# Online Gaming and Addiction: A Psychosocial Investigation using Mixed Methods

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## Statement of Originality

The findings in this thesis are original and independent. It should be noted that data collection for Chapter 2 of the thesis (i.e. the scoping study) was completed with the help of Alexander Meredith. No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification at this or any other university or institute of learning.

Some of the findings presented in Chapters 4, 5 and 6 have been published in peer-reviewed academic journals. The full references to these published papers are:

Meredith, A., Hussain, Z. & Griffiths, M.D. (2009). Online gaming: A scoping study of Massively Multi-player Online Role Playing Games. *Electronic Commerce Research,* 9, 3-26.

Hussain, Z. & Griffiths, M.D. (2009). Excessive use of Massively Multi-Player Online Role-Playing Games: A pilot study. *International Journal of Mental Health and Addiction,* 7, 563-571.

Hussain, Z. & Griffiths, M.D. (2009). The Attitudes, Feelings and Experiences of Online Gamers: A Qualitative Analysis. *CyberPsychology & Behavior,* 12, 747-753.

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## Glossary of Terms

This glossary contains brief definitions of online gaming terms that have been used in this thesis.

**Duelling**: Individual Player versus Player batttles that can occur outside battlegrounds, between two characters.

**EQ:** Abbreviation for EverQuest. An online video game.

**First-person game**: Games in which the player 'sees' through the eyes of the character – typically associated with First Person Shooters (FPS) such as Counter Strike, though also possible with most MMORPGs.

**Guild:** A guild is a collection of players who share a common principle or outlook, it can be a specialized group or simply a loose affiliation of players. Guilds are popular among the variety of MMORPGs available. Depending on the game, guilds can have a deity alignment (good, evil, neutral) and carry out actions consistent with that alignment. However, any players caught behaving badly or against the policies of the guild will be dealt with appropriately, such as being expelled from the guild.

**GL/GM:** Abbreviation for guild leader or guild master

**Instance/Instance Dungeon system**: A specific part of the game environment that requires the co-operation of multiple players, involving tougher mobs and better rewards.

**IRL:** Abbreviation for "In real life"

**Kill stealing:** When another player attacks the same creature as another player and receives the reward for the kill instead of the person who originated combat. Newer games have mechanisms for discouraging this behaviour.

**Levelling:** Completing tasks/quests, fighting monsters or other gamers with the purpose of gaining a level

**Loot drops/Money drops**: The money or items that drop from a Mob when it has been killed by a player.

**Mission:** A task which you are offered to complete in turn for receiving a reward upon completion either in equipment, experience points, money, or reputation.

**MMORPG:** Massively-Multiplayer Online Role-Playing Game.

**MUD:** Multi-User Dungeon or Multi-User Domain. These were the first textual online worlds.

**NPCs:** Non-Player Character (NPC): This is a character in a game that is controlled by artificial intelligence or a Gamemaster (human controllable characters often employed for guidance and help within the game; i.e., customer services).

**NPC "salvage"**: The ability to loot items from NPCs that have been killed.

**PvP:** Player versus Player combat.

**PvE:** Player versus Environment. In this case, environment equates to all quests and monsters (mobs) in the virtual world.

**Power Levelling:** An activity involving two gamers, where one is assisting the other in gaining experience points at a rate far faster than they could obtain normally and / or levelling up a character by the fastest means possible.

**Power Sets**: Item sets (clothing, weaponry, etc) created by the game designers, normally only acquired by player characters after extensive raiding or high-end use of a trade skill.

**PuG:** Abbreviation for Pick-up-Group. Temporary groups assembled on the spot for various tasks.

**Quest/questing**: The process of completing tasks set by NPCs, in the process gaining experience and thereby levelling up.

**Race/Class**: The individual characteristics of a particular character within a game, e.g. Race – Night Elf, Class – Mage

**Raid (Raiding):** A more substantial engagement involving a large organized group of players typically set in a dungeon and involving difficult mobs (monsters).

**End-game Raiding:** Synonymous with raiding but focuses on substantial engagement in later levels of an MMORPG.

**Realm:** An online world within a game, several realms can exist on one real world server.

**Realm vs. Realm:** Player versus Player events in game environments in which players of different realms (worlds) can fight each other.

**RP:** Role-play or Role-Playing

**Server:** In computing this term refers to a computer program that delivers a service to clients.

**Skills:** Someone who has 'skills' may be particularly talented at a certain aspect of an MMORPG. This term also refers to a trade skill acquired within a MMORPG. For instance, mining, fishing or hunting.

**Trade skills**: Professions chosen by the character that exist outside of the class type, e.g. Tailor, Blacksmith, etc.

**WoW:** Abbreviation for World of Warcraft. An online video game.

## Abstract

Online virtual worlds known as Massively Multiplayer Online Role-Playing Games (MMORPGs) have gained increased popularity over the last decade. MMORPGs provide a sophisticated environment that enables complete immersion within the virtual world to the extent that it may become an alternative reality to its users. Some researchers have suggested that online gaming addiction is growing in prevalence among adolescents and adult gamers. It has been proposed that research is needed to establish the incidence and prevalence of MMORPG addiction. The aim of this body of research was to examine the impact of MMORPGs (psychologically and socially) on peoples' lives for the purpose of providing an empirical research base on which future research in the area can build. Using a mixed methods approach for data collection and analysis, an online scoping study, interview study and two questionnaire studies were conducted. The thesis provides a detailed conceptualisation of the psychological processes involved in MMORPG playing. The thesis was directed by previous research into video games, online gaming and addiction which provided a substantive picture of the psychosocial effects of online gaming. The findings showed that there were both positive and negative effects associated with online gaming; gamers used MMORPGs to alleviate negative feelings and to meet new people, learn about new cultures, and build friendships. Gamers also provided detailed descriptions of personal problems that had arisen due to playing MMORPGs. A small percentage of gamers (3.6%) were classified as addicted to MMORPGs, these gamers may find it difficult to control their game playing behaviour. However, there are still gaps in our knowledge of MMORPGs. Overall, the research has shown that the psychology of MMORPGs is an important topic that requires further in-depth investigation. The present research has revealed valuable information about the impact of MMORPGs on the lives of gamers that can be built upon by other researchers. Implications of the findings regarding excessive playing and addiction to MMORPGs, and social responsibility were discussed, and recommendations for future research studies were proposed.

## Outline of Chapters

The thesis presented here is organised into eight chapters. A brief overview of each chapter is provided below:

*Chapter 1:* This chapter begins with a brief history of video games and then provides a review of the video game literature by covering the most academically researched areas concerning video games. These are the areas of video games and aggression, video games and health, the positive effects of video games, and online gaming/Massively Multi-Player Online Role Playing Games (MMORPGs).

*Chapter 2:* This chapter discusses the psychology of addiction by examining some of the underlying theories of addiction. The chapter then moves onto examining technological addictions and excessive (online and offline) video gaming and addiction. The chapter concludes with an outline of the main aim and objectives of the research project/thesis.

*Chapter 3:* This chapter provides a methodological justification for using online quantitative and qualitative approaches to data collection and analysis. The chapter compares online research with offline research and then considers the advantages and disadvantages of both approaches. The ethical and practical issues encountered by researchers when conducting research on the internet are also discussed.

*Chapter 4:* This chapter presents the first empirical study, which is the scoping study. This study was undertaken to examine the extent, range and nature of different MMORPGs. A summarised overview of the twenty most popular MMORPGs is presented in this study.

*Chapter 5:* This chapter presents the online interview study which set out to explore the attitudes, experiences and feelings of online gamers. The chapter provides a qualitative account of the experiences of gamers. The findings are discussed in relation to previous research in the area.

*Chapter 6:* This chapter presents the online pilot questionnaire study. This study examined excessive and 'dependent' online game playing behaviour amongst a self-selecting sample of 119 online gamers. The study discusses whether excessive online gaming can lead to psychological and behavioural dependencies.

*Chapter 7:* This chapter presents the online MMORPG questionnaire study. This study followed on from the earlier online pilot questionnaire study and set out to establish the incidence and prevalence of MMORPG addiction using validated addiction criteria. Possible risk factors relating to online gaming were also examined to establish whether they were linked to MMORPG addiction. The implications of the study findings for the assessment of MMORPG addiction are discussed.

*Chapter 8:* This chapter provides a general discussion of the findings from the empirical studies in this thesis. The main findings are discussed across each of the four studies in relation to the main aim and objectives of the thesis and also in relation to the underlying theories of addiction. The implications of this research are discussed, and suggestions are made for future research in the area.

## Chapter 1: A Review of the Video Game Literature

### A Brief History and Overview of Video Games

It is difficult to connect the emergence of video games to one inventor. However, there were a number of people from a variety of backgrounds who made their own contribution to what would eventually become a new form of popular culture (Malliet & De Meyer, 2005). In this thesis, the term "video game" is used as a generic term that includes all electronic, interactive online, offline games and virtual worlds (Ritterfeld & Weber, 2006).

There were a number of scientific and cultural traditions that had prepared the ground for the development of the video game. There was the amusement industry with pinball machines and board games on one side, and the rapid development of computer technology on the other. There were three 'founding fathers' of the video game that have been linked to being the first inventors. The first of the three was Steve Russell, who was a student at the Massachusetts Institute of Technology (MIT) in 1962, when he developed *Spacewar* for the PDP-1 mainframes that were available at the MIT. He had intended to create this application for entertainment and soon the game code spread amongst universities across America (Malliet & De Meyer, 2005).

The second 'founding father' was Ralph Baer, who worked as an engineer at an electronics company. He designed a device in 1966 that could be connected to a television, allowing a person to play a ping-pong game on the screen. In 1967, he developed a hockey simulation game (Herman, Horwitz, Kent, & Miller, 2002). Finally, the third 'founding father' was Nolan Bushnell. He encountered *Spacewar* at university and used it as the basis for a game he developed in 1970 called *Computer Space* (Jacobi, 1996; Hunter, 2002). *Computer Space* was marketed as the first arcade video game. However, the game was not very successful because the instructions were too complicated and the majority of the public ignored it (Malliet & De Meyer, 2005). In 1972, Bushnell learned from his previous mistakes and introduced a new arcade game called *Pong*. This rapidly became an arcade hit with very simple instructions for everybody to enjoy. Bushnell managed to make a significant contribution to the

development of video games by bringing them out of the sphere of scientific research and in to the sphere of the general public (Malliet & De Meyer, 2005).

The 1980s saw the release of *Pac-Man* which became a huge arcade hit. Combined with this, there was also a push towards the development of video games for home use. Competition between Nintendo's *Super NES* and Sega's *Mega Drive* was notable in the early 1990s until *Sony* introduced the revolutionary *PlayStation* console in 1994 which caused other video games companies to release consoles such as the *Sega Saturn* and the *Nintendo 64* (Malliet & De Meyer, 2005). The latest type of video games have utilised the internet by moving towards network game play "beginning with text-based networked games called MUDs [multi-user domains] and proceeding to graphical versions called MMORPGs [massively multi-player online role-playing games]" (Williams 2006, p.200). These online games have attracted a wide range of players across many demographic boundaries, and has led the way towards technological innovation.

Over the past 40 years, the continuous development of computer technology has served as the driving force behind the ever-increasing sophistication of video games (Malliet & De Meyer, 2005). This influential driving force will serve as the structure throughout this thesis. The present chapter will provide a review of the video game literature by covering the most academically researched areas concerning video games (the topic of video games and addiction will be discussed in chapter 2 as it has received much attention). These are as follows;

- Video Games and Aggression
- Video Games and Health
- The Positive Effects of Video Games
- Online Gaming / Massively Multi-Player Online Role Playing Games (MMORPGs)

## Video Games and Aggression

Violent video games and their alleged link to subsequent aggression has received a lot of attention from the media, social scientists, and policy makers. Previous research (Lin & Lepper, 1987; Anderson & Ford, 1986) has shown a relationship between video game playing and aggression providing reasons to be concerned about the effects of video games (Anderson, 2000). The main aim of this section is to critically examine the empirical studies that have focused on violent video games and their psychosocial effects. The possible relationship between violent video game playing and subsequent aggression will also be discussed. A variety of older and more recent studies that have used observational, experimental and self-report methods as well as new types of methods will be reviewed. Only those studies that have proven to be insightful in terms of adding to the topical issue of violent video games and aggression will be reviewed.

Aggression has been defined as behaviour intended to harm another individual who is motivated to avoid harm (Anderson & Bushman, 2001). Many video games have violent themes that adhere to this definition of aggression. Games such as *Mortal Kombat* and *Gears of War* require players to harm their opponents in order win (Gunter, 2005). Research from the television (TV) violence literature suggests that repeated exposure to violent TV or movie scenes can increase aggression in children and adolescents by becoming desensitised to the content (Bushman & Huesmann, 2001). The link between television violence and violent video games is that they both share similar underlying psychological processes (Anderson & Bushman, 2001). That is, the effects of video games could operate through the priming of aggressive thought networks, weakening of inhibitions against antisocial behaviour, modelling, and decreased empathy for others (Dill & Dill, 1998).

Psychological theories that attempt to explain the effects of violent video games suggest that violent video games can either increase (the social learning theory (SLT) - Bandura, 1986) or decrease (the catharsis theory - Fesbach & Singer, 1971) aggression (Griffiths, 1991). A meta-analysis of thirty-three studies by Anderson and Bushman (2001) and a more recent meta-analysis of 136 research reports by Anderson, Shibuya et al (2010) revealed that video game violence was associated with aggression. Sherry

(2001) undertook a meta-analysis of thirty-two studies and found a small effect of video games on aggression. The research methods used to investigate violent video games can be categorised as follows; observations, experiments, self-reports and new methods. Hence, the studies reviewed below have been categorised according to the aforementioned categories.

**Observational research**

Silvern and Williamson (1987) attempted to examine the effects of aggressive video game play and violent television viewing on aggressive, fantasy, and pro-social behaviour in 4- to 6-year old boys and girls using a pre-post study design. Prior to video game or television exposure, the researchers videotaped a baseline free play session. Then the children were exposed to two separate experimental sessions. In one session they watched a violent cartoon (*Roadrunner*) with a same sex partner. In the other session, one partner played a violent video game (*Space Invaders*) while the other observed. After each session children's free play was videotaped and analysed. The analysis revealed that there was an increase in aggressive behaviour and a decrease in pro-social behaviour after exposure to video game and television violence. However, this study consisted of a very small sample of only 28 children making it difficult to achieve a significant finding. In a similar study, Irwin and Gross (1995) analysed children's free play after exposure to violent video games. The results indicated that there was an increase in physical and verbal aggression towards inanimate objects and there was increased aggression toward a confederate in a frustrating/competitive situation. However, it can be argued that the frustrating/competitive situation may have caused the aggression rather than the video game.

Schutte, Malouff, Post-Gorden and Rodasta (1988) studied post-game behaviour in relation to video game theme. A sample of 5- to 7-year old children played either a violent Karate game called *Karateka* or a non-violent game called *Jungle Hunt*. The children played the games with a same-sex pair and were then observed in the same pairs during a free play session in a room containing a Bobo doll, dressed in a karate suit, and a jungle swing toy. Schutte et al (1988) found that children in the *Jungle Hunt* condition played more with the jungle swing toy. While the children in the *Karateka*

condition were more aggressive toward the Bobo doll and the other child than those children in the *Jungle Hunt* condition. The results showed support for the SLT. The limitations with this study were that a small sample was used ($n$ = 31) and it can be argued that dressing a Bobo doll in a karate suit could have provoked the children to behave aggressively.

Research by Panee and Ballard (2002) examined the influence of high and low aggressive video game priming on violence during game play (e.g., shooting, choking), hostility, frustration with game play, blood pressure, and heart rate. Male undergraduates (n = 36) were assigned to a high aggressive or low aggressive video-game priming condition. Observation of game playing behaviour revealed that participants in the high aggression condition used significantly more violent action during game play and reported more hostility than those in the low aggression condition. Heart rate was correlated with feelings of hostility. The findings indicated that both aggressive priming and use of game violence influence arousal and negative affect and may increase behavioural aggression. Bushman and Anderson (2009) tested the hypothesis that exposure to violent video games reduces aid offered to people in pain. Participants played a violent or non-violent video game for 20 minutes. After game play, while completing a lengthy questionnaire, they heard a loud fight, in which one person was injured outside the laboratory. Participants who played violent games took longer to help the injured victim, rated the fight as less serious, and were less likely to "hear" the fight in comparison to participants who played non-violent games. The findings suggested that violent video games make people numb to the pain and suffering of others.

Polman, de Castro and van Aken (2008) examined free play sessions of 59 children aged 10-13 after actively playing or watching a violent video game. The observations revealed that boys behaved more aggressively after playing the video game. For girls, game condition was not related to aggression. The authors concluded that for boys, playing a violent video game should lead to more aggression than watching television violence. Cooper and Mackie (1986) randomly assigned 84 boys and girls, aged 10- to 11-years old, to play or observe a violent video game (*Missile Command*), a non-violent video game (*Pac-Man*), or a pen-and-paper game for a period of eight minutes.

The children were then observed during a free play session. The children were then asked to indicate how much punishment or reward they would give to a "good child" and "bad child" in a hypothetical scenario.

The free play observations showed that girls who played or observed the violent video game spent more time playing with the aggressive toy. The boys who played with the aggressive toy were not affected by the type of game played. However, the video games had no effect on the childrens' interpersonal aggression. There were no differences in reward and punishment given to the "good child" and "bad child" in the hypothetical scenario. What is of concern is that the participants' personal ratings of the games showed that *Pac-Man* and *Missile Command* were not significantly different in aggression. This highlighted certain inaccuracies in the study findings.

The observational studies appear to show that aggressive video games increase aggression and lend support for the SLT. However, Griffiths (1999a) has argued that the observational analysis of free play may be contributing to the effect as participants may act violently because they are being observed by researchers. This raises the issue of demand characteristics whereby just observing impressionable young children play can encourage them to play violently. The studies mentioned above were measuring aggressive play and not aggressive behaviour. Aggressive play does not imply the intent to harm and therefore these studies did not prove that violent video game playing led to aggressive behaviour (Weber, Ritterfeld & Kostygina, 2006).

What needs to be measured is aggressive behaviour, which tends to involve intent and provides more meaning. One of the main criticisms with observational studies is to do with how the researchers have operationally defined "violent affect", "aggressive behaviour", "aggressive play", or any other related terms. A questionable issue is that of comparing an interactive medium like video games with a non-interactive medium in order to prove video games cause aggression. It can be argued that they do not have any similarities and that it is difficult to say one causes the other.

## Experimental research

Experimental research has the advantage of controlling specific variables while manipulating others. It is seen as an ideal way to test for the effects of playing video games. For instance, Anderson and Dill (2000) recruited 210 university students in order to examine the effects of violent video game play on aggressive thought, affect, and behaviour. Participants played either a violent or non-violent video game. They then played the game again and completed an affective measure, a world view measure, a cognitive measure and behavioural measure. The results indicated that violent video game play was positively related to aggressive behaviour and delinquency. The relation was stronger for individuals who were characteristically aggressive and for men. Exposure to a graphically violent video game increased aggressive thoughts and behaviour in the participants.

Konijn, Nije Bijvank and Bushman (2007) randomly assigned Dutch adolescent boys (n = 112) to play a realistic or fantasy violent or non-violent video game. Next, they competed with a partner on a reaction time task in which the winner could blast the loser with loud noise through headphones (the aggression measure). The most aggressive participants were those who played a violent game and wished they were like a violent character in the game. These participants used noise levels loud enough to cause permanent hearing damage to their partners, even though their partners had not provoked them. Identifying with a violent video game character led to more aggressive behaviour. Players were especially likely to identify with violent characters in realistic games and with games they felt immersed in. This study, as well as many other experimental studies (e.g., Carnagey & Anderson, 2005; Ferguson, Rueda et al, 2008; Barlett, Harris & Baldassaro, 2007) can be criticised for using a pseudo-experimental setting and that there was a possibility of the noise blasts causing the aggression rather than the video games.

Chambers and Ascione (1987) examined the effects of both aggressive and pro-social video game play on pro-social behaviour. Their sample consisted of children aged between 8- to 11-years who played either an aggressive or pro-social game. It was found that the children who had played the aggressive game gave less money to a

donation box than those who played the pro-social game. This finding can be criticised for not being directly related to aggression. Kirsh (1998) got 8- to 11-year old boys and girls to play either a violent or non-violent video game. After playing the games, the children interpreted a series of ambiguous stories in which a negative event occurred but the intent of the harm doer was not clear, (e.g., a child is hit in the back with a ball). The children were asked six questions about the harm doer's intent, emotional state, potential retaliation, and punishment. Children exposed to the violent game responded more negatively to the ambiguous stories than those children exposed to the non-violent game on three of the six questions. The former and latter study provided very little and arguably no insight into the effects of video games and the measures used were somewhat irrelevant and unrelated to video game aggression.

Anderson and Morrow (1995) showed that participants in a competitive condition had a significantly higher "kill ratio" in a video game than participants in a cooperative condition. This study consisted of a sample of 60 students and the results are difficult to generalise from such a small sample. Anderson, Deuser and DeNeve (1995) found that by increasing the room temperature while participants played video games, increased state hostility, hostile cognition, and physiological arousal. However, an increase in room temperature would be an obvious reason for increases in hostile cognition. Experimental research has also reported no increase in aggression after video game playing (Winkel, Novak & Hopson, 1987), and that playing violent video games did not make players more aggressive (Scott, 1995).

Anderson and Carnagey (2009) examined the impact of excessive violence in sport video games. Participants played either a non-violent simulation-based sports video game (baseball or football) or a matched excessively violent sports video game. Participants then completed measures assessing aggressive cognitions, aggressive affect, and attitudes towards violence in sports or aggressive behaviour. Playing an excessively violent sports video game increased aggressive affect, aggressive cognition, aggressive behaviour, and attitudes towards violence in sports. The findings showed that violent content uniquely leads to increases in several aggression-related variables. However, it can be argued that the competitive content of the games rather than the violent content led to increased aggression.

Research by Barlett, Branch, et al (2009) attempted to answer the question of how long do the short-term effects of violent video games last? Participants (n = 91) completed pre- and post-video game measures of aggressive thoughts, aggressive feelings, and heart rate. They also completed an aggressive behaviour measure after four minutes or nine minutes of delay. Results indicated that aggressive feelings, aggressive thoughts, aggressive behaviour, and heart rate initially increased after video game play. There was an increase in aggressive feelings and aggressive thoughts that lasted less than four minutes, whereas heart rate and aggressive behaviour lasted four to nine minutes. Other experimental research has shown that increased play of a violent first person shooter video game can significantly increase aggression from baseline (e.g., Barlett, Harris & Baldassaro, 2007), and violent games that reward violent actions can increase aggressive behaviour by increasing aggressive thinking (Carnagey & Anderson, 2005). Interestingly, experimental findings by Ferguson, Rueda, et al (2008) indicated that innate aggression and family violence were predictive of violent crime, but exposure to violent games was not.

Inherent methodological problems and problems with the measures used to detect aggression have led to mixed experimental findings. The artificial (pseudo-experimental) setting in which experiments are conducted raises the argument that 'real' video game play is not being studied. Thus, video game playing needs to be investigated in a more naturalistic setting (Griffiths, 1999a). Research also needs to move away from simply testing a violent and non-violent condition and rather focus on the in-game features of video games. Video game playing sessions in experimental studies can range in length. A short playing session may give rise to frustration, while a longer session may lead to boredom which could inevitably affect the experimental treatment (Sherry, 2001). Experimental findings require careful causal interpretation of the relation between video games and aggressive outcomes due to the fact that many experimental studies are not rigorously administered (Weber et al, 2006). Goldstein (2005) has criticised experimental research for not recognising the fact that video game players freely engage in play, and are always free to stop. Additionally, they play in a playful frame of mind – something that is missing from experimental studies (Goldstein, 2005).

**Self-report methods**

Self-report methods have also been used to investigate violent video games. Anderson and Ford (1986) made use of the Multiple Affect Adjective Checklist (Lubin, Zuckerman, Hanson, & Armstrong et al, 1986) to measure the hostility of 60 students after playing a very aggressive and mildly aggressive video game. Students who played the very aggressive game showed more hostility and anxiety. However, it is not possible to generalise from this study due to the small sample size. Kestenbaum and Weinstein (1985) found that aggressive video game playing had a calming effect, this provided support for the catharsis theory (Fesbach & Singer, 1971). Lin and Lepper (1987) found a positive relationship between self-reported video game use in 9- to 12-year old boys (n = 210) and their teachers' ratings of their impulsivity and aggressiveness. However, it can be argued that the young children used in this sample may have over-reported their video game use and were more likely to be affected by demand characteristics.

Fling, Smith, et al (1992) examined the video game playing habits of 11- to 18- year old boys and girls using a survey method. The results revealed a significant positive relationship between self-reports of frequency and duration of video game play, and both teacher and peer ratings of aggressiveness. Research findings such as these raise questions about whether it is the video games that evoke aggression, or is it that aggressive people are more inclined to play video games? Or could it be that aggressive people play video games to cope with their problems (Weber et al, 2006)? In a study by Roe and Muijs (1998), it was found that boys who performed poorly in school were more motivated to play video games in order to perform well in the games. The researchers speculated that this was to compensate for their failure at school. Fleming and Rickwood (2001) investigated the relationship between violent video games and children's mood. The results indicated that arousal increased significantly after playing a violent video game. The results from this study must be treated with caution, as it cannot be concluded that the effect is due to the violence as it may be the arousal that caused the effect (Freedman, 2001).

Markey and Scherer (2009) used questionnaires to measure participants' (n = 118) levels of psychoticism before video game play, and hostility and aggressive cognitions after playing a violent video game or a non-violent video game using either a traditional controller or motion capture controls. Results showed that the use of motion capture controls did not increase the negative effects of violent video games. However, participants with high levels of psychoticism were much more affected by violent video games than other participants. This indicated that only some individuals are adversely affected by violent video games and that those who are affected have pre-existing dispositions which make them susceptible to violent games. Research by Funk, Baldacci, et al (2004) used surveys to determine if there were relationships between real-life and media violence exposure in a sample of 150 students. Analyses revealed that only exposure to video game violence was associated with lower empathy. Both video game and movie violence exposure were associated with stronger pro-violence attitudes. However, as with many of the studies examining violent video games, causality was not investigated.

Wiegman and van Schie (1998) investigated the relationship between the amount of time children spent playing video games and aggressive, as well as pro-social, behaviour. Children (n = 278) were asked to register in a diary how much time they spent playing video games over a period of a week. The peer nomination technique was also used. This required children to indicate which children in their class exhibited certain aggressive behaviours (e.g., fighting). No significant relationship was found between video game use in general and aggressive behaviour. However, the results did show that children who preferred aggressive video games were more aggressive and showed less prosocial behaviour. These findings were inconclusive but provided some evidence for the speculation that aggressive people are more inclined to play video games.

Funk, Buchman, et al (2003) evaluated short-term and long-term exposure to violent video games in a sample consisting of 63 children aged 5- to 12- years old. Children's responses to vignettes portraying everyday experiences after playing a violent or non-violent video game were examined. The children also completed questionnaires measuring attitudes towards violence and empathy. Funk et al (2003) found that long-

term exposure to violent video games contributed to lower empathy vignette scores. However, it must be noted that this result does not establish causality, as there could be other mediating factors such as peer group association and family upbringing that may be responsible for low empathy scores. The results also indicated that long-term exposure to violent video games may be associated with desensitisation to violence. There were no short-term effects of playing a violent versus non-violent game on vignette scores for aggression or empathy. These findings were questionable due to the young age of the children. Many of their responses did not relate to the theme of the vignette, and this was partly due to their limited level of verbal skills. Furthermore, social desirability may have influenced some of the children's responses.

Self-report methods depend on the participants to tell the truth. Studies that have used this method tend to utilise young children who may provide false responses, therefore the validity of the results are questionable. The use of diaries by Wiegman and van Schie (1998) may have resulted in exaggerated accounts being given by the children. Self-report methods do have their advantages; they are quick and easy to administer, and they have been used to investigate a variety of different variables that may be related to aggression (e.g., teacher and peer ratings). These variables may provide support for the existence of a relationship between video games and aggression (Dill & Dill, 1998). However, it is not possible to establish causality with these methodologies. Correlational evidence could indicate that aggressive children are attracted to violent video games rather than aggression being the result of playing violent video games (Griffiths, 1999a). This has been echoed in research by Lemmens, Bushman and Konijn (2006) who found that aggressive and less empathic boys were attracted to violent video games. Thus, correlational research should be viewed with caution.

**New methods**

As video games become increasingly sophisticated video game researchers have sought to examine video games by focusing on video game content, brain images, and qualitative experiences. Recent research has led the way forward (e.g., Eastin & Griffiths, 2006; Yang & Matthews et al, 2009). For example, research by Eastin and Griffiths (2006) explored how game interface (virtual reality and standard console),

game content (fighting, shooting, and driving), and game context (human and computer competition) can influence levels of presence and hostile outcomes among male gamers. Analysis revealed that game interface and game content influenced hostile expectations. The researchers suggested that simply testing violent and non-violent game situations neglects the complexity of contemporary video game play.

Yang and Matthews et al (2009) reported a functional magnetic resonance imaging (fMRI) study during two modified Stroop tasks performed immediately after playing a violent or non-violent video game. During an emotional Stroop task, the violent video game group showed more activity in the right amygdala and less activation in regions of the medial prefrontal cortex (MPFC). Further analyses revealed a negative coupling between the right amygdala and MPFC in the non-violent video game group. The authors concluded that these results suggest differential engagement of neural circuitry in response to short term exposure to a violent video game as compared to a non-violent video game. Other brain imaging research (i.e., Motluk, 2005) has shown that as violence becomes imminent in-game, the cognitive parts of the brain are activated, while during a fight, the emotional parts of the brain, such as the amygdala and parts of the anterior cingulate cortex, become inactive. This pattern is similar to that seen in participants who have had brain scans during other simulated violent situations such as imagining an aggressive encounter (Motluk, 2005).

Dietz (1998) used content analysis to examine the portrayal of women and the use of violent themes in a sample of 33 video games. The analysis revealed that traditional gender roles and violence were central to many games in the sample. There were no female characters in 41% of the games. In 28% of the games women were portrayed as sex objects. Nearly 80% of the games included aggression or violence as part of the strategy or object. Other findings indicated that 27% of the games contained socially acceptable aggression, and nearly half included violence directed specifically at others. Although the sample of video games was small, the findings showed that video games, like other media forms, can impact the identity of children and their behaviour. Olson, Kutner and Warner (2008) used focus groups with 42 boys aged 12- to 14-years to investigate how children perceived the uses and influence of violent video games. The boys used games to experience fantasies of power and fame, to explore and to work

through angry feelings or relieve stress, and as social tools. They did not believe they had been harmed by violent games but were concerned that younger children might imitate game behaviour.

Longitudinal studies examining the effects of violent video games have provided interesting insights. Anderson, Sakamoto, et al (2008) tested whether high exposure to violent video games increased physical aggression over time. Video game habits and physically aggressive behaviour tendencies of school children were assessed at two points in time, separated by three to six months. Habitual violent video game play early in the school year predicted later aggression. Violent video games were seen as a significant risk factor for later physically aggressive behaviour. The research suggested reducing the exposure of youth to violent video games. Wallenius and Punamaki (2008) conducted a two-year longitudinal study with 12- and 15 year-old adolescents in order to investigate the roles of sex, age, and parent-child communication in moderating the association between game violence and direct aggression. Results showed that game violence was linked to direct aggression both longitudinally and synchronously, and that the link was moderated by parent-child communication in interaction with sex and age. Poor parent-child communication was seen as one of the factors in an adolescent's development that may strengthen the negative effects of game violence. These longitudinal studies need to be replicated to see if the long-term effects have a lasting impact.

Research into the effects of violent video game play and aggression has produced variable results. Weber et al (2006) argued that the diversity in operational definitions that have been used by researchers might be the underlying reason for the inconsistent results. Furthermore, they argue that this makes the measurement of aggressive or violent behaviour unreliable. The one consistent finding is that video games with violent content appear to induce short-term aggressive effects in young children (Holmes & Pellegrini, 2005). Many studies can be criticised for having insufficient, weak, and/or methodologically flawed evidence. They can also be criticised for using inappropriate measures of aggression (e.g., Chambers & Ascione, 1987; Kirsh, 1998), using games that are not significantly different in terms of aggression (e.g., Cooper & Mackie, 1986), and/or for using small samples (e.g., Anderson & Ford, 1986).

There is also evidence that shows playing pro-social video games decreases aggressive cognitions by decreasing the accessibility of antisocial thoughts (Greitemeyer & Osswald, 2009; Gentile et al, 2009) suggesting that they are valuable learning tools. There are also many studies (e.g., Gibb, Bailey, Lambirth & Wilson, 1983; Scott, 1995; Lynch, 1994) showing no increases in aggression after violent video game play. As video games become more technologically sophisticated with realistic graphics, sound effects and enhanced in-game features, research that explores how these new features can affect negative outcomes is very much needed in order to develop an evidence based public health message (Farrar et al, 2006; King, Delfabbro & Griffiths, 2010).

## Video Games and Health

Video games are now playing an increasingly important role in the lives of children and adolescents. Most children now have video game consoles at home, and it has been estimated that video game consoles are present in 36 million homes in the United States (Schlimme, 2002). Research shows that 92% of children and adolescents aged 2- to 17-years of age play video games, and on any given day 30% of children aged 2- to 18-years will play a video game, and those who play spend an average of just over an hour playing (The Kaiser Family Foundation, 2002). Research by Griffiths and Hunt (1995; 1998) showed that 7% of their sample claimed to play video games for over thirty hours a week. It is findings like this that has led to growing concern about how children may be affected by regular excessive playing of video games. It could be speculated that the time spent playing video games may displace more important developmental activities such as socialising with friends and family (Subrahmanyam, Kraut, Greenfield, & Gross, 2000).

In a study by Selnow (1984), 210 adolescent video game players were administered a questionnaire assessing video game playing habits. The results revealed that 33% of video game players were classed as heavy users. These players indicated that playing video games was more enjoyable and desirable than being with others. Selnow (1984) concluded that heavy users of video games perceived the video games as alternative friends or ‘electronic friends’. This suggested that people played the games instead of forming human friendships or interacting with their peer groups. With increasing

numbers of players now playing video games, it is inevitable that certain types of negative effects will emerge because video games will psychologically and physiologically affect each individual in a different way. To date, there has been a substantial body of research that has focused on the medical consequences and psychosocial effects of video games. This section will evaluate research concerning video games and health. The empirical research has been grouped into the following three categories: (a) physical health issues, (b) psychophysiological health issues, and (c) the therapeutic value of video games.

**Physical health issues**

Some studies have reported the health consequences of elevated arousal levels and physiological reactions due to video game playing. Some of the physiological effects that have been associated with video game playing include increases in cardiovascular reactivity, blood pressure, and oxygen consumption in players (Modesti, Pela et al, 1994; Segal & Dietz, 1991; Mounier-Vehier, Girard et al, 1995). Research has also reported increases in breath duration in children (Denot-Ledunois, Vardon et al, 1998). Markovitz, Raczynski et al (1998) showed that the cardiovascular reactivity in participants when playing video games was a reliable predictor of hypertension occurring in the future. The negative consequences of these physiological effects are that they can cause strokes, dementia, heart attacks, and negative mood states.

Cleary, McKendrick and Sills (2002) reported the case of a 15-year old boy who suffered from hand-arm vibration syndrome due to prolonged playing of a *Sony Playstation* with a vibrating hand-held controller. His hands became white and swollen when exposed to the cold and they became red and painful when his hands were warm. Cleary et al (2002) recommended that there should be statutory health warnings to advise users and parents of the potential negative effects of prolonged video game playing.

There is a popular conception that television and video game use is associated with an increase in obesity in children and adolescents, this can lead to negative health implications (Gortmaker, Dietz et al, 1987). Many studies have found evidence that

supports this conception. For example, Vandewater, Shim and Caplovitz (2004) investigated the links between childhood obesity, activity participation and television and video game use in a nationally representative sample of children (*n* = 2831) aged 1– to 12- years using age-normed Body Mass Index (BMI) ratings. Results showed that video game use was strongly associated with children's weight status. The results also showed that children with higher weight status spent more time in sedentary activities than those with lower weight status. The researchers suggested that video game use was partly responsible for the prevalence of paediatric obesity, especially among very young children. However, it must be noted that the study used correlational data and thus no causal inference could be made. Furthermore, the relationship between video game use and weight status was only found for children under the age of 8 years.

Shimai, Yamada, Masuda, and Tada, (1993) found that obesity was correlated with long periods of video game playing in Japanese children. This was also found in French children (Deheger, Rolland-Cachera, & Fontvielle, 1997). However, the former study can be criticised for being culturally specific to Japan only and the latter study can be criticised for using a small sample. Johnson and Hackett (1997) found an inverse relationship between physical activity and video game playing in British schoolgirls. As time spent playing video games increased, the time spent engaging in some form of physical activity decreased. There is still a scarcity of studies examining the relationship between children's video game use and weight status.

