicine and Biology Society*, *9*(3), 308–318.

Jacobs, G., & Ip, B. (2003). Matching games to gamers with quality function deployment. *Total Quality Management & Business Excellence*, *14*(9), 959–967.

Jansz, J., & Tanis, M. (2007). Appeal of playing online First Person Shooter Games. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *10*(1), 133–136.

Jones, C. M., Scholes, L., Johnson, D., Katsikitis, M., & Carras, M. C. (2014). Gaming well: links between videogames and flourishing mental health. *Frontiers in Psychology*, *5*.

Jung, Y., Li, K. J., Janissa, N. S., Gladys, W. L. C., & Lee, K. M. (2009). Games for a better life: effects of playing Wii games on the well-being of seniors in a long-term care facility. *Proceedings of the Sixth Australasian Conference on Interactive Entertainment*, 5.

Juul, J. (2009). Fear of failing? the many meanings of difficulty in video games. *The Video Game Theory Reader*, *2*, 237–252.

Juul, J. (2010). *A casual revolution: Reinventing video games and their players*. MIT press.

Juul, J. (2011). *Half-real: Video games between real rules and fictional worlds*. MIT press.

Kaplan, A. Y., Shishkin, S. L., Ganin, I. P., Basyul, I. A., & Zhigalov, A. Y. (2013). Adapting the P300-Based Brain–Computer Interface for Gaming: A Review. *IEEE Transactions on Computational Intelligence in AI and Games*, *5*(2), 141–149.

Kaufman, D., Sauvé, L., Renaud, L., & Duplàa, E. (2014). Benefits and Barriers of Older Adults' Digital Gameplay. *CSEDU (1)*, 213–219.

Kim, J., & Ricaurte, J. (2011). TapBeats: accessible and mobile casual gaming. *The Proceedings of the 13th International ACM SIGACCESS Conference on Computers and Accessibility*, 285–286.

Kleiber, D. A., Hutchinson, S. L., & Williams, R. (2002). Leisure as a resource in transcending negative life events: Self-protection, self-restoration, and personal

transformation. *Leisure Sciences*, *24*(2), 219–235.

Klimmt, C., Blake, C., Hefner, D., Vorderer, P., & Roth, C. (2009). Player Performance, Satisfaction, and Video Game Enjoyment. In *Lecture Notes in Computer Science* (pp. 1–12). https://doi.org/10.1007/978-3-642-04052-8_1

Kloos, A. D., Fritz, N. E., Kostyk, S. K., Young, G. S., & Kegelmeyer, D. A. (2013a). Video game play (Dance Dance Revolution) as a potential exercise therapy in Huntington's disease: a controlled clinical trial. *Clinical Rehabilitation*, *27*(11), 972–982.

Kloos, A. D., Fritz, N. E., Kostyk, S. K., Young, G. S., & Kegelmeyer, D. A. (2013b). Video game play (Dance Dance Revolution) as a potential exercise therapy in Huntington's disease: a controlled clinical trial. *Clinical Rehabilitation*, *27*(11), 972–982.

Kordyaka, B., Jahn, K., & Niehaves, B. (2020). Towards a unified theory of toxic behavior in video games. *Internet Research*, *30*(4), 1081–1102.

Kowert, R., Domahidi, E., & Quandt, T. (2014). The relationship between online video game involvement and gaming-related friendships among emotionally sensitive individuals. *Cyberpsychology, Behavior and Social Networking*, *17*(7), 447–453.

Krumer-Nevo, M., & Sidi, M. (2012a). Researching against othering. *Qualitative Inquiry and the Politics of Advocacy*, *7*. https://books.google.co.uk/books?hl=en&lr=&id=kLhmDAAAQBAJ&oi=fnd&pg=PA185&dq=Krumer-Nevo+and+Sidi,+2012,&ots=vQuM4BkcUR&sig=-OrSBEyo1BXshEA86m33tsQwIHg

Kücklich, J. (n.d.). Precarious playbour: Modders and the digital games industry. *Journal.fibreculture.org*. http://journal.fibreculture.org/issue5/kucklich_print.html

Kücklich, J. (2008). Forbidden pleasures: Cheating in computer games. *The Pleasures of Computer Gaming: Essays on Cultural History, Theory and Aesthetics*, 52–71.