Research by Stettler, Signer and Suter (2004) found that electronic game use was associated with obesity. There was almost a two-fold increased risk for obesity by hour per day spent playing electronic games. However, most of these studies used participants who played video games excessively. Such adverse effects have not been found in moderate players of video games (Griffiths, 2004). Some research has found no links between video game or television use and obesity. For instance, McMurray, Harrel et al (2000) examined video game and television use in a sample of 2,389 adolescents aged 10- to 17- years. They found that there was no relationship between television or video game use and BMI once the influence of socioeconomic status and ethnicity was controlled.

New generation active video games (also known as 'exergaming') may help players to lose weight and improve health outcomes (Daley, 2009). Graham and Yang (cited in Brown, 2006) studied the heart rates of children playing the popular party game *Dance Dance Revolution*, a game where players use a dance mat to step on designated symbols flashing on the screen. The results revealed that dancing for a 45-minute session increased metabolic rates and calorie burning in children. More recent research (Lanningham-Foster, Foster et al, 2009) has shown that activity promoting video games increased energy expenditure in a sample of 42 video game players.

Graves, Stratton et al (2007) presented findings that showed new generation active video games (*Nintendo Wii* tennis, bowling and boxing) use significantly more energy than playing sedentary video games in a sample of 11 school children. It must be noted that active video game playing did not use as much energy as playing the sport itself. Furthermore, the energy used when playing the active games was not of high enough intensity to contribute towards the recommended daily amount of exercise for children. The long-term impact of exergaming has not been investigated. There is a need for high-quality randomised, controlled trials to evaluate the effectiveness of exergaming (Daley, 2009). Once such trials have been conducted researchers will then be in a better position to comment upon the positive health outcomes of exergaming.

From the studies described above, there appear to be mixed findings concerning the relationship between obesity and video games. The problem with most of the studies that have focused on obesity is that they have used excessive players. Video game prevalence studies have found little evidence of serious adverse effects on health from moderate play (Griffiths, 2004).

There are many other medical consequences that have been linked to video game playing. Bright and Bringhurst (1992) presented the case of a 12- year old boy who reported suffering from elbow pain for at least a month. The boy had been playing video games a lot and was otherwise healthy. The researchers treated the condition via the administrating of pain killers and the discontinuation of playing. Nine days later, the problem had been successfully resolved. Miller (1991) reported the phenomenon of "Nintendo neck" or neck pain in his own son who was an avid *Nintendo Game Boy*

player. After playing an absorbing and intense game, he complained of pain in his neck. Miller (1991) explained that the discomfort his son felt could be explained by the posture he took up whilst playing (hunched over, chin almost resting on his chest). And if the child were to continue playing like this for long hours on end then it could lead to severe muscle spasms. It was concluded that parents were guilty of allowing their children to play for longer than they should.

Loftus and Loftus (1983) conducted a survey of arcade video game players and found that 65% of players complained of blisters, calluses, sore tendons, and numbness of fingers, hands and elbows. It can be argued that these types of negative effects tend to be very rare and affect only a small minority of players. They are likely to cause relatively minor and temporary problems to health and can be resolved with decreased play or abstinence (Griffiths, 2004). Wrist pain (McCowan, 1981), repetitive strain injuries (Mirman & Bonian, 1992), enuresis (Schink, 1991), encoprisis (Corkery, 1990) have also been reported in the literature. In the cases of enuresis and encoprisis the treatment was fairly easy to implement, the children were so immersed in the activity of playing video games that they did not want to go to the toilet. In these cases the treatment was simply to teach the children how to use the "pause" button. Tenosynovitis which is also known as 'nintendonitis' where the constant pushing of buttons on a controller leads to painful swelling on the back of the thumb has also been reported (Brasington, 1990; Casanova & Casanova, 1991). However, these cases were found in players who had been playing for long periods of time.

**Psychophysiological health issues**

Video game-related seizures (VGRS) is another area that has been researched quite extensively because of reported cases that epileptic seizures can be triggered by specific types of visual stimuli. Dahlquist, Mellinger and Klass (1983) reported a case of a 15-year old boy who had no history of previous seizures. He had been playing video games on a regular basis for one year before he had his first seizure. Dahlquist et al (1983) noted that on one occasion the boy appeared to be in a daze with his hand twitching whilst he was playing a video game. He subsequently developed a sensitivity to bright sunlight when it flickered through trees.

Graf, Chatrian, Glass and Knuass (1994) analysed 10 patients who had reported experiencing VGRS and reviewed 35 other cases. They found that the VGRS that were displayed by the patients were specific epileptic events triggered by visual stimuli inherent within the video games. The seizures occurred during certain video game sequences including repetitive, high-intensity multicoloured and/or white flashes, rapid changes of scenes, swift displacement of images across the screen, appearance of line patterns and flickering TV patterns. It was concluded that rather than taking anti-convulsant drugs, abstinence from video games was the recommended treatment for VGRS.

Kasteleijn-Nolst Trenite, da Silva, Ricci, et al (1999) performed a European study in four countries to investigate video game epilepsy. The participants were investigated using the *Super Mario World* video game and a standard non-provocative TV programme on either a 50-Hz or 100-Hz television. The results showed that *Super Mario World* proved to be more provocative than the standard programme regardless of the distance between the participant and the TV screen. The results also revealed that 45% of participants were 50-Hz television sensitive and 26% were 100-Hz sensitive. They advised that players should sit at least 2.5 metres away from the TV screen in order to prevent seizures. However, Kasteleijn-Nolst Trenite et al (1999) acknowledged that it was possible that many of the participants may have had spontaneous seizures especially the male participants who tended to spend many hours playing. Thus the epileptic seizures in this study and many other studies could have occurred independently of the video games or may have been influenced by other factors such as anxiety, stress, fatigue, prolonged play and sleep deprivation (Chuang, Chang et al 2006).

This makes it difficult to establish whether video games can entirely be blamed for VGRS. Most studies that have investigated VGRS tend to use participants who are sensitive or have a history of seizures induced by visual stimuli (e.g., Piccioli, Vigevano, Buttinelli et al, 2005). These participants are inevitably going to experience a VGRS when tested in an experimental situation. Research by Badinand-Hubert, Bureau, Hirsch, et al (1998) supports this assertion, as they found that video games had

no effect on non-photosensitive epileptic participants. Case studies of individuals with no previous history of seizures are very rare.

Auditory hallucinations have also been associated with video game use. Spence (1993) reported the case of HL, a 20-year old lady who suffered from 'Nintendo hallucinations' (auditory hallucinations of a *Nintendo* video game). The video game consisted of a soundtrack that affected HL who took it to imply that she was homeless. However, it must be noted that HL suffered from depression and had suffered a head injury earlier in her life. Following a similar theme, Hebert, Beland et al (2005) examined the effect of built-in music on cortisol secretion as a consequence of video game playing. Participants were assigned to either a 'music' or a 'silence' condition and saliva samples were taken after a practice session, immediately after having played for 10 minutes, 15 minutes after the end of the experiment, and 30 minutes after the end of the experiment. The results indicated that the 'music' group had significantly higher cortisol levels 15 minutes after the end of the experiment. The in-game music significantly contributed to the stress response during video game playing. Herbert et al (2005) suggested that in-game music, as a cortisol secretion trigger, could provide the foundation for an addiction process to develop. However, the long-term consequences on the players' health are unknown.

**Therapeutic value of video games**

Despite the considerable amounts of research focusing on the negative effects of video games, studies have also shown that video games can be used in psychotherapeutic and medical settings in order to treat childhood and adolescent disorders (Griffiths, 2004). Gardner (1991) made use of video games in his psychotherapy sessions and found that the video games helped in establishing a common ground between himself and his child clients. Furthermore, he was able to make some insightful behavioural observations. These included observing children's repertoire of problem-solving strategies, eye-hand coordination, and the release of aggression and control. Gardner (1991) claimed that the use of video games was the most effective technique during his therapy sessions. Similarly, Spence (1988) incorporated video games into his repertoire of behaviour management techniques and provided case study evidence to show that

video games can bring about positive behavioural changes in the development of relationships, motivation, cooperative behaviour, aggressive behaviour and self-esteem.

King (1993) tested whether the use of a video game as a purposeful activity increased the number of repetitions made by patients in grip and pinch exercises for hand strengthening. A sample of 146 adults, aged 16- to 78-years were given grip and pinch devices attached to a computer. All participants were asked to play a video game for three minutes using the devices and were also asked to exercise for three minutes using their devices. The results showed that the mean number of repetitions for the video game condition was significantly greater than for the exercise condition. This showed that the use of video games in an occupational therapy setting helped to increase hand strength among patients.

Phillips (1991) reported the case of an 8-year old child who suffered from neurodermatitis and scarring due to picking at his upper lip. A *Nintendo Game Boy* was used as part of a behaviour modification programme to keep the boy's hands occupied and to stop him picking at his face. After a two-month follow up, the affected area had healed. Studies by Suzuki and Kato (2003), Kolko and Rickard-Figueroa (1985) and Vasterling, Jenkins et al (1993) have demonstrated that video games can provide cognitive distractions in children during cancer chemotherapy and that such distractions can reduce the need for painkillers. These studies reported that compared to a control group, the distracted patients reported less nausea before chemotherapy and lower systolic blood pressure after treatment. This shows how video games can be very helpful in providing distractions in order to divert pain perception in children (Griffiths, 2004).

Loftus and Loftus (1983) reported the case of a teenage girl who suffered from spelling dyspraxia (a sudden inability to spell). A video game called '*Hangman*' which involves spelling was used to help treat the disorder. It was found that after two months of treatment, the dispraxia had been greatly reduced. Other studies have used video games to help learning disabled children in their development of spatial abilities (Masendorf, 1993), and problem-solving skills (Hollingsworth & Woodward, 1993). Krichevets, Sirotkina, Yevsevicheva, and Zeldin, (1995) used a video game in order to improve

arm control in a child with Erb's palsy. The use of a video game helped produce a substantial improvement in the child's arm control. Krichevets et al (1995) concluded that the use of a video game technique capitalised on the child's motivation to succeed, it has advantages over traditional physiotherapy that tends to involve passive, repetitive movements and sometimes painful limb manipulation.

Video games have been shown to be beneficial in teaching health education such as safe sex education (Cahill, 1994; Kashibuchi & Sakamoto, 2000), juvenile diabetes self-care (Brown, Lieberman et al, 1997) and general medical education (Boreham, Foster, & Mawer, 1989). Educational games have been useful in helping children with attention-deficit/hyperactivity disorders (Pope & Bogart, 1996) and improving motivation in children with learning disabilities (Lee & Peng, 2006). Video games have also been used to help the elderly. For instance, Goldstein, Cajko, et al (1997) examined the effects of playing *Super Tetris* on reaction time, cognitive/perceptual adaptability, and emotional well-being on a sample of elderly people. The results showed that those who played the video game had faster reaction times and a more positive sense of well-being than those who did not play the video game. In a study that focused on hockey players, Goodman, Bradley et al (2006) found that the use of a video game was very successful in teaching players about concussion symptoms.

Many different types of medical consequences and psychosocial effects that are associated with video game playing have been reported in the literature. Studies that have focused on obesity and video games have found mixed results while studies investigating VGRS show that video games can evoke seizures in individuals who tend to be sensitive to certain types of visual stimuli. Evidence showing that video games can evoke VGRS in individuals with no previous history of seizures is very rare. Nonetheless, many video games now carry labels warning players of the possible dangers of bright lights.

Case studies displaying the negative consequences of video games have been criticised by Griffiths (2004) because they all involved people who were excessive players. Moreover, Griffiths (2004) claims that prevalence studies provide very little evidence

of adverse effects on health from moderate video game playing. Furthermore, many of the negative consequences tend to be temporary and can be relieved by decreasing the amount of time people spend playing (Griffiths, 2004). There are no findings that show the long-term effects of video games. This is an area in which further research is needed. Lee and Peng (2006) believe that studies on the consequences of game play would have been more systematically done if they were based on the theoretical understanding of the nature of game experience. They believe that a better understanding of video games will only be achieved by finding out what players actually experience while they are playing video games.

The therapeutic value of video games should not be underestimated. There is a substantial amount of research showing that 'video game therapy' can help children with learning disabilities, attention-deficit/hyperactivity disorders, and Erb's palsy. However, Griffiths (2005a) states that reported positive effects in some instances have been found in specially designed video games ('serious games') rather than commercially available games, and this makes it difficult to evaluate the therapeutic value of video games as a whole. It can be concluded that video games can have negative health effects in extreme cases but they also have positive therapeutic value.

## The Positive Effects of Video Games

Much of the video game literature has focused on the potential negative consequences of video game playing. However, there is a substantial amount of research that has shown the beneficial aspects of video game playing in terms of learning important social, cognitive, and motivational skills. Some types of video games can provide an experience that integrates cognitive, metacognitive, and social experiences that can help in the developmental learning of children and adolescents (Ritterfeld & Weber, 2006). Video games have the appeal, the goals, the interactivity, the narrative, and many components that can aid learning. This section will review the empirical literature on the positive effects of video games in order to establish whether there are benefits in playing video games.

**Educational benefits / academic performance**

New technological mediums such as video games can provide the opportunity for new learning experiences. In this sense, video games have captured the interest of training professionals and educators (Garris, Ahlers & Driskell, 2002). Griffiths (2002a) has suggested many reasons why video games may be useful in an educational context. For example;

- Video games can assist children in setting goals, providing feedback, reinforcement, and maintaining records of behavioural change
- Video games can provide elements of interactivity that may stimulate learning
- Video games may help in the development of transferable IT skills
- Video games allow players to experience novelty, curiosity and challenge that may stimulate learning.

Many of these suggestions have been researched to show that video games can be effective tools for learning and understanding complex topics (Cordova & Lepper, 1996; Ricci, Salas, & Cannon-Bowers, 1996). Video games that incorporate instructions have been shown to improve student motivation, learning, attention and retention of training content (Ricci et al, 1996). Doolittle (1995) has shown that video games that emphasise the rehearsal of creative skills can be effective in improving creativity in students. Research (Kafai, Franke et al, 1998) also shows that specially designed video games that teach mathematical ideas can encourage mathematical thinking in students and teachers, although this depends on the type of game being used.

Educational learning is partly due to motivation and this can be found in many video games that encourage and motivate players to learn button configurations, team working skills and problem solving skills (Durkin, 2006). Din and Calao (2001) investigated whether children who played an educational video game learned better than children who did not play the game. Forty-seven pre-school aged children participated in the study. The experimental group played the video games for 40 minutes per day in school for 11 weeks. The results indicated that the experimental

group gained more than the control group in spelling and decoding areas. However, the experimental group did not gain significantly more in mathematics than the control group. The researchers acknowledged that the limitation of the study was that a small sample had been used.

Research by Rosas, Nussbaum, et al (2003) evaluated the effectiveness of an educational video game using a sample of 1,274 students over a three-month period. Children's learning abilities were assessed through ad hoc tests and classroom observations. The results showed significant improvements in mathematics, reading comprehension, spelling, and general motivation to learn in the experimental group. This indicated that educational video games can be a useful tool in promoting learning within the classroom. However, the study only used students from economically disadvantaged schools thus excluding students from other schools. Furthermore, there were no significant differences between the experimental group and an internal control group.

Ranalli (2008) looked into whether the popular simulation game *The Sims* could be beneficial to university students by means of supplementary material. The study found statistically significant improvements in vocabulary knowledge among students. However, the study only focused on university students, and it is not known whether the same results would be found with schoolchildren. Chuang and Chen (2009) investigated cognitive learning by comparing a video game-based instructional strategy against a traditional strategy. They found that the video game strategy improved fact/recall processes in school children (n = 108) and also promoted problem solving skills. The study was conducted on a Taiwanese sample, and there are issues regarding whether the findings can be generalised to other cultures. Owston, Wideman et al (2009) also found that using video games as a pedagogical activity helped to improve student content retention, editing skills, and the ability to compare and contrast information. However, some of the measures were analysed using observation notes which raise questions regarding reliability.

Studies investigating the educational benefits of video games have highlighted their positive potential. There have been considerable improvements in educational ability

when games are designed to address a specific problem or to teach a certain skill (Griffiths, 2002a). New forms of video games (particularly MMORPGs) still need to be considered in relation to clear pedagogic strategies and tutor engagement (de Freitas & Griffiths, 2008, 2009).

**Cognitive skills**

An important developmental and cognitive skill that adolescents develop early in their lives is the skill of spatial representation. Spatial skills are important in a variety of real world situations such as word processing (Gomez, Egan, & Bowers, 1986), programming (Roberts, 1984), and may be one of the components of the ability to read and utilise information on computer screens (Subrahmanyam & Greenfield, 1994). Spatial skills are also useful for training personnel for jobs that involve mechanical tasks or machinery operation tasks (Subrahmanyam & Greenfield, 1994). Research by Okagaki and Frensch (1996) examined the relation between video game play and spatial skills among adolescents. The participants played the game *Tetris*, a game that requires the rapid rotation and placement of different-shaped blocks. Experimental participants played the video game for a total of six hours. The results indicated that playing *Tetris* improved mental rotation and spatial visualisation skills. However, the researchers acknowledged that it was difficult to say how generalisable such skills are because there was no formal test of the variety of contexts to which spatial skills developed within a particular video game, or how they were then successfully transferred.

McClurg and Chaille (1987) found that spatial skills and mental rotation performance improved in their sample of schoolchildren (n = 57) after video game practice. The children also became more proficient at using mental maps as an aid to memory. However, the researchers admitted that the generalisability of the results to other populations had to be established. Furthermore, there were potential negative effects being fostered from one of the games used as it involved destruction and violence. Subrahmanyam and Greenfield (1994) studied the effect of video game practice on spatial abilities in girls and boys (n = 61). Participants practised on an action video game or a computerised word game. The results showed that video game practice was

significantly more effective than the word game in improving spatial performance. Video game practice was more effective for children who started out with relatively poor social skills. Subrahmanyam and Greenfield (1994) suggested that video games might be useful for equalising individual differences in spatial skill performance, including those associated with gender. The study did not establish that all video game play is unquestionably beneficial in all respects for all players (Greenfield, 1996), but it did indicate that positive outcomes are possible in at least some areas of video game play.

According to Greenfield, Camaioni et al (1996), the actions involved in video game playing such as figuring out what symbols mean and discovering how a character interacts with screen objects are all part of the cognitive process of inductive discovery. This is the process by which people learn about the world, and is the process behind scientific thinking and discovery (Greenfield, Camaioni et al, 1996). In order to test this notion Greenfield, Camaioni et al (1996) performed a cross-cultural study with students (n = 200) in the United States and Italy using a pre-test-post-test design. The results revealed higher scores for males, US students, and experienced video game players. Video game experience was found to have a significant positive association with scientific technical discovery (STD) skills. Video game playing was also associated with greater skill in decoding scientific-technical information. Greenfield, Camaioni et al (1996) concluded that video games provided informal education for the scientific and technical use of computers. However, the study was correlational.

Video games may also have the ability to improve cognitive processing skills such as divided visual attention. Greenfield, DeWinstanley et al (1996) looked at the effects of video game expertise on divided visual attention in college students (n = 34). Divided attention was measured by using response time to targets of varying probability at two locations on a computer screen. It was found that video game experience appeared to help in improving the ability to divide visual attention. This skill could be useful in occupations such as air traffic control or military activities. However, the study had some notable limitations; the sample consisted of young adolescents, and people tend to be good at detection tasks when they are young. Additionally, it is not known whether the same results would be found with an older aged sample. Furthermore, the

study showed only the short-term effects of video game playing, therefore longitudinal effects of game playing on visual attention need to be investigated.

Boot, Kramer et al (2008) attempted to replicate and extend on the work of Green and Bavalier (2003) who found a relationship between playing action video games and improvements in visual and attentional skills. Boot et al (2008) compared expert and non-gamers (n = 21). Their results showed that expert gamers and non-gamers differed on a number of cognitive skills. Compared to non-gamers, experts could (i) track objects moving at greater speeds, (ii) better detect changes to objects stored in visual short-term memory, and (iii) switch more quickly from one task to another. However, there was a possibility that pre-existing group differences in abilities (i.e., the self-selection effect) could have led to the differences in cognitive performance. Research by Feng, Spence and Pratt (2007) found that after only 10 hours of training with an action video game, participants (n = 48) realised substantial gains in both spatial attention and mental rotation. The authors concluded that the findings had practical implications for attracting people to the mathematical and engineering sciences as good spatial skills are needed in these fields. However, the authors failed to examine the long-term cognitive gains.

**Training**

The positive effects of video games on hand-eye coordination can be beneficial for certain types of job roles. Rosenberg, Landsittel and Averch (2005) attempted to investigate whether there was a correlation between skill in video games and skill in laproscopic surgery that requires good hand-eye coordination. Eleven medical students participated in the experiment. The participants played video games for 30 minutes and then performed four laparoscopic tasks (object transfer, tracing a figure-of-eight, suture placement, and knot-tying). They were assessed in terms of the amount of time it took to complete the task, number of errors committed, and hand-eye coordination. The results showed significant relationships between practising video games and laparoscopic skills, particularly in terms of time taken to complete each task and hand-eye coordination. However, the limitations of the study included the small sample size and the fact that video game practice did not significantly improve laparoscopic skills.

Subsequent research investigating links between video game play and laparoscopic surgical skills have shown support for the use of video games to help train surgeons (e.g., Rosser, Lynch et al, 2007, Schlickum, Hedman et al, 2009). In other fields, video games have been used in military training activities to teach important soldiering skills. For instance, *Full Spectrum Command* (FSC) and *America's Army* have been used in training exercises to teach trainee soldiers leadership and decision-making skills (Lee & Peng, 2006; Biros, Hass et al, 2005). The training potential of video games have been realised and utilised by military and medical professionals. Video games have also been used to provide driver training and may be extended to provide training in other skills.

**Sociability**

There have been concerns that video games have the potential to cause social isolation or a lack of interaction with friends and family members (Selnow, 1984). Contrary to these concerns Mitchell (1985) arrived at an opposite conclusion. She set out to learn how family interaction and family life were affected by the introduction of home video game consoles. An interview study was administered on 20 American families focusing on attitudes, perceptions and opinions in relation to home video game playing. The data showed that video games brought families together in the home in common recreational interaction, and they encouraged interpersonal relationships to develop within family circles. It can be argued that the study data are outdated due to the study examining the use of old video games consoles that are unlike the consoles used today. In a study by Orleans and Laney (2000), the social interaction of children using home computers was examined. A case study approach was used to gather observational data of 32 children aged between 8 and 17 years. The results showed that heavy computer users did not experience social isolation and boys were more likely to socialise in relation to computers than girls. This study made use of a small sample so it is difficult to generalise from the findings.

Durkin and Barber (2002) examined the relationship between game play and several measures of adjustment and risk-taking in a sample of 1,304 16-year-old American

students. Questionnaires and school records were used to gather data about the students' video game use, adjustment, self-concept, risk behaviours, and social context. No evidence was obtained of negative outcomes among game players. Game players scored more favourably on several measures than non-game players including family closeness, activity involvement, positive school engagement, substance use, self-concept and friendship network. The findings did not support assertions that video games have a negative impact on social adjustment and social interaction, but instead indicated positive correlates. The researchers concluded that video game playing can be a positive feature of healthy adolescence. It is important to note that the findings were based on data collected in 1988, and since then video games have developed considerably in terms of graphics, interactivity, and content. Additionally, the findings relied on self-ratings, that raises issues concerning the validity of the accounts of the participants.

In a questionnaire study conducted among 120 adolescents by Colwell, Grady and Rhaiti (1995) found that males who were heavy video game players were likely to see their friends more often outside school, thus showing that video games are not taking the place of normal social interaction. However, the results also showed that the same male video game players stated that they preferred video games to friends. These findings appear to be unusual and can be explained in both a positive and negative way. A study by Philips, Rolls et al (1995) found no differences in the amount of social interaction for video game players and non-video game players (n = 816). The studies appear to show mixed findings in regards to social interaction and video game playing, more research is warranted in this area.

Video games tend to be designed in such a way that they meet the cognitive developmental needs of adolescents (Durkin, 2006). This section has shown that important cognitive and perceptual skills can be obtained through video game playing (e.g., Greenfield, Camaioni et al, 1996; Okagaki & Frensch, 1996; McClurg & Chaille, 1987; Subrahmanyam & Greenfield, 1994). However, neither all video games nor players will obtain benefit from playing (Greenfield, 1996). Individual and developmental differences are likely to affect how players will interpret the video games they play and therefore the same skill requirements that are essential may

engage different processes according to the players' cognitive competencies (Durkin, 2006). Individual and developmental differences are an area that warrants further research. It can be speculated that video games that involve puzzle solving may improve players' ability to think logically, simulation games may enhance players' scientific thinking, and adventure games may increase players' skill in observation (Lieberman, 2006). However, not all of these speculations have been empirically tested.

Many of the studies described above are correlational studies, and these types of studies usually examine the skills of video game players at a snapshot in time. They do not show causality, so it is not known whether video game playing causes improvements in skills such as hand-eye coordination, or could it be that the people who already have the skill enjoy playing video games frequently (Lieberman, 2006). A player already having the skill is a confounding variable that will distort results. Furthermore, having video game experience and practise may enhance participants' performance on particular games that will inevitably skew results (Griffiths, 2002a). Video games are constantly being upgraded so it can be difficult to evaluate the positive effects of video games across studies (Griffiths, 2002a). Up-to-date research is needed to keep up with the advances in video game technology.

It must be recognised that most of the studies that have focused on the positive and negative effects of video game playing have only presented the short-term effects (Ritterfeld & Weber, 2006). There is a paucity of longitudinal research that shows the long-term impact of video games (maybe because there are no long-term effects). Most studies have used young children and adolescents, therefore we do not know whether the same results would be obtained with an older sample. Furthermore, many of the studies have found effects with specific types of video games such as action video games or educational video games. This shows that not all video games have positive effects. Generalisability of the results from the studies remains a notable limitation. On the other hand, Griffiths (2002a) states that, "despite the disadvantages, it would appear that video games (in the right context) may be a facilitatory educational aid" (p.48). Thus, it can be concluded that specific types of video games will have a positive effect on some players, but as and when new forms of video games are introduced they must

be empirically tested in order to evaluate their impact on the newer generation of players.

## Online gaming / Massively Multi-Player Online Role Playing Games

With the introduction of the internet, video game developers have sought new ways of encouraging people to play video games. The result is the relatively new phenomenon of Massively Multiplayer Online Role-Playing Games (MMORPGs). These games have utilised the internet to allow people to play video games online with each other across the globe. It has been estimated that there are approximately 16 million online gamers worldwide and this number is increasing steadily (Woodcock, 2008). With new and more diverse MMORPGs expected to enter the market, this will inevitably lead to more online gamers worldwide (Chan & Vorderer, 2006).

Research in the area of MMORPGs has been growing very rapidly. Online gaming has become a phenomenon that requires extensive research. This section will review the online gaming literature by focusing on some of the topic areas that have received a lot of attention. These topics include demographics, socialisation, group membership, identity and motivations. The topic area of addiction will be covered in Chapter 2. This section begins by providing a brief overview into the development of MMORPGs. This section concludes by proposing some research questions that the present thesis attempts to answer in relation to online gaming.

### The development of MMORPGs

MMORPGs evolved out of the text-based role-playing games known as Multi-User Dungeons/Domains (MUDs). One of the first high profile MMORPGs was *Ultima Online,* launched in 1997. What distinguished MMORPGs like *Ultima Online* from MUDs was the number of active players that this new type of video game could support (Yee, 2006a). MMORPGs allowed players to develop their own character, own homes, explore new land, and form ‘guilds’ or online groups.

MMORPGs are one of the most interesting innovations in the area of online video gaming. They have utilised the internet as a new gaming medium that allows people to link up and play together (Griffiths, Davies & Chappell, 2003). The nature of MMORPGs is to offer a rich three-dimensional world that is populated by thousands of gamers. It also provides a sophistication that enables complete immersion within the virtual world to the extent that it becomes an alternative reality to its users. This immersion is most notably aided by the use of realistic graphics, sound effects, and enhanced social interaction. MMORPGs feature social and competitive aspects, making devotion to the game mandatory. While traditional video games end at some point or become repetitive and boring, MMORPGs are endless, because the main feature of MMORPGs is its system of goals and achievements (Ng & Wiemer-Hastings, 2005). Chan and Vorderer (2006) have described six broad characteristics of MMORPGs that defines the interactive medium as a whole;

*Persistence*: This refers to the permanence of the virtual world and means that the virtual world is online and accessible 24 hours a day, seven days a week.

*Physicality*: MMORPGs are physical by design. They comprise a physical environment that has been reproduced in a virtual world and the usual notions of time and space that apply offline, also apply online.

*Social interaction*: MMORPGs contain specific features that allow gamers to communicate among themselves individually or as part of a group. Social interaction is an integral part of the game.

*Avatar-mediated play*: This is a character representation of the player in the virtual world. The avatar (or character) is used to attain specific goals in the virtual world. The extent to which gamers affiliate with their avatar tends to vary.

*Vertical game play*: This refers to progression in the MMORPG and how it is assessed. In most MMORPGs, progression is usually assessed by a character's level in the game, the quality of their equipment, and/or the amount of wealth that has been attained in the

game. However, there are some MMORPGs that do not have any quantitative measures of achievement.

*Perpetuity*: This is a distinctive feature of the MMORPG experience that makes them different to other video game formats and mediums. MMORPGs do not have a finite end goal or finishing point. The in-game decision making and gamers' actions will affect the on-going storyline of the game. Therefore, the game continues on as their will always be new goals to achieve in the endless virtual worlds.

Part of the appeal of MMORPGs is that they are built around persistent worlds that change and develop (Suciu, 2004). They are occupied by thousands of gamers who can physically influence the virtual environment. The following section will provide an analysis of research that has examined many aspects of MMORPGs.

**Demographics**

Early research that investigated MMORPGs focused on the demographics of online gamers. Griffiths, Davies and Chappell (2003) collated secondary data relating to online gamers (n = 23, 995). Data was gathered from two online *EverQuest* gaming fan sites and found that 60% of online gamers were over 19 years of age. They also found that most players were generally well educated and the game clientele was very much an adult profile. This evidence demonstrated that the stereotype of the typical online gamer being a socially withdrawn young male with limited sex role was misplaced. In a follow-up study, Griffiths et al (2004a) gathered primary data on the basic demographic factors of online game players (n = 540). The results showed that 81% of online gamers were male, and that the mean age of players was 27 years. The studies by Griffiths et al (2003, 2004a) can be criticised for gathering data from a small number of fan sites thus bringing up issues of validity when generalising from the findings to other types of MMORPGs.

Yee (2006a) conducted a demographic survey of 30,000 online gamers by collecting data from four online fan sites. The findings showed that 85% of gamers were male with the average age of gamers being 26 years. The average playing time online was 22

hours per week. Many of the gamers were in stable careers and had families of their own. Yee's (2006a) findings showed that teenagers, college students, early adult professionals, middle-aged homemakers, and retirees populated the MMORPG environment. One of the limitations with this study was its reliance on a self-selected group of respondents who may not have reflected the MMORPG population in general. Research by Williams, Yee and Caplan (2008) gathered demographic data from 7,000 players of *EverQuest 2*. Players were found to be primarily adult, male, white and middle class. It was difficult to generalise from these findings as data were gathered from only one MMORPG, and the demographic make-up of MMORPGs is constantly changing.

**Motivations for playing MMORPGs**

Researchers have been interested in why people play MMORPGs. Taylor and Taylor (2009) interviewed 21 participants in order to discover the motivations for playing MMORPGs. Analysis of the interview transcripts showed that social communication and group cohesion were the strongest motivators for game playing. The author acknowledged that the study was a small-scale pilot study, and that a larger study was warranted on this topic of research. Klimmt, Schmid and Orthmann (2009) reported findings from an online survey of 8,203 players of a German online game (*Travian*). Results suggested that the game was enjoyed primarily because of the social relationships involved in game play, and the specific time and flexibility characteristics ("easy-in, easy-out"). The game in question was a strategy game, therefore it could be argued that the motivations of players who play these types of games will be different than for players of other game types.

Choi and Kim (2004) conducted a large-scale survey investigating the motivations of Korean gamers (n = 1,993). The results indicated that gamers continued to play online if they had pleasant social interactions with other gamers online. Appropriate in-game goals and communication tools also facilitated motivations for playing. The research contained a few limitations. Only 16 MMORPGs were investigated, many MMORPGs were not included as well as more recent MMORPGs.

Research by Yee (2006b) revealed a five factor model of user motivations; Achievement, Relationship, Immersion, Escapism, and Manipulation. Male players were significantly more likely to be driven by the Achievement and Manipulation factors, while female players were significantly more likely to be driven by the Relationship factor. However, the study lacked qualitative insights of why gamers were driven by the aforementioned factors. Frostling-Henningsson (2009) examined young adults' (n = 23) motives for online gaming using a variety of qualitative methods. The results showed that the social aspects of cooperating and communicating among gamers, as well as escapism, were key motivating factors. However, the study was limited to experiences of gamers who played two types of online games (*Counter-Strike* and *World of Warcraft*) and who attended an online gaming centre in Sweden. Research into gamer motivations has generally provided interesting insights.

**Identity**

The character customisation options in MMORPGs allow gamers to change identity online. This can be a liberating experience for many gamers (Morahan-Martin, 1999). Bessiere, Seay and Kiesler (2007) examined the possibilities for identity exploration that is allowed by MMORPGs. They found that players (n = 51) created their main character more similar to their ideal self than the players themselves were. Players rated their character as having more favourable attributes that were more favourable than their own self-rated attributes. Players with lower psychological well-being scores rated themselves comparatively lower than they rated their character. However, the study was limited to players of *World of Warcraft* (WoW) and the sample comprised mainly students, therefore further research is needed to generalise from the study.

Yee, Bailenson and Ducheneaut (2007) explored the hypothesis that people infer their expected behaviours and attitudes from observing their avatar's appearance - a phenomenon known as the Proteus Effect. It was found that both the height and attractiveness of an avatar in an online game were significant predictors of the player's (n = 32) performance. Participants given taller avatars negotiated more aggressively in subsequent face-to-face interactions than participants given shorter avatars. In this particular study, participants were given characters rather than being able to choose

their own character - the typical situation in MMORPGs. Different findings may have been obtained had the participants been able to choose their own character. MMORPGs provide players with anonymity and the opportunity to create a virtual life for themselves online. Suler (1999) argues that people have an inherent need to alter their consciousness and to experience reality from different perspectives. Research focusing on identity and the influence on personality is therefore much needed.

**Socialisation / social interaction**

Social interaction is one of the main aspects of MMORPGs. These virtual environments are designed to encourage interaction between gamers. Cole and Griffiths (2007) explored the social interactions that occur both within and outside of MMORPGs. An online survey was completed by 912 gamers from 45 countries. The study showed that MMORPGs were highly socially interactive environments providing the opportunity to create strong friendships and emotional relationships. MMORPGs also offered a place where teamwork, encouragement, and fun can be experienced. One of the limitations of the study was that a self-selected sample was used which may not have been representative of the population of online gamers. Many other studies (e.g., Hussain & Griffiths, 2008; Lo, Wang & Fang, 2005; Bessiere, Seay & Kiesler, 2007) can also be criticised for using self-selected samples.

Hussain and Griffiths (2008) investigated online socialisation and the phenomenon of gender swapping in MMORPGs. The researchers used an online questionnaire method to gather data from 119 gamers. The results showed that 21% of gamers said they preferred socialising online to offline, more male gamers than female gamers said that they found it easier to converse online than offline. The gamers saw the online worlds as pleasant and satisfying environments which provided equality. The results also showed that 57% of gamers had engaged in gender swapping. However, the use of self-report measures and a small sample must be taken into consideration when interpreting these findings.

Chen, Duh et al (2006) conducted 40 in-depth interviews with online gamers and found that social interaction was a key factor that determined the level of engagement.

Engaged gamers experienced high levels of enjoyment more frequently and valued the importance of social interactions more than non-engaged gamers. The use of a small sample in this study makes it difficult to generalise from the results. Research examining socialisation suggests that MMORPGs are based around the concept of social interaction and this has many psychological implications for those who inhabit these virtual environments. MMORPGs allow gamers to express themselves in ways they may not feel comfortable doing in real life and they are extraordinary social networking tools (Cole & Griffiths, 2007).

**Consequences of play**

There are many physical and psychosocial effects that have been attributed to online gaming. Smyth (2007) conducted a longitudinal study to examine the consequences of MMORPG play. A total of 100 gamers aged 18- to 20-years were randomly assigned to play arcade, console, solo computer, or MMORPG games. After one month of playing, the MMORPG group reported more hours spent playing, worse health, worse sleep quality, and greater interference in "real-life" socialising and academic work. The use of a small sub-group of participants (18-20 year olds) raises doubts about the findings of this study because many gamers of other age groups were not examined. Research by Longman, O'Connor and Obst (2009) used an online survey to examine whether social support can be derived from MMORPGs. Gamers (n = 206) were found to derive social support from playing, and a positive relationship was found between game engagement and levels of in-game social support. Higher levels of in-game social support were associated with fewer negative psychological symptoms. However, the study focused on only one MMORPG thus limiting the scope of the findings.

Lo, Wang and Fang (2005) surveyed 174 Taiwanese students to collect data on the potential effects of MMORPGs. The results revealed that the quality of interpersonal relationships decreased, and the amount of social anxiety increased as the amount of time spent playing increased. However, this study only examined gamers from one country thus making it difficult to generalise to other cultures. Research by Wang and Wang (2008) found that gamers (n = 402) tend to help others in MMORPGs due to altruism and reciprocity. Male gamers were more likely to seek friendship with female

gamers to obtain emotional support. There were some notable limitations with this study; the use of self-report measures raises issues of validity, and the data were gathered from one gaming website excluding many other popular websites.

Wood, Griffiths and Parke (2007) used an online survey to examine experiences of time loss among gamers (n = 208). Results showed that time loss occurred irrespective of gender, age, or frequency of play, but was associated with particular structural characteristics of games such as their complexity, the presence of multi-levels, and multiplayer interactions. Time loss could have both positive and negative outcomes for gamers. Positive aspects of time loss included helping gamers to relax and temporarily escape from reality. Negative aspects included the sacrificing of other things in their lives, and guilty feelings about wasted time. However, the study did not show the longitudinal effects of time loss, and longitudinal research on this topic area is needed. Research on the consequences of MMORPG play has revealed diverse effects but as this is a new area of research, more systematic studies are needed to help further understanding.

**Group membership / communities**

The development of close-knit online guilds or communities within virtual worlds has caught the interest of researchers. Axelsson and Regan (2002) investigated how group membership in an MMORPG affects online and offline social interaction. Data was gathered from 5,064 gamers and showed that online groups make gamers more social online and offline, they have more close friends online and they participate in social activities more often, they have more social contacts with players' offline. However, Axelsson and Regan (2002) only investigated one MMORPG therefore we do not know the effect of group membership in many other MMORPGs. The study failed to examine the effect of solo-play on group membership. This is an area where more research is needed.

Chen, Sun and Hsieh (2008) focused on guild dynamics within the *World of WarCraft* (WoW). The researchers used the WoW user interface to collect data on in-game player activities. After gathering data for 641,805 avatars on 62 Taiwanese WoW game

servers Chen et al (2008) created five guild type categories that have different meanings in terms of in-game group dynamics. The five guild types were; newbie guilds, small guilds, large guilds, elite guilds, and unstable guilds. These guild categories explained the guild life cycle (i.e., the formation of guilds, their membership and development). However, these findings were culturally specific to Taiwan. The same guild types may not exist in game worlds in other countries. Research by Nardi and Harris (2006) examined group structure using participant observation methods and interviews with 26 gamers. The results showed that MMORPG play was characterised by a multiplicity of collaborations in structured groups making the MMORPG more enjoyable and providing rich learning opportunities. The study focused on only one MMORPG, and research examining a variety of MMORPGs is needed.

MMORPGs have had a large influence on the video game industry, and they have changed the way in which people play video games. Judging from the various MMORPG studies, it can be asserted that MMORPGs are more than just games (Chan & Vorderer, 2006). MMORPGs represent a different gaming experience with different social experiences, cultural norms, values, and hierarchical structures. These virtual environments have different consequences than other types of video games and appear to pose both unique risks and benefits from their use (Smyth, 2007). Significant limitations in the studies, such as the predominant use of self-report measures, self-selected samples, samples consisting of young adolescents or students, and a focus on specific MMORPGs, point to the need for further research. As online gaming becomes increasingly popular it will inevitably bring with it many physical, behavioural and psychological consequences such as excessive play and addiction to MMORPGs.

## Chapter 2: The Psychology of Addiction

### Addiction: An introduction

Many people have struggled with a health-related and relationship damaging addiction or know someone who has (Browne-Miller, 2009). Addiction is a global issue as it has implications for every population and every age group, it poses a significant threat to the health, social and economic fabric of families, communities and nations (The World Health Organisation, 2008; Browne-Miller, 2009). The World Health Organisation (2008) has provided figures on psychoactive drug use estimating that there are 2 billion alcohol users worldwide, 1.3 billion smokers and 185 million users of other drugs. In addition to this, the World Health Organisation has estimated that there are at least 76 million people with alcohol use disorders and 15 million people with drug use disorders worldwide. These figures highlight the role of some of the substances that are playing a role in the global addiction epidemic (United Nations, 2008). Clearly, the pervasive problem of addiction must be studied within a societal context. Most definitions of addiction tend to involve the taking of drugs. Consider the following definitions of addiction;

*"Compulsive physiological and psychological need for a habit-forming substance"* (American Heritage Dictionary, 2007).

*"The state of being enslaved to a habit or practice or to something that is psychologically or physically habit-forming, as narcotics, to such an extent that its cessation causes severe trauma"* (dictionary.com).

*"The condition of being habitually or compulsively occupied with or involved in something"* (American Heritage Dictionary, 2007).

*"Addiction is defined by tolerance, withdrawal, and craving. We recognize addiction by a person's heightened and habituated need for a substance"* (Peele, 1985, p.1).

**"***A chronic relapsing condition characterized by compulsive drug-seeking and abuse and by long-lasting chemical changes in the brain"* (medecinenet.com).

Researchers have recognised that behaviours that do not require the ingestion of a drug can also be addictive. These include behaviours such as gambling (Griffiths, Wardle, et al, 2009), exercise (Allegre, Souville et al, 2006; Glasser, 1985), overeating (Orford, 2001), internet use (Widyanto & Griffiths, 2006) and work (Griffiths, 2005b). An all encompassing (referring to both chemical and non-chemical behaviours) definition is more suitable when considering the current research context. Thus, addiction can be defined as a;

*"Compulsive, uncontrollable dependence on a substance, habit, or practice to such a degree that cessation causes severe emotional, mental, or physiological reactions"* (Mosby's Medical Nursing & Allied Health Dictionary, 1998; p321).

This definition allows one to explore the meaning of addiction and to become aware of the fact that the concept of addiction has changed over time. It is important to note that an addiction to a substance, habit, or practice leads to many negative consequences such as conflicts in life, a loss of control and withdrawal symptoms. Both chemical and non-chemical addictions can cause psychological, medical and social harm to the addicted individual (West, 2001; Griffiths, 1995a). West (2001) stated that "addiction typically involves initial exposure to a stimulus followed by behaviours seeking to repeat the experience. After a number of repetitions of the behaviour–stimulus sequence, the addiction becomes established" (p.3). Stimuli that provide pleasure, relief and/or excitement have the tendency to become the focus of addiction (West, 2001). This chapter discusses the psychology of addiction by examining some of the underlying theories of addiction. The chapter will also briefly examine technological addictions including excessive (online and offline) gaming.

## Components model of addiction

One method used to determine whether a particular behaviour is addictive is to compare it against clinical criteria of more established addictions (Griffiths, 2005a). This method makes potential addictive behaviours more clinically identifiable and has been supported by researchers (e.g., McIlwraith, Jacobvitz, Kubey & Alexander, 1991 [television addiction]; Griffiths, 1991a, 1992 [amusement machine addiction]). Furthermore, it can be argued that all types of addictive behaviour have elements in common (Griffiths, 2009a). Further to this, Griffiths (2005b) has operationally defined addictive behaviour as any behaviour that features the six core components of addiction, which were first outlined by Brown (1993) and later modified by Griffiths (1996a; 2005), (i.e., salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse). The six components of addiction were extracted from the Diagnostic and Statistical Manual (DSM) pathological gambling criteria (American Psychiatric Association, 1980, 1994, 2000). Under this model, it is argued that any behaviour that fulfils the six criteria can be operationally defined as an addiction. Using these criteria, Griffiths (2010) has shown how online gaming would be operationally defined as an addiction:

*Salience* - This occurs when online gaming becomes the most important activity in the person's life and dominates their thinking (preoccupations and cognitive distortions), feelings (cravings) and behaviour (deterioration of socialised behaviour). For instance, even if the person is not actually gaming online they will be thinking about the next time that they will be.

*Mood modification* - This refers to the subjective experiences that people report as a consequence of engaging in online gaming and can be seen as a coping strategy (i.e. they experience an arousing "buzz" or a "high" or paradoxically tranquilizing feeling of "escape" or "numbing").

*Tolerance* - This is the process whereby increasing amounts of online gaming are required to achieve the former mood modifying effects. This basically means that for

someone engaged in online gaming, they gradually build up the amount of time they spend online engaged in the behaviour.

*Withdrawal symptoms* - These are the unpleasant feeling states and/or physical effects that occur when online gaming is discontinued or suddenly reduced (e.g., the shakes, moodiness, irritability, etc.).

*Conflict* - This refers to the conflicts between the online gamer and those around them (interpersonal conflict), conflicts with other activities (job, schoolwork, social life, hobbies and interests) or from within the individual themselves (intrapsychic conflict and/or subjective feelings of loss of control) which are concerned with spending too much time engaged in online gaming.

*Relapse* - This is the tendency for repeated reversions to earlier patterns of online gaming to recur and for even the most extreme patterns typical of the height of excessive online gaming be quickly restored after periods of abstinence or control.

Griffiths (2002b) has argued that all these components must be present for a behaviour to be operationally defined as addictive. People tend to engage in behaviours that have rewarding elements. Griffiths (2005b) has also argued that when engaging in such rewarding behaviours they may show signs of being addicted but may not necessarily display a full-blown addiction (Griffiths, 2005b). With this in mind, Griffiths (2005b) argues that "if someone has no negative withdrawal effects after stopping their excessive behaviour, are they really addicted? If the excessive behaviour does not conflict with anything else in that person's life, can it be said to be an addiction? The difference between an excessive healthy enthusiasm and an addiction is that healthy enthusiasms add to life whereas addictions take away from it" (p.195). The components model of addiction has been widely applied by researchers in the behavioural addiction field (e.g., Charlton, 2002; Terry, Szabo & Griffiths, 2004; Lemmens, Valkenburg & Peter, 2009).

## Explanations of addictive behaviour

Various explanations of addictive behaviour have emerged from the scientific literature to help further understanding of addiction. This section will briefly examine some of the most prominent general explanations. These are those from biological, cognitive and behavioural perspectives.

### Biological explanations of addiction

Biological explanations of addiction centre on factors such as neurotransmitter substances in the brain and/or genetic differences between people with addictions and people without addictions (Griffiths, 2009a). Biological factors contribute to the process of addiction in that alcohol, drugs, gambling, etc., have a physical effect upon the body (and in particular the brain) that will consequently influence behaviour (McMurran, 1994). It has been reported that an under functioning dopamine reward system or reward deficiency can lead to the development of addictive behaviours (Blum, Braverman & Holder, et al 2000; Betz, Mihalic, et al, 2000). Neurotransmitters such as dopamine and other neurochemicals such as norepinephrine, serotonin and noradrenaline have also been found to have implications for addiction (Potenza, 2001). Serotonin and norepinephrine have also been implicated in behaviours such as gambling (Moreno, Saiz-Ruiz & Lopez-Ibor, 1991; Roy, Adinoff et al, 1988; Comings, et al, 1996) and video game playing (Koepp, et al, 1998). Research comparing the genetic make-up of addicted and not-addicted individuals has shown that there is a link between addictive behaviour and the personality traits of psychoticism, neuroticism, aggression and trait anxiety (Eysenck, 1997; Mehroof & Griffiths, 2009; Jang, et al, 2000; Comings, et al, 1996). Jang et al (2000) found a connection between genetics, anti-social personality characteristics and alcoholism. Contrary to these findings, Han, et al (1999) found that environmental factors (rather than genetic factors) were the major influences on the decision to use substances.

Dunwiddie (1983) put forward the biological theory of addiction noting that drugs such as cocaine, amphetamines and opiates can pharmacologically stimulate many parts of the brain known as reward centres. Dunwiddie (1983) speculated that normal pathways to these ‘reward centres’ function inadequately in individuals who misuse drugs of

abuse. Peele and Alexander (1998) have criticised Dunwiddie's (1983) theory for not supporting it with actual research findings of drug abusers. Milkman and Sunderwirth's (1983) neurological model of addiction proposes that addiction is the result of "self-induced changes in neurotransmission" (p.36) by the use of drugs such as cocaine which leads to heightened mood states. This theory also touches upon the influence of enzymes on hormones and neurotransmitters that may contribute to an addictive personality. However, there are no research findings to support the theory (Peele & Alexander, 1998). The exposure model or the exposure orientation (Alexander & Hadaway, 1982) proposed that the introduction of certain substances (e.g., amphetamines, cocaine, and alcohol) into the body can cause metabolic adjustments that require the individual to continue substance use with increasing dosages in order to avoid withdrawal (Peele & Alexander, 1998). Linked to this theory, researchers (e.g., Goldstein & Cox 1977; Snyder, 1977) have surmised that regular substance abuse can reduce the natural production of endorphins in the human body thus leading to a reliance on the drug. This theory as well as the exposure model can be criticised for not providing research findings that show alterations in cell metabolism can lead to addiction (Peele & Alexander, 1998). Research by Bennett, Batonhorst, et al (1982) investigated self-administration of morphine by hospital patients and found that patients in the self-administration condition used declining doses of morphine. This shows that there was less desire for the drug which goes against the exposure model of addiction.

Biological explanations have provided interesting insights into human vulnerabilities and susceptibilities to addiction. These explanations have also provided researchers with implications for addiction treatment such as pharmacological interventions (pharmacotherapy) (Draper & McCance-Katz, 2005). The limitations associated with the biological explanations are that the complex effects of neurotransmitters are not fully known due to the complexity of the brain (Griffiths, 2009a). It is difficult to determine that a single response in the brain is associated with a specific behaviour after engaging in that particular behaviour. For instance, Ashton and Golding (1989) suggested that nicotine simultaneously affects a number of biological systems; the same result is obtained when people engage in video game playing, gambling and food consumption (Grant & Potenza, 2004; Ko, Liu et al, 2009). Another problem with

biological explanations is that the social context in which the addictive behaviour occurs is often ignored thus biological explanations are too reductionist to be complete (Griffiths, 2009). The social context of the society in which a person lives in will influence the pleasures associated with taking a drug or engaging in a rewarding behaviour (Orford, 2001). The study of genes and their links to addictive behaviour cannot provide the only explanation (Comings, 1998).

**Cognitive explanations of addiction**

Cognitive explanations of addiction focus on the thinking processes and cognitive biases of people. The explanations look at the way people process information and the judgements they make. This type of explanation predicts that faulty judgements might lead to the development of addictive behaviours (Griffiths, 2009a). In terms of cognitive biases, this can be explained using the behaviour of gambling as an example. For instance, studies show that gamblers believe they can control gambling outcomes even when the odds of the gambling activity are weighted in favour of the gambling operator (e.g., Langer, 1975; Das & Teng, 1999). Research by Griffiths (1994a) found cognitive differences in regular and non-regular gamblers using the 'think aloud' method. Regular gamblers were significantly more likely to have irrational verbalisations (e.g., personifying the slot machine, talking and swearing at the machine). Irrational verbalisations and thinking have been linked to problematic gambling behaviour (Wagenaar, 1988; Parke, Griffiths & Parke, 2007).

The cognitive labelling model (Cooney, Baker, et al, 1984) posits that an individual will experience arousal when exposed to cues associated with addictive substances. This model is based on Schachter and Singer's (1962) cognition-arousal theory of emotion which has been applied to drug craving. An individual may interpret or label the arousal that he/she experiences when faced with drug-related cues as craving for the drug (Tiffany, 1995). This arousal will be based on past drug use as this will remind him/her of the mood changing experience when faced with drug-related cues. West and Schneider (1987) theorised that smoker's interpreted the physiological changes that occur from nicotine withdrawal as craving for a cigarette. The cognitive labelling model could be beneficial in that through therapeutic interventions aimed at cognitive

reframing the craving responses to cues could be reduced (Drummond, 2001). However, there is limited evidence to support the cognitive labelling model (Tiffany, 1995). Furthermore, the cognition-arousal theory has very little research to support it (Reisenzein, 1983).

The outcome expectancy model (Marlatt, 1985) proposes that peoples' beliefs or 'expectancies' about drugs and their behavioural outcomes are linked to drug use. These expectancies are influenced by environmental cues such as parents, friends, education and society in general. So for example, a person might develop an expectancy that alcohol causes pleasurable feelings as it is a substance that is commonly consumed at parties where people are enjoying themselves (McMurran, 1994). In this case, the expectancy links alcohol consumption to pleasurable feelings and parties. This expectancy will influence future alcohol consumption whenever a person is at a party. This model can be criticised for complicating matters when it comes to investigating the pharmacological effects of drugs as it doesn't take such effects in to account (Goldman, Brown & Christiansen, 1987).

The cognitive processing model (Tiffany, 1990) proposes that addictive use of alcohol and other drugs is regulated by automatic processes. After a long history of drug taking, the actions involved in drug taking become 'automatized' and require little attention. According to this model if an individual's automatic drug-taking behaviour is impeded by an environmental obstacle (e.g., the bar is closed) then non-automatic processes are activated (e.g., frustration). These non-automatic processes generate craving for alcohol (Tiffany, 1990). The model proposes that drug use will occur without craving which is seen as a non-automatic cognitive process, thus craving is not necessary for drug use (Tiffany 1999). However, this model has been criticised for its pessimism about the role of craving in relapse (Drummond (2001). Furthermore, many of the premises of the model have not been systematically examined (Tiffany, 1999).

Cognitive explanations of addiction have highlighted individual differences. Griffiths (1994a) revealed individual differences amongst gamblers during the development and maintenance stage of gambling. However, the limitations of cognitive explanations are that it is not possible to establish a causal link between cognitive biases and addictive

behaviour (Griffiths, 2009a). Moreover, these explanations may be limited to the explanation of non-chemical addictions. Cognitive models such as the cognitive labelling model has had limited evidence to support it when applied to chemical addictions. Cognitive processes may not play a role in the maintenance of addictive behaviour, and evidence for this was shown in Griffiths' (1994a) study; regular gamblers had greater difficulty than non-regular gamblers in verbalising their thoughts whilst gambling. However, cognitive explanations are beneficial in relation to understanding mood state on cue reactivity (Drummond, 2001).

**Behavioural (learning) explanations of addiction**

Behavioural explanations of addiction are influenced by the theories of classical and operant conditioning. For instance, in operant conditioning, gamers change their behaviour in response to changes in the environment due to rewards and punishments in-game. A gamer playing a MMORPG may experience positive feelings of pleasure whilst playing. The rewards (i.e., reinforcers) and punishments can bring about changes in mood (e.g., reaching a high level in a MMORPG). Skinner's (1953) work found that variable ratio reinforcement schedules produced the strongest behavioural changes that lead to habitual and repetitive behaviour. Many MMORPGs make use of the same reinforcement schedules. Behavioural explanations also propose that a person would be most susceptible to addiction at both the initiation and maintenance of an activity. This is because the rewarding aspects of an activity (e.g., MMORPG playing) can shape future behaviour as well as maintain behaviour (Griffiths, 2009a).

The partial reinforcement effect (PRE) theory has been used to explain the occurrence of excessive video game playing and the process of video game addiction (Wanner, 1982). This theory suggests that the intermittent reinforcement schedules in video games encourage the player to continue responding in the absence of reinforcement hoping that another reward is close by. Many video games have made use of the PRE and may help explain why video games tend to be so appealing (Griffiths & Davies, 2005). Griffiths and Wood (2000) reported that youth gambling and video game playing were linked to the receiving of intermittent rewards. However, the effects of MMORPG playing in terms of PRE theory have not been examined. The opponent

process model (Solomon & Corbit, 1974) puts forward the premise that an addictive behaviour such as gambling is reinforcing as it produces feelings of excitement. Gambling behaviour also produce opponent processes that counteract the exciting effects of gambling. So in this case there would be feelings of deflation as the excitement of gambling will lessen after time (McMurran, 1994). So the prediction of this model is that gamblers will attempt to regain previous levels of excitement by raising the stakes or dispel low moods by spending more time gambling (McMurran, 1994). However, this theory assumes that there is a causal relationship between the initiation and maintenance of an addictive activity. Thus neglecting the role of craving, relapse and emotional states (Drummond, 2001).

The Hedonic Management Model of Addiction (Brown, 1997) proposes that people use certain activities to manipulate their arousal and mood to sustain good hedonic tone (i.e., states of relative pleasure and euphoria). An addiction develops when an activity provides relatively powerful and effective means of manipulating hedonic tone to sustain long periods of euphoria. The choice of addictive activity depends on the social support for the activity, the range of activities available in the environment, and the inherent properties of that activity to affect the individual's hedonic tone. Activities with stronger reinforcement effects lead to faster development of addiction (Brown, 1997). Recovery is brought about by regaining a normal repertoire of activities and better planning for long-term manipulation of hedonic tone. Brown has stated that addictions are value free in that they have desirable and undesirable consequences both socially and individually. This theory provides a complex developmental process of addiction. However, the theory has not been tested empirically.

Behavioural explanations have helped to explain the processes that take place during the development and maintenance of an activity. In this respect they have also helped to account for individual differences. However, some research (i.e., Delfabbro & Winefield, 1999) has shown that excessive gambling behaviour does not always adhere to operant conditioning principles as reinforcement magnitudes are not independent of player responses (e.g., gambling stake sizes). Furthermore, Griffiths (1995b) has argued that behavioural explanations have been less useful in explaining why people recommence gambling after a long period of abstinence. Neither type of conditioning

can provide a sufficient explanation. The principles might not apply to all addictive activities, especially those activities where there is a long time-interval between initiation and outcome (e.g., poker and sports betting).

**Addictive behaviour: Towards a biopsychosocial explanation**

The different explanations of addictive behaviour all have shortcomings associated with them. None of them can provide a comprehensive explanation for addictive behaviour. Research tends to show that addictions result from an interaction and interplay between many factors including biological and/or genetic predispositions, psychological foundations (personality factors, attitudes, expectations, beliefs and intrinsic motivations), social environment (i.e., situational characteristics), and the activity itself (i.e., structural characteristics) (Griffiths, 1999b). This highlights the interconnected processes and integration between different explanations of addiction. Addiction is a multifaceted behaviour strongly influenced by many factors, therefore a biopsychosocial approach that incorporates biological, psychological and sociological theory to understand addiction is required (Griffiths, 2005b; 2008).

Griffiths and Larkin (2004) have suggested four core components of a successful theory of addiction. A successful theory must: (i) synthesize pharmacological, cultural, situational and personality factors, (ii) account for the varying nature of addiction across cultures, individuals and time, (iii) account for commonalities between all addictions, and (iv) be faithful to lived human experience. Griffiths and Larkin (2004) have also argued the case for a complex systems model of addiction. This model was influenced by the fact that addiction is a complex phenomenon based on Davies (1992) argument that alternative explanations for excessive behaviour require ‘‘the development of a ‘system’ within which drug use is conceived of as an activity carried out for positive reasons, by people who make individual decisions about their substance use, and who may take drugs competently as well as incompetently’’ (p.163).

The complex systems model of addiction is a flexible theoretical approach that has the potential to help bridge the epistemological gap. Furthermore, the model fits well with

the biopsychosocial approach to addiction (e.g., Marlatt, Baer, et al., 1988; McMurran, 1994). The model also allows for the consideration of all types of elements that are specific to an individual's situation including psychological, physiological, social and cultural factors, as well as considering the pharmacological properties and the reinforcing properties of substances and non-substances (Griffiths, 2005b).

## Video games and Gambling

There are many negative consequences that can result from excessive video game playing. This includes a lack of participation in physical activities, excessive spending on games, and ignoring important tasks such as homework (Griffiths & Hunt, 1998; Phillips et al, 1995). Video games could lead to compulsive behaviour, as the individual falls into a virtual world for long periods of time each day. In this sense, video games have been compared to some forms of gambling. Griffiths and Davies (2005) have argued that on both a psychological and behavioural level, slot machine playing and video game playing share many similarities. These similarities include:

- Similar demographic differences, such as age and gender breakdown
- Similar reinforcement schedules
- Similar potential for "near miss" opportunities
- Similar structural characteristics involving the use of light and sound effects
- Similarities in skill perception
- Similarities in the effects of excessive play

Wood, Gupta, et al (2004) investigated adolescent gambling, video game playing and substance abuse using questionnaires. They found a relationship between problem gambling and high frequency video game playing in adolescents. Problem gamblers were more likely to spend excessive amounts of time playing video games, problem gamblers found video games similar to electronic machine gambling, and their motivation to take part in both activities was to experience feelings of arousal and/or relaxation (Wood, Gupta, et al, 2004). Playing video games and gambling were seen as very similar activities. Griffiths (1991a) suggested that video game playing is often a

precursor to slot machine playing and may be considered a non-financial form of gambling, trying to gain as many points as possible instead of money. Slot machines and arcade video games have a very similar playing philosophy, that is to stay on the machine for as long as possible using the least amount of money (Griffiths, 1990a, 1990b).

Research by Gupta and Derevensky (1996) has shown links between video game playing and gambling. They found that children and adolescents who reported excessive video game playing were also more likely to participate in gambling activities. High frequency video game playing males were more likely to gamble at least once per week. High frequency video game playing females behaviour was almost the same as males. Reasons for doing both activities were similar, primarily for enjoyment and the excitement these activities provided. Thus people may be drawn to these activities due to the presence of similar properties. However Gupta and Derevensky (1996) acknowledged the fact that it is difficult to establish causality such that video game playing actually leads to increased gambling behaviour. There have been an increasing number of research findings suggesting that arcade video games are similar to slot machines, particularly in terms of dependency (e.g., Brown & Robertson, 1993; Griffiths, 1991a, 1993, 1997a; Gupta & Derevensky, 1996; Fisher & Griffiths, 1995). Increased use of video game technology in gambling machines will bring overlapping similarities between video games and gambling. Technological advances have led to a focus on technological addictions.

## Technological Addictions

The social environment has changed due to the advances in computer technology. Furthermore, the opportunities and social forces leading to addiction have created new problems (West, 2001). Research has begun to focus on new types of addictions. There is a growing body of research investigating the addictive aspects of email (Chatzky, 2007; Zhou, Tang & Peng, 2009), instant messaging (Huang & Leung, 2009; Neo & Skoric, 2009), mobile phone use (Bianchi & Phillips, 2005; Takao, Takahashi & Kitamura, 2009), online chat rooms, MMORPGs (Zhou, Tang & Peng, 2009; Hsu, Wen & Wu, 2009), slot machine gambling (Griffiths, 1991b), general internet use

(Gong & Chen et al, 2009; Ni & Yan et al, 2009), and television viewing (McIlwraith, Jacobvitz, et al, 1991). Addiction to these types of technologies have been termed "technological addictions" (Griffiths, 1995a; 1996b) and have been operationally defined as non- chemical (behavioural) addictions that involve excessive human–machine interaction. According to Griffiths (1995a), these types of addictions can either be passive (e.g., television) or active (e.g., computer games), and tend to contain inducing and reinforcing features which may contribute to the promotion of addictive behaviours. Technological addictions contain the core components of addiction (Brown, 1993; Griffiths, 1996b) and they have been viewed as a subset of behavioural addictions (Marks, 1990).Young (1999) has claimed that people can get addicted to the internet. For Young (1999), 'internet addiction' is a broad term that covers a variety of behaviours and impulse control problems that, can be categorised into five specific subtypes:

- *Cybersexual addiction:* Compulsive use of adult websites for cybersex and cyberporn
- *Cyber-relationship addiction:* Over involvement in online relationships
- *Net compulsions:* Obsessive online gambling, shopping or day-trading
- *Information overload:* Compulsive web surfing or database searches
- *Computer addiction:* Obsessive computer game-playing (*Doom, Myst, Solitaire*, etc.).

Griffiths (2000a) has argued that many of the excessive users who are supposedly addicted to the internet are not 'internet addicts', rather they use the internet excessively in order to fuel other addictions. Griffiths (2000a) gives the example of a gambling addict who chooses to gamble online and a computer game addict who plays online. The internet is the place where both addicts choose to engage in their addictive behaviour (Griffiths, 2000a).

In contrast, there is case study evidence that appears to report addiction to the internet itself (e.g., Young, 1996; Griffiths, 2000b). The capability of the internet to allow users to socialise by using email, chat rooms and MMORPGs may be the reason why people spend excessive amounts of time in their chosen activity (Byun & Ruffini et al, 2009). Many research studies (e.g., Kim, Namkoong, et al, 2008; Grusser, Thalemann &

Griffiths, 2007; Hsu, Wen & Wu, 2009; Griffiths & Hunt, 1995) have raised concern about the risk of addiction to offline video games and MMORPGs. This is an issue that has received a lot of attention from psychologists. The next section reviews the psychological research literature in regards to video gaming and addiction.

## Video gaming and addiction

The popularity of video games has led to them becoming an essential part of many people's lives. Video games are now a predominant part of leisure culture and have become a new form of popular culture (Griffiths & Dancaster, 1995). Arcade video game machines have become a familiar site in bars, clubs, cafes, restaurants and in many other social environments. Video games provide a number of features that make them very attractive (e.g., realistic graphics, realistic sound effects, character development, multi-player features, etc.). The rapid growth in popularity of video games, together with the enthusiastic way young children play has raised much concern amongst parents, politicians, and social scientists (Egli & Myers, 1984). Such concerns include the fear that young people who play video games may develop an addiction to them (Egli & Myers, 1984).

There have been a number of press reports about excessive video game players ("joystick junkies"), and it has been alleged for over twenty years that social pathologies are beginning to surface among excessive video game players (Griffiths & Davies, 2005). For instance, Soper and Miller (1983) argued that 'video game addiction' was like any other behavioural addiction, consisting of compulsive behavioural involvement, a lack of interest in other activities, association with other addicts, and physical and mental symptoms when attempting to stop the behaviour (e.g., the shakes).

There is speculation that online gaming maybe more problematic and addictive than offline video gaming (Griffiths, et al, 2003). The last decade have seen writings focusing on online gaming addiction as it is this variant that appears to be causing the most problems for users (Griffiths, 2009b). Many self-help web sites dedicated to

online gaming addiction have emerged on the internet (e.g., onlinegamersanonymous.com, wowdetox.com, internetrecovery.com). Furthermore, in a report for the *Council on Science and Public Health*, Khan and Kantof (2007) specifically referred to MMORPGs as being associated with 'video game overuse' more than any other genre of video game.

The fact that MMORPGs can be never-ending, are accessible 24/7, and that they are played in real-time, provides reasons as to why they have been seen to be more addictive than offline video games. Griffiths, et al's (2004a) research examining the demographic factors of online game players revealed that 4% of players claimed to play for over 70 hours a week. Unpublished research by Yee (2002) showed that more than 52% of gamers stated that they had played an MMORPG for 10 or more hours continuously. Longman, et al's (2009) survey study of 206 online gamers identified a small sub-sample of gamers (n = 21) who played for 44 to 82 hours per week. These gamers had significantly lower levels of offline social support and higher levels of negative symptoms compared to the rest of the sample. This data were based on self-report measures; there is a possibility that the excessive gamers may have provided exaggerated responses.

Mood disorders (e.g., depressive disorders, bipolar disorders), anxiety disorders (e.g., social phobia), attentional disorders (e.g., attention deficit hyperactivity disorder) and substance use disorders (e.g., amphetamine, cannabis abuse or dependence) have been found to co-occur with online gaming addiction (Yoo & Cho et al, 2004; Christensen & Orzack et al, 2001; Volkow, 2004). However, it is not known whether these disorders are caused by online gaming or by other factors. Further research is needed. Although the *American Psychiatric Association* does not currently view any type of 'video game addiction' as a mental disorder, it has stated that it would be considered when the association compiles the new edition of the Diagnostic and Statistical Manual (DSM) in 2012 (Freeman, 2008). The issue of addiction and video games is open to further examination. This section will provide an overview of video game addiction irrespective of medium (i.e., online and offline video gaming). Particular interest will be placed on the screening instrument used by researchers to establish addiction.

Studies are reviewed in terms of using similar addiction screening instruments. Qualitative studies are reviewed in a separate section.

## Screening instruments

Before moving on to the overview of the video game addiction literature it is important to provide a brief summary of the psychiatric classification of addiction and how it relates to video game addiction. Two main classification criteria have been used to measure psychiatric disorders which have then been adapted to measure video game addiction. These criteria are the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM) and the World Health Organisation's (WHO) International Classification of Diseases (ICD). Both criteria are revised and updated on a regular basis, the DSM is in its fourth edition (the DSM-IV) while the ICD is in its tenth edition (ICD-10). Both classification criteria are used by mental health professionals in order to better understand the variety of problems faced by people.

## Studies that have investigated video game addiction using the DSM criteria

Researchers have compared video game addiction against clinical criteria for other established addictions. Fisher (1994) developed a scale adapted from the DSM-IV to identify arcade video game addiction in adolescents (n = 467). The results revealed that the scale had acceptable internal consistency, reliability and factorial validity. Arcade video game addiction was characterised by a subjectively experienced, overwhelming need to play arcade video games. Fisher (1994) argued that arcade video game playing is a behaviour that resembles pathological gambling. The new generation of gambling machines are increasingly more interactive and they have integrated video game graphics and technology. Fisher (1994) suggested that these new gambling slot machines may prove to be attractive to a generation of adolescents who have grown up on arcade video games. However, it can be argued that it is not possible to generalise the findings of this study to adolescents in other areas of the UK due to the fact that the study only focused on one location.

Griffiths and Dancaster (1995) investigated the relationship between Type A personality and arousal in video game play using a sample of 24 participants. The measurement instrument in this study was the computer game addiction checklist adapted from the DSM-III-R, a set of criteria used to identify pathological gambling in adults (American Psychiatric Association, 1987). The results indicated that Type A individuals (n = 12) had significantly higher heart rates than Type B individuals. Type A individuals were twice as likely to fulfil game addiction criteria. Video game players became aroused whilst playing video games and through this arousal they were more likely to play again. There were a number of limitations to the study including the use of a very small sample of students who were not representative of the video game playing population. Furthermore, six participants had no experience of playing video games, which may have had a confounding effect on the results.

Philips, Rolls, Rouse and Griffiths (1995) attempted to quantify the extent of home video game playing in a sample of 868 school children using a questionnaire method The results showed that 77.2% of children played video games and that most of the children played for between one half and one hour a day. The results also revealed that 7.5% of players in their sample displayed behaviour that might be considered to be addictive based on DSM-III-R criteria. For instance, these players reported neglecting homework to play, felt that they played longer than they intended, and played video games six or more days per week. The study did not examine further indicators of addiction that would be needed to prove video game addiction existed, such as mood modification and withdrawal symptoms.

Griffiths and Hunt (1995; 1998) attempted to establish video game dependence by using a scale adapted from the DSM-III-R criteria. A questionnaire study was undertaken with 387 adolescents aged between 12-to-16 years of age. Analysis indicated that one in five adolescents were dependent upon video games. Dependent players were more likely to report not wanting to stop playing and wishing they were still playing after they had stopped. Boys played significantly more regularly than girls and were more likely to be classified as dependent. The earlier children began playing video games the more likely they were to be playing at dependent levels. Interestingly,

7% of the sample claimed to play video games for over thirty hours a week. Undoubtedly, playing video games for thirty hours or more a week is likely to have an adverse psychological and social effect on the individual. An unexpected finding was that dependent players were no more likely to truant to play video games, steal to buy new games or to report poor school performance as a result of their playing. This raises doubts in regards to the validity of the scale that was used to measure dependence. Griffiths and Hunt (1995, 1998) acknowledged that the scale was more of a measure of preoccupation than dependence.

Griffiths (1997a) administered a survey on 147 eleven-year old computer game players in order to explore computer game playing behaviour in early adolescence. An addiction scale adapted from the DSM-III-R was used. The results showed that the main reasons for playing were for fun, for a challenge, because there was nothing else to do, and because their friends played. The results also revealed that 37% of gamers were classified as addicted. One of the limitations of the study sample was the use of a sample consisting of very young children who may have provided exaggerated responses. Griffiths (1997a) acknowledged that the addiction scale was inadequate and that clearer operational definitions and diagnostic criteria were needed.

Salguero, Moran and Rosa (2002) investigated the addictive use of video games in a sample of 223 Spanish adolescents. They reviewed and adapted the DSM-IV criteria in order to design a short scale called the PVP (problem video game playing). This scale was then used to measure the problems associated with the addictive use of video games. The results showed that the excessive use of video games was associated with a number of problems that resembled dependence. Salguero et al (2002) suggested that for some of the adolescents, video game playing was a behaviour that was out of their control, invasive, used as an escape from reality or involved serious risks to their social development. However, caution must be taken in generalising the findings from this study as there were some methodological limitations. For instance, the scale used by Salguero et al (2002) did not have a cut-off point to distinguish problem video game players from recreational players, thus the scale was infeasible in terms of classifying addiction to video games. Furthermore, the sample consisted of only Spanish

adolescents. A more diverse sample would be needed in order to increase the generalisability of the results.

Grusser, Thalemann et al (2005) investigated video game playing behaviour in a sample of 323 children ranging in age from 11 to 14 years. The DSM-IV and ICD-10 criteria for dependency and pathological gambling were used to measure excessive video game playing. The data showed that 9% of children fulfilled all criteria for excessive video game playing. Furthermore, these children differed from their class mates as they watched more television, had poorer communication patterns and problems concentrating in school lectures. It was concluded that video game players use their excessive rewarding behaviour specifically as an inadequate stress coping strategy.