Kulshreshth, A., & LaViola, J. J., Jr. (2013). Evaluating performance benefits of head tracking in modern video games. *Proceedings of the 1st Symposium on Spatial User Interaction*, 53–60.

Kuznekoff, J. H., & Rose, L. M. (2013). Communication in multiplayer gaming:

Examining player responses to gender cues. *New Media & Society*, *15*(4), 541–556.

Kwak, H., & Blackburn, J. (2014). Linguistic Analysis of Toxic Behavior in an Online Video Game. In *arXiv [cs.SI]*. arXiv. https://doi.org/10.1007/978-3-319-15168-7_26

Kwak, H., Blackburn, J., & Han, S. (2015). Exploring Cyberbullying and Other Toxic Behavior in Team Competition Online Games. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 3739–3748.

Lange, B., Chang, C.-Y., Suma, E., Newman, B., Rizzo, A. S., & Bolas, M. (2011). Development and evaluation of low cost game-based balance rehabilitation tool using the Microsoft Kinect sensor. *Conference Proceedings: ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*, *2011*, 1831–1834.

Lange, B., Chang, C.-Y., Suma, E., Newman, B., Rizzo, A. S., & Bolas, M. (2011). Development and evaluation of low cost game-based balance rehabilitation tool using the Microsoft Kinect sensor. *Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE*, 1831–1834.

Lange, B., Flynn, S., Chang, C. Y., Ahmed, A., Geng, Y., Utsav, K., Xu, M., Seok, D., Cheng, S., & Rizzo, A. (2010). Development of an interactive rehabilitation game using the Nintendo® WiiFit™ Balance Board for people with neurological injury. *Topics in Stroke Rehabilitation*, *15*(5), 345–352.

Lange, B., Flynn, S., & Rizzo, A. (2009). Initial usability assessment of off-the-shelf video game consoles for clinical game-based motor rehabilitation. *Physical Therapy Reviews: PTR*, *14*(5), 355–363.

Lepicard, G., Vella, F., Vigouroux, N., Rigolleau, B., Chautard, D., & Pucheu, E. (2007). The virtual paddle: an universal interaction for accessible video games. In *Universal Access in Human-Computer Interaction. Applications and Services* (pp. 677–686). Springer.

Li, J., Theng, Y.-L., & Foo, S. (2014). Game-based digital interventions for depression therapy: a systematic review and meta-analysis. *Cyberpsychology, Behavior and Social Networking*, *17*(8), 519–527.

López, S. A., Corno, F., & Russis, L. D. (2017). Design and Development of One-

Switch Video Games for Children with Severe Motor Disabilities. *ACM Transactions on Accessible Computing*, *10*(4), 12.

Madyaningrum, M. E. (2017). Researching Diversity: Othering and Reflexivity. *People's Search for Meaning through Ethnicity, Culture, and Religion: Psychology's Role in Handling Conflicts and Sustaining Harmony in Multicultural Society*, 10.

Manca, L. (2017). Article 30 [Participation in Cultural Life, Recreation, Leisure and Sport]. In *The United Nations Convention on the Rights of Persons with Disabilities* (pp. 541-555). Springer, Cham.

Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., & Pallesen, S. (2011). Problematic video game use: estimated prevalence and associations with mental and physical health. *Cyberpsychology, Behavior and Social Networking*, *14*(10), 591–596.

Miesenberger, K., Ossmann, R., Archambault, D., Searle, G., & Holzinger, A. (2008). More than just a game: accessibility in computer games. *Symposium of the Austrian HCI and Usability Engineering Group*, 247–260.

Miller, D., Parecki, A., & Douglas, S. A. (2007). Finger dance: a sound game for blind people. *Proceedings of the 9th International ACM SIGACCESS Conference on Computers and Accessibility*, 253–254.