Studies have adapted Young's (1996, 1999) eight-item questionnaire for diagnosing internet addiction (e.g., Chak & Leung, 2004; Ko, Yen, et al., 2005; Rau, Peng, & Yang, 2006). Young's model for internet addiction is also based on the clinical criteria of pathological gambling found in the DSM-IV (American Psychiatric Association, 1994). In a study by Ko, Yen, et al (2005) the extent to which gender and related factors predicted MMORPG addiction was investigated. Severity of addiction, behavioural characteristics, number of stressors, and level of satisfaction with daily life were investigated using a sample of 395 Taiwanese students. The Chinese Internet Addiction Scale (CIAS) which was a variation of Young's (1998) internet addiction scale was used in the study. The results indicated that older age, lower self-esteem, and lower satisfaction with daily life were associated with more severe addiction among males, but not among females. However, the sample of gamers were not representative of the population of gamers worldwide.

Chan and Rabinowitz (2006) utilised a survey study of adolescents' (n = 72) and parents (n = 72) to examine video game playing behaviour. The researchers modified Young's (1999) internet addiction scale in order to measure video game addiction. Results revealed that online and offline video game use was associated with increases in addiction. Chan and Rabinowitz (2006) also reported that the scores on the addiction scale were not high enough to be considered as evidence of addiction. The main

limitation with this study was that the researchers did not define a cut-off point on the scale in order to measure excessive gaming. This makes it difficult to ascertain video game addiction.

Research by Kim, Namkoong, et al (2008) investigated the relationship between MMORPG addiction, aggression, self-control, and narcissistic personality traits. An online survey containing the online game addiction scale (modified from Young's (1999) Internet addiction scale), and the narcissistic personality disorder scale was used to gather data from 1,471 participants. The results indicated that certain psychological characteristics such as aggression, self-control, and narcissistic personality traits may predispose some individuals to become addicted to MMORPGs. However, there were several limitations with this study. It utilised a self-selected sample of gamers that raises issues of validity and generalisability. Furthermore, the online game addiction scale used in the study had not been psychometrically validated for the measurement of video game addiction. Lu and Wang (2008) explored the factors that affect online game addiction using an online survey of 1,186 Taiwanese online gamers. Addiction was measured using Young's (1998) internet addiction scale. The results indicated that perceived playfulness and descriptive norms influenced online game addiction. It was also found that addiction contributed to satisfaction and loyalty to a particular MMORPG. However, the authors stated that the findings should be interpreted cautiously because the sample was self-selected and not drawn randomly from overall online gamers in Taiwan.

Bioulac, Arfi and Bouvard (2008) used the Child Behaviour Checklist and the PVP scale to compare the behaviour of 29 hyperactive children and 21 control children playing video games. The hyperactive children exhibited more problems associated with videogame playing. The authors suggested that a subgroup of these children (n = 10) could be vulnerable to developing dependence upon video games. However, the use of a small sample prevented any generalisations being made from the study. Sun and Ma et al (2008) investigated excessive computer game playing (ECGP) and its possible links to cognitive deficits in a sample of 65 students. ECGP scores were evaluated via the use of the PVP scale. Participants were then divided into 3 three groups based on their ECGP scores (current ECGP participants, previous ECGP

participants, and control participants). The three groups of participants were then tested on a Multiple Object Tracking (MOT) task. The current ECGP participants performed significantly worse than the previous ECGP participants. This suggested that ECGP may be related to cognitive deficits. The limitations of this study were that the sample was small and consisted of only male participants.

Smahel, Blinka and Ledabyl (2008) investigated relationships between players (n = 548) and their game characters using an online questionnaire containing DSM-IV items. Their research showed that younger players (aged 12-27 years) had a tendency towards intensive gaming and were more prone to addiction. Identification with a character was seen as a factor influencing addiction. The limitation of the research was that the sample consisted of gamers who played fantasy MMORPGs who could not be considered representative for all types of MMORPGs. In a study by Hsu, Wen and Wu (2009), students gaming experience and level of addiction was explored using an online survey. The sample comprised 418 Taiwanese students aged 18- to 25-years. An addiction rating scale containing DSM-IV criteria were used in the study. The results showed five critical factors (i.e., curiosity, role-playing, belonging, obligation and reward) can be used to predict MMORPG addiction. However, the researchers only recruited a small sub-set of gamers making cross-country and cross-age comparison unfeasible.

Gentile (2009) used a national sample to gather information about video gaming habits. A randomly selected sample of 1,178 American youth aged 8 to 18 were surveyed. A questionnaire containing items from the DSM-IV was completed by the participants. The results indicated that 8% of video game players in the sample exhibited pathological patterns of play. Pathological gamers spent twice as much time playing as non-pathological gamers and received poorer grades in school. Pathological status significantly predicted poorer school performance even after controlling for sex, age, and weekly amount of video game play. However, the correlational nature of the study did not allow any claims to be made about the causal relation between the variables in the study.

Lemmens, Valkenburg and Peter (2009) developed and validated a scale to measure video game addiction. The researchers created 21 items to measure seven underlying criteria based on the DSM (i.e., salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems). Two independent samples of adolescent gamers (*n* = 721) were used to investigate the dimensional structure of the scale. The scale showed high reliability and good concurrent validity across samples. It was found that 2-9% of gamers were classed as addicted. Lemmens et al (2009) successfully validated the scale to measure video game addiction. Further research investigating video game addiction could make use of this scale in order to avoid criticisms regarding measurement instruments. Mehroof and Griffiths (2009) focused on the links between online gaming addiction and personality factors using an opportunity sample of 123 student online gamers. The game addiction scale (Lemmens et al, 2009) was used to measure video game addiction. Results indicated that five traits (neuroticism, sensation seeking, trait anxiety, state anxiety, and aggression) displayed significant associations with MMORPG addiction. These findings suggested that certain personality traits may be important in the acquisition, development, and maintenance of online gaming addiction. However, the study had several limitations such as the small student sample which was not representative of gamers.

Skoric, Teo and Neo (2009) examined video gaming habits, addiction, engagement and scholastic achievement. A survey containing Danforth's (2003) Engagement-Addiction (II) scale and questions from DSM-IV (American Psychiatric Association, 2004) was used to collect information from 333 school children. The authors found that video game addiction showed a negative association with academic performance. However, the authors acknowledged that they were unsure whether the children were able to give accurate responses to some of the questions, this raises issues of validity. Research by Kuss, Louws and Wiers (2010) examined addictive play in a sample of 158 MMORPG players. An online questionnaire containing the PVP scale as well as questions regarding gaming behaviour was completed by the gamers. The results indicated that the variables of game motivations, escapism, achievement and play time predicted excessive gaming, which may be viewed as 'game addiction' (Kuss et al, 2010). This study utilized a relatively small sample when compared to previous online research. Further research would need to gather data from a larger number of gamers. Table 1

provides a summary of the studies that have used DSM criteria to study video game addiction.

**Table 1. Summary table of studies that have used DSM criteria to investigate video game addiction**

| Authors | *n* | Main findings |
|---|---|---|
| Fisher (1994) | 467 | Video game addiction characterised by overwhelming need to play video games |
| Griffiths and Dancaster (1995) | 24 | Type A individuals were twice as likely to fulfil game addiction criteria |
| Philips, Rolls, et al (1995) | 868 | 7.5% of players displayed behaviour that might be considered to be addictive based on DSM criteria |
| Griffiths and Hunt (1995; 1998) | 387 | One in five adolescents were dependent upon video games |
| Griffiths (1997a) | 147 | 37% of gamers were classified as addicted |
| Salguero et al (2002) | 223 | Excessive video game use was associated with a number of problems that resembled dependence |
| Grusser, Thalemann et al (2005) | 323 | 9% of children fulfilled all criteria for excessive video game playing |
| Ko, Yen, et al (2005) | 395 | older age, lower self-esteem, and lower satisfaction with daily life were associated with addiction among males |
| Chan and Rabinowitz (2006) | 144 | Online and offline video game use was associated with increases in addiction |
| Kim, Namkoong, et al (2008) | 1,471 | Aggression, self-control, and narcissistic personality traits may predispose gamers to become addicted to MMORPGs |
| Lu and Wang (2008) | 1,186 | Perceived playfulness and descriptive norms influenced online game addiction |
| Bioulac, Arfi and Bouvard (2008) | 50 | Hyperactive children exhibited more problems associated with videogame playing. A subgroup of these children (n = 10) could be vulnerable to video game dependence |

| | | |
|---|---|---|
| Sun and Ma et al (2008) | 65 | Excessive playing may be related to cognitive deficits |
| Smahel, Blinka and Ledabyl (2008) | 548 | Younger players had a tendency towards intensive gaming and were more prone to addiction |
| Hsu, Wen and Wu (2009) | 418 | Five critical factors (i.e., curiosity, role-playing, belonging, obligation and reward) can be used to predict MMORPG addiction |
| Gentile (2009) | 1,178 | 8% of video game players exhibited pathological patterns of play |
| Lemmens, Valkenburg and Peter (2009) | 721 | 2-9% of gamers were classed as addicted |
| Mehroof and Griffiths (2009) | 123 | Five traits (neuroticism, sensation seeking, trait anxiety, state anxiety, and aggression) were associated with MMORPG addiction |
| Skoric, Teo and Neo (2009) | 333 | Video game addiction showed a negative association with academic performance |
| Kuss, Louws and Wiers (2010) | 158 | The variables of game motivations, escapism, achievement and play time predicted excessive gaming/gaming addiction |

**Studies that have investigated video game addiction using other types of addiction criteria**

The use of non-DSM criteria has also been considered by some researchers. McClure and Mears (1986) examined the relationship between video game playing and several psychopathologies in a sample consisting of 290 students. The researchers used the Psychopathic Deviance Scale from the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1940) to measure psychopathology. The main conclusion of the study was that high-rate video game playing was not related to the major measures of psychopathology such as neurotic pathology or conduct disorders (e.g., high alcohol and drug use). Therefore, there was no evidence for video game addiction in this study. The study did not use a direct measure of addiction, which made it difficult to assess the phenomenon of addiction.

Brown and Robertson (1993) attempted to measure addiction to video games in a sample of 45 Scottish school children. They selected items from the twenty questions used by Gamblers Anonymous to determine the presence of "compulsive" gambling. The results revealed a high positive and significant correlation between addiction to arcade video game playing and the proportion of available money spent playing. Brown and Robertson (1993) speculated that a sizeable percentage of the population might be addicted to video games. However, this speculation was based on results from a very small sample.

Yang (2005) investigated the correlation between life events and video game addiction amongst 165 junior middle school students. A video game addiction questionnaire and a self-rated life events checklist were used to gather data. A significant gender difference in terms of video game addiction was found as boys were significantly more likely to be addicted than girls. Video game addicted students scored higher on the life events checklist than non-addicted students. The correlation between life events and video game addiction was significant. Yang (2005) suggested that help should be provided to adolescents to deal with their life events properly. This study was based on a Chinese sample, different results may be found if the study used a sample from a different country due to cultural differences.

Wan and Chiou (2006a) used flow theory and humanistic needs theory to investigate the psychological motivations of Taiwanese adolescents (n = 199) who were addicted to online games. The Online Games Addiction Scale for adolescents in Taiwan (OAST) was utilised by the researchers in this study. The results indicated that flow state was negatively correlated with addictive inclination to MMORPGs. The addicts' compulsive use of MMORPGs appeared to stem from the relief of dissatisfaction rather than the pursuit of satisfaction. However, this study fell short on uncovering the factors that explain online gaming addiction. It can also be argued that the use of qualitative research methods may have been better for the examination of the experiences of 'flow' amongst gamers. Lee, Ko, et al (2006) used Korean internet addiction scales to examine video game use in a sample of 627 Korean school students. The results revealed a relationship between video game addiction and interpersonal relationship

patterns. Lee, Ko, et al (2006) suggested that some game genres have a unique psychological addiction potential that is different from others, and that this influences game selection. However, the research needs to be extended to other cultures in order to find out whether it is possible to make generalisations from the findings.

Some researchers have investigated video game addiction by adapting the ICD-10 (World Health Organization, 2000) diagnostic criteria for pathological gambling. For instance, Grusser, Thalemann and Griffiths (2007) conducted an online survey study in order to investigate the addictive potential of online gaming. A sample comprising of 7,069 gamers completed two questionnaires online. The ICD-10 was modified for the measurement of addiction. The data revealed that 11% of participants fulfilled at least three diagnostic criteria of gaming addiction. There are some problems with the addiction criteria used in this study. Participants who fulfilled at least three of six criteria of addiction were operationally defined as pathological gamers. It could be argued that such an operational definition may lead to over-estimates of problematic behaviour.

Research by Wolfling, Thalemann and Grusser-Sinopoli (2008) investigated excessive computer gaming in 221 German adolescents. The researchers adapted the diagnostic criteria of substance related addictions as defined by the ICD-10. Results showed that 6% of participants fulfilled the diagnostic criteria for psychopathological computer gaming behaviour. These participants were mostly males, used computer gaming as a mood management strategy, had low educational backgrounds, and had limited cognitive flexibility. However, the use of self-report measures brings up issues of validity. Lafreniere, Vallerand, et al (2009) used a short version of the Passion scale (Vallerand, Blanchard, et al 2003) to measure the possible psychological consequences of online gaming. The items of the scale were adapted to refer to MMORPGs. An online survey was completed by 222 online gamers. It was found that obsessive passion (less adaptive outcomes of MMORPG playing) was positively related to problematic behaviours generally associated with excessive gaming. However, the researchers utilised a correlational design that did not allow them to infer causal inferences.

Rehbein, Kleimann and Moble (2010) conducted a national survey of 15, 168 German adolescents. The researchers used a video game dependency scale (KFN-CSAS-II) to investigate video game dependence. The results revealed that 3% of gamers were classed as dependent on video games. These dependent gamers showed increased levels of psychological and social stress in the form of lower school achievement, increased truancy, sleep disturbance, limited leisure activities and suicidal thoughts. Further studies are required to validate the measurement instrument used in this study. Table 2 provides a summary of the studies that have been reviewed in this section.

**Table 2. Summary table of studies that have used other types of addiction criteria to investigate video game addiction**

| **Authors** | ***n*** | **Main findings** |
|---|---|---|
| McClure and Mears (1986) | 290 | High-rate video game playing was not related to the major measures of psychopathology |
| Brown and Robertson (1993) | 45 | Significant correlation between addiction to arcade video game playing and the proportion of available money spent playing |
| Yang (2005) | 165 | Boys were significantly more likely to be addicted than girls |
| Wan and Chiou (2006a) | 199 | Addicts' compulsive use of MMORPGs appeared to stem from the relief of dissatisfaction rather than the pursuit of satisfaction |
| Lee, Ko, et al (2006) | 627 | There was a relationship between video game addiction and interpersonal relationship patterns |
| Grusser, Thalemann and Griffiths (2007) | 7,069 | 11% of participants fulfilled at least three diagnostic criteria of gaming addiction |
| Wolfling, Thalemann and Grusser-Sinopoli (2008) | 221 | 6% of participants fulfilled the diagnostic criteria for psychopathological computer gaming behaviour. These participants were mostly males and used gaming as a mood management strategy |
| Lafreniere, Vallerand, et al | 222 | Obsessive passion was positively related to problematic behaviours |

| | | |
|---|---|---|
| (2009) | | generally associated with excessive gaming |
| Rehbein, Kleimann and Moble (2010) | 15,168 | 3% of gamers were classed as dependent on video games. These dependent gamers showed increased levels of psychological and social stress |

**Studies that have investigated video game addiction using self-devised addiction criteria**

Research studies (e.g., Chiu, Lee, & Huang, 2004; Ng & Wiemer-Hastings, 2005) have used self-devised criteria for game addiction. McClure and Mears (1984) examined the personality characteristics and demographic variables of frequent video game players. A questionnaire containing self-constructed questions about video game playing habits and personal attitudes was completed by a sample of 336 high school students. It was found that frequent video game players were young males who liked competitive activities. The findings also revealed some indicators of addiction. For instance, 15% of players played video games to escape outside pressures and 26% of players used part or all of their lunch money to finance their video game playing. The findings appeared to show that an addiction to video games may have been emerging in some players but the study could not investigate the issue any further due to the absence of firm addiction criteria.

Egli and Meyers (1984) surveyed 151 adolescent video game players who visited video game arcades in the U.S. Survey questions were constructed on the basis of concerns expressed regarding the negative effects of video games. The results showed that 10-15% of players displayed compulsive behaviour. These players also made many sacrifices by giving up going to the cinema, buying clothes, records and food. They felt somewhat addicted to playing video games and they tended to enjoy video game playing more than anything else. Egli and Meyers (1984) also found that these players felt a strong impulse to play video games whenever they were around them, that is, that the games were difficult for them to resist. The major limitation of this study was that the sample consisted of a predominately white, middle-class group of video game players thus excluding players from other socio-economic groups. Furthermore, the

participants did not report some of the indicative signs of addiction such as experiencing poorer school performance or reduced participation in active sports.

Chiu, Lee and Huang (2004) studied video game addiction in a sample of 1,228 children and teenagers in Taiwan. The researchers devised a game addiction scale which was influenced by the theories of other researchers (Buchman & Funk, 1996; Clymo, 1996; Howard, 1999). The results showed that video game addiction was statistically predicted on measures of hostility, and a group with high video game addiction was found to be more hostile than others. Furthermore, gender and video game addiction was negatively associated with academic achievement. This study only examined Taiwanese children and adolescents thus making it difficult to generalise to other populations. It can be argued that many other factors can influence academic achievement and not just addiction to video games. Chiu et al (2004) did not provide any information about the items of the scale used which made it difficult to evaluate the measurement instrument.

Ng and Wiemer-Hastings (2005) compared MMORPG users and offline video game users to try and differentiate the two types of users and to find factors that contributed to overuse. The researchers used two online surveys which included questions exploring the behavioural patterns of gamers. The findings showed that MMORPG users spent more time playing than offline video game players. MMORPG users found the social aspects of the games more pleasant and satisfying than the real world. MMORPG users did not exhibit the behaviour of addicts; they did not seek self-confidence in-game, and did not feel irritated if they did not have the chance to play for one day. The limitations of this study was that it consisted of a small sample (n = 91) and the survey responses did not provide an accurate depiction of the prevalence of addiction. There is very little number of studies that have opted to use self-devised addiction criteria which suggests that the use of firm addiction criteria that has been tried and tested tends to be more common. Table 3 provides a summary of the studies that have used self-devised addiction criteria.

**Table 3. Summary of studies that have used self-devised addiction criteria to measure video game addiction**

| Authors | *n* | Main findings |
|---|---|---|
| McClure and Mears (1984) | 336 | 15% of players played video games to escape outside pressures and 26% of players used part or all of their lunch money to finance their game playing |
| Egli and Meyers (1984) | 151 | 10-15% of players displayed compulsive behaviour |
| Chiu, Lee and Huang (2004) | 1,228 | Video game addiction was statistically predicted on measures of hostility |
| Ng and Wiemer-Hastings (2005) | 91 | MMORPG users spent more time playing than offline video game players. MMORPG users did not exhibit the behaviour of addicts |

## Qualitative studies that have investigated video game addiction

Qualitative studies have focused on detailed experiences and meanings gamers attach to their game playing. Shotton (1989) investigated the phenomenon of computer addiction using a sample consisting of 106 participants who claimed that they were 'dependent' on computer games. Interview data revealed that playing computer games had become a dominant activity in the lives of dependent players leaving them little time to undertake any other activities. However, Shotton's (1989) study can be criticised for using participants who were self-reportedly dependent on computer games. They had not been tested against clinical criteria to validate their claims and the types of games they were playing may not be seen as addictive today. Keepers (1990) reported the case of a 12-year-old boy whose pathological preoccupation with video games was classed as a partially successful adaptive response to the family problems he was experiencing. It was also reported that the boy played video games at a repetitive rate and he resorted to stealing and truanting in order to continue playing arcade games. However, the boy's video game playing problems were resolved after spending time in a residential treatment centre and after his parents had received

counselling for the family problems. This case study showed that underlying family problems were the source of the problems rather than the video games.

Chappell, Eatough, et al (2006) examined the experiences of gamers (n = 12) who played *EverQuest* using Interpretative Phenomenological Analysis (IPA). Data were gathered from various online forums where gamers who perceived their playing to be excessive shared their experiences of playing *EverQuest*. The analysis of the data revealed that the gamers appeared to be 'addicted' to *EverQuest*. Most of the gamers appeared to display the core components of addiction such as salience, mood modification, tolerance, conflict, withdrawal symptoms, cravings, and relapse. However, no single account mentioned all the core components of addiction, therefore, this study did not demonstrate that online gaming addiction exists. Analysing accounts of gamers who play a specific MMORPG raises the issue of how representative the findings are when compared with other MMORPGs and the gamers who play them.

Wan and Chiou (2006b) investigated the conscious and unconscious psychological motivations of online game addicts and the relationship between surface and source motivations. Ten Taiwanese adolescents with online game addiction were selected for in-depth interviews. After analysing the interview transcripts, it was found that the participants' motivations for playing online games were for four reasons: 'entertainment and leisure', 'emotional coping', 'excitement and challenge seeking' and 'escaping from reality'. The participants also suggested that MMORPGs provided them with a compensatory channel for unsatisfying needs or motivations in their real life. The study only included a very small number of Taiwanese adolescents therefore it is not possible to generalise beyond the parameters of the study.

Allison, von Wahlde, et al (2006) reported the case of Mr A, an 18 year-old gamer who played an MMORPG for 12-16 hours per day, missed classes at college and stole money and credit cards from his parents to continue his excessive gaming behaviour. Mr A avoided situations in which there were large groups of people because he was afraid that he would say something foolish. The researchers concluded that Mr A's obsession with MMORPGs did not fit a simple addiction model. Online gaming allowed Mr A to express aspects of himself that served a compensatory function

psychologically. The researchers acknowledged that there were positive and negative aspects to MMORPGs and recommended inpatient psychiatric treatment for Mr A. This was a case of only one gamer which limited the scope of the findings. The researchers did not provide any information on whether inpatient treatment helped Mr A.

Wood (2008) presented four case study accounts of gamers who had displayed excessive video game playing behaviour. All of the gamers spent their spare time playing MMORPGs or offline video games. The accounts showed that the gamers had problems controlling their excessive game playing behaviour, there were signs of family conflict and withdrawal symptoms in some of the accounts. Wood (2008) concluded that the most likely reason that the gamers played excessively was due to either ineffective time management skills or as a symptomatic response to other underlying problems that they were escaping from, rather than any inherent addictive properties of the actual games. Underlying problems in the lives of excessive gamers must be considered and not just there game playing behaviour. The case study by Keepers (1990) supports this conclusion. However, Wood (2008) argued against the concept of 'video game addiction' but did not put forward his own preferred criteria for addiction which can be problematic when using case studies to negate whether 'video game addiction' exists (Griffiths, 2008).

King and Delfabbro (2009) investigated the psychological and social context of video game playing in order to understand the phenomenon of excessive game play. Small group interviews were conducted with 38 gamers and then data was analysed using thematic analysis. The results showed that a video game can be an empowering agent that gives a player a sense of mastery and status within the context of the game. The study suggested that gamers played excessively because of the strong feelings of empowerment associated with video games and due to the lack of empowerment that they have in the real world. One of the limitations of this study was that the group interview method may have influenced the findings. Gamers may have structured their responses taking into account the context of the group they were in.

Griffiths (2010) used data from two case studies to highlight the role of context in distinguishing excessive gaming from addictive gaming. Both of the gamers in the study claimed to play MMORPGs for up to 14 hours a day. After analysis, Griffiths (2010) argued that one of the gamers was genuinely addicted to online gaming but the other player was not based on context and consequences. The study concluded that an activity cannot be described as an addiction if there are few (or no) negative consequences in the player's life even if the gamer plays for an excessive amount of time. However, further case study accounts are needed to support the assertions of Griffiths' (2010) case studies. Qualitative studies have delved into the lives of gamers to provide more detail about the experiences of gamers. There are very few qualitative studies and most have focused on a small number of cases of excessive or addictive playing behaviour. More qualitative studies with larger and diverse samples are needed. Table 4 provides a summary of the qualitative studies that have been reviewed in this section.

**Table 4. Summary table of qualitative studies investigating video game addiction**

| **Authors** | ***n*** | **Main findings** |
|---|---|---|
| Shotton (1989) | 106 | Playing computer games had become a dominant activity in the lives of dependent players |
| Keepers (1990) | 1 | Underlying family problems were the source of the problems rather than the video games |
| Chappell, Eatough, et al (2006) | 12 | Most of the gamers appeared to display the core components of addiction |
| Wan and Chiou (2006b) | 10 | Gamers motivations for playing online were for four reasons: 'entertainment and leisure', 'emotional coping', 'excitement and challenge seeking' and 'escaping from reality' |
| Allison, von Wahlde, et al (2006) | 1 | Obsession with MMORPGs did not fit a simple addiction model |
| Wood (2008) | 4 | Excessive play was due to either ineffective time management skills or a symptomatic response to other underlying problems rather than addictive properties of games |
| King and Delfabbro | 38 | Gamers played excessively because of the strong feelings of empowerment associated |

| | | |
|---|---|---|
| (2009) | | with video games |
| Griffiths (2010) | 2 | One of the gamers was genuinely addicted to online gaming but the other player was not based on context and consequences |

**Brain imaging studies that have investigated video game addiction**

The examination of gamers' brain activity has provided insight in to the biological aspects of addiction when related to video game playing. Research by Koepp, Gunn, et al (1998) has demonstrated an increase in the release of dopamine within the ventral striatum (nucleus acumbens) during video game playing. However, only a small number of participants (n = 8) took part in the study and other enjoyable activities were not compared and contrasted against video game playing. Thalemann, Wolfling and Grusser's (2007) psychophysiological investigation of excessive computer gaming revealed interesting findings. The electroencephalographic recordings of 30 gamers were analysed. The findings showed that addiction is characterised and maintained through sensitization of the mesolimbic dopaminergic system along with incentive salience of specific addiction-associated cues (e.g., video game playing). One of the limitations to the study was the use of an all-German sample. The study needs to be replicated using samples from other countries in order to increase the validity of the findings.

Hoeft, Watson, et al (2008) examined brain activity in a sample of 22 students whilst playing a computer game or a control task. The results showed that males had greater activation and functional connectivity compared to females in the mesocorticolimbic system, this neural system is related to reward and addiction. Hoeft, Watson, et al (2008) stated that the gender difference may explain why males find video games more attractive and are more likely to become addicted than females. This study utilised a simple non-commercial computer game that was not familiar to the participants. The use of more sophisticated games that are played by the majority of gamers may have provided different results.

Ko, Liu, et al (2009) attempted to identify the neural substrates of online gaming addiction through the evaluation of brain areas associated with cue-induced gaming urge. Ten online gaming addicts and ten controls without online gaming addiction were presented with gaming pictures and non-gaming pictures while undergoing functional Magnetic Resonance Imaging (fMRI) scanning. The results demonstrated that the brain regions associated with cue-induced gaming urge/craving in online gaming addiction was similar to that of cue-induced craving in substance dependence. This finding suggests that gaming urge/craving in online gaming addiction and craving in substance dependence might share the same neurobiological mechanism. However, these findings were not very convincing as actual MMORPG playing was not used as a stimuli in the study. Further research that examines the changes in the functions of the neurochemistry of the brain may be the way forward to understanding the process of video game addiction (Griffiths & Davies, 2005). Table 5 provides a summary of brain imaging studies that have been reviewed in this section.

**Table 5. Summary table of brain imaging studies that have investigated video game addiction**

| **Authors** | ***n*** | **Main findings** |
|---|---|---|
| Koepp, Gunn, et al (1998) | 8 | There was an increase in the release of dopamine within the ventral striatum (nucleus acumbens) during video game playing |
| Thalemann, Wolfling and Grusser (2007) | 30 | Addiction is characterised and maintained through sensitization of the mesolimbic dopaminergic system |
| Hoeft, Watson, et al (2008) | 22 | Males had greater activation and functional connectivity compared to females in the mesocorticolimbic system |
| Ko, Liu, et al (2009) | 20 | Brain regions associated with cue-induced gaming urge/craving in online gaming addiction was similar to that of cue-induced craving in substance dependence |

The studies examining the addictive aspects of video games have provided suggestive evidence of the addictive capabilities of video games and they have provided

information about the motivations of addicted gamers, and the associations between personality traits and addiction. Research examining the neurobiological mechanisms of online gaming addiction has provided new opportunities for research because of the possible links between neurochemicals and addiction. Most studies have used DSM criteria to examine video game addiction as this appears to be the most widely used and accepted addiction measurement instrument. The recently validated game addiction scale (Lemmens et al, 2009) which contains DSM items looks to confirm the use of DSM criteria for future video game research. MMORPG addiction is a complex phenomenon as different players are attracted to different aspects of MMORPGs (Yee, 2002). The addictive potential of MMORPGs has led to an increasing number of studies focusing on the underlying psychological mechanisms of MMORPGs. Expanding the theoretical understanding of this popular medium would be of much benefit.

Many of the studies that have investigated online gaming and addiction suffer from the limitations of using self-report measures, adolescent samples, focusing on one type of MMORPG, and using gamers from only one country. Other limitations with video game studies is the use of self-selected samples in many cases and hardly any are representative of gamers. Very few studies have investigated video game addiction on a national scale. Studies (e.g., Ng & Wiemer-Hastings, 2005; Egli & Meyers, 1984) using self-devised criteria have reported inaccurate addiction rates. The use of standardised addiction criteria is recommended. It can be argued that many of the excessive video game players in previous studies are not addicted because they do not fulfil the six criteria of the core components of addiction (or any other criteria) (Griffiths, 1996b). Moreover, research does not suggest any clinically significant problems that are associated with video game playing. However, research suggests that if video game addiction does exist, it only affects a minority of players (e.g., Egli & Meyers, 1984; Phillips et al, 1995; McClure & Mears, 1984). Research also suggests that arcade video games appear to be similar to slot machines, particularly in terms of dependency and they also share some important structural characteristics (Fisher & Griffiths, 1995).

Many of the studies have made use of survey methods and tend to focus on adolescents. Longitudinal research that makes use of qualitative methods (e.g., in-depth interviews, case studies, etc.,) is needed to answer two important questions: (1) Does excessive play persist after adolescence or is it age related? (2) What types of longitudinal effect does excessive video game playing have on the social and educational development of children and adolescents? It is now possible to play video games on many different gaming formats, such as hand held consoles and the Internet. Griffiths (2010) has shown that the social context in which people play may have an impact on the addictive potential of video games. Research examining the structural and situational characteristics of these different gaming mediums in order to establish their addictive potential is needed (Wood, Griffiths et al, 2004; King, Delfabbro & Griffiths, 2010). An established body of research literature on the psychological, sociological, and physiological effects of video game playing and addiction is essential for the education, prevention, intervention, and treatment of video game induced health problems (Griffiths & Davies, 2005).

One of the criticisms of many of the studies investigating video game addiction is that studies in different countries indicate different prevalence rates (Abreu, Karam et al, 2008). According to Abreu, Karam et al (2008) this is due to the absence of consensus and the use of diverse names to describe video games that in turn brings about the adoption of distinct diagnostic criteria. Other criticisms have suggested that classifying individuals as video game addicts using checklists based upon adaptations of DSM criteria for pathological gambling is likely to over-estimate the number of people addicted to video games (Charlton, 2002). At present very few studies have used validated measurement instruments to investigate video game addiction. The results of Lemmens et al (2009) study showed that the game addiction scale demonstrated potential as a continuous measure of problem video game playing. Further research that utilises this particular addiction scale as a clinical instrument is needed.

The review of the literature shows that there has been a move towards the investigation of online video gaming. Researchers have recognised the enhanced game playing potential of MMORPGs. Addiction is more of a concern when discussed in regards to MMORPGs due to the fact that these virtual worlds allow gamers to play video games

in a traditional sense but also explore new relationships and identities (Griffiths & Cole, 2007). Research (Ng & Wiemer-Hastings, 2005) suggests that MMORPG players spend more time playing than offline video game players. MMORPGs demand large amounts of time to be invested in them which in turn might increase the likelihood of addiction. Studies investigating online game play tend to obtain larger sample sizes than studies investigating offline play. This may be because online gaming studies have used online methods of recruitment which allows larger numbers of people to be contacted. The internet is facilitating researchers in the recruitment of online gamers, many people are using the internet for multiple tasks. The internet may also be facilitating excessive online gaming and this has been an increasingly researched area.

## Overview of the current research project

The online gaming phenomenon looks set to increase with rapid technological advances. MMORPGs provide a sophisticated environment that enables complete immersion within the virtual world to the extent that it may become an alternative reality to its users. Some researchers have suggested that online gaming addiction is growing in prevalence among adolescents and adult gamers (Wan and Chiou, 2006a). While no detailed research is available on exact incidence and prevalence rates, anecdotal reports indicate that this is an increasing issue among therapists in numerous settings (Griffiths, Davies & Chappell, 2003; Oravec, 2000; Griffiths & Meredith, 2009).

Popular media and news reports have also reported difficulties with addictive behaviour in MMORPG users, relating incidents of child neglect, suicide, and failing marriages as a result of excessive MMORPG use (Hsu, Wen & Wu, 2009). Further research is needed to determine the extent to which these anecdotal reports are representative of gamers who come from many different parts of the world. The present research will examine the extent of excessive online gaming and the effect of MMORPGs on the biopsychosocial make-up of those who play them. The findings could provide much needed evidence in relation to addictive online behaviours. The

health implications will be of benefit to all those associated with the health care and psychological profession.

## The main aim and objectives of the research project

The project is designed to provide a theoretically grounded empirical base on which future research in the area can build. From the preceding overview of the literature it is clear that there is a need for further empirical research and theory on online gaming. The main aim and objectives of the PhD research project were as follows:

**Aim**

- How do MMORPGs impact (psychologically and socially) on peoples' lives? (This was addressed throughout the research)

**Objectives**

- What makes new and developing forms of MMORPGs potentially addictive? (This was addressed in the online scoping study)
- What types of MMORPGs currently exist, how are they located, accessed, and utilised by players? (This was addressed in the online scoping study)
- To understand the experiences and attitudes of gamers who play MMORPGs (This was addressed in the online interview study)
- Are there any aspects of MMORPGs that may be linked to addiction? (This was addressed in the online scoping study, online interview study and online questionnaire studies)
- Can excessive MMORPG playing lead to addiction? (This was addressed in the online questionnaire studies)
- Are there any factors that may increase the likelihood of becoming addicted to MMORPGs? (This was addressed in the online questionnaire studies)

The following chapter provides a methodological justification for using online quantitative and qualitative approaches to data collection and analysis. The chapter also provides a methodological evaluation of the research methods that were used to gather data for the present thesis.

## Chapter 3: Methodological Evaluation of Online and Offline Research Methods

The internet is a new medium that can be harnessed to carry out all kinds of research that would not have been possible a decade ago (Schmidt, 2007). Increasingly, researchers are using online methods rather than traditional research approaches. Joinson (2005, p.21) states that, "the Internet, and in particular the World Wide Web, has enabled social scientists to create a virtual laboratory where data can be collected twenty-four hours a day, across the globe, without the costs (time, transcription errors and financial) associated with more traditional methods". Many of the traditional research methods now have electronic equivalents that demonstrate how researchers have attempted to adapt to the technological changes occurring in the world. Reips (2007, p.376) has summarised some of the advantages of online methods as follows:

- "It is possible to test large numbers of participants quickly;
- It is possible to recruit large heterogeneous samples and people with rare characteristics; and
- Web-based methods are more cost-effective in administration, time, space, and labour in comparison with laboratory research".

The internet has changed the way in which research is undertaken, almost all researchers will use the Internet in one way or another to carry out their work. This chapter will provide a methodological justification for using online qualitative and quantitative approaches to data collection and analysis. More specifically, the chapter will compare online research and offline research and then elucidate on the advantages and disadvantages of using an online scoping study, online interviews and an online questionnaire for data collection. The chapter will focus on theory, methodology and empirical research to provide a justification for using online methods for data collection and analysis. This chapter will also discuss the ethical and practical issues encountered by researchers when conducting research on the internet.

## Online vs. Offline research

There is a range of technologies available to the researcher intending to conduct research online rather than offline. For example, instant messaging (IM), Internet Relay Chat (IRC), online survey software, and Virtual Learning Environments (VLEs) are some of the technologies that have been utilised by researchers. Researchers are increasingly opting to use online research methods to gather data. Drawing from experience of a number of online gaming studies, Wood, Griffiths and Eatough (2004) noted that the internet is a good medium to carry out research. For instance, the internet:

- Is accessible to online gamers who are proficient in using it
- Allows large scale samples to be surveyed quickly and efficiently at a fraction of the cost of 'pen and paper' equivalents
- Facilitates automated data inputting
- Has a disinhibiting effect on users and reduces social desirability. This may lead to increased levels of honesty (i.e., higher validity in the case of self-report)
- Has a potentially global pool of participants allowing researchers to make cross-cultural and international comparisons
- Provides access to "socially unskilled" individuals who may not have taken part in the research if it was offline.
- Aids participant recruitment through advertising on bulletin boards and websites.

A number of online studies have reported findings that are comparable to traditional offline studies. Murray and Sixsmith (1998) investigated people's prosthesis use by recruiting participants via mailing lists. They concluded that the email interview presented a viable and valuable approach alongside traditional face-to-face (F2F) interview methods. Ferriter's (1993) research findings revealed that clinical psychiatric interviews conducted using computer-mediated communication (CMC) obtained more candid responses than F2F interviews. Bowker and Tuffin (2004) interviewed disabled people via email to investigate their perceptions of the internet as a source of information and support on disability issues. The authors reported that the email interview method was an effective and appropriate approach for accessing discourse

about the online experiences of people with disabilities. The email interview method or the 'e-interview' (Bampton & Cowton, 2002) has some interesting benefits for the researcher and participant. This will be discussed later in this chapter.

Riva, Teruzzi and Anolli (2003) explored the possible use of internet tools in psychological research by comparing a web-based questionnaire with a traditional paper-based questionnaire. The findings showed that web-based data collection neither statistically enhanced nor diminished the consistency of responses, nor compromised the integrity of the test, and were a suitable alternative to more traditional methods. These findings were similar to those found by Buchanan and Smith (1999a) who assessed personality constructs using a web-based questionnaire and a paper and pencil version. This study showed that web-based personality assessment was possible as the psychometric properties of the web-based questionnaire compared favourably to the paper and pencil version. In another study, Buchanan and Smith (1999b) demonstrated that the web-based personality questionnaire showed high construct validity. Furthermore research by Miller, Neal, Roberts, et al (2002) showed that web-based measures were a suitable and cost-efficient alternative to more traditional methods. The researchers also found that most of the participants (80%) found the web-based survey used in the study easy to use.

In their study examining web-based and pen and paper questionnaires Smith and Leigh (1997) found that the Internet is a useful research environment and a potential source of research participants. The study concluded that Internet participants can be used as a primary participant population and the Internet can also serve as a supplemental participant pool. Smith and Leigh (1997) suggested that an Internet sample can reasonably be combined with the local sample for a single analysis when researchers have difficulty in locating sufficient numbers of participants in their local areas.

There is research evidence showing high levels of self-disclosure from participants taking part in online studies. Bargh, Mckenna and Fitzsimons (2002) found that participants in their study were able to present aspects of their true selves to a partner over the internet than participants interacting F2F. Mckenna, Green and Gleason (2002) also found similar findings. Both studies proved that people are more likely to disclose

information about themselves online even if the information would be considered socially unacceptable. There is evidence of relationships and online romances (which in some cases have resulted in marriage) occurring in different places online, including Usenet groups (Parks & Floyd, 1996), multi-user domains (MUDs) and massively multi-player online games (MMOs) (Utz, 2000) and in on-line communities (Rheingold, 1993).

Research examining online dating sites by Whitty (2008) has shown that people reveal intimate information about themselves a lot quicker online than offline. This may be because people perceive the online environment to be a safe place to reveal information about themselves (Cooper & Sportolari, 1997; Walther, 1995; Whitty, 2003, 2004; Buchanan, 2000). This suggests that the internet is an appropriate medium for research on sensitive topics that people would usually not talk about in face-to-face settings. Rosson's (1999) analysis of 133 web stories posted by Internet users found that Internet users felt comfortable posting personal information about themselves online. Joinson (2001) found significantly higher levels of self-disclosure in computer-mediated discussion compared to face-to-face discussion. Visually anonymous participants disclosed significantly more information about themselves than non-visually anonymous participants. The findings provided a better understanding of how social relationships develop online.

Online methods have made the investigation of sensitive topics and hard to reach populations possible via the internet. Coomber's (1997) online survey research with a sample of drug dealers from 14 countries provided insight that would have been difficult if conducted using traditional offline methods. Similarly, Rodgers, Buchanan, Scholey, et al (2001) accessed a large sample of drug users via the use of a web-based survey. The researchers found that the participants in the study were willing to disclose information about their drug use providing support for previous findings showing that participants are more candid online (McKenna & Bargh, 2000). Fyfe, Leonard, Gelmi, et al (2001) reported that an online questionnaire was a fast and cost-efficient way of researching an otherwise inaccessible group (sufferers of Rett syndrome, a rare neurological disorder). Hirshfield, Wolitski, Chiasson, et al (2008) reported that the internet is a viable medium to reach and screen men at risk of depression. Other

researchers have benefitted from using the internet to research controversial topics such as the measles, mumps and rubella (MMR) vaccine (Skea, Entwistle, Watt & Russell, 2008) and vulnerable research populations such as lesbians and gay men (James & Platzer, 1999).

It can be argued that there are threats to the internal validity of online experimental and survey research. By conducting an experiment online, the researcher loses control over the experimental environment and equipment (Krantz, Ballard & Scher, 1997). Someone completing the questionnaire in a noisy cyber café will experience a different set of environmental stimuli or distractions to somebody completing the questionnaire in their home. However, Krantz, Ballard and Scher (1997) compared results from experiments conducted over the internet and in a laboratory. In both experiments, the online data were comparable to the laboratory data despite variations in experimental environment, procedures and equipment that are the consequence of using different methods. Boyer, Olson, Calantone and Jackson (2002) found similar results. They also found that the online survey responses had fewer missing responses and that online surveys could be coded and presented in a more flexible manner. Furthermore, they found that both methods had statistically similar response rates, scale/construct means, and inter-item reliabilities. Boyer et al (2002) concluded that the two methods are largely inter-changeable if careful research design is employed prior to starting data collection.

Gosling, Vazire, Srivastava and John (2004) examined internet samples and data quality by comparing a large internet sample ($n$ = 361,703) with a set of 510 published offline samples. Analysis showed that internet samples were relatively diverse with respect to gender, socioeconomic status, geographic region, and age. Moreover, internet results generalised across presentation formats, were not adversely affected by false and repeat responses, and were consistent with results from traditional methods. This research demonstrated the strengths of online research when compared with more traditional offline research. Gosling et al (2004) reached the conclusion that online samples provided quality data and they were as diverse as many offline samples. Their findings challenged the view that traditional methods are inherently superior to online methods.

**Summary of online versus offline research**

Research suggests that online methods of data collection offer a viable alternative to offline methods. The reliability of online research is similar to data collected using offline methods (Mathy, Kerr & Haydin, 2003). Nevertheless, researchers should consider their aims and objectives before beginning data collection as careful design and implementation can prevent many potential problems (Boyer et al, 2002). Online methods may not be suitable for all topics particularly highly sensitive topics in which case offline methods would be the suitable methodology. Boyer et al (2002) have said that on a macro-level, online and offline methods offer comparable results, but there are important differences at a more detailed level. For instance, results may differ depending on method of data collection (e.g., e-mail, post, instant-messaging or face-to-face survey). Results may also differ depending on the sample recruited – for example, in the interview study and online questionnaire studies all participants were computer literate due to the researcher's choice to use online gamers. There are trade-offs that need to be considered with whichever methodology one decides to use.

What can be seen from many online studies is that researchers are making good use of a new and ever-growing research environment, allowing wide geographical dispersion. The internet provides access to a very large number of participants who can take part in research at minimal expense and relative ease. Musch and Reips (2000) survey research found that web experimenters believed that the most important benefits of online research was the availability of large sample sizes and the resulting statistical power. Increased levels of self-disclosure have been found using internet samples (e.g., Locke and Gilbert, 1995). There might have been an increase in honesty due to the anonymity and psychological distance between the participant and researchers. No outlay is required for laboratory space, testing time, materials, and other expenses that are traditionally associated with offline research methods. Most online studies can effectively be left to run themselves with no researcher intervention. The sheer number and variety of people using the internet means that researchers can contact populations more easily than has previously been the case. The majority of online studies have managed to obtain considerably large sample sizes and access to vulnerable and inaccessible groups that would be difficult to obtain using traditional methods.

Like every method, there are limitations associated with online methods. These include lack of control over the research environment. Online researchers are usually not aware of non-stable attributes of the online participant (such as mood state, fatigue, or intoxication) which may increase unexplained variances in responses. Online samples are not representative of the general population but neither are offline samples. The large sample sizes that are obtained using the Internet mean that even small proportions of participants (e.g., certain ethnic minority groups) are represented by large absolute numbers (Gosling et al, 2004). It can be argued that online studies tend to gather data from a biased population that includes young, middle-class groups who are computer literate. (DiMaggio & Hargittai, 2001). This is no longer the case as the Internet user population is changing all the time due to low cost Internet access and increased Internet use amongst the older generation. Online methods have many unique advantages over offline methods and in many cases they are the best choice method for particular research topics. It is clear that researchers have realised the benefits of online research. Researchers should select whichever method (online or offline) to suit their research goals (Gosling et al, 2004).

## Methodological Evaluation

There were many issues, implications and ethical considerations that were encountered when conducting the studies. This section provides a methodological evaluation of the current research.

### Design

The research presented in this thesis made use of an online scoping study, online interview study, and online questionnaire studies to investigate Massively Multi-Player Online Role-Playing Games (MMORPGs). This section will examine each online methodology separately and attempt to provide a methodological justification for the choice of research methodology.

## Scoping studies

Study one used a scoping study to view the broader topic area of MMORPGs. According to May, Roberts and Popay (2001, p.194) scoping studies "aim to map rapidly the key concepts underpinning a research area and the main sources and types of evidence available, and can be undertaken as stand-alone projects in their own right, especially where an area is complex or has not been reviewed comprehensively before". A scoping study was undertaken as there was a lack of data concerning the extent, range and nature of MMORPGs.

The scoping study method is a method that has gained ascendancy in the social sciences (O'Malley & Croucher, 2005). This method has been used to study a wide range of subject areas including creative learning (Craft, Cremin, Burnard & Chappell, 2007), mental health nursing education and practice (Clinton & Hazelton, 2002), leisure environments (Findlay & Southwell, 2004) and manufacturing enterprises (Saad & Gindy, 2007). The use of rigorous and transparent techniques for searching and locating literature on a given topic makes the scoping study an efficient method of research. This serves the purpose of mapping the territory (or research area) as well as providing a reliable, replicable and methodologically rigorous review of existing research in a given area (May et al, 2001).

Arksey and O'Malley (2005) have made useful comparisons between the scoping study and the full systematic review. They point out that the process of collecting and reviewing studies for a full systematic review usually results in a small percentage of studies being included in the final report. Findings from studies not included in the final review tend to remain hidden from publication. In contrast, the scoping study presents an overview of all material that has been reviewed and the issue of how best to present the material is crucial (Arksey & O'Malley, 2005).

Study one used a consistent framework to collate and summarise the results of the scoping study. In all high-quality research, the position, potential bias, and subjective decisions of the work are made clear to the reader (Arksey & O'Malley, 2005). Bearing

this in mind, the scoping study made use of a ‘template’ which was applied to each MMORPG when reporting findings in order to provide a consistent approach to the research and also to provide clarity of data reporting strategy. The template began by providing a brief description of the MMORPG in question and then provided empirical evidence examining the MMORPG. After reviewing a total of the twenty most played MMORPGs, there was a ‘summary of results’ section that displayed a table showing the type and amount of data available for the MMORPGs reviewed in the scoping study. The use of a consistent approach in the scoping study allows for comparisons across MMORPGs, helps to identify contradictory evidence regarding specific MMORPGs and also identifies gaps in the research literature that then opens the way for future research (Arksey & O’Malley, 2005).

The scoping study used in study one may have some limitations which are as follows; the databases used to search for literature may have limitations in terms of coverage, the scoping study is restricted to literature written in English, not all MMORPGs were reviewed and the study was restricted to a short time period of four months (July 2007 – October 2007). Decisions were made from the outset concerning the time span and language of the scoping study. These decisions took into consideration the issues of practicality, time, and funding of research. As a result potentially relevant information could have been left out. There are also limitations in regards to the data gathered, for instance, the data was not evaluated in terms of quality which can lead to a large amount of data being included irrespective of whether the data is of good quality or not (Arksey & O’Malley, 2005). However, it can be argued that quality appraisal of data is not one of the aims of the scoping study, other more lengthy methods (such as the systematic review) should be utilised for quality appraisal of data.

The scoping study is a valuable method that requires a rigid investigative framework, expertise in retrieving, managing, and analysing data, as well as technical knowledge of using the Internet and other related applications. The method, like many other methods, will incur time and costs to the researcher and research funding body.

## Online interviews

When attempting to obtain qualitative data through the use of interviews, it is important to build a rapport with the interviewee. This tends to be easier to achieve when conducting a face-to-face (F2F) or telephone interview, as this is the traditional interview method (Mann & Stewart, 2000). However, it is possible to build a rapport with participants when conducting an online interview. The online interview method was used in study two due to the fact that there are very few studies examining the experiences of online gamers using a qualitative approach. Research that allows the gamers to speak and provide their own accounts of playing MMORPGs was needed. Furthermore, gamers preferred communicating via email and IM as it is a fast and convenient method of interaction especially when they are located in different countries and time zones. The method was less time-consuming compared to F2F interview method and it also allowed the researcher to obtain a geographically diverse sample (Wood, Griffiths & Eatough, 2004).

The Internet may be used to support synchronous communication by using many chat facilities such as Internet Relay Chat (IRC), Virtual Learning Environments (VLEs), and Instant Messaging (IM). The Internet may also be used to support asynchronous communication by using facilities such as email, online bulletin boards (BBS), Usenet discussion groups or 'newsgroups', and some online discussion forums and VLEs (Hewson, 2007). The 'e-interview' is a term coined by Bampton and Cowton (2002) to signify an interview conducted by means of email. The e-interview is a convenient method as it allows the participant to reply in his/her own time. There is also the potential to conduct an e-interview in a foreign language even if the researcher is not sufficiently fluent to do so face-to-face (Bampton & Cowton, 2002).

There have been differing levels of success reported by researchers who have made use of these Internet facilities to conduct interviews. For instance, Davis, Bolding, Hart, et al (2004) made use of IRC software to study Internet use and sexual behaviour amongst gay men. Although the procedure was successfully executed allowing for one-to-one online synchronous interviews with gay men, Davis et al (2004) reported limited

findings due to the brevity of responses by participants. In contrast, Madge and O'Connor (2002) organised online focus groups using a synchronous discussion forum to discuss parenting, the authors reported that the method yielded rich and elaborate data.

Research by Kenny (2005) explored whether active engagement and group interaction could be captured in an online environment. Thirty-eight nurses participated in an online focus group using a VLE called *WebCT*. The author reported that the VLE provided a comfortable, non-threatening medium that encouraged detailed responses from participants. Research by Schneider, Kerwin, Frechtling and Vivari (2002) revealed the differences in the characteristics of focus group discussions in the online and face-to-face formats. The researchers compared content from four online focus groups and four face-to-face focus groups. The online participants tended to contribute shorter comments but participation levels were more consistent. In the face-to-face focus groups, some participants tended to contribute larger comments, whereas other participants were somewhat silent. These results showed that online and face-to-face focus groups had different roles in qualitative research.

There are many advantages of online interviews that become apparent when reading the literature. Research evidence has highlighted increased depth and reflexivity (Bowker & Tuffin, 2004), enhanced candidness and self-disclosure (Joinson, 2001; Bargh et al 2002), potential for a balanced power relationship between the researcher and participant (Murray & Sixsmith, 1998), and the facilitation of participation from difficult to access groups (Bowker & Tuffin, 2004). The online interview has some unique benefits when compared to online questionnaires. The presence of a real human during the interview who can instantaneously respond to queries and clarify questions assists in the recreation of an offline interview. Some respondents may be more likely to stay until the end of the interview as they are interacting with a human interviewer (Stieger & Goritz, 2006).

However, online interviews have some disadvantages associated with them. Bampton and Cowton (2002) have pointed out that there are limitations to the email interview;

the method provides a limited register for communication and it is dependent on the willingness and competence of both participants and researchers to access the technology needed to conduct the interview. There are other issues concerning who can participate, due to the need for technological equipment and the possible biased nature of the Internet User Population (IUP) (Hewson, 2007). However, the PC equipment can now be purchased at cheap prices and the IUP is changing all the time resulting in a diverse user population. Then there is the issue of a lack of researcher control of the procedure that can lead to misunderstandings when conducting interviews (Reips, 2000). This can be solved by the use of practice interviews and providing clear instructions to all participants.

Other disadvantages associated with online interviews include difficulties in establishing rapport and due to the text based nature of online interviews there is the possibility of a lack of depth and ambiguous data being gathered (Hewson, 2007). There are ways of dealing with these issues. To increase rapport; researchers can disclose their institutional affiliation and provide brief biographies. Madge and O'Connor (2002) used this technique and achieved good rapport with participants. The lack of depth in responses and ambiguous data has been linked to the failure to build a rapport with participants and the absence of non-verbal cues (e.g., body language) and paralinguistic cues (e.g., tone of voice) (Hewson, 2007). Making use of webcams, acronyms (e.g., LOL: 'laughing out loud'), and 'emoticons' (e.g., smile: ☺) may lead to richer data and the reduction of ambiguities (Wood, Griffiths & Eatough, 2004). The semi–structured online interviews conducted via the use of *MSN Messenger* and email in study three provided a more in-depth analysis of gamers' perceptions of online gaming.

## Online questionnaires

Online questionnaires were used in two of the studies in this thesis (Study 3 and Study 4). There has been a considerable growth in the number of surveys being administered online (Bryman, 2004). The online questionnaire is probably the most widely used online method of data collection. Many studies have made use of this method to

investigate various topics such as online problem poker gambling (Griffiths, Parke, Wood & Rigbye, 2009), the availability of emotional support in chat rooms (Whitty, 2002), gender swapping in online video gaming (Hussain & Griffiths, 2008), panic disorder (Stanford & McAlister, 2008; Lawlor, Breslin & Renwick et al, 2008), religious beliefs (Smith & Simmonds, 2006; Mckenna & West, 2007) career-related learning experiences (Williams & Subich, 2006), and attitudes towards politics (Tybur, Miller & Gangestad, 2007).

The online questionnaire served the purpose of gathering data on the frequency of online gaming, demographic make-up of gamers, and most importantly, information about excessive online gaming and potential addiction to MMORPGs. The online survey is a valuable research tool and has many benefits for the researcher. Online surveys can be developed and published online within a short time span and involve little costs. Data entry and collection is automated which again saves time and money. Once the data have been submitted by participants, it can be easily transferred by the researchers into specialist data analysis software (e.g., SPSS, Microsoft Excel or MLwin). Large numbers of participants can now take part in online questionnaires as access to the internet has grown exponentially in the developed and undeveloped world (Schmidt, 1997). The online questionnaire is particularly suited for the discussion of sensitive issues (such as online gaming addiction, drug use and abuse) that participants may find embarrassing in a face-to-face situation (Wood & Griffiths, 2007a).

Problems associated with online questionnaires include missing data, multiple submissions, and unacceptable responses (Schmidt, 1997). There are many measures that can be employed to minimise such incidents. Online questionnaire software allows users to apply a function that requires all or at least absolutely necessary questions are answered by the respondent (Schmidt, 1997). Obtaining current email addresses from participants, checking Internet protocol (IP) addresses, and looking for exaggerated answers can help stop multiple submissions. Manual checking by the researcher and the use of good online questionnaire software that detects data entry errors and asks participants to backtrack and enter an appropriate value can help to prevent unacceptable responses (Schmidt, 1997).

There may be cases where participants completing an online questionnaire may have questions regarding the understanding of instructions. Lack of comprehension can lead to incorrect responses and (sometimes) early withdrawal from the study. These problems can be resolved via the use of a pilot study that encourages feedback by email. This assists in the detection of misunderstandings and for appropriate revision of instructions (Reips, 2000). Although there are issues surrounding self-selection, large numbers of people can participate with no increased consequences in terms of expenses. The nature of this medium means that a relatively high degree of anonymity can be maintained which can lead to increased levels of self-disclosure (Bargh et al, 2002; Joinson, 2001) and reduced levels of socially desirable responding (Joinson, 1999).

The disadvantages of online questionnaires (e.g., potentially biased samples, validity issues) are in many ways no different than those encountered in more traditional research approaches. These disadvantages, and in particular the issue of validity, were tackled in study 3 by asking participants to provide a current email address, this helped detect multiple responses by simply checking if more than one response had been made from a single domain address.

The online questionnaire method offers researchers the opportunity to gain access to large numbers of participants from many different countries. Researchers save time, money, paper, and other resources when recruiting participants and gathering data (Wood & Griffiths, 2007a). Increasingly, video game researchers are using online methods to gather their data rather than traditional offline research approaches. The use of online research is likely to lead to a much larger and possibly more diverse sample than that obtained via a traditional offline approach such as a postal questionnaire.

## Mixed methods opportunities in online research

The use of both quantitative and qualitative methods to gather data is a research strategy that is gaining popularity. Quantitative and qualitative approaches have their strengths and weaknesses. When combined together to examine a research question the ‘triangulation’ of different methods provides the advantage of cross-validating and

verifying different pieces of evidence that will ultimately strengthen the research study overall (Hewson, 2007).

There is research evidence that suggests the successful implementation of online mixed methods approaches. For example, Herring, Johnson and DiBenedetto (1998) used observation methods to examine postings to a mailing list discussion thread followed by an online survey in order to investigate online gendered communication. The mixed methods approach helped to obtain diverse data from participants providing a valuable insight into the research topic. Similarly, Kendall (1999) used face-to-face (F2F) interviews, group participation sessions and data from newsgroups and mailing lists. The ease of combining data gathered via different methods was seen as a major advantage of mixed methods research.

Wood and Griffiths (2007b) made use of a mixed methods approach to evaluate a gambling help and guidance service (*GamAid*). They collected data by using an online questionnaire, secondary data, and an online 'mystery shopper' method. Wood and Griffiths (2007b) concluded that the use of a mixed methods approach provided a more 'rounded' picture of the guidance service that would not be possible if only one online method had been used. The disadvantages of a mixed approach will depend on the specific data gathering methods that are utilised by the researcher. Sometimes, the use of different online methods will not always provide coherent and/or consistent results (Griffiths, 2009b). However, utilising the strengths of different methods to gather data on the Internet (which provides considerable time and cost savings) will inevitably provide a richer and valuable exploration of a given research topic (Hewson, 2007).

## Ethical Considerations

The issue of ethics is always a major concern in psychological research. A careful balance must be struck between the aims of the research and the rights of the participants as humans. This was especially important in the studies in this thesis where people's views and opinions were being examined. The possible ethical issues that may be encountered in all the studies are considered below.

## Scoping study ethics

The online scoping study will involve searching for research evidence from various sources such as online news websites, industry reports, and video gaming forums. As a result, most of the ethical issues covered below do not affect the scoping study.

## Informed Consent

Because of the nature of online research, it can be difficult, if not impossible, to obtain written informed consent. A reasonable method of obtaining informed consent electronically needs to be in place (Smith & Leigh, 1997). Participants in studies 2, 3 and 4 will be provided with information about the study and the researcher (including researcher contact details) before and after the study.

During the online interview study phase (study 2) all participants will be sent a *Microsoft Word* document containing the consent form (see Appendices for interview study consent form). At the beginning of the IM interviews, the researcher will ask all participants to confirm that they have read the consent form and that they agree to take part. During the online questionnaire phases (studies 3 and 4) all participants will be informed at the beginning of the questionnaire that by completing the online questionnaire it is assumed that they have given informed consent. Furthermore, all participants will be informed that they have the right to withdraw their consent at anytime by closing the web browser before submitting questionnaire responses or by emailing the researcher after the submission of responses.

**Confidentiality**

Confidentiality can be a big issue when it comes to providing personal information online. Great care will be taken to ensure that any data from the participants is kept strictly confidential. All participants will be informed before and after they have completed the online questionnaire or online interview that the data they provide will remain confidential. Judging from previous experience it is unlikely that there will be any problems or queries raised by the participants concerning this issue.

There is a risk with all online research that the security of the data may be threatened by hackers who may try to gain access to the data (Hewson, Yule, Laurent & Vogel, 2003). This risk is not unique to online research as it can affect all data stored on networked computers (Kraut et al, 2004). With this in mind, the researcher will take several steps to ensure confidentiality. All participants will be advised that they do not have to provide any information that they feel uncomfortable providing. This includes any personal and identifying information. Participants in the pilot survey study (study 1) will be asked to provide email addresses in order to prevent multiple responses. The email addresses will also be used to contact participants if they state that they are interested in taking part in future research. The pilot study questionnaire will be designed using *Autoform*. This software does not store participants IP addresses making it difficult to check for multiple responses. The researcher will ask participants to provide email addresses to overcome the problem.

Participant email addresses will be stored separately from all other data in password protected computers and files. Kraut et al (2004) have approved of these procedures in order to maximise confidentiality. When conducting the main online questionnaire study (study 4), the researcher intends to use *SurveyMonkey* online questionnaire software (www.surveymonkey.com). This software stores participants IP addresses together with their responses. The researcher will check IP addresses for multiple responses, this will help to increase the validity of the responses. The IP addresses will then deleted leaving the data anonymous.

**Anonymity and Harm**

In the interview study and online questionnaire studies, there is a trade-off between achieving high validity or anonymity. Researchers want to stop participants from making multiple responses, therefore all participants who take part in the online questionnaire pilot study (study 3) will be asked to provide an email address to prevent multiple responses, and thus anonymity will be compromised for validity during this phase of the research. In the main online questionnaire study (study 4) participants will not be asked to provide an email address so responses will be anonymous. Research suggests that guaranteeing anonymity and confidentiality of participants' responses can reduce the influence of demand characteristics (Esposito, Agard & Rosnow, 1984) thus encouraging higher levels of honesty from participants. Although participants were assured that responses would remain anonymous and confidential, complete anonymity is not possible (Joinson, 2005) as IP addresses can be stored on computers or traced by experienced computer users if needed. In regards to the online interview data, responses are not as anonymous as the online questionnaire data due to participants' email addresses being known when submitting responses by email or when taking part in an IM interview.

There is an increased likelihood of causing offence or distress online due to the lack of non-verbal cues and ambiguity in wording (Wood, Griffiths & Eatough, 2004). The researcher will tackle this issue by carefully phrasing questions to avoid harm, thoroughly explaining the content of the questionnaire/interview in the pre-study briefing and encouraging participants to contact the researcher if they have any queries or concerns. If participants experience distress, then they will be referred to a self-help group such as the *Samaritans*. At the end of all of the studies, participants will be provided with the researcher's email address and details of support groups (see appendices for interview study debriefing sheet and debriefing statement and online questionnaire end of study debriefing). The researcher will also take care not to provide advice that is beyond his professional knowledge. Any other queries raised by participants concerning the studies will be answered thoroughly. It is anticipated that participants may contact the researcher for clarification of questions.

**Validity and truthfulness**

There is a concern about how can we be sure that the participants who take part are who they say they are? Are they telling the truth? Previous research has shown that online gamers will swap gender online during playing sessions (Griffiths et al, 2003; Hussain & Griffiths, 2008). So how can be sure that participants are consenting adults? The answer is that we cannot be 100% sure (Wood, Griffiths & Eatough, 2004). However, the issue of truthfulness is not specific to online research. There are many instances in traditional offline methods where we must take the participants word.

For example, it is impossible to confirm the validity of an interviewee's statement about their experience, biography or life (Taylor, 1999). In the online interview and online questionnaire studies, the participants will be required to state that they are over 18 years of age. We should be aware of the consequences and implications should minors take part in our research (Wood & Griffiths, 2007a). To maximise truthfulness in the online interview study and the online questionnaire pilot study, the researcher will follow the suggestions provided by Wood, Griffiths and Eatough (2004) that is to obtain a current email address from participants so that checks can be made at a later date, if necessary. Furthermore, the researcher will look for exaggerated answers, for example, if a participant reports that they play online for 20 hours a day, this would need to be investigated and verified before it is included in the data set. Checks for multiple responses to the main online questionnaire will be made by examining IP addresses and looking for exaggerated answers. After collecting the data and checking the responses, it should be safe to say that the data is valid and reliable and that a reasonable conclusion can be reached with the data.

## Deception and Debriefing

Care was taken not to deceive the participants. The aim of the study was explicitly explained prior to the participants taking part in any of the studies. The aim of the study was reiterated at the end as part of the study debriefing. In addition, all participants were encouraged to email the researcher if they had any questions concerning the study.

## Right to withdraw

In accordance with ethical regulations, all participants were informed of their right to withdraw from the study at any stage. Hewson et al. (2003) advise that participants in online research must be provided with the right to withdraw from the research at any stage of the research. Participants who wished to withdraw their data could do so by emailing the researcher. Withdrawing from an online study is easier and very different to withdrawing from a study that is administered in a face-to-face situation. It is not known how many people withdrew from the studies but it can be speculated that more people would have withdrawn in an online setting than in an offline setting because the researcher is not physically present. However, in an online questionnaire setting, there is no researcher influence on the participant when he/she is filling in the questionnaire so the results are more likely to be high in validity. One of the reasons why participants may withdraw from the study is because they feel that the questionnaire is too long in length. The researcher tried to make the online questionnaire and interview as short as possible in order to prevent participant fatigue which could lead them to withdraw from the study.

## A Duty to the Research Community and Participants

When conducting the interview study and online questionnaire studies the researcher will have a duty to the research community and to the participants to avoid doing research that only examined the negative aspects of online gaming and to avoid the creation of a ‘moral panic’ (Wood, Griffiths & Eatough, 2004). In the past, the media

have reported the findings of research that had focused on the negative effects of video games. This led to widespread concern amongst parents, politicians, and social scientists (Egli & Meyers, 1984). The findings from the studies in this thesis could attract the attention of the media and the researcher is aware of this. The costs and benefits of the research in regards to avoiding negative media publicity and the duty of the researcher to the participants must be considered. Either way the researcher must be prepared for possible media interest by thinking about ways to deal with it. In addition, the researcher must consider how the publicity would affect those who take part in the study. Would they feel embarrassed or betrayed and would such publicity have negative consequences for them, perhaps from parents or employers (Wood, Griffiths & Eatough, 2004). This shows how unforeseen problems could lead to far-reaching implications.

## Practical considerations and issues

### Power Relations

According to Fraser (1994), power relations between the researcher and participant are present in online environments and we are incapable of 'bracketing-off' differences in status and culture. However, the online environment eliminates visual social cues (such as gender and ethnicity) which may inform power relations. All researchers must contemplate that a power relation could exist between the participants and themselves. For example, a power relation involving the researcher's status as a professional who has been university educated against a participant who has not been educated to the same level could emerge during the research process. The researcher will deal with this by making interviews and recruitment posts as informal as possible. The use of unfamiliar psychological terms will also be avoided (see Appendix 8 for copy of a posting).

**Access**

During the research process, the issue of obtaining access to online gamers could be a major obstacle for the researcher. In order to gain access to the forums one must register with the gaming fan sites. This requires the disclosure of some personal details such as the user's name, date of birth and a valid email address. Users must also agree with the fan site's rules and regulations (e.g., no racist, violent or sexist language). After registration to the fan site, new users are often asked to browse through the various forums and read some of the discussions that are taking place. New users of online gaming fan sites tend to do this in order to get accustomed to the online community and to get some sort of picture of the group dynamic. It can be quite intriguing to see what online gamers talk about, there are usually discussions relating to music, sport, movies and even politics.

There may be problems with developing a rapport with the online gamers in the forums in which they communicated with other gamers. Online gamers tend to have their own communities which give the impression that 'outsiders' are not welcome. The researcher will have to try to get involved in some of the discussions by occasionally posting his views at the end of discussion threads. This may help to gain acceptance from the community before advertising the research studies.

This researcher is an online gamer with a genuine interest in MMORPGs and has been playing the *World of Warcraft* for more than 2 years. King, Delfabbro and Griffiths (2009) advise researchers investigating video games to become a gamer as it provides many benefits. By being directly involved with video games, conversing and playing with gamers within a virtual world, meeting video games players in social settings and attending gaming events this researcher has learned more about gaming culture and has gained a more critical perspective on video game-related literature (King et al, 2009).

There is concern that some gamers may have a negative view of psychology or science in general. This may be due to many reasons such as bad media coverage of gamers in the past. This may lead to negative ratings being attached to the researcher's

recruitment posts and calls for removal of the posting. The researcher will deal with this by informing all participants that the research is value-free and it is in adherance to the ethical guidelines of the British Psychological Society. Gamers will also be sent a copy of the study results so that they can see the conclusions that are drawn from the data collected. The researcher will also adhere to netiquette (Hewson, 2007) which tends to govern online behaviour in online forums and communities.

## Conclusions

This chapter has provided a methodological justification for using online quantitative and qualitative approaches to data collection by comparing online research and offline research. The advantages and disadvantages of using an online scoping study, online interviews and an online questionnaire have also been discussed by reflecting upon empirical research. Evaluation of the methodological approaches that will be used in the different types of studies has provided the opportunity to reflect on the strengths, weaknesses, implications and ethical consequences of conducting research. Being aware of these issues in advance can help researchers to implement safeguards to prevent potential flaws in the research. Many of the methodological issues can also provide deeper insights in to how people perceive research, which will consequently enhance the research process.

Ethical issues such as confidentiality and harm are inevitably going to be of concern when conducting research of any type. The ethical issues concerning the interview and questionnaire studies will be dealt with in an appropriate manner by making use of the strategies suggested by other researchers (e.g., Wood, Griffiths & Eatough, 2004; Hewson, et al., 2003; Kraut et al., 2004). All research methods have their advantages and disadvantages, but it’s a question of what safeguards will be put into practice to prevent potential failings. The research phenomenon being examined required that online methods be utilised. Online gaming is a technologically driven pursuit, and consequently an online scoping study, online interviews and online questionnaires are seen as the most useful and appropriate methods to use to examine this phenomenon. It

would be difficult to research the phenomenon of online gaming without the use of online methods.

The following four chapters display how an online scoping study, online interview study and online questionnaire studies were utilised to examine MMORPGs.

## Chapter 4: An Online Scoping Study of MMORPGs


### Abstract

The popularity of Massively Multiplayer Online Role-Playing Games (MMORPGs) has risen greatly over the last few years. To date there has been very little published academic research concerning online gaming and even less on the different types of online games that exist. Given the lack of data, a scoping study was undertaken to examine the extent, range and nature of different MMORPGs. Data were collected relating to the twenty most popular MMORPGs. The primary aim was to present a summarised overview of all material reviewed. The secondary aim was to provide a thematic construction in order to present a narrative account of existing MMORPG literature. Overall, the scoping study found that whilst some games had received moderate, or even substantial attention, others have had no research conducted upon them at all. This presents a problem since the growth in both the player base and the industry suggests that a single psychological profile of 'the gamer' cannot be relied upon, and as such further research is required. It is hoped that this study suggests ways forward and helps set research agendas for future research into MMORPGs.

## Introduction

Over the last few years, the popularity of Massively Multiplayer Online Role-Playing Games (MMORPGs) has risen**.** MMORPGs are typically represented by large, sophisticated, detailed and evolving worlds based in different narrative environments (Griffiths, Davies & Chappell, 2003). Examples of such games include *World of Warcraft, Runescape, Lineage, Everquest,* and *Anarchy Online.* In these games, the non-player characters (NPCs) are designed with advanced Artificial Intelligence that offers a rich and unpredictable mileu for players to experience a virtual world through their own 'player character'. The nature of these games is to offer a rich three-dimensional world that is populated by thousands of players, the game form being a fully developed multi-player universe with advanced narrative storylines set within a rich visual and auditory environment.

To date there has been very little published academic research concerning online gaming. Studies to date have examined such areas as the social interactions within online games (Cole & Griffiths, 2007), experiential value and satisfaction of online games (Shieh & Cheng, 2007), the introduction of voice communication within an online game (Williams, 2007), various aspects of excessive and addictive online gaming (Chappell et al, 2006; Wan & Chiou, 2006a, 2006b; Grüsser, Thalemann & Griffiths, 2007), and demographic factors of specific online games such as *Everquest* (e.g., Griffiths et al, 2003, 2004a; Chappell et al, 2006).

According to Hursthouse (2005) most gamers play for more than 20 hours a week and that the majority of MMORPG gamers are late teenagers to twenty-something males. This was empirically confirmed by Yee (2006) who found that in a sample of 5,471 MMORPG players, the hours played per week ranged from 16 to 24 hours. On average, respondents spent 22.71 hours (SD = 14.98 hours) each week in their chosen MMORPG. Similar results have also been reported by Griffiths et al (2003; 2004a)

Yee (2006a) found that 50% of respondents (n = 2846) worked full-time, while another 22.2% were full-time students, and 13% of female players were homemakers (n = 438). He also found that 36% (n = 2846) of respondents were married and 22% had children

(n = 2846). The overall demographic composition of gamers was quite diverse consisting of college students, early adult professionals, middle-aged homemakers, as well as retirees. Yee (2006a) reported that female players are typically introduced to the environment by a romantic partner. The study also showed that females ranged from 9% to 20% depending upon MMORPG type. It was also reported that 16% of male players (n = 1589) and 60% of female players (n = 311) participated in the MMORPG environment with a romantic partner, while 25.5% of male players and 39.5% of female players participated with a family member.