Nacke, L. E., Harrigan, K., & Randall, N. (2013). Positively playful : when videogames lead to player wellbeing. In L. E. Nacke, K. Harrigan, & N. Randall (Eds.), *First International Conference on Gameful Design, Research and Applications*. ACM (The Association for Computing Machinery). http://eprints.qut.edu.au/63627/

Nardi, B., & Harris, J. (2009). Strangers and Friends: Collaborative Play in World of Warcraft. In *International Handbook of Internet Research* (pp. 395–410). https://doi.org/10.1007/978-1-4020-9789-8_24

Newzoo's Key Numbers. (n.d.). Retrieved August 3, 2020, from https://newzoo.com/key-numbers/

Nhs, H. (2016). *NHS, Symptoms of Huntingtons*. http://www.nhs.uk/Conditions/Huntingtons-disease/Pages/Symptoms.aspx

Nhs, P. (2016). *NHS, Symptoms of Parkinsons*. https://www.parkinsons.org.uk/content/parkinsons-symptoms

Obst, P., & Stafurik, J. (2010). Online we are all able bodied: Online psychological sense of community and social support found through membership of disability-specific websites promotes well-being for people living with a physical disability. *Journal of Community & Applied Social Psychology*, *20*(6), 525–531.

O'Connor, E. L., Longman, H., White, K. M., & Obst, P. L. (2015). Sense of Community, Social Identity and Social Support Among Players of Massively Multiplayer Online Games (MMOGs): A Qualitative Analysis: Social relationships between MMOG players. *Journal of Community & Applied Social Psychology*, *25*(6), 459–473.

O'Connor, T. J., Cooper, R. A., Fitzgerald, S. G., Dvorznak, M. J., Boninger, M. L., VanSickle, D. P., & Glass, L. (2000). Evaluation of a manual wheelchair interface to computer games. *Neurorehabilitation and Neural Repair*, *14*(1), 21–31.

O'Donovan, J., Ward, J., Hodgins, S., & Sundstedt, V. (2009). Rabbit run: Gaze and voice based game interaction. *Eurographics Ireland Workshop, December*.

Ossmann, R., Archambault, D., & Miesenberger, K. (2008). Accessibility issues in game-like interfaces. *International Conference on Computers for Handicapped Persons*, 601–604.

Paaßen, B., Morgenroth, T., & Stratemeyer, M. (2017). What is a True Gamer? The Male Gamer Stereotype and the Marginalization of Women in Video Game Culture. *Sex Roles*, *76*(7), 421–435.

Paetzold, R. L., García, M. F., Colella, A., Ren, L. R., Triana, M. del C., & Ziebro, M. (2008). Perceptions of People with Disabilities: When is Accommodation Fair? *Basic and Applied Social Psychology*, *30*(1), 27–35.

Pinelle, D., Wong, N., & Stach, T. (2008). Heuristic evaluation for games: usability principles for video game design. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1453–1462.

Porter, J. R., & Kientz, J. A. (2013a). An empirical study of issues and barriers to mainstream video game accessibility. *Proceedings of the 15th International ACM SIGACCESS Conference on Computers and Accessibility*, 3.

Porter, J. R., & Kientz, J. A. (2013b). An empirical study of issues and barriers to mainstream video game accessibility. *Proceedings of the 15th International ACM SIGACCESS Conference on Computers and Accessibility*, 3.

Power, C., Cairns, P., & Barlet, M. (2018). Inclusion in the Third Wave: Access to Experience. In *New Directions in Third Wave Human-Computer Interaction: Volume 1-Technologies* (pp. 163–181). Springer.

Powers, G. M., Nguyen, V., & Frieden, L. M. (2015). Video Game Accessibility: A Legal Approach. *Disability Studies Quarterly: DSQ*, *35*(1).

Prentice, D. A., Miller, D. T., & Lightdale, J. R. (1994). Asymmetries in Attachments to Groups and to their Members: Distinguishing between Common-Identity and Common-Bond Groups. *Personality & Social Psychology Bulletin*, *20*(5), 484–493.

Przybylski, A. K., Deci, E. L., Rigby, C. S., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology*, *106*(3), 441–457.

Putnam, C., Cheng, J., Lin, F., Yalla, S., & Wu, S. (2016). "Choose a Game": Creation and Evaluation of a Prototype Tool to Support Therapists in Brain Injury Rehabilitation. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 2038–2049.

Riddell, S., & Weedon, E. (2006). What counts as a reasonable adjustment? Dyslexic students and the concept of fair assessment. *International Studies in Sociology of Education*, *16*(1), 57–73.

Rubin, V. L., & Camm, S. C. (2013). Deception in video games: examining varieties of griefing. *Online Information Review*. https://doi.org/10.1108/OIR-10-2011-0181

Russoniello, C. V., O'Brien, K., & Parks, J. M. (2009). The effectiveness of casual video games in improving mood and decreasing stress. *Journal of Cyber Therapy and Rehabilitation*, *2*(1), 53–66.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*(1), 68.

Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion*, *30*(4), 344–360.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6),

1069.

Sacks, H. (1984). On doing "being ordinary." *Structures of Social Action: Studies in Conversation Analysis*, 413–429.

Salter, A., & Blodgett, B. (2012). Hypermasculinity & Dickwolves: The Contentious Role of Women in the New Gaming Public. *Journal of Broadcasting & Electronic Media*, *56*(3), 401–416.

Salter, M. (2018). From geek masculinity to Gamergate: the technological rationality of online abuse. *Crime, Media, Culture*, *14*(2), 247–264.

Schell, J. (2014a). Game Mechanics Must be in Balance. In *The Art of Game Design: A book of lenses* (pp. 208–209). CRC Press.

Schell, J. (2014b). *The Art of Game Design: A book of lenses*. CRC Press.

Schell, J. (2014c). *The Art of Game Design: A book of lenses*. AK Peters/CRC Press.

Schell, R., Hausknecht, S., Zhang, F., & Kaufman, D. (2015). Social Benefits of Playing Wii Bowling for Older Adults. *Games and Culture*, 1555412015607313.

Schuurman, D., De Moor, K., De Marez, L., & Van Looy, J. (2008). Fanboys, competers, escapists and time-killers: a typology based on gamers' motivations for playing video games. *Proceedings of the 3rd International Conference on Digital Interactive Media in Entertainment and Arts*, 46–50.

Seay, A. F., Jerome, W. J., Lee, K. S., & Kraut, R. E. (2004). Project Massive: A Study of Online Gaming Communities. *CHI '04 Extended Abstracts on Human Factors in Computing Systems*, 1421–1424.

Seligman, M. E. P. (2004). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfilment*. Simon and Schuster.

Shakespeare, T. (2006). The social model of disability. *The disability studies reader*, *2*, 197-204.

Shaw, A. (2012). Do you identify as a gamer? Gender, race, sexuality, and gamer identity. *New Media & Society*, *14*(1), 28–44.

Sherif, M. (1966). *In common predicament: Social psychology of intergroup conflict and cooperation*. Houghton Mifflin comp.

Sherry, J. L., Lucas, K., Greenberg, B. S., & Lachlan, K. (2006). Video game uses and gratifications as predictors of use and game preference. *Playing Video Games: Motives, Responses, and Consequences*, *24*(1), 213–224.

Shores, K. B., He, Y., Swanenburg, K. L., Kraut, R., & Riedl, J. (2014). The

identification of deviance and its impact on retention in a multiplayer game. *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing*, 1356–1365.

Stenros, J., Paavilainen, J., & Mäyrä, F. (2009). The many faces of sociability and social play in games. *Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era*, 82–89.

Stetina, B. U., Felnhofer, A., Lehenbauer, M., & Kothgassner, O. D. (2012). *Games for Health: Have Fun with Virtual Reality!* INTECH Open Access Publisher.

Stone, E., & Priestley, M. (1996). Parasites, pawns and partners: disability research and the role of non-disabled researchers. *The British Journal of Sociology*, *47*(4), 699–716.

Strauss, A., Corbin, J., & Others. (1990). *Basics of qualitative research* (Vol. 15). Newbury Park, CA: Sage.