Yee (2006a) also examined the demographics, motivations and experiences of gamers who played various MMORPGs. An exploratory factor analysis revealed a five-factor model of user motivations - Achievement, Relationship, Immersion, Escapism, and Manipulation - illustrating the multifaceted appeal of these online environments. It was reported that males and females are motivated to participate in MMORPGs for entirely different reasons. Female players prefer to relate to other players, while male players prefer to work together to achieve goals. Male players were motivated by the factors of "achievement" and "manipulation". The achievement factor implied the desire to become powerful in the context of the virtual environment through the achievement of goals and accumulation of items that confer power. The manipulation factor related to the desire to manipulate other gamers for personal gains and satisfaction. In contrast, female players were motivated by the factors of 'relationship' (the desire of users to interact with other users, and their willingness to form meaningful relationships that are supportive in nature), 'immersion' (enjoying being in a fantasy world as well as being "someone else") and 'escapism' (the desire of being in a virtual world to temporarily avoid, forget about, and escape from real-life stress and problems).

Given the lack of data about different types of MMORPGs, a scoping study was undertaken to examine the extent, range and nature of MMORPGs. This type of methodology does not necessarily attempt to describe research findings in any detail but is a useful way of mapping fields of study where it is difficult to visualize the range of material that might be available (Arksey & O'Malley, 2005).

## Method

### Design and Materials

Data were gathered via the use of a scoping study. A scoping study aims to "map rapidly the key concepts underpinning a research area and the main sources and types of evidence available, and can be undertaken as stand-alone projects in their own right, especially where an area is complex or has not been reviewed comprehensively before" (Mays, Roberts & Popay, 2001; p.194). The scoping study method as a technique to map relevant information in the field of online video games has never been used in researching MMORPGs. The intention was to introduce a new method of data collection that can be used in this area as well as providing a valuable contribution to knowledge.

Unlike a systematic literature review, a scoping study tends to address broader questions and topics and does not seek to address specific research questions nor does it seek to assess the quality of included studies (Arksey & O'Malley, 2005). The scoping study was conducted over a four-month period (July 2007-October 2007) and was structured around the following key areas and questions:

- *The scope of MMORPGs:* What types of online video games currently exist and how are they located, accessed, and utilised by players?
- *Game description:* This should simply be a brief description of the game. Where is it set? What types of characters exist in the game? What are the aims and/or objectives of the game? What are the primary features (socializing, fighting, quests)?
- *Number of participants:* How many people play or participate in the game/world?
- *Frequency of participation:* How many people play or participate regularly and to what degree? Can we say anything about very excessive use and/or addiction? Are there any particular games that appear to be more addictive inducing?
- *Playing history:* How long have gamers been playing/participating in the game/world? Have they graduated from playing other games?
- *Gender breakdown:* What do we know about the game demographics?

- *Gender and/or identity swapping and exploration:* What do we know about the frequency of gender and/or identity swapping and exploration within the game or world.
- *Socialization:* Who (if anyone) do players play the game with (online or offline)? What type of socialization do players involve themselves in? Romantic/emotional attachments? Friendship? What do players discuss within the game/world?
- *Nationality:* What are the nationalities of the participants who play?
- *Education/Occupation:* What types of people are playing in terms of life role (e.g., student, particular types of job, unemployed, etc.) and level of education?
- *Favourite game:* Do players participate in more than one game? If so, which games do they like playing the best?
- *Game motivation:* Why do players participate in their game of choice? What is their motivation for playing?

**Procedure**

The researchers adopted a comprehensive strategy that involved searching for research evidence (quantitative and qualitative) from various sources These sources included the following:

- *Online polls*: Online news stories/articles; Online video games forums; Electronic databases and journals; Grey literature (industry reports, etc.).
- *Electronic databases*: Academic Search Elite; Applied Social Sciences Index and Abstracts (ASSIA); Business Source Premier; Ingenta (ingentaconnect.com); PsyArticles; PsycINFO (EBSCO); Social Science Citation Index; Sociological Abstracts.
- *Miscellaneous online sources*: online video gaming articles, news websites, online video gaming forums. (See Appendix 1 for a complete list of over 60 websites that were visited by the research team).

Data relating to twenty MMORPGs were included in the study. Popular MMORPGs that had a subscription market share of more than 1% were included (see Table 6). The

cost and time involved in researching more than the top twenty MMORPGs was also taken into consideration by the researchers. The next stage of the research study involved a 'data extraction' technique. The quantitative and qualitative data were synthesized and interpreted by sifting, charting and sorting material according to key topics, issues and themes. The data were then collated, summarized and reported (see Results section). The primary aim was to present a summarised overview of all material reviewed. The secondary aim was to provide a thematic construction in order to present a narrative account of existing MMORPG literature. The following results present the extent, nature and distribution of MMORPGs following the extraction and 'charting' information from the sources listed above.

**Table 6: Online games by genre and market share**

| Online game | Genre | Market share | Participants |
|---|---|---|---|
| World of Warcraft | Fantasy RPG | 52.9% | 9,000,000 (07/07) |
| Lineage II | Fantasy RPG | 12.0% | 1,302,340 (03/06) |
| Lineage | Fantasy RPG | 10.4% | 1,500,000 (06/06) |
| Runescape | Fantasy RPG | 6.3% | 800,000 (06/06) |
| Final Fantasy XI | Fantasy RPG | 4.0% | 500,000 (03/06) |
| Everquest | Fantasy RPG | 1.6% | 200,000 (03/06) |
| Everquest II | Fantasy RPG | 1.4% | 175,000 (03/06) |
| Star Wars Galaxies | Sci-Fi/Superhero | 1.4% | 170,000 (03/06) |
| City of Heroes/Villains | Sci-Fi/Superhero | 1.3% | 160,000 (03/06) |
| Ultima Online | Fantasy RPG | 1.0% | 135,000 (03/06) |

| | | | |
|---|---|---|---|
| Eve Online | Sci-Fi/Superhero | 1.0% | 125,625 (03/06) |
| Dark Age of Camelot | Fantasy RPG | 1.0% | 125,000 (03/06) |
| Vanguard: Saga of Heroes | Fantasy RPG | < 0.5% | 40,000 (03/06) |
| Matrix Online | Sci-Fi/Superhero | < 0.5% | 30,000 (03/06) |
| Anarchy Online | Sci-Fi/Superhero | < 0.5% | 12,000 (03/06) |
| World War II Online | Combat/FPS | < 0.5% | 11,000 (03/06) |
| Guild Wars | Combat/FPS | < 0.5% | - |
| Knight Online | Fantasy RPG | < 0.5% | - |
| Lord of the Rings Online | Fantasy RPG | < 0.5% | - |
| Second Life | Social/Other | < 0.5% | 540,000 (09/07) |

## Results

The following results list the MMORPGs reviewed in alphabetical order. It is accompanied by a description of the game followed by any data collected about each of these games.

***Anarchy Online:*** *Anarchy Online (AO)* is one of the few popular MMORPGs set in a science fiction future and carries the distinction of being the first MMORPG to make use of the 'instance-dungeon system'. At character creation, players may choose one of four breeds (which in turn affects game statistics and skills), and one of 14 professions and one of three factions soon after. As in many MMORPGs, characters in AO gain experience points and levels through combat and mission completion. However, a

character's capabilities are impacted much more by 'Improvement Points' than by levels. These improvement points are awarded to players at each level and can be spent at any time to raise skills of their choice.

*Empirical evidence:* To date, there has been no research directly examining this game and little is known even about basic demographic factors.

***City of Heroes/City of Villains:*** City of Heroes (CoH) is a MMORPG based on the superhero comic book genre. It begins with an extensive character creation system where the player can choose an archetype (which determines their superpower choices) and Power Sets, design a distinctive costume, and write a history for their hero. As with most MMORPGs, in CoH experience points and levels are gained via vanquishing foes and completing missions. In CoH, the levels are called "security levels" and grant heroes increased health, more powers, and added slots for holding power enhancements and temporary power-ups.

*City of Villains (CoV)* is a MMORPG also based on the superhero comic book genre and is integrated with *CoH.* Character creation in this MMORPG is a detailed process, making for a diverse assortment of characters in the game. Several improvements over *CoH* accompany *CoV* which include an instant-access mission system, PvP areas for hero versus villain battles, the ability of players to build Super-Villain bases, better graphics, and rag doll physics. Super-Villain bases are similar to guilds in other MMORPGs, allowing members to meet privately, travel directly to specific zones. and craft base improvements using NPC "salvage".

*Empirical evidence*: There has been very little evidence to date about *CoH/CoV* players. One website poll (Vault.ign.com) reported that a significant minority played over 21 hours a week (42%). Over half (52%) played between 10 and 20 hours of *CoH/CoV* a week, with 6% playing for less than five hours a week. The vast majority of players appear to be located in the Americas (80%) with the remaining CoH/CoV players living in Europe (15%), Oceania (4%) and Asia/SE Asia (1%) (Stratics.com).

One poll by Stratics.com examined the different player types among *CoH/CoV* players and reported that 11% were power gamers, 17% were casual gamers, 29% were role players, 3% were PvP'ers, 28% were solo oriented gamers, and that 19% were group oriented gamers. *CoH/CoV* players were asked in an online poll (stratics.com) about the number of MMORPGs they played. The largest minority (39%) reported that *CoH/CoV* was the only game they played whereas one-third (33%) played one other MMORPG, and 26% played two or three other MMORPGs. As with many of these website polls, there was no indication given of the number of participants.

***Dark Age of Camelot:*** *The Dark Age of Camelot (DAOC)* is a medieval fantasy MMORPG set in the turbulent time immediately after King Arthur's death. There are 44 different classes and 18 different races (six per realm) are available for playing in this game. Gamplay involves fighting animals, monsters and NPCs, completing quests and tasks, and defeating other players in combat. This is all at the discretion of the player and helps earn money and experience for leveling. Each level (up to level 50) opens up new skills and abilities to the player. Expansions to DAOC allow for additional "parallel" levels beyond the level 50 limit which make unique skills and abilities available to dedicated players. Two styles of combat are accessible to players of DAOC: Realm vs. Realm (or PvP in other MMORPGs) and PvE. Successful PvE combat in DAOC may be rewarded with loot and money drops, while RvR rewards are in the form of prestigious Realm Points and sometimes a small amount of money.

*Empirical evidence:* To date, there has been no research directly examining this game and little is known even about basic demographic factors.

***Eve Online:*** *Eve Online (EO)* is a science fiction MMORPG set in space. Gameplay revolves around players piloting custom-built spaceships, of which there are many designs available and each of which is suited to specific tasks. Unlike many other MMORPGs that grant character advancement through earned experience points, a player's character in EO "learns" skills by training a specific skill over time, even when not logged in. There is much to keep players occupied in EO's universe including

combat, research, mining, manufacturing, piracy, trading, missions and cargo hauling. While NPCs sell low-tech goods, the rest of EO's economy is player-driven. In combat, spaceship builds are just as important as a player's tactical ability and flexibility. EO features an open PvP system. This means any player can attack any other player anywhere. This system is countered by each solar system possessing a security rating. The higher the security rating, the safer a solar system is for space travellers.

*Empirical evidence*: There has been very little research into *EO* players. The website mmorpg.com reported that 95% of EO players are male although there was no evidence of a particular study or poll to back this claim up. One website poll (http://evevault.ign.com/?dir=sympoll&dispid=4) asked players what their favourite activity was in the game. In a poll of 220 EO players, there were many favourite activities including missions (17.5%), mining (17%), NPC hunting (12.5%), deadspace complexes (4.5%), pirating (17.5%), anti-pirating (17.5%), manufacturing and research (8%), and trading (5.5%).

***Everquest/Everquest 2:*** *EverQuest (EQ)* is a real 3D massively multiplayer fantasy role playing game. In this game, players enter an enormous virtual world with its own diverse species, economic systems, alliances, and politics. Players can be a noble human knight, a vicious dark elf thief, a greedy dwarven merchant, or whatever suits their desires. Players can choose from a variety of races and classes, customize their characters, and begin quests in any number of cities or villages throughout multiple continents. Players can equip themselves for adventure, seek allies and knowledge, and experience a rich world of dungeons, towers, crypts, evil abbeys, and even planes and realities beyond players' imaginations. Socially, players can meet new friends from around the world to face epic challenges.

*Empirical evidence*: In an attempt to establish some benchmark data, Griffiths, Davies and Chappell, (2003) collated data from two online gaming fan sites for *Everquest* players. Socio-demographic data showed that the majority of players were male (approximately 85%). Over 60% of players were older than 19 years. The vast majority

of players were North American (73% American and 8% Canadian) and players had a wide variety of education. Thirty-three percent of the sample was still at an educational establishment including those currently in middle school (3%), high school (14%), college (14%), and graduate school (2%). Of those who were in employment, 23% had a high school diploma, 33% had an undergraduate diploma, 7% had a Masters degree, and 2% had a doctoral degree. The data provided evidence that the game clientele was very much an adult profile and suggested a different picture to the stereotypical image of an adolescent online gamer.

Griffiths et al (2003) acknowledged that the major weakness of their research was its reliance on secondary data. Therefore, Griffiths et al (2004a) collected some primary data from 540 *Everquest* gamers. Results showed that 81% of online game players were male, and that the mean age of players was 27.9 years of age. For many players, the social aspects of the game were the most important factor in playing. A small minority of players appeared to play excessively (over 80 hours a week) and results suggest that a small minority sacrifice important activities in order to play (e.g. sleep, time with family and/or partner, work or schooling). Their results confirmed most of the findings from their survey of secondary data (Griffiths et al, 2004a).

In a later qualitative study, Chappell, Eatough, Davies and Griffiths (2006) collected data from a range of online gaming forums where individuals shared their experiences of playing *EverQuest*. Data were analyzed using interpretative phenomenological analysis (IPA), a method for analyzing qualitative data and meaning making activities. Chappell et al (2006) reported that the accounts presented by players and ex-players appear to be 'addicted' to *EverQuest* in the same way that other people become addicted to alcohol or gambling. Most of the individuals in their study appeared to display (or allude to) the core components of addiction such as salience, mood modification, tolerance, conflict, withdrawal symptoms, cravings, and relapse.

*EverQuest II (EQ2),* like the original *EverQuest*, is a MMORPG focusing heavily on questing and killing creatures for money and experience points. However, *EQ2* improves substantially on the original. Trade skills are now a much more engaging

character archetype. Also, an optional "locked encounters" feature has been added which prevents kill stealing and power leveling. To enhance the sound features of *EQ2*, professional actors contributed 130 hours of dialogue and original music was composed. "Live Updates" to EQ2 have added additional servers and closed arenas for mutual PvP and dueling.

*Empirical evidence*: Little data has been collected on *EQ2* players although some data published on the vault.ign.com website (2007) reported that one in five *EQ2* gamers (of an unspecified sample size) played for over 45 hours a week. Others in the sample played much less including those that played up to 10 hours a week (27%), 11 to 20 hours a week (19%), 21 to 30 hours a week (19%) and 31 to 45 hours a week (14%).

***Final Fantasy XI:*** *Final Fantasy XI (FFXI)* is another MMORPG that can be played in both first and third person. Players are only able to control one character, but can fully personalize it. Unlike many other MMORPGs, FFXI's environment does not allow a turn-by-turn based "battle area" when an enemy is encountered. After Level 10, FFXI strongly encourages groups of six or more players, and up to three groups to form an alliance to take on especially difficult foes. A monster in FFXI becomes "claimed" once a player attacks it, which means only members in that player's party may attack the monster unless they "call for help".

Empirical evidence: To date, there has been no research directly examining this game and little is known even about basic demographic factors.

***Guild Wars:*** *Guild Wars (GW)* is a cooperative/competitive MMORPG with emphasis on skill selection. Many aspects of *GW* differ from other MMORPGs. As its name suggests, guilds are central to *GW* gameplay. Once a guild is formed, the guild leader can purchase and design capes for the whole guild and eventually acquire a 'member's only' Guild Hall. Cooperative gameplay is put to the test during Guild versus Guild Arena combat that pits eight guild members against eight from a competing guild. Non-

guild (four-on-four) PvP is also available in the forms of Random or Team Arena combat.

*Empirical evidence*: Most gamers play GW for more than 20 hours a week and are in their late teens or twenties (Hursthouse, 2005). According to one small poll of 135 *GW* gamers (http://gwvault.ign.com/?dir=sympoll&dispid=104), 22% play five or less hours a week, 21% play six to ten hours a week, 19% play 11 to 20 hours a week, 17% play 21 to 30 hours a week, and 21% play over 30 hours a week. Another similar poll of 218 *GW* players (http://gwvault.ign.com/?dir=sympoll&dispid=45) found that 29% played five or less hours a week, 10% played six to ten hours a week, 20% played 11 to 20 hours a week, 17% played 21 to 30 hours a week, 5% played 31 to 40 hours a week, and 19% played over 40 hours a week.

Another small poll of 154 *GW* players examined how long gamers had been playing *GW* (http://gwvault.ign.com/?dir=sympoll&dispid=102). It was reported that 17.5% had been playing over two years, 48% almost two years, 13% almost one year, 4% around six months and the rest had only just got the game (17.5%).

In terms of game motivation, players play to prove their skill and to show that they are better than others. Players want a good community in-game and they want a change from console games. They also want PvP experience (mmorpg.com). This is almost identical to the game motivation of those who play *Knight Online* (see below). In a very small poll of players (n = 115; see http://gwvault.ign.com/?dir=sympoll&dispid=59), the main reason for playing GW was the fact that it had no monthly fee to play (72%). Other reasons included the fact that casual players can reach the low level cap easily (6%), great PvP (6%), it was next on the list of online games they had not played (3%), other friends already played (3%), players liked what they saw (3%), or reasons other than those mentioned (7%).

In relation to the favourite type of interaction within *GW*, another small poll (n = 290; see http://gwvault.ign.com/?dir=sympoll&dispid=41), the favourite activity was the opportunity to play player versus environment (39%). The remainder preferred player

versus player (11%), Guild versus Guild (10%), both PvP/PvE (9%), both PvP/GvG (9%), both PvE/GvG (5%), or liking all the types of interaction equally (17%).

In relation to what most players enjoyed about *GW*, a final small poll (n = 177: see http://gwvault.ign.com/?dir=sympoll&dispid=14) provided a wide range of differing reasons. This included the lack of level grind (19%), the professions and character abilities(17%), the instanced fighting and grouping (14%), the ability to 'solo' with henchmen (8%), the quests (10%), the graphics (10%), and the PvP (22%).

***Knight Online:*** *Knight Online (KO)* is a fantasy MMORPG in which players must choose to play as an orc and side with the nation of Karus, or play as a human and side with the nation of El Morad. There are four classes to choose from (Warrior, Rogue, Magician or Priest), and a second class may be chosen at Level 10. *KO* features many different zones to adventure in, and events to participate in (some scheduled, some spontaneous). In *KO*, forming a party of two to eight players is encouraged as doing so grants more 'experience points' in combat. Clans can be formed in *KO* that grants the ability to join other members of the same clan without level restrictions and without them being close enough to manually select them.

*Empirical evidence*: One small piece of evidence suggests that the game motivation for playing Knight Online is because players want to play PvP, they like the KO community, they have a desire to prove their skill, and they want a change from console games (mmorpg.com). Not only is this evidence somewhat anecdotal, but the reasons given are very generic and could apply to most online games.

***Lineage/Lineage II:*** *Lineage* and *Lineage II (L2)* are medieval-style fantasy MMORPGs. *L2* features considerably enhanced first-person 3D graphics over its predecessor. There are five choices of races to play in *L2*; Dark Elf, Dwarf, Elf, Human or Orc, and a player can keep up to seven characters on a server. Gameplay is either solo or grouped and either PvE or PvP. In order to gain experience points, new skills, and various item drops, monsters can be battled and quests can be completed. Also, as

players travel the expanse of *L2* there are many social, political and economic aspects to participate in.

*Empirical evidence:* Whang and Chang (2004) explored the lifestyles of gamers (n = 4,786) who played *Lineage*. This research classified the gamers lifestyles into three general categories. These were:

- Single-oriented players (28%): These types of players did not feel the need to be part of a community. They are individualistic players who do not like to be interfered with.

- Community-oriented players (45%): Theses players showed a strong trait of being social, having strong comradeship in-game. These players tend to follow the hierarchical order in a guild and appreciate the social network features in-game.

- Off-real world players (27%): These players showed a strong inclination for off-reality and anti-social behaviour in the game world. These players believe it is all right to harm others in the game world, whereas they do not in the real world. These players displayed an inclination to use every possible means to achieve personal success in the game world.

There has also been a couple of very small polls on l2vault.ign.com about the length of time *Lineage* gamers have been playing. The first one completed by 70 gamers (see http://l2vault.ign.com/?dir=sympoll&dispid=47) reported 43% had been playing *Lineage* since its original release or previously on beta versions. The second poll completed by just nine gamers asked whether *Lineage* was just a game or means more to the players (see http://l2vault.ign.com/?dir=sympoll&dispid=42). Of the nine gamers, two players said it was just a game, five gamers said it was a game but could be stressful and just like life, and the remaining two gamers said the game meant the world to them. However, given that a combined total of only 79 players answered the two polls respectively, the results are almost meaningless.

***Lords of the Rings Online:*** *Lord of the Rings Online (LotRO)* is a fantasy MMORPG. Players can choose a character from four race options (Men, Elves, Hobbits and Dwarves), and a variety of classes (healer, a tank, a buffer/debuffer, ranged and melee). Several appearance modifications are also available. Gameplay is either solo or grouped and either PvE or PvP. Players can engage in a combat-oriented play style or a more peaceful alternative where they can engage in crafting or woodwork. Players can also go on quests to explore, fight monsters, and join a fellowship or guild. One of the key elements of *LotRO* is the emphasis on storytelling as an integral part of the play experience.

*Empirical evidence:* There is very little empirical evidence about *LotRO*. In a poll of just 49 players, 16 players said they were in a gaming relationship (33%) and the remainder were not (see http://lotrovault.ign.com/?dir=sympoll&dispid=16). The main motivations for playing are for the community, to prove their skill, to engage in PvP, and that it is a change from console games (see: mmorpg.com).

In a poll of 94 *LotRO* gamers (see http://lotrovault.ign.com/?dir=sympoll&dispid=12), the preferred style of playing in the game was playing solo (50%), playing in a group (18%), raiding (2%), and those who had no preference as long as they were having a good time in the game (30%). In a bigger poll of 201 gamers (see http://lotrovault.ign.com/?dir=sympoll&dispid=2), the biggest selling point of *LotRO* for gamers was the Tolkein setting (68%). Other lesser features were the monster play (4.5%), the in-game cinematics (2%), the unique character traits and development system (6%), the quest/adventure system (9%), the graphics (6%), and created by Turbine (4.5%).

***The Matrix Online:*** *The Matrix Online (TMO)* is a science fiction MMORPG set in the fictional universe of *The Matrix*, made popular by various films and books. *TMO* features a streamlined combat system unique among MMORPGs, comprising attacks and special abilities which personify *The Matrix* world. Examples include ‘bullet time’, ‘wire fu’ and ‘systemic anomalies’. Players may side with one of three factions (Zionist

Humans, Exiles, or Machines) and join in the ongoing war against the other two. Missions in *TMO*, unlike many MMORPGs, are randomly generated, involved, multi-tiered undertakings that encompass such *Matrix*-like activities as hacking, lock-picking and disabling security devices. *TMO* is praised for being the first MMORPG ever to feature a storyline delivered cinematically, and in mission packs made available each week between game updates. Special live events arranged and acted out by the *Sony Online Entertainment* game developers also help the storyline progress.

*Empirical evidence*: There is very little empirical evidence about *TMO*, but as with other online games already outlined, the motivation to play is that gamers want a change from console games, they want PvP experience, community experience, and want to prove their skill (see: mmorpg.com).

***Runescape:*** *Runescape* is a fantasy/adventure MMORPG in which there are quests to complete, monsters to kill and treasure to acquire. There are no specific classes so players can be whatever they want to be (Kraczeck, 2007). Runescape has been designed for children and adults. It does not require installation of hardware, as all players need is access to the Internet as the game is played via an Internet browser (Bye, 2007). The game is free to play but it does provide a subscription system that provides access to more extensive game content and items. Players control their own character which improves and becomes more powerful after each quest. Money can be earned in-game by cooking, fishing, crafting weapons, and trading valuable goods with others. Runescape also allows PvP combat so you can choose to fight with like-minded people to try and steal their treasure. As with all MMORPGs, Runescape is multiplayer which means players can meet many other people in the virtual world who they can communicate and trade with or to go adventuring with.

*Empirical evidence:* According to a 2007 poll on the official *Runescape* website in which 22,704 *Runescape* players took part (http://tip.it/runescape/index.php?poll_id=18), 7% said they played less than 1 hour per

day, 23% played 1 to 2 hours a day, 24% played 3 to 4 hours a day, 21% played 5 hours or more a day, and 25% said they had stopped keeping track. In another 2006 website poll survey of 16,634 *Runescape* players (http://tip.it/runescape/index.php?poll_id=23), 82% were male and 11% were female (the remaining 7% did not say). In a 2006 poll of 17,493 *Runescape* players (http://tip.it/runescape/index.php?poll_id=24), 16% lived in the UK, 21% lived in Europe, 8% lived in Australia or New Zealand, 51% lived in the Americas, and 4% lived elsewhere. In a 2006 poll of 24,601 *Runescape* players (http://tip.it/runescape/index.php?poll_id=22), 14% were under 13 years, two-thirds (67%) were aged between 13 and 18 years, 10% were 19 to 30 years, and only 8% were over 30 years.

In another 2006 poll (http://tip.it/runescape/index.php?poll_id=9), 25,818 players reported how long they had been playing *Runescape*. A total of 12% had played from the very start in 2001, 17% had been playing three to four years, 41% had been playing one to two years, and 30% had been playing under a year.

In relation to the biggest reason as to why they 'got into' *Runescape*, a 2004 poll of 13,554 players (http://www.runescape.com/ ) found that 18% played because there was so much to do in-game, 13% played it because it was easy and fun to get into the gameplay, 10% played because most of their friends played, 4% played because they could play the game in the browser, and there were no installation problems. Over half of the players (55%) played because of a combination of all these factors. In relation to what specific activity players most enjoyed in *Runescape*, a 2004 poll of 10,577 players (http://www.runescape.com/), found that over half (51%) enjoyed levelling up their character, 16% enjoyed completing quests, 12% enjoyed killing other players, 9% enjoyed in-game events (like 'drop parties'). 7% enjoyed chatting with friends, and 5% enjoyed duelling.

In a 2006 poll of 20,322 *Runescape* players (http://tip.it/runescape/index.php?poll_id=1), two-thirds of players (66%) said that

*Runescape* was the only game they played. A further 8% also played World of Warcraft, 6% also played Guild Wars, and 1% also played Everquest2 (the remaining 20% played other unspecified games).

***Second Life:*** *Second Life (SL)* is a MMORPG based on real-life although most would argue it is not really a game but a synthetic world. *SL* is an expansive online society, lived in and built by its participants. Players join a 3D world full of people, activity, and fun, where they can build a shared reality with fellow in-game residents. Players choose their own goals: travel and explore, claim and build on virtual land, make friends and socialize, or vie for status and wealth. Participants can change their characters appearance to whatever suits them. For example, they can be an imaginary superhero, a mythical monster, or their own mirror image. Players can also change their surroundings. For instance, they can build their own dream home, make art, or become a world-famous clothing designer. *SL* also allows collaboration between players. Players can collaborate to build a major civic work or an entire city. *SL* lets the participants free their imagination. *SL* has gained popularity for mimicking the real world and for allowing its residents to buy and sell virtual goods, or rent "land" inside the game.

*Empirical evidence:* research on SL indicates that SL participants tend to be a diverse group. About a quarter of participants are female, and the average age is just over 30 years (Hursthouse, 2005) with a steady continuum of ages from 18 through to 72 years (see Womengamers.com). Although women account for about 27% of the total registered population in SL, they account for 45% of the population by usage hours. Papagiannidis, Bourlakis and Li (2007) found that the average age of SL players was 32 years, and the median age was 36 years with 43% of players being female.

About 20% of players are from over 50 countries outside the US, with the UK and Canada having the largest non-US representation (Hursthouse, 2005). More recent research by Papagiannidis et al (2007) reported that 25% of *SL's* participants were from outside the USA, with the UK being the second-largest country of origin. In terms

of occupation, Papagiannidis et al (2007) also found that 25% of players were sellers. Among the sellers, 'low hundreds' of them identified *SL* as their full-time job. In terms of motivation, players want to socialise online, they want community, they want somewhere to relax, and they want a change from real life (see mmorpg.com).

***Star Wars Galaxies:*** *Star Wars Galaxies (SWG)* is a sci-fi MMORPG initially released as Star Wars Galaxies: An Empire Divided. This MMORPG's world consists of ten different planets, each one a 16 km x 16 km map and borrowed from the known fictional Star Wars universe. Its timeline is set between the Episode IV: A New Hope and Episode V: The Empire Strikes Back movies. SWG features content both mentioned and not mentioned in various Star Wars media. During character creation, players may choose from ten different species and nine different primary professions, all of which are mentioned in various Star Wars media.

*Empirical evidence*: Very little is known about those who play *SWG*. In one online poll (Swgalaxies.net) of an unspecified number of players, it was reported that over half of all players (53%) played between 20 and 25 hours a week on the game. Less than one in five players (16%) played up to five hours a week with the remaining players (31%) playing between 5 and 20 hours a week. Stratics.com reported the age breakdown on an unspecified number of players. A total of 8% were aged 11 to 15 years, 27% were aged 16 to 19 years, 24% were aged 20 to 24 years, 19% were aged 25 to 29 years, 16% were aged 30 to 40 years, and 2% were aged over 40 years.

A couple of websites have also reported data on how long gamers have been playing *SWG*. Stratics.net reported that 43% of players had been playing since the launch (or an earlier beta version) whereas Swgalaxies.net reported only 22% had played since the launch. Stratics.com reported that 57% had been playing *SWG* for less than a year whereas Swgalaxies.net reported that only 29% had been playing *SWG* for less than a year. However, given there are no dates for when the survey took place or the number of participants in either poll, it is hard to assess the true situation.

***Ultima Online:*** *Ultima Online (UO)* was the Internet's first virtual world. *UO* is a fantasy MMORPG in which players choose their virtual life and immerse themselves into the mystical, medieval world of Britannia. Players are given an unprecedented degree of freedom to shape their own destiny. There are many possibilities in *UO.* Players can build a house, craft a sword, tame animals, run a shop, delve deep into perilous dungeons, or just talk with other players over a goblet of virtual ale. In *UO* players are free to do whatever they choose. Players have built whole cities, formed guilds, and waged large-scale wars in the virtual world of Britannia. Gameplay can be PvP or PvE.

*Empirical evidence***:** Taylor (2003) reported that *UO* officials claimed there were 20-30% female *UO* players. Yee (2007) found that some gamers play *UO* in order to roleplay, and to explore the virtual world. Others played in order to strengthen social bonds and to build trust by working together. Others played in order to socialise and help others with quests. Yee (2007) also found that some gamers played *UO* in order to 'solo' and were not interested in socialising with other gamers. Some gamers played because they enjoyed the sense of constant progress (the grind) in *UO* (Yee, 2007). Other reported motivations include the opportunities for PvP, community, proving their skill, and wanting a change from console games (see mmorpg.com).

***Vanguard: Saga of Heroes:*** *Vanguard: Saga of Heroes (VSoH)* is an MMORPG that consists of an immersive virtual world filled with elements of familiar high fantasy, including traditional themes, all depicted using cutting-edge graphics technology. *VSoH* contains a vast, detailed world of swords, sorcery, dragons and knights. *VSoH* is a world in which a myriad of sentient races and creatures, many of whom players will be able to base a character on, live and affect change. Players can follow very different paths of advancement, including assuming the roles of adventurers, crafters and merchants. Players can also experience settings ranging from enjoying a virtual drink in a tavern to walking through the streets of a bustling city. They can own buildings and vehicles, travel with trade caravans across deserts and fight pirates on the high seas, or explore the depths of eerie dungeons.

*Empirical evidence:* As with many of the other games outlined, the motivation to play *VSoH* includes PvP, wanting a change, community, and proving their skill by showing that they are better than others (see mmorpg.com). One small poll of 77 gamers (see http://vanguardvault.ign.com/?dir=sympoll&dispid=34) reported on the part of *VSoH* that 'keeps the player going'. The reasons were the adventuring (30%), the crafting (3%), the diplomacy (4%), their friends (27%), and the game being fun (36%).

In a poll of almost 1000 gamers (n = 988), *VSoH* players were asked how many hours a day they played the game (see http://vanguardvault.ign.com/?dir=sympoll&dispid=13). Results showed that 15% played under two hours a day, 40% played between two to four hours a day, 21% played between four to seven hours a day, and 24% played more than seven hours a day. In another poll, *VSoH* players (n = 341) were asked what their play style was (see http://vanguardvault.ign.com/?dir=sympoll&dispid=10). Although most players (43%) preferred playing both PvE and PvP, 37% preferred playing PvE and 20% preferred playing PvP.

***World of Warcraft:*** World of Warcraft (WoW) is the first MMORPG in the (so far) four-part Warcraft series, with previous Warcraft titles being RTS games. Like most MMORPGs, players can find adventure in fighting various monsters and in performing missions offered by numerous NPCs throughout Azeroth. In WoW, success in these endeavours yields rewards in the form of currency, items and experience. Players may also take part in PvP battles in the forms of dueling and fights with players of opposing factions. In the early to middle stages of exploration around Azeroth, most monsters and quests can be handled solo. However, past this point, more and more gameplay requires a good team of players, usually two to five in number. Large-scale raids can require up to 40 players to succeed.

*Empirical evidence*: There is growing research in the *WoW* area. Yee (2007) has reported that the average age of WoW players is 28.3 years (SD = 8.4). The majority of players are male (84% male; 16% female). Female players are significantly older (M = 32.5 years, SD = 10.0) than male players (M = 28.0 years, SD = 8.4). On average,

WoW players spend 22.7 hours per week playing WoW (SD = 14.1). There were no gender differences in hours played per week.

This is very similar to a poll on vault.ign.com reported that half of all *WoW* players (50%) spend over 21 hours a week playing the game. A minority (10%) play below five hours a week, 12% play 6 to 10 hours a week, and 28% play 11 to 20 hours a week. However, the number of participants in the poll was not recorded. Another poll reported on Stratics.com reported that 11% had never played any other MMORPGs before whereas 35% had played one or two others, 22% had played three or four others, and 29% had played five others. Again, the number of participants was not reported.

Other findings that have been reported on website polls include that most gamers play *WoW* in the evening or night (57%), 40% whenever they could and 3% in the day only (both findings on Vault.ign.com) and that a third of WoW players (33%) had engaged in gender swapping their character online. Yee (2007) reports that one out of two female characters is played by a man, and about one out of every 100 male characters is played by a woman. According to Yee, the real life gender distribution is 84% male vs. 16% female. The in-game *WoW* gender distribution is 65% male and 35% female.

There is some anecdotal poll evidence that *WoW* might be impacting negatively on players' lives. For instance, one website poll (Vault.ign.com) reported that 14% of *WoW* players sacrifice their personal hygiene to play, 22% sacrifice sleep, 9% sacrifice education, 11% sacrifice work, and 10% sacrifice sex. Another website poll (Stratics.com) of *WoW* players reported that over one-third are "totally addicted" (38%) and that 30% were "somewhat addicted".

***World War II Online:*** *WWII Online (WW2O)* is a MMORPG based on a real-life simulation of World War II combat fought on land, air, and sea. Players can captain ships, command tanks, pilot combat aircraft, or fight "down and dirty" in the infantry or marines. In this virtual world, players can create a character from a specific country,

allied with either the Axis or the Allies. The more experience the player gains, the greater their rank and influence on the battle.

*Empirical evidence:* There is almost no empirical evidence on WW2O but like other online games, the main motivations for playing are community, proving their skill, wanting PvP, and having a change from consoles (see mmorpg.com).

***Summary of results:*** Table 7 briefly summarises the type and amount of data currently available and its source. Table 7 highlights that only one game has had substantial amounts of research devoted to it *(World of Warcraft).* Although some games have been researched to a moderate degree, it is apparent that the majority have had minimal (or no) research conducted on them – even with respect to basic demographic data.

**Table 7. Scoping Study Results**

| Game | Amount of Information Available | Source of Data |
|---|---|---|
| *Anarchy Online* | None | N/A |
| *City of Heroes / Villains* | Minimal | Website polls |
| *Dark Age of Camelot* | None | N/A |
| *Eve Online* | Minimal | Website polls |
| *Everquest* | Moderate | Academic journals, website polls |
| *Everquest 2* | Minimal | Website polls |
| *Final Fantasy* | None | N/A |
| *Guild Wars* | Moderate | Academic journals, website polls |
| *Knight Online* | None | N/A |

| | | |
|---|---|---|
| *Lineage / Lineage 2* | Moderate | Academic journals, website polls |
| *Lord of the Rings Online* | Minimal | Website polls |
| *Runescape* | Minimal | Website polls |
| *Second Life* | Moderate | Academic journals, website polls |
| *Star Wars Galaxies* | Minimal | Website polls |
| *The Matrix Online* | None | N/A |
| *Ultima Online* | Moderate | Academic Journals, website polls |
| *Vanguard* | Minimal | Website polls |
| *World of Warcraft* | Substantial | Academic journals, website polls |
| *World War 2 Online* | None | N/A |

## Discussion

The results show that there are extensive gaps in our knowledge with respect to the basic demographic data of many MMORPGs. This lack of data may have severe repercussions for the validity of current research since it cannot be assumed that player populations exhibit the same psychological characteristics across game types. Across the spectrum of MMORPGs, the study found a considerable variety of information that had been acquired from a diverse range of academic and non-academic sources. Additionally, many areas of interest such as gender swapping or player nationality have not been addressed, even within those games that have received attention. The work of Yee (2006a, 2006b) and Hursthouse (2005) has looked at general MMORPG data (including player motivation), but it is clear that much game-specific research needs to be done. As outlined in the introduction, some academic papers have addressed deeper

issues within online gaming, but without an understanding of the basic player database of those games there is a risk that such research will be contextually adrift.