Strobach, T., & Schubert, T. (2014). Positive consequences of action-video game experience on human cognition: potential benefits on a societal level. *Epidemiology of Online Game Addiction. OMICS Group*.

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *7*(3), 321–326.

Swain, J., French, S., & Cameron, C. (2003). *Controversial issues in a disabling society*. McGraw-Hill Education (UK).

Sweetser, P., & Wyeth, P. (2005). GameFlow: a model for evaluating player enjoyment in games. *Computers in Entertainment (CIE)*, *3*(3), 3–3.

Szell, M., & Thurner, S. (2010). Measuring social dynamics in a massive multiplayer online game. *Social Networks*, *32*(4), 313–329.

Tajfel, H. (1974). Social identity and intergroup behaviour. *Information. An International Interdisciplinary Journal*, *13*(2), 65–93.

The AbleGamers Charity | The Worlds Largest Charity for Gamers with Disabilities. (n.d.). Retrieved June 25, 2020, from https://ablegamers.org/

The games industry in numbers | Ukie. (n.d.). Retrieved June 29, 2020, from https://ukie.org.uk/research

Todd, C. (2015). Commentary: GamerGate and resistance to the diversification of gaming culture. *Women's Studies Journal*, *29*(1), 64.

Trepte, S., Reinecke, L., & Juechems, K. (2012). The social side of gaming: How playing online computer games creates online and offline social support. *Computers in Human Behavior*, *28*(3), 832–839.

Trewin, S., Hanson, V. L., Laff, M. R., & Cavender, A. (2008). PowerUp: an accessible virtual world. *Proceedings of the 10th International ACM SIGACCESS Conference on Computers and Accessibility*, 177–184.

Vallejo-Pinto, J. Á., Torrente, J., Fernández-Manjón, B., & Ortega-Moral, M. (2011). Applying sonification to improve accessibility of point-and-click computer games for people with limited vision. *Proceedings of the 25th BCS Conference on Human-Computer Interaction*, 449–454.

Velez, J. A., & Ewoldsen, D. R. (2013). Helping Behaviors During Video Game Play. *Journal of Media Psychology*, *25*(4), 190–200.

Vicencio-Moreira, R., Mandryk, R. L., & Gutwin, C. (2015). Now You Can Compete With Anyone: Balancing Players of Different Skill Levels in a First-Person Shooter Game. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 2255–2264.

Voida, A., & Greenberg, S. (2009). Wii all play: the console game as a computational meeting place. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1559–1568.

Wadley, G., Carter, M., & Gibbs, M. (2015). Voice in Virtual Worlds: The Design, Use, and Influence of Voice Chat in Online Play. *Human–Computer Interaction*, *30*(3-4), 336–365.

Westin, T. (2004). Game accessibility case study: Terraformers--a real-time 3D graphic game. *Proceedings of the 5th International Conference on Disability, Virtual Reality and Associated Technologies, ICDVRAT*.

Westin, T., Ku, J. J., Dupire, J., & Hamilton, I. (2018). Game Accessibility Guidelines and WCAG 2.0--A Gap Analysis. *International Conference on Computers Helping People with Special Needs*, 270–279.

WHO,Disability. (n.d.). Retrieved August 3, 2020, from https://www.who.int/health-topics/disability

Wright, P., McCarthy, J., & Meekison, L. (2003). Making sense of experience. In *Funology* (pp. 43–53). Springer.

Xu, Y., Cao, X., Sellen, A., Herbrich, R., & Graepel, T. (2011). Sociable Killers:

Understanding Social Relationships in an Online First-Person Shooter Game. *M Arch, 19*, 23.

Yan, J., & Randell, B. (2005). A systematic classification of cheating in online games. *Proceedings of 4th ACM SIGCOMM Workshop on Network and System Support for Games*, 1–9.

Yin, R. K. (2003). Design and methods. *Case Study Research, 3*. https://doc1.bibliothek.li/acc/flmf044149.pdf

Yuan, B., & Folmer, E. (2008). Blind hero: enabling guitar hero for the visually impaired. *Proceedings of the 10th International ACM SIGACCESS Conference on Computers and Accessibility*, 169–176.