The study highlights there are many gaps in our knowledge, and to an extent this is to be expected since MMORPGs are a relatively new phenomenon. With these types of games more than any other, the real time increase in players – 1.3m in January 2000 up to 12.3m in July 2006 (MMOGCHART.COM) – indicates that these types of games appeal to a much larger audience than previous genres. It is the psychological and social implications of such increased player shift that requires detailed research – simply because the context of computer game playing has changed so dramatically.

One of the strengths of scoping studies is that they provide a rigorous and transparent method for mapping areas of research (Arksey & O'Malley, 2005). With regards to the present study, the scoping study method allowed the authors to be in a position to illustrate the field of MMORPGs in terms of the volume, nature and characteristics of the genre. Despite such strengths, the research presented here has a number of limitations. Possibly the most serious is the nature of scoping studies themselves (Arksey & O'Malley, 2005). Firstly, there was no attempt in this study to give more weight to one particular source of information over another (mainly because of the lack of academic research). As a consequence, results from peer reviewed academic papers have been grouped with online polls. Whilst this is not necessarily problematic, it does lead to a secondary and associated criticism that there is no assessment of the quality of the data. As such, this paper is a descriptive account of the state of demographic research into MMORPGs, and not to be taken as a critical analysis of the current research.

However, these types of limitations are in the nature of scoping studies (i.e., they are descriptive in nature). Arksey and O'Malley (2005) noted that "the scoping study does not seek to assess quality of evidence and consequently cannot determine whether particular studies provide robust or generalizable findings" (p.27). Nonetheless, it is evident that research into the basic demographics of games and the psychological profiles of the players they attract is required to establish both a broader and deeper understanding of online games. There was also an attempt to cover a larger spectrum of

games from a variety of sources and as a consequence, there is a greater breadth of MMORPGs data than depth in terms of the sources utilised. Whilst this was the intention of the study, it must be acknowledged that some data will have been overlooked as a by-product of this data-gathering strategy.

**Conclusions and the way forward**

Having identified that there are substantial gaps in the literature with respect to gaming practices and specific MMORPGs, there are many promising avenues for future research. The central problem is that it has not been proven that gamers of any one particular MMORPG are representative of MMORPG 'gamers' in general. Indeed, a common-sense approach would infer that reducing thousands of individual psyches and psychological motivations into one meta-category of the 'gamer' seems unwise. In addition, games companies design their products with target audiences in mind. Nobody would argue that *Pikmin* (a puzzle-based game) has been designed specifically with a first-person shooter like *Call of Duty 4* players in mind. Given the assumption that these (non-MMORPG) gamers play for different reasons, why should this logic not apply to MMORPGs? With this in mind, some research suggestions and the methods needed to do it are presented to clarify these issues and present a way forward.

Firstly, are there any differences in those gamers playing different MMORPGs? It cannot be assumed that all gamers play MMORPGs for the same reason, and therefore researchers must investigate if there are different sub-categories of player by both game, genre and medium (i.e., online versus offline). This is not only important for academic researchers but would additionally provide valuable information for games companies. The information may also be of use for other online companies in terms of systems design and/or the wider commercial use of online technologies. As a preliminary study, it is suggested that a large-scale quantitative online questionnaire study would provide satisfactory results accessing players via game-related forums and bulletin boards. Some researchers have found this a very successful strategy for obtaining such data (e.g., Griffiths et al, 2004a; 2004b). This would allow for a rapid collection of data, primarily assessing the impact of core demographic variables and gaming habits on the prevalence of playing MMORPGs. Wood, Griffiths and Eatough (2004) argue that data

collected online allows large-scale samples to be surveyed quickly and efficiently at a fraction of the cost of 'pen and paper' equivalents. They also point out that the Internet has a disinhibiting effect on users and reduces social desirability. This may lead to increased levels of honesty (i.e., higher validity in the case of self-report).

Secondly, and on the assumption differences do exist, what are the personal psychological reasons that different gamers play their chosen MMORPG? Again, this is valuable information not only to academics, but also to the online games industry. With the burgeoning industry of educational and serious games, it is important to know what players look for in a game or within virtual environments as a whole. Aside from the collection of demographic data, it is anticipated that understanding the context of gaming would be valuable here and as such semi-structured interviews and focus groups (in addition to online questionnaires) would be beneficial for collecting these types of data as has been used elsewhere to collect 'rich' data about gamers (Chappell et al, 2006).

Thirdly, do the game environments themselves explain any potential differences in gaming behaviour? Again, this will prove beneficial for those designing games for a particular purpose, as it may be that certain structural characteristics facilitate interaction for particular groups or sub-category of player. It is anticipated that an analysis of the configuration of differing games (i.e., an analysis of structural characteristics) would provide answers to this question similar to the analysis carried out by Wood, Griffiths, Chappell and Davies (2004) in offline games.

Finally, why do people stop playing a particular game, or interacting in a virtual environment? Given that many MMORPGs allow for a continuous gaming experience, why do players leave the game? In addition to the academic interest, these data would also be valuable to educational, serious games and entertainment games designers. This information could help facilitate continued engagement between the gamer and the game or virtual environment. Given these aims, it is suggested that a mixed methods design of questionnaire and semi-structured interviews would be most applicable to investigate these types of question.

Overall, the scoping study found that whilst some games had received moderate, or even substantial attention, others have had no research conducted upon them at all. This presents a problem since the growth in both the player base and the industry suggests that a single psychological profile of 'the gamer' cannot be relied upon, and as such (and as highlighted above) further research is required. It is hoped that this study suggests ways forward and helps set research agendas for future online video gaming research that uses these and other methods. However, many research questions were left unanswered due to the complete lack of data on many games.

Note: The data on game motivation was extracted from MMORPG.COM. This website caters for all MMORPGs and strives to bring the best news, features and community in the MMORPG genre. Any poll results that appear on this website will consequently include players who play all types of MMORPGs.

# Chapter 5: An Online Interview Study Exploring Attitudes, Feelings, and Experiences of Online Gamers


## Abstract

The playing of Massively Multi-Player Online Role-Playing Games (MMORPGs) is now a highly popular leisure activity. The present study set out to explore the attitudes, experiences and feelings of online gamers. The study comprised 71 interviews with online gamers (52 males and 19 females) from 11 different countries. Six main themes emerged from the analyses of the interview transcripts. These were: (1) online gaming and integration into day-to-day lives, (2) online gaming, excessive play and problems, (3) addiction, (4) psychosocial impact of online gaming, (5) online gaming, dissociation and time loss, and (6) online gaming and the alleviation of negative feelings and mood states. These findings specifically showed how gamers used MMORPGs to alleviate negative feelings and provided detailed descriptions of personal problems that had arisen due to playing MMORPGs. The implications of these findings are discussed in relation to previous qualitative and quantitative research in the area.

## Introduction

Research in the area of Massively Multi-Player Online Role-Playing Games (MMORPGs) has been growing rapidly. Research has focused on the demographic make-up of gamers (Griffiths, Davies & Chappell, 2003, 2004a; Yee, 2006a) group membership and guild dynamics (Chen, Sun & Hsieh, 2008), social motivations for playing and development of in-game friendships (Cole & Griffiths, 2007), motivations of gamers (Yee, 2006b), online gaming addiction (Grusser, Thalemann & Griffiths, 2007) and gender swapping (Hussain, & Griffiths, 2008). Griffiths et al (2004b) gathered primary data on the basic demographic factors of online game players. The results showed that 81% of online gamers were male, and that the mean age of players was 28 years of age. It was also found that 4% of players claimed to play for over 70 hours a week. Yee's (2006a) demographic survey of online gamers revealed similar findings.

Hussain and Griffiths (2008) investigated online socialisation and the phenomenon of gender swapping in MMORPGs. Results showed that just over one in five gamers (21%) preferred socialising online to offline. Gamers saw the online worlds as pleasant and satisfying environments which provided equality. Results also showed that 57% of gamers had engaged in gender swapping. Gamers' gender swapped for reasons of interest, to experiment playing a different gendered character, for fun and to prevent unsolicited male approaches. Experimental research by Lim and Lee (2009) examined how task types and social contexts affect physiological arousal in MMORPG play. Results showed that when compared with solo play, collaborative play led to a significant decrease in arousal in response to violent tasks, while leading to a slight increase for nonviolent tasks. Steinkuehler (2007) made use of ethnography to investigate the cultural practices and consequences of playing the MMORPG *Lineage.* Findings showed that through participation in activities within the MMORPG, gamers gained valuable knowledge about the customs and practices within *Lineage*. Gamers learned gaming terminology and gained knowledge of the terrain, the trading system and the points system.

Chen et al (2008) collected data on in-game player activities and observed how players join and leave guilds. Data were gathered for 641,805 avatars on 62 Taiwanese *World of Warcraft* servers. Chen et al (2008) created five guild type categories that had different meanings in terms of in-game group dynamics. The guild types were; newbie guilds, small guilds, large guilds, elite guilds and unstable guilds. These guild categories explained the guild life cycle (i.e., the formation of guilds, their membership and development), in-game mechanisms and player behaviour. Eatough et al (2006) examined the perceptions of *EverQuest* players using Interpretative Phenomenological Analysis (IPA). Data were analysed from various online forums and showed that the gamers appeared to be 'addicted' to *EverQuest*. Most of the gamers appeared to display the core components of addiction such as salience, mood modification, tolerance, conflict, withdrawal symptoms, cravings, and relapse.

As has been observed in this brief overview, research into online gaming has used a variety of methods obtaining quantitative and qualitative data. Many of the quantitative studies can be criticised for obtaining small samples sizes, being culturally specific and/or using pseudo-experimental methods in artificial settings recruiting students. There are many quantitative studies but very few qualitative studies. Further research focusing on the experiences of gamers that allows the gamers to speak and provide their own accounts of playing MMORPGs is needed. The present study set out to explore the attitudes, experiences and feelings of online gamers. The study comprised qualitative interviews that made use of gamers' preferred methods of communicating (via email and instant messaging).

## Method

### Participants

A total of 71 online gamers (52 males and 19 females) participated in the study. The participants ranged in age from 18 to 54 years (mean = 26 years, SD = 8.4 years). Most of the participants were from the USA (n = 32), followed by the UK (n = 19), Canada (n = 5), and Netherlands (n = 4), although seven other countries were also represented

among the remaining participants (n = 11) (i.e., Norway, Sweden, Portugal, Finland, Australia, Belgium and Greece). The mean gaming time per week was 18.9 hours. The mean years of gaming experience was 4.7 years. Gamers were categorised into three gamer types: (i) casual gamer (play 15 hours a week or less; n = 39); (ii) regular gamer (play more than 15 hours and up to 30 hours a week; n = 21); (iii) excessive gamer (play more than 30 hours a week; n = 12).

**Design and Procedure**

Participants were recruited in response to recruitment posts on various online gaming forums (see Appendix 2 for a complete list of websites and forums posted on during participant recruitment) and in-game posts in the *World of Warcraft* MMORPG. The sample was therefore self-selecting. Participation was voluntary and no incentive was offered for participation. Semi–structured interviews were conducted over a four-month period (October 2007 to January 2008). The interviews were carried out (synchronously) via *MSN Messenger* (an online chat facility) or (asynchronously) via email. All interviews were conducted at a time that was most convenient for the participants.

All participants were emailed a consent form (see Appendix 3) and participant information sheet (see Appendix 4) which explained the research in more detail and provided the participants with the researcher's contact details. The interviews began with a few structured questions regarding gamer demographics that then led onto to unstructured questions about gamers' feelings and experiences concerning their day-to-day playing behaviour. The unstructured nature of the interviews allowed gamers to develop their own narrative by exploring their experiences of MMORPGs (see Appendix 5 for a copy of the interview schedule).

The researcher allowed gamers to speak for themselves (i.e., the emergent themes were participant led rather than researcher-led). This allowed gamers to take control of the interview process, this prevented the researcher's subjective bias entering the analytic stage. All participants were debriefed before and after the study (see Appendix 6 for a

copy of the debriefing sheet). Each interview lasted approximately 75 minutes. Those that were interviewed by email generally gave shorter responses to interviewer questions than those interviewed using *MSN Messenger*. However, there was no difference in the type of response content. Data were gathered using the preferred medium of the gamer (i.e., email or *MSN Messenger*). Data from the interviews were imported into *QSR Nvivo*, a qualitative data analysis software tool, and were analysed using thematic analysis.

Thematic analysis is a flexible method for identifying, analysing and reporting themes within qualitative data (Braun & Clarke, 2006). This method can offer a rich description of the data set and is very useful for summarising large bodies of data. Thematic analysis also allows for the psychological interpretation of data and can generate unanticipated insights. In the first stage of the thematic analysis, the researcher read through all the transcripts twice to become familiar with the data, and then searched for the main themes to emerge from the responses to each of the questions asked. The responses to each question were re-read with particular attention being paid to the themes arising from the first stage of data analysis. The responses were then collated under the emerging theme headings and were given provisional labels and definitions. The responses were then re-read to see if they contained any further relevant information to the provisional themes. The themes were then given their final analytical form and definition. These themes were then refined further through systematic examination of each theme by the researcher. The searching, coding and labelling of themes were done by the use of *QSR Nvivo*.

## Results

Six main themes emerged from the analyses of the interview transcripts. These were: (1) online gaming and integration into day-to-day lives, (2) online gaming, excessive play and problems, (3) addiction, (4) psychosocial impact of online gaming, (5) online gaming, dissociation and time loss, and (6) online gaming and the alleviation of negative feelings and mood states.

**Online gaming and integration into day-to-day lives**

The theme of online gaming and integration into day-to-day lives revealed how gamers fitted their online gaming into their lives. Many gamers said that they played in their free time after work, school, college or university (n=43; 33M, 10F). Others said they integrated their online gaming by playing with friends (n=3, all male) whilst some gamers said that they played during work hours (n=5; 4M, 1F). A few gamers (n=3; 1M, 2F) played with their spouses or romantic partners. Typical quotes for those who played in their free leisure time included:

*Extract 1: I leave for work at 7 am and work 8am-5pm. I come home, help the kids with homework (I have teenagers), make sure the chores are done, have dinner and then we log on after that (P2, female, age 34, USA, regular gamer).*

*Extract 2: I play after my kids have gone to bed and I have "free" time to do as I wish. My wife chooses to watch TV I choose to relax by playing video games (P5, male, age 37, USA, excessive gamer).*

These quotes show how gamers played at specific periods in their day-to-day lives. They played before or after work, after dinner or completing certain tasks. The findings indicated that gamers appeared to be very organised and managed their time very well. This is contrary to many beliefs that gamers lose control of their lives. Typical quotes of gamers who played with their friends said:

*Extract 3: WoW* [World of Warcraft] *takes a lot less priority now I'm in my final year at University. A couple of our friends who live nearby also play so we try to arrange to meet up in game and complete an instance now and again (P6, male, age 26, UK, casual gamer).*

*Extract 4: I play with friends I have in real life – both from home and meeting up with them online, and also going to their house and playing in the same room (P7, male, age 27, USA, regular gamer).*

These responses show how gamers played together with friends and how they had made their game playing into a social activity they would get together in real life or online to enjoy each others company. It also highlights the social nature of MMORPGs. Typical quotes of gamers who played while at work:

*Extract 5: I work from home, so that doesn't pose a problem. My husband used to play with me, but quit. He went back to FFXI and I play WoW (P8, female, age 23, Canada, regular gamer).*

*Extract 6: I work from home, so if I don't have enough work to do I often spend the rest of the time playing MMORPGs. I also play after my work day is complete (P9, male, age 36, USA, excessive gamer).*

These quotes show how gamers did not have a problem with their jobs and playing MMORPGs. There was no real conflict between work and leisure time as they worked and played in the same location. Integrating online gaming into their lives was very simple for them. Below are some typical quotes from gamers who said they played with their spouses or romantic partners:

*Extract 7: When at all possible I play with my husband. We enjoy yelling insults at each other while our characters are interacting. Hardest part is finding the time to play while the kids are home (P10, female, age 27, Canada, casual gamer).*

*Extract 8: I play with my partner, but this is because I actually met my partner through the game. We've since moved in together, but met online, and originally lived thousands of miles apart (P11, female, age 22, USA, regular gamer).*

These quotes show that gamers may play with their partners. For instance, P11 (Extract 8) originally met her partner online within the MMORPG. This shows how the MMORPG can be used a medium to communicate and meet people.

**Online gaming, excessive play and problems**

A majority of the gamers interviewed stated that their game playing is excessive (n=27; 20M, 7F) or was excessive (n=13; 11M, 2F). Only a few gamers said that their game playing was not excessive (n=4; 2M, 2F). The remainder of gamers did not comment upon this issue. There was a high degree of awareness of game playing being excessive for those who said that they played excessively. For example, those who current playing was excessive typically said:

*Extract 9: Yes,* [my playing is] *very excessive. The end-game raiding content is what's keeping me hooked as well as the social aspect (P15, male, age 18, UK, regular gamer).*

*Extract 10: I still feel I spend too much time playing – but sometimes I can't help myself…I just love building my gear and chatting (P7, male, age 27, USA, regular gamer).*

*Extract 11: I really don't know why I play it so much. But, it's where my friends are at, and it's just something to waste time with. I don't see myself as addicted to WoW* [World of Warcraft], *even though it seems that way (P16, male, age 18, UK, excessive gamer).*

These quotes show how the social aspects of MMORPGs can have the negative impact of causing excessive game playing. The virtual world was seen as a place to waste time which led to excessive playing for some gamers. The online community also facilitated excessive play. Typical quotes from gamers who said their online gaming was (but no longer) excessive:

*Extract 12: It was quite excessive at one point. I wanted to try all the instances, try all the gear, level up as fast as possible (P6, male, age 26, UK, casual gamer).*

*Extract 13: I was "raiding" in one of the best guilds in World of Warcraft. I felt I had the time for it so I continued even if it required me to play around five to eight hours each day. So I have had a time it was excessive (P17, male, age 21, Sweden, excessive gamer).*

*Extract 14: There were a couple of things that contributed to my excessive playing in the past. Foremost among them was belonging to a raiding guild. A second contributing factor was setting goals for myself (P18, male, age 40, USA, regular gamer).*

These quotes provide insight into the nature of MMORPGs and what caused many of the gamers to play excessively in the past. Gamers talked about the raiding, levelling up, and belonging to a guild. These were factors that caused excessive playing. Also the quotes provide an insight into the thinking processes of the gamers (e.g., Extract 14) which explain parts of his gaming behaviour and how he would tell himself that a specific quest had to be completed. There was a sense of urgency to complete the quest. Below are some quotes from gamers who said that their online gaming was not excessive:

*Extract 15: I don't think my MMO playing is excessive. It's a hobby (P19, female, age 20, USA, regular gamer).*

*Extract 16: Not really* [game playing is not excessive], *although I do play a lot. Most from a desire to 'finish what I started' (P21, male, age 21, UK, regular gamer).*

Gamers here explained their online gaming behaviour as not excessive, and viewed it as a hobby. However, P21 (Extract 16) showed signs of playing excessively from his quote even though he said his game playing was not excessive.

**Addiction**

Online gaming was seen as potentially addictive by some gamers (n=14; 10M, 4F). For instance:

*Extract 17: It's obvious that MMORPGs are addictive. My competitive nature is constantly hooked by testing my skill with other people (P22, female, age 20, USA, casual gamer).*

*Extract 18: MMORPGs will be the new cocaine and the new trigger of the status of the mind's emotional state. MMORPGs are highly addictive (P24, female, age 18, UK, regular gamer).*

*Extract 19: Everquest used to be called 'Evercrack' due to its highly addictive nature and large scale social interactions. This led people to skip work to play, leading to a loss of a job (I watched it happen at my place of employment) (P25, male, age 27, USA, regular gamer).*

These quotes highlight the potential addictiveness of MMORPGs as viewed by the players themselves. As highlighted in the quotes, the social interaction, competition, and the in-game tasks were some of the triggers to addiction according to these gamers.

**Psychosocial impact of online gaming**

The vast majority of gamers (n=50; 35M, 15F) highlighted the positive effects of online gaming and there were many different aspects that were touched upon. However,

a majority of the gamers (n=45; 37M, 8F) also commented upon the negative effects of MMORPGs. Positive aspects included:

*Extract 20: You meet new people, you learn about new cultures, learn about teamwork and build friendships. At the same time you're having fun by playing a game (P16, male, age 18, UK, excessive gamer).*

*Extract 21: I'm absolutely more proficient at* [using] *computers, I've made friendships that have stood the test of time. My husband and I are such a close unit now, and part of it is sharing a love for something that's so not the norm (P2, female, age 34, USA, regular gamer).*

*Extract 22: MMORPGs can teach cooperation, typing, reading comprehension, economics, even complex mathematics (P26, male, age 23, USA, casual gamer).*

These quotes express some of the capabilities of MMORPGs. The gamers had many positive experiences with MMORPGs and there were many other beneficial uses of MMORPGs. However, many of the gamers also noted potential negative effects:

*Extract 23: I've lost my IRL* [in real life] *friends because I couldn't find the time to be with them, I quit school. Whenever someone asks me to do something on the weekends, I always think 'ooh but we're raiding, I really shouldn't go out' and that's a way of thinking which I really dislike (P32, female, age 21, Norway, excessive gamer).*

*Extract 24: Probably the most profound experience was losing friends to MMORPGs. Had a girlfriend who ended up playing 14 hours a day until I realised my attempts to help were futile and said goodbye (P33, male, age 25, USA, regular gamer).*

*Extract 25: I have neglected hygiene, eating, sleep, work and school because of it. It causes restlessness anytime I'm not playing (P34, male, age 22, USA, casual gamer).*

These quotes highlighted the potentially adverse effects that were associated with MMORPGs. Most notably the experience of losing friends to MMORPGs is an issue that would appear to require further research.

**Online gaming, dissociation and time loss**

Gamers were asked whether they experienced detachment from real-life or whether they lost track of time and if they played longer than intended. Just under a third of gamers experienced detachment (n=22; 17M, 5F). Over a third of gamers experienced time loss and said they played longer than intended (n=25; 16M, 9F). In terms of detachment, gamers reported:

*Extract 26: I noticed what a mess my bedroom is. I do the dishes every morning, that's about the only chore I have. I put myself last. If I need to do something in-game, I'll wait with the shower and the dinner (P32, female, age 21, Norway, excessive gamer).*

*Extract 27: When I'm playing online, I don't even think of me as sitting in the same world as everyone else. I get sucked into the game and the only thing that matters to me is that game (P22, female, age 20, USA, casual gamer).*

*Extract 28: I do actually [feel detachment]. I feel that [other tasks] can wait and that I can do them later which results in time being wasted and usually me not doing the homework or my household tasks given to me (P29, male, age 21, USA, regular gamer).*

These quotes showed the immersive properties of MMORPGs that caused detachment in some gamers. This appeared to be an appealing feature of MMORPGs. Of those who played longer than intended, typical quotes included:

*Extract 29: One doesn't always realise how long one has played (as witness the occasional Friday night when I suddenly realise it's 3am, and should have gone to bed hours ago). Game time is different (time is not 1:1), it is easy to fail to notice physical time (P27, female, age 40, USA, casual gamer).*

*Extract 30: I do tend to lose track of time while playing. WoW is an incredibly immersive game and I become very absorbed in what my character is trying to accomplish (P37, female, age 33, Canada, casual gamer).*

*Extract 31: I do lose time when I am online gaming. I would think that an hour went by and it was like 4-5. I started setting an alarm clock for every hour. So it would help me keep track of time (P12, male, age 33, USA, casual gamer).*

The quotes above show that gamers experienced time loss to such an extent that some gamers set an alarm to alert them of the time. The level of involvement that is required when playing a MMORPG was seen as a reason for time loss.

### Online gaming and the alleviation of negative feelings and mood states

Analysis demonstrated how gamers used online gaming to alleviate negative feelings that in turn brought positive feelings. Just under a third of gamers (n=22; 13M, 9F) spoke about how they removed negative feelings such as stress, anger, and frustration by playing MMORPGs. For instance:

*Extract 32: I usually use WoW to relieve loneliness by finding my friends or making new ones. It fills you with happiness that you are having a great time even when no-one is around you (P24, female, age 18, UK, regular gamer).*

*Extract 33: I have used [MMORPGs] to alleviate frustration. It is much better to go and kill monsters than to yell at the family. They can be a good release (P38, female, age 54, USA, regular gamer).*

*Extract 34: For me it's a way of stepping out of everyday stress and annoyances, and entering a sort of sanitised world where I am mostly in control of what happens to me (P41, female, age 27, UK, casual gamer).*

These quotes showed how gamers utilised MMORPGs to relieve very strong negative feelings that can be difficult to relieve in some cases. Gamers used MMORPGs as a release and as a medium to 'step away' away from everyday problems.

## Discussion

The study examined whether online gaming impacts (psychologically and socially) on peoples' lives by exploring attitudes and views towards online game playing and consequent behaviour. The qualitative nature of the study enabled an in-depth analysis of gamers' perceptions. The interviews allowed for the development of qualitative accounts that provided information about particular aspects of online gaming. For instance, the study showed how gamers used MMORPGs to alleviate negative feelings and it provided detailed descriptions of personal problems that had arisen due to

playing MMORPGs. Furthermore, the study provided detailed accounts of gamers' day-to-day lives and how they integrated online gaming into their lives.

**Online gaming and integration into day-to-day lives**

The results showed that more than half of gamers (n=43) played MMORPGs in their 'free time' outside of school, college or university, while a smaller number (n=5) played while at work. These findings show that gamers integrate online gaming into their lives with few adverse social effects on their daily lives. Results also showed that most gamers planned their gaming around their daily education, work and/or home tasks. For instance, one gamer reported that he played after his children had gone to bed (Extract 2). The results show that gamers tend to manage and integrate their MMORPG playing into their lives but that a few play along with friends and partners. These findings were similar to those of Cole and Griffiths (2007) who found that 26% of their sample played MMORPGs with family and real-life friends. The findings also show similarity to that of Whang and Chang (2004) who explored the lifestyles of online gamers and compared their real-world lifestyles with their values and attitudes in the virtual world.

**Online gaming, excessive play and problems**

The present study also found that more than half of the gamers (n=40) thought their game playing is or was excessive. Only four gamers specifically said that their game playing was not excessive. The reasons for excessive play were varied. For instance, one gamer (Extract 9) said the 'end-game raiding' content as well as the social aspects of the game caused him to play excessively. Another gamer (Extract 10) stated that the social aspect as well as 'building his gear' caused gaming excess. Other reasons for excessive playing included the competitive surroundings of the virtual environment, the community, having a lot of free time, the lack of interesting alternative entertainment outlets with the same relative ease of coming and going, and having to get their money's worth if they had paid a subscription. For those who said their game playing was excessive in the past, they provided similar responses to those who played excessively at present.

The gamers who said that their playing was not excessive saw their online gaming as a hobby (e.g., Extract 15). From the findings, online gaming appeared to facilitate excessive play to a high extent. The findings showed that gamers were aware of their game playing behaviour and for many their playing was excessive. Specific aspects of MMORPGs were highlighted as causing excessive play that could lead to adverse health effects for some gamers (such as missing meals and not exercising regularly). Future research should try to assess the extent of excessive playing using a quantitative measure. There were also some insights into online gaming as an addiction. A fifth of gamers (n=14) thought MMORPGs were addictive. One gamer (Extract 18) likened MMORPGs to a drug and thought they were highly addictive. Another gamer (Extract 17) saw her playing as excessive and got 'hooked' by testing her skill with other people. These findings support the findings of Grusser, Thalemann and Griffiths (2007) who found that 12% of gamers met at least three addiction criteria. However, the present study does not claim that the gaming behaviour of the participants is related to dysfunctional social behaviour. Conversely, in regards to the present findings, the qualitative data on excessive playing and addiction needs to be supported with quantitative data.

**Psychosocial impact of online gaming**

The present study was distinctive in terms of collecting data on the positive and negative effects of online gaming. More than two-thirds of gamers (n=51) commented upon the positive effects of online gaming. Some of the positive effects included meeting new people, learning about new cultures, facilitating teamwork, and building friendships (Extract 20). Online gaming was linked to improved efficiency at using computers (Extract 21). It was also seen as a good tool for teaching cooperation, typing, reading comprehension, economics and mathematics (Extract 22). Interestingly, online gaming was also seen as a medium that allowed people to exercise their imagination and could teach teamwork and planning skills. Such positive effects lend support to the collaborative learning approaches that focus on problem and experienced based learning and to the literature showing online games can be educationally useful (de Freitas & Griffiths, 2008).

The negative effects of online gaming were commented upon by almost two-thirds of gamers (n=45). Somewhat paradoxically, gamers linked online gaming to being social online, but anti-social in real life. Other negative effects included online gaming being time consuming and affecting the breakdown of friendships and relationships (Extract 23). One gamer (Extract 25) provided detailed information of how he had neglected hygiene, eating, sleep, work and school due to playing online games. Video game developers could benefit from these findings by incorporating more of the positive aspects and omitting the negative aspects when developing new MMORPGs. For instance, MMORPGs could incorporate rest breaks and reward gamers for doing so. In-game quests could perhaps be made to be more educationally oriented. Rather than making tasks that are repetitive, tasks that test gamers' analytical, communication and decision-making skills would be one way of making the games more educational.

**Online gaming, dissociation and time loss**

The present study also examined the potential capabilities of online gaming to cause detachment and/or time loss. Less than a third of gamers (n=22) said that they experienced 'detachment'. For one gamer (Extract 29) the experience of detachment had caused her to delay real-world tasks such as cleaning her bedroom and taking showers. Another gamer (Extract 30) thought she was in a different world to everyone else. She also mentioned the feeling of getting 'sucked' into the game. These accounts provide detailed accounts of the types of feelings and thoughts that were provoked by online gaming. Just over a third of gamers (n=25) stated that they experienced time loss and played longer than intended. Participants' comments were varied on this topic. One gamer (Extract 31) felt that time went by quickly and she mentioned that in-game time is different to real-world time and can lead to not noticing real-world time. Others experienced time loss and had resorted to setting an alarm. These findings support the findings of Wood, Griffiths and Parke (2007) that showed that gamers experienced time loss and was associated with particular structural characteristics of video games such as their multiplayer interaction, multi-levels and their complexity. Further research on both time loss and its link with particular structural characteristics, such as that by Wood, Griffiths, Chappell and Davies (2004), is needed.

**Online gaming and the alleviation of negative feelings and mood states**

The interviews also yielded data on how gamers had used online gaming to alleviate negative feelings. Almost one-third of gamers (n=22) spoke about such effects. Gamers used online gaming to relieve loneliness and boredom and also to alleviate frustration (Extract 33). Online games were used to relieve everyday stresses and annoyances. Here, online gaming had a therapeutic capability and could perhaps be used in psychotherapy by allowing patients to play MMORPGs in order to relieve negative feelings. Hence, online games appear to have the capability to bring about positive behavioural changes as noted in past video game research in psychotherapeutic settings (Gardner, 1991). However, further research that examines the psychological and therapeutic aspects of online games is needed.

This study did not set out to find findings that can be generalised. It was a qualitative study and thus emphasised the gathering of rich, elaborate, meaningful data. The semi–structured interviews conducted via the use of *MSN Messenger* and email provided a more in-depth analysis of gamers perceptions of online gaming. This method can be seen to have many advantages. For instance, Instant Messaging (IM) interviews are cheap to administer, obtain geographically diverse samples, and are less time-consuming compared to face-to-face interviews. Research by Stieger and Goritz (2006) showed that IM interviews were a feasible method of data collection, as the quality of data, the contact rate, response rate and retention rate was good. They also found that the risk of obtaining false responses in IM interviews was small.

There are some limitations associated with the use of IM and email interviewing. The mixture of synchronous and asynchronous data collection may have influenced the findings. Furthermore, non-verbal (e.g., body language) and paralinguistic (e.g., tone of voice) cues were not available making it difficult for the interviewer to know the psychological disposition of the interviewees. However, technologies do exist which allow the incorporation of audio and video capabilities into online real-time chat (e.g., webcams) thus making the setting resemble a face-to-face interview setting (Hewson, 2007). However, there are technical difficulties associated with incorporating audio and video into online interviews such as interruptions due to loss of connections or slow

data transmission rates. The interview questions were loose and unstructured allowing the gamers to talk about what was important to them rather than what the researcher felt were the salient issues. Therefore, some of the themes that emerged were only discussed by a minority of gamers.

The online interview method used in this study appeared to lead to enhanced levels of candidness from gamers as can be seen from the quote from one gamer (Extract 23) who provided detailed information about her social life. The anonymity provided by this method could also explain the willingness of gamers to disclose highly personal and sensitive information. The lack of non-verbal and paralinguistic cues may have contributed to the high levels of self-disclosure. Furthermore, past online research has shown high levels of self-disclosure from participants and reduced levels of social desirable responses (Joinson, 1999). The present study revealed a variety of attitudes and experiences of gamers. It showed the positive and negative effects of online games, gender differences, and online and offline use of gaming technologies by gamers. It can be seen that the IM interview and email interview method, are feasible methods for data collection. The qualitative accounts of gamers prove the suitability of such methods for further research.

## Chapter 6: A Pilot Online Questionnaire Study Examining the Excessive use of MMORPGs


### Abstract

Massively multiplayer online role-playing games (MMORPGs) are one of the most interesting innovations in the area of online computer gaming. This pilot study set out to examine the psychological and social effects of online gaming using an online questionnaire with particular reference to excessive and 'dependent' online gaming. A self-selecting sample of 119 online gamers ranging from 18 to 69 years (mean = 28.5 years) completed the questionnaire. The results showed that 41% of gamers played online to escape and 7% of gamers were classified as 'dependent' individuals who were at risk of developing a psychological and behavioural dependence for online gaming using an adapted 'addiction' scale. Further analysis showed that excessive online gaming was significantly correlated with psychological and behavioural 'dependence'. It was also found that 'dependent' gamers appear to possess some core components of addiction to MMORPGs (e.g., mood modification, tolerance and relapse).

## Introduction

It has been estimated that there are approximately 5 million online gamers worldwide and this number is increasing steadily (Chan & Vorderer, 2006). With new and more diverse massively multiplayer online role-playing games (MMORPGs) expected to enter the market, this will inevitably lead to more subscribers worldwide (Chan & Vorderer, 2006). MMORPGs are one of the most interesting innovations in the area of online video gaming. They have utilised the Internet as a new gaming forum that allows people to link up and play together (Griffiths, Davies & Chappell, 2003). Psychological immersion is most notably aided by the use of realistic graphics, sound effects and enhanced social interaction. While traditional videogames end at some point or become repetitive and boring, MMORPGs are endless, because the main feature of MMORPGs is its system of goals and achievements (Ng & Wiemer-Hastings, 2005). Chan and Vorderer (2006) have described six broad characteristics of MMORPGs that defines the interactive medium as a whole:

- *Persistence*: This refers to the permanence of the online virtual world, that is online and accessible 24 hours a day, 7 days a week.
- *Physicality*: MMORPGs are physical by design. They consist of a physical environment that has been reproduced in a virtual world and the usual notions of time and space that apply offline also apply online.
- *Social interaction*: MMORPGs contain specific features that allow gamers to communicate among themselves individually or as part of a group. Social interaction is an integral part of the game.
- *Avatar-mediated play*: This is a character representation of the player in the virtual world. The avatar (or character) is used to attain specific goals in the virtual world. The extent to which the gamer affiliates with his/her avatar tends to vary.
- *Vertical game play*: This refers to progression in the MMORPG and how it is assessed. In most MMORPGs, progression is usually assessed by a character's level in the game, the quality of their equipment and/or the amount of wealth that has been attained in the game. However, there are some MMORPGs that do not have any quantitative measures of achievement.

- *Perpetuity*: This is a distinctive feature of the MMORPG experience that makes them different to other videogame formats. MMORPGs do not have a definite end goal or finishing point. The in-game decision-making and gamers' actions will affect the ongoing storyline of the game. Therfefore, the game continues on as there will always be new goals to achieve in the endless virtual worlds.

As with other online applications (such as chat rooms, MUDs, newsgroups, or email), MMORPGs provide players with anonymity. It is this anonymity that gives those with low self-confidence, the chance to create a virtual life for themselves on the Internet (Ng & Wiemer-Hastings, 2005). Here, the MMORPG playing can become a substitute for real life social interaction, giving the user an escape from reality. Suler (1999) argues that people have an inherent need to alter their consciousness and to experience reality from different perspectives. The MMORPG virtual environment is a new arena in which to satisfy that need. For example, one's sense of time, space and personal identity can be changed when playing MMORPGs. Over the last few years, there has been an increasing number of papers examining online gaming (e.g., Griffiths, Davies and Chappell, 2003; 2004a; 2004b; Yee, 2006a).

More recently, research has begun to look at the relationship between MMORPGs and pathological use in the sense that it could lead to the emergence of addiction. Wan and Chiou (2006b) investigated the conscious and unconscious psychological motivations of online game addicts and the relationship between surface and source motivations. Ten Taiwanese adolescents with online game addiction were selected for in-depth interviews. After analysing the interview transcripts, it was found that the participants motivations for playing online games were for 'entertainment and leisure', 'emotional coping' 'excitement and challenge seeking', and 'escaping from reality'. The participants also suggested that MMORPGs either provided them with a compensatory channel for unsatisfying needs or motivations in their real life, or for the same things they are seeking in real life. The limitations of this study were that only ten Taiwanese adolescents were interviewed so it is not possible to generalise beyond the parameters of the study with such a small sample of participants from one country.

Research by Ng and Wiemer-Hastings (2005) compared MMORPG users and offline videogame users to try and differentiate the two types of users and to find factors that contribute to overuse. The researchers used two online surveys, which served to compare the two types of users. The findings revealed that MMORPG users spent more time playing than offline videogame players. MMORPG users found the social aspects of the games more pleasant and satisfying than the real world. However, Ng and Wiemer-Hastings (2005) stated that MMORPG users were not addicted, did not seek self-confidence in-game, and would not feel irritated if they did not have the chance to play for one day. Thus, they did not exhibit the behaviour of addicts.

Research into online gaming has also examined the concept of 'flow' experience in relation to addiction. 'Flow' is a state of altered awareness when playing online and is categorised by various feelings that include enjoyment, temporary loss of self-consciousness, and an altered sense of time. Wan and Chiou (2006a) investigated the relationship between 'flow' state and online gaming addiction in a sample of 177 high school and college Taiwanese adolescents. Flow state was measured via a questionnaire that examined factors such as the participants' optimal experience of MMORPGs, attentions focus, and intrinsic interest. Online gaming addiction was measured via the Online Games Addiction Scale for Adolescents in Taiwan (OAST). This scale consisted of 29 items and four subscales that included compulsive use and withdrawal, tolerance, related problems of family, school, and health, and related problems of peer interaction and finance. The results indicated that flow state was negatively correlated with addictive inclination to MMORPGs. Pathological users of MMORPGs did not experience high levels of flow state, and so their addiction to online games could not be explained by the flow experience.

In a qualitative study by Eatough, Davies, Griffiths and Chappell (2006) gamers who played *EverQuest* were examined to see how they perceived and made sense of the game in the context of their lives. Interpretative Phenomenological Analysis (IPA) was used as the method of analysis in order to make sense of the unique subjective experiences of the online gamers. The data were gathered from various online forums where gamers shared their experiences of playing *EverQuest*. The analysis of the data revealed that the gamers appeared to be 'addicted' to *EverQuest*. Most of the gamers

appeared to display the core components of addiction such as salience, mood modification, tolerance, conflict, withdrawal symptoms, cravings, and relapse. However, no single account mentioned all the core components of addiction this shows that online gaming addiction may not necessarily have existed in these gamers. Furthermore, Eatough et al only gathered data from accounts of gamers who played *EverQuest*. This again brings up the issue of how representative the findings are when compared with other MMORPGs and the gamers who play them. A recent study investigating the addictive potential of gaming was reported by Grüsser, Thalemann and Griffiths (2007). A sample comprising of 7069 gamers answered two online questionnaires. The authors reported that 12% of participants (840 gamers) fulfilled at least three diagnostic criteria of addiction concerning their gaming behaviour.

To date, there is a relative lack of research on the psychology of online gaming. The studies that have examined online gaming have tended to focus on the demographics of online gamers. The present study set out to examine some of the psychosocial effects of online gaming using an online questionnaire particularly in relation to excessive use and 'dependence'. The main objectives of the study were to: (i) assess the impact of online gaming on the lives of gamers, and (ii) establish whether excessive online gaming leads to psychological and behavioural dependencies.

## Method

### Participants

One hundred and fifty seven participants completed an online questionnaire. Thirty-eight participants were eliminated for being under the age of 18 years, resulting in a sample of 119 participants. There were 83 males (69%) and 32 females (26%), with four participants not specifying their gender. The participants ranged in age from 18 to 69 years (mean age = 28.5 years; SD = 9.6 years). The majority of participants were from the United States (73%), followed by those from the UK (8%) and Canada (3%). Participants were recruited from online gaming forums that were specifically for online gamers.

**Design and Materials**

An online questionnaire survey was used in the present study for the collection of both quantitative and qualitative data. A specially designed piece of online questionnaire software (*Autoform*) was used for the collection of online data. The online questionnaire asked questions on basic demographics of online gamers (e.g., country of residence, gender, education level, etc.). It also asked questions relating to playing frequency (e.g., the amount of time spent playing online per week), reasons for playing (e.g., for entertainment, for stress relief, etc), playing history and Likert-scale questions relating to the effects of online gaming (e.g., whether they played online in order to avoid feeling anxious).

The questionnaire also included six statements based on a modified version of the components of behavioural addiction (Griffiths, 2005). These statements were self-constructed and were designed to be indicative of the addictive behaviour components. Each statement had a five-point Likert response option. The statements were coded so that high scores reflected attributes of addictive online gaming behaviour: 1 = 'Strongly disagree', 2 = 'Disagree', 3 = 'Neither agree nor Disagree', 4 = 'Agree', 5 = 'Strongly agree'. The six statements were as follows:

- *"Online gaming is the most important thing in my life"*
- *"Conflicts have arisen between me and my family and/or my partner about the amount of online gaming I do"*
- *"I use online gaming as a way of changing my mood"*
- *"Over time I have increased the amount of online gaming I do in a day"*
- *"If I have to miss an online gaming session I feel moody and irritable"*
- *"If I cut down the amount of online gaming I do, and then start again, I always end up gaming as often as I did before"*.

At the time of this pilot study there was no validated gaming addiction scale, these statements were adapted and modified from the Exercise Addiction Inventory (EAI) and psychometrically validated by Terry, Szabo and Griffiths (2004). A score of 24 (out of 30) represented those individuals considered at risk of gaming addiction.

## Procedure

The online questionnaire (see Appendix 7 for a copy of the online questionnaire) was publicised and placed on various gaming forums hosted on well-known gaming sites. These sites were www.Allakhazam.com, www.eqvault.ign.com, www.womengamers.com, and www.white-wolf.com. The Allakhazam site was used as the main recruitment forum because of its large audience. It also caters for more than five MMORPGs, which includes *Everquest 1 and 2*, *Final Fantasy XI*, *World of Warcraft*, *Star Wars Galaxies*, *Dark Age of Camelot* and *Lineage II*.

Postings inviting gamers to take part in the study were placed in the off-topic forums. All participants were informed about the purpose of the study (i.e., to examine the psychosocial effects of online gaming). Once gamers visited the hyperlink address to the questionnaire, they were given clear instructions on how to fill in the questionnaire and were ensured that the data they provided would remain anonymous and confidential. A debriefing statement at the end of the questionnaire reiterated the purpose of the study, and informed participants of their right to withdraw their data.

# Results

## Excessive online gaming and psychological and behavioural 'dependencies'

Participants' scores on the six statements that had been adapted from the EAI provided an indicative measure of each gamer's psychological and behavioural 'dependence' to online gaming. The results revealed that gamers who scored 24 (or above) played for an average of 358 minutes per playing session. Gamers who scored 13 to 23 played online for an average of 191 minutes per playing session. Those who scored 6 to 12 played online for an average of 158 minutes per playing session. There was a significant effect of length of game playing session on scores on the EAI scale ($F(3,112) = 7.06$, $p < .05$, $w = .4$).

To establish whether excessive online gaming leads to psychological and behavioural 'dependencies', the two variables that asked gamers about the amount of times per

week they played online, and their length of each playing session were multiplied together to create a new variable. This variable showed the approximate amount (in minutes) each participant was spending online per week. All scores that were 2100 minutes per week or more were operationally defined as an "excessive" gaming score. (It should also be noted that 2100 minutes is 35 hours – the equivalent of weekly full-time employment). Further analysis showed that excessive online gaming was significantly correlated with psychological and behavioural 'dependence' in terms of score on the adapted addiction scale ($r$ = .14, $p$ < .05). Results also showed that excessive gamers spent more minutes online per week (mean = 2424 minutes [40.4 hours]) than non-excessive gamers (mean = 666 minutes [11.1 hours]), a finding that was significant ($t$[44] = 11.61, $p$ < 0.05). Using a 5-point Likert scale, significantly more male gamers (39%) than female gamers (9%) stated that they played online longer than they intended ($X^2$[10] = 46.41, $p$ < 0.001). Results also demonstrated that the majority of gamers (59%) said they did not play online to escape from other things in their lives. One third of gamers (34%) agreed or strongly agreed they used gaming as a way of changing their mood compared to 44% who disagreed or strongly disagreed.

**'Dependent' gamers versus non-dependent gamers**

Seven gamers were classified as 'dependent' individuals because of their responses to the six statements that were based on a modified version of the components of behavioural addiction. Ninety-four gamers were classified as 'non-dependent' (the remaining 18 gamers either did not respond or did not complete all six statements). The 'dependent' gamers were then compared to 'non-dependent' gamers on the various items of the online questionnaire. The results showed that 42.9% (3 out of 7) of dependent gamers and 11.7% of non-dependent gamers (11 out of 94) said that they would rather spend time with friends online than offline. This finding was significant ($X^2$[4] = 11.40, $p$ < 0.001; odds ratio = 0.05).

Further analysis revealed that 71.4% of dependent gamers (5 out of 7) said that they found it easier to converse online than offline compared to 36.2% of non-dependent gamers (34 out of 94). However this finding was not significant ($X^2$[4] = 4.76, $p$ > 0.001; odds ratio = 0.76). Results also showed that 57.1% of dependent gamers (4 out

of 7) and 21.3% of non-dependent gamers (20 out of 94) said that they found the socialising aspect online more pleasant and satisfying than offline socialisation. This finding was significant ($X^2[4] = 14.13$, $p < 0.001$; odds ratio = 0.22).

Results revealed that 85.7% of dependent gamers (6 out of 7) and 25.5% of non-dependent gamers (24 out of 94) felt that online gaming satisfied their social needs that were not satisfied in the real world. This finding was significant ($X^2[4] = 12.25$, $p < 0.001$; odds ratio = 0.06). The results also showed, 57.4% of non-dependent gamers (54 out of 94) and 42.9% of dependent gamers (3 out of 7) said they had gender-swapped. This finding was significant ($X^2[4] = 12.79$, $p < 0.001$; odds ratio = 1.8).

Gamers were asked to indicate their responses on a 5-point Likert scale (where 1 = strongly disagree, and 5 = strongly agree) to the question of whether online video gaming was the most important thing in their life. The responses of dependent gamers (mean = 3.86) were closer to agreeing with this statement compared to the responses of non-dependent gamers (mean = 1.36). This finding was significant ($t[99] = -8.913$, $p < 0.05$; effect size, $r = 0.61$). This showed that dependent gamers and non-dependent gamers differed significantly in regards to the role of online video gaming in their lives. Gamers were asked if conflicts had arisen between them and their family and/or their partner about the amount of online gaming they do. Responses were indicated on a 5-point Likert scale. The mean scores of dependent gamers (mean = 4.43) was greater than the mean scores of non-dependent gamers (mean = 2.33). This finding was significant ($t[99] = 4.288$, $p < 0.05$; effect size, r = 0.40).

In respect to whether gamers used MMORPGs as a way of changing their mood state, dependent gamers mean scores (mean = 4.57) were higher than non-dependent gamers scores (mean = 2.55). This finding was significant ($t[99] = 8.355$, $p < 0.05$; effect size, $r = 0.64$). Dependent gamers mean scores (mean = 4.71) were higher than non-dependent gamers (mean = 2.62) in respect to the question: *"Over time I have increased the amount of online gaming I do in a day"*. This finding was significant ($t[99] = 6.618$, $p < 0.05$; effect size, r = 0.55). Dependent gamers mean scores (mean = 4.71) were also higher than non-dependent gamers scores (mean = 1.86) in regards to the question: *"If I have to miss an online gaming session I feel moody and irritable"*.

This finding was significant ($t$[99] = 13.23, $p < 0.05$; effect size, $r = 0.71$). Gamers were also asked to indicate their response on a 5-point Likert scale to the following statement: *"If I cut down the amount of online gaming I do, and then start again, I always end up gaming as often as I did before"*. Dependent gamers mean scores (mean = 5.00) were higher than non- dependent gamers scores (mean = 2.88). This finding was significant ($t$[99] = 14.93, $p < 0.05$; effect size, $r = 0.83$).

## Discussion

The present study examined the psychosocial effects of MMORPGs, particularly the excessive use of MMORPGs. The results showed that 42.9% of 'dependent' gamers and 11.7% of 'non-dependent' gamers said they would rather spend time with friends online than offline. More than half of dependent gamers (57.1%) and 21.3% of non-dependent gamers said that they found the socialising aspect more pleasant and satisfying than offline socialisation. These results appear to suggest that the Internet (and more specifically MMORPGs) provide a better and more pleasurable environment for interaction than offline environments for excessive gamers. A significant finding was found in regards to online video gaming being the most important thing in the lives of gamers. The mean scores of dependent gamers were significantly higher than the mean scores of non-dependent gamers. This indicates that dependent gamers may associate a higher than normal value to MMORPGs in their lives.

There were also other interesting findings. For instance, dependent gamers mean scores were higher than non-dependent gamers scores in response to questions that asked whether they used MMORPGs to change their mood and whether they had increased the amount of online gaming they did over time. Furthermore, dependent gamers mean scores were significantly higher than non-dependent gamers scores on the question *"If I cut down the amount of online gaming I do, and then start again, I always end up gaming as often as I did before"*. All these findings suggest that dependent gamers appear to possess some core components of addiction to MMORPGs (e.g., mood modification, tolerance and relapse). These characteristics may be indicative of a tendency for some gamers to use online gaming as a mood modifier. The gamers may

also engage in online gaming as a means of coping with problems in their everyday lives. These findings support Jacobs's (1986) *General Theory of Addiction* that suggests people who play excessively are either over-or under-aroused and use online gaming, or other reinforcing behaviours, as a means of escape and to relieve depressive states. Research by Wood and Griffiths (2007c) found that escape was the prime characteristic of the gambling experience that facilitated the continuation of problem gambling.

The measure of psychological and behavioural 'dependence' as measured via the use of the six adapted statements taken from the EAI, showed that 7% of gamers scored 24 or above, (i.e., gamers that were classified as 'dependent' individuals who were at risk of developing a psychological and behavioural dependence to online gaming). The 'dependent' individuals played online for an average six hours per session (almost twice the amount of other gamers) suggesting that the adapted scale had some face validity. Further evidence of face validity is provided by the fact that a significant relationship was found between excessive online gaming (as measured by time) and psychological and behavioural dependence (as measured by the adapted EAI). However, this result must be treated with caution for two reasons. Firstly, the correlation indicated that the relationship was relatively weak. Secondly, the six adapted EAI statements have not been psychometrically validated for online gaming addiction.

It should also be noted that many gamers play online for 20 hours or more per week and would not class themselves as playing excessively. Therefore, the relationship between excessiveness and problematic play may not be linear. It is also important to recognise the methodological limitations of the study. Firstly, self-report measures raise questions about the truthfulness of responses that must be taken into consideration although research appears to indicate that people are more likely to tell the truth online compared to offline (Wood, Griffiths & Eatough, 2004). Secondly, the 'dependent' gamers group consisted of only seven participants in comparison to 94 participants in the non-dependent gamers group. Therefore replication with bigger sample sizes must be carried out. Thirdly (and as already indicated), the six adapted EAI statements have their limitations. Most notably, the measurement instrument has not been validated in

the field of online gaming as Terry et al (2004) only validated the EAI for recognising exercise addiction. They claimed that the EAI could be a valid and reliable instrument capable of quickly and easily identifying individuals at risk from exercise addiction. Thus, a similar measurement instrument to that of the EAI needs to be developed and validated for recognising online gaming dependency. Such an instrument should be tested for internal reliability, content validity, concurrent validity and construct validity. Once this has been achieved, it may then be possible to successfully apply a psychometrically valid instrument to the measurement and identification of online gaming dependence. This would provide good evidence for its utility in online gaming addiction assessment. Finally, the data collected came from only four online forums catering for approximately ten MMORPGs. This raises the issue of how representative these MMORPGs and their players are. Thus, further research would need to gather data from a larger number of forums that cater for more MMORPGs.

Future research could take a more in-depth qualitative approach to data analysis by making use of Interpretative Phenomenological Analysis (IPA). Eatough et al (2006) used IPA in their study to examine how individuals perceived *Everquest* in the context of their lives. They managed to gather valuable data by making use of IPA. This type of methodological approach would be useful in examining online gaming experiences such as addiction or to examine the personality of online gamers and meaning making in online virtual worlds. IPA could also be used to understand how gamers express themselves when they create their own characters and identities.

The findings presented here may be of benefit to psychologists and social scientists in the sense that it will help identify the types of behaviour that could lead to negative effects on gamers. The findings could also help in developing prevention programmes in order to prevent the possible detrimental effects on the well being of gamers. Further research that focuses on both the positive and negative effects of online gaming is clearly required.

# Chapter 7: The MMORPG Online Questionnaire Study Examining the Prevalence of MMORPG Addiction


## Abstract

Massively multiplayer online role-playing games (MMORPGs) have gained increased popularity over the last decade. However, Problems relating to MMORPG playing have emerged, more specifically in relation to addiction to MMORPGs. The present study followed on from the earlier online pilot questionnaire study and set out to establish the incidence and prevalence of MMORPG addiction using validated addiction criteria. Factors relating to online gaming were examined to establish whether they were linked to MMORPG addiction. These factors were the age of gamers, the number of years a gamer had been playing, the amount of time gamers devoted to playing, employment status of gamers and the type of server the gamer played on. A self-selecting sample of 1,420 gamers ranging in age from 12 years to 62 years ($M$ = 23.18 years; $SD$ = 8.39 years) completed an online questionnaire. The results showed that 44.5% of gamers were classified as addicted according to the polythetic format and 3.6% were classified as addicted according to the monothetic format. Logistic regression analysis showed that certain variables (i.e., ‘years of gaming’, ‘total time spent playing online per week’, ‘being unemployed’, ‘being retired’, ‘playing on a Player vs. Player server’ and ‘playing on a role-playing server’) can have a major impact on the probability of MMORPG addiction. The implications of these findings for the assessment of MMORPG addiction are discussed.

## Introduction

Massively multiplayer online role-playing games (MMORPGs) have gained increased popularity over the last decade. Approximately 16 million people play MMORPGs worldwide (Woodcock, 2008), and this number is set to increase as video game developers introduce new MMORPGs. Problems relating to MMORPG playing have emerged, more specifically in relation to addiction to MMORPGs. Addiction to interactive technologies such as MMORPGs have been termed "technological addictions" (Griffiths, 1995a; 1996a) and have been operationally defined as non-chemical (behavioural) addictions that involve excessive human–machine interaction and feature the six core components of addiction (Griffiths, 2005c).

Many studies have raised concern about the risk of addiction to MMORPGs. For instance, Research by Kim, Namkoong, et al (2008) investigated the relationship between MMORPG addiction**,** aggression, self-control, and narcissistic personality traits. An online survey was used to gather data from 1,471 gamers. The results indicated that certain psychological characteristics such as aggression, self-control, and narcissistic personality traits may predispose some individuals to become addicted to MMORPGs. However, it is important to note that the online game addiction scale and the narcissistic personality disorder scale used in the study had not been psychometrically validated. Mehroof and Griffiths (2009) focused on the links between online gaming addiction and personality factors using an opportunity sample of 123 student gamers. Results indicated that five traits (neuroticism, sensation seeking, trait anxiety, state anxiety, and aggression) displayed significant associations with MMORPG addiction. These findings suggested that certain personality traits may be important in the acquisition, development, and maintenance of online gaming addiction. However, the sample size was small and may not have been representative of all gamers.

Research by Smahel, Blinka and Ledabyl (2008) investigated relationships between players (n = 548) and their game characters using an online questionnaire containing DSM-IV items. The results showed that younger players (aged 12-27 years) had a tendency towards intensive gaming and were more prone to addiction. Identification

with a character was seen as a factor influencing addiction. However, the study focused on gamers who played fantasy MMORPGs only. Gamers who played other types of MMORPGs were not examined and may have led to different findings. Chappell, Eatough, et al. (2006) examined the experiences of gamers (n = 12) who played *EverQuest* using Interpretative Phenomenological Analysis (IPA). Data were gathered from various online forums where gamers who perceived their playing to be excessive shared their experiences of playing *EverQuest*. The analysis revealed that the gamers appeared to be 'addicted' to *EverQuest*. Most of the gamers appeared to display the core components of addiction. However, no single account mentioned all the core components of addiction, therefore it cannot be concluded that the gamers were genuinely addicted to MMORPGs.

Hsu, Wen and Wu (2009) used an online survey to explored students gaming experience and level of addiction. The sample comprised 418 Taiwanese gamers aged 18- to- 25 years old. The results revealed five predictors of MMORPG addiction (curiosity, role-playing, belonging, obligation and reward). However, the researchers only recruited a small sub-set of gamers making cross-country and cross-age comparison unfeasible. Grusser, Thalemann and Griffiths (2007) conducted an online survey study in order to investigate the addictive potential of online gaming. The data revealed that 11% of participants fulfilled at least three diagnostic criteria of gaming addiction. These gamers played for significantly longer daily periods of time when compared to the remaining gamers. They were also significantly more likely to report withdrawal symptoms and craving. However, there were some problems with the addiction criteria used in this study. Participants who fulfilled at least three of six criteria of addiction were operationally defined as pathological gamers. It can be argued that this led to an over-estimate of problematic behaviour.

The examination of brain activities of gamers has revealed some potentially interesting findings. Ko and Liu et al. (2009) attempted to identify the neural substrates of online gaming addiction through the evaluation of brain areas associated with cue-induced gaming urge. Their sample comprised ten online gaming addicts and ten control subjects without online gaming addiction. They were presented with gaming pictures and non-gaming pictures while undergoing functional Magnetic Resonance Imaging

(fMRI) scanning. The results demonstrated that the brain regions associated with cue-induced gaming urge/craving in online gaming addiction was similar to that of the cue-induced craving in substance dependence. This finding suggests that gaming urge/craving in online gaming addiction and craving in substance dependence might share the same neurobiological mechanism. The use of a larger sample and examining brain activity whilst playing an MMORPG would provide a better insight into the neurobiology of online gaming.

Some of the most commonly occurring limitations of previous online gaming research are the (i) use of adolescent samples, (ii) focus on one type of MMORPG, and (iii) using gamers from only one country. More importantly, almost all researchers have failed to use standardised and validated addiction criteria, although several studies (Salguero, Moran & Rosa, 2002; Griffiths & Hunt, 1995, 1998; Bioulac, Arfi & Bouvard, 2008) have adapted the DSM criteria for substance dependence and pathological gambling in order to investigate addiction to offline video games. However, the criteria have not been psychometrically validated for the measurement of problem video game playing and so they may be over-estimating or under-estimating the prevalence of gaming addiction. Charlton and Danforth (2007) argued that some research studies (e.g., Griffiths & Hunt, 1995; 1998) had overestimated the prevalence of addiction due to the use of a polythetic format to classify addiction. Polythetic formats require the endorsement of a number of items rather than all items (which is known as a monothetic format). Charlton and Danforth (2007) argued for the use of a monothetic format when investigating video game addiction. The type of classification system used will have an impact on the prevalence estimates of addiction in a given sample.

The present study set out to examine the impact of online gaming on the lives of gamers. The study followed on from the earlier pilot study and set out to establish the incidence and prevalence of MMORPG addiction using validated addiction criteria (Lemmens et al, 2009). The study also examined gamers playing styles (e.g., solo/group playing) and typical playing behaviour. Both monythetic and polythetic formats to addiction was also examined. The aim of the study was to measure MMORPG addiction using a sample of MMORPG players. It was hypothesised that

the prevalence of MMORPG addiction would be small when classifying addiction to MMORPGs using a monothetic format.

Certain factors relating to online gaming were examined to establish whether they were linked to MMORPG addiction. These factors were the age of gamers, the number of years a gamer had been playing, the amount of time gamers devoted to playing, employment status of gamers and the type of server the gamer played on. It was hypothesised that the more years a gamer had been playing, the more likely their chances of being addicted to MMORPGs. It was also hypothesised that the more time gamers devoted to playing MMORPGs the more likely they would be addicted. It was also hypothesised that being unemployed or retired would lead to a higher likelihood of addiction. Finally, it was hypothesised that playing on a 'player versus player' (PvP) server would increase the likelihood of addiction to MMORPGs.

## Method

### Participants

A total of 1,420 gamers completed an online questionnaire. The sample comprised 1,095 males (77.1%) and 325 females (22.9%). The gamers ranged in age from 12 years to 62 years ($M$ = 23.18 years; $SD$ = 8.39 years). Most of the gamers were living in the United States (46.4%), followed by the UK (14.8%), Canada (6.3%), Australia (4.2%) and Finland (2.9%). Many other countries were also represented in the remainder of the sample (13.2%) including those from New Zealand, Greece, Norway, the Netherlands, Germany, Poland, Sweden and Japan.

### Design and Materials

Online questionnaire software (i.e., *SurveyMonkey*) was used to collect data for the survey. The online questionnaire asked questions relating to basic demographics of the online gamers (e.g., age, country of residence, gender, etc.). It also asked questions relating to typical online game playing behaviour (e.g., amount of time spent playing

online per week, etc.) and playing style (e.g., whether gamers preferred playing solo, with guild members, or a pick-up group, etc.). The questionnaire also incorporated the 7-item Game Addiction Scale (GAS; Lemmens, et al. 2009). This self-report measure includes seven items representing seven DSM-based criteria for game addiction that had been identified in earlier research (e.g., Griffiths & Hunt, 1998). Lemmens, and colleagues (2009) developed and validated the GAS to measure video game addiction. The questions related to seven underlying addiction criteria (i.e., salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems). Two independent samples of adolescent gamers were used to investigate the dimensional structure of the scale. The results showed that the GAS showed high reliability and good concurrent validity across samples. In the present study scale items were slightly adapted to relate to MMORPG playing. Gamers rated all game addiction items on a 5-point Likert scale (where 1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*).

Examples of the GAS items were as follows: “Did you think about playing a game all day long?”, “Did you spend increasing amounts of time on games?”, “Did you play games to forget about real life?”. Items such as these were adapted to relate to MMORPG playing by substituting the word “games” for “MMORPGs”. This was done as follows:

- “Did you think about playing a MMORPG all day long?”
- “Did you spend increasing amounts of time on MMORPGs?”
- “Did you play MMORPGs to forget about real life?”

A copy of the online questionnaire can be seen in Appendix 10. Responses to the online questionnaire were checked in order to detect untruthful responses. Exaggerated and inappropriate responses (e.g., gamers who claimed that they played more than 100 times a week, gamers who entered profanity in text boxes instead of useable data) were removed from the data and IP addresses were checked to prevent multiple responses.

## Procedure

Postings inviting gamers to take part in the study (see Appendix 8 for a copy of the online recruitment post) were placed in the off-topic and general discussion forums of various well-known online gaming websites (see Appendix 11 for a complete list of the websites and forums). Each gaming site had similar structural features (e.g., latest news, help guide, site map, forums, etc.). The online recruitment post informed all gamers about the purpose of the study. The post contained a link to a participant information sheet (see Appendix 9) and a link to the online questionnaire. Participants were informed that the study had been approved by the Nottingham Trent University's Ethics Committee. Once gamers visited the hyperlink address to the questionnaire, they were given clear instructions on how to fill in the questionnaire and were ensured that the data they provided would remain anonymous and confidential. A debriefing statement at the end of the questionnaire reiterated the purpose of the study and informed gamers of their right to withdraw from the study.

## Results

### *Typical game playing behaviour*

Gamers were asked about the number of times per week they played MMORPGs. The mean number of times gamers played online was 6.79 times per week (*SD* = 6.64; *Median* = 6.00). Gamers were also asked about the average length of each gaming session. The mean length of gaming sessions was 179 minutes (*SD* = 121.87; *Median* = 170.00). Female gamers played longer per playing session (*M* = 182.16 minutes; *SD* = 96.97) than male gamers (*M* = 178.8 minutes; *SD* = 128.56). However, this difference was not significant [$t(590.81) = -.451$, $p > .05$; effect size, $r = .02$][1].

Female gamers played online more times per week (*M* = 7.33; *SD* = .6.89) than male gamers (*M* = 6.63; *SD* = 6.56) but this difference was not significant [$t\ (1268) = -1.583$, $p > .05$; effect size, $r = .04$]. There was a significant positive relationship between the number of times gamers played online per week and the length of game playing session

[1] The Welch-Satterthwaite t-test was reported throughout the analysis because of unequal group sizes

[*rs* (1083) = .25, *p* < .01]. There was also a significant negative relationship between the age of gamers and the number of times gamers played MMORPGs per week [*rs* (1264) = -.06, *p* < .05]. The analysis also revealed a significant positive relationship between the age of gamers and the length of game playing session [*rs* (1059) = .08, *p* < .01].

***Number of MMORPGs played***

Gamers were subscribed to an average of 1.28 MMORPGs (*SD* = 1.19). Female gamers subscribed to more MMORPGs (*M* = 1.38; *SD* = 1.103), than male gamers (*M* = 1.25, *SD* = 1.090) but this difference was not significant [*t* (1388) = -.1.940, *p* > .05; effect size, *r* = .05]. *World of Warcraft* was the most common MMORPG played by the gamers (42.5%) followed by *Guild Wars* (7.9%) and *RuneScap*e (4.9%). Table 8 provides a complete list of the MMORPGs played by gamers.

**Table 8: Names of MMORPGs that were currently being played by gamers**

| **Name of MMORPG** | **n** | **Percentage** |
|---|---|---|
| *World of Warcraft* | 603 | 42.5% |
| *EverQuest 1 and 2* | 40 | 2.9% |
| *Runescape* | 69 | 4.9% |
| *Guild Wars* | 112 | 7.9% |
| *City of Heroes and City of Villians* | 32 | 2.2% |
| *Ultima Online* | 22 | 1.6% |
| *Conquer Online* | 40 | 2.9% |
| *Lord of the Rings Online* | 19 | 1.3% |
| *Warhammer Online* | 41 | 2.9% |
| *Lineage 2* | 7 | 0.5% |
| *Age of Conan* | 7 | 0.5% |
| *Final Fantasy IX* | 13 | 0.9% |
| *Eve Online* | 7 | 0.5% |
| *Perfect World* | 8 | 0.6% |
| **Total** | **1,020** | **72.1%** [2] |

[2] Percentages in some of the tables did not add up to 100% due to participants not answering the question(s)

### *Demographic information*

The data showed that 704 gamers (50.0%) were students, 504 gamers (35.8%) were in employed work, 55 gamers (3.9%) were self-employed, 134 gamers (9.5%) were unemployed, and 12 gamers (0.9%) were retired. The majority of gamers (61.8%) were single, 14.3% were married and 24.0% were in an intimate relationship. The mean number of years of formal education for gamers was 11.8 years (*SD* = 4.6). Female gamers had more years of formal education (*M* = 12.61 years, *SD* = 5.36), than male gamers (*M* = 11.56 years, *SD* = 4.26), a difference that was significant [*t* (387.99), = -.3.031, $p < .05$; effect size, *r* = .15]. The mean number of years gamers had been playing MMORPGs was 4.53 years (*SD* = 3.11). Male gamers had been playing MMORPGs for longer (*M* = 4.73 years; *SD* = 3.19) than female gamers (*M* = 3.87 years; *SD* = 3.19), a finding that was significant [*t* (1208) = 4.091, $p < .05$; effect size, *r* = .1].

### *Level of avatar, gamers' in-game choices and character/avatar information*

The mean level of gamers' main avatar was 64.7 (*SD* = 29.67)[3]. Female gamers had higher-level characters (*M* level = 67.2; *SD* = 22.65) than male gamers (*M* level = 63.9; *SD* = 31.59), but this difference was not significant [*t* (650.06) = -1.877, $p > .05$; effect size, *r* = .07]. The mean number of avatars that gamers had in their main MMORPG was 6.54 (*SD* = 6.99). Gamers were asked about the class and race of their avatar. The results revealed that 13.3% of gamers played the *Warrior* class of avatar, 10.6% played the *Mage* class and 7.5% played the *Priest* class. Table 9 provides the class of avatars played by gamers. In regards to the race of avatar chosen by gamers, 30.6% of gamers chose the human race of avatar, 15.5% chose Elves, and 6.8% chose the Undead race. Table 10 provides the race of avatars played by gamers.

[3] Many gamers have more than one avatar/character in a MMORPG. The highest level in the majority of MMORPGs is usually 80

**Table 9: Class of avatar played by gamers**

| Class of Avatar | n | Percentage |
|---|---|---|
| *Hunter* | 82 | 5.8% |
| *Druid* | 50 | 3.5% |
| *Death Knight* | 20 | 1.4% |
| *Mage/dark or white mage* | 149 | 10.6% |
| *Rogue/gunner* | 83 | 5.9% |
| *Shaman* | 34 | 2.4% |
| *Warlock* | 66 | 4.6% |
| *Warrior* | 188 | 13.3% |
| *Paladin* | 46 | 3.3% |
| *Priest* | 106 | 7.5% |
| *Trojan/Trojan master* | 12 | 1% |
| *Archer* | 9 | 0.7% |
| **Total** | **845** | **60%** |

**Table 10: Race of avatar played by gamers**

| Race | n | Percentage |
|---|---|---|
| *Dwarf* | 46 | 3.3% |
| *Human* | 435 | 30.6% |
| *Undead* | 97 | 6.8% |
| *Troll* | 35 | 2.5% |
| *Blood/Knight/Dark Elf* | 219 | 15.5% |
| *Tauren* | 44 | 3.1% |
| *Drainei* | 35 | 2.5% |
| *Gnome* | 20 | 1.4% |
| *Orc* | 40 | 2.8% |
| *Cat/Mithra* | 2 | 0.2% |
| **Total** | **973** | **68.7%** |

Gamers were asked about the type of realm/server they chose to play on. The results showed that 47.7% of gamers played on 'Player vs. Environment' (PVE) servers, and 37.3% of gamers played on 'Player vs. Player' (PVP) servers. Table 11 provides details of the types of servers gamers played on.

**Table 11: Type of realm/server played on by gamers**

| Realm/server | n | Percentage |
|---|---|---|
| Player vs. Environment | 619 | 47.7% |
| Player vs. Player | 485 | 37.3% |
| Role-playing | 108 | 8.3% |
| Role-Playing – Player vs. Player | 87 | 6.7% |
| **Total** | **1,299** | **100%** |

***Gamers preferred playing styles***

Gamers were asked questions about their in-game playing styles. The results showed that 37.8% of gamers liked to play 'solo' in-game whilst 35.5% of gamers did not like playing solo. The results also showed that 76.4% of gamers enjoyed playing with guild members, and that 7.3% of gamers did not enjoy playing with guild members. The results also showed that 22.7% of gamers liked playing with a Pick-up Group (PuG), and 43% of gamers did not like playing with a Pick-up Group.

***Addiction***

Taking in to consideration the arguments of Charlton and Danforth (2007), both a monthetic and polythetic format to determine whether a person is addicted was examined. This allowed for a comparison between the different addiction formats and would show how they differ when reporting the prevalence of MMORPG addiction. When using a monothetic format, all of the criteria for MMO addiction had to be endorsed to be classified as an addict. The polythetic format required endorsement of at least half of the criteria for someone to be classified as 'addicted'. In the present study, an item was considered to be endorsed when a gamer answered four *often* responses on the 5-point addiction scale items. The polythetic format resulted in 44.5% of gamers who met at least four of the items in the 7-item scale. The monothetic format resulted in 3.6% of gamers who endorsed all 7 items in the 7-item scale.

### *Monothetic and Polythetic distinctions*

In terms of the monothetic criteria, addicted gamers played longer per session ($M$ = 251.3 minutes; $SD$ = 146.7 minutes) than non-addicted gamers ($M$ = 182.5 minutes; $SD$ = 122.5 minutes). This difference was significant [$t$ (992) = -2.861, $p < .05$; effect size, $r$ = .09]. In terms of the polythetic criteria, addicted gamers played longer per session ($M$ = 213.3 minutes; $SD$ = 144.9 minutes) than non-addicted gamers ($M$ = 161.9 minutes; $SD$ = 98.7 minutes). This difference was also significant [$t$ (729.697) = -6.341, $p < .05$; effect size, $r$ = 0.2].

### *MMORPG Addiction Predictors*

Further exploratory analysis was conducted to predict which factors may explain addiction to MMORPGs. An ordered logistic regression analysis was carried out using the predictors of employment status, server played on by gamers, age, how long gamers had been playing MMORPGs, and the logarithm of total time. The logarithm of total time was used because the variable was skewed and because it produces a model in which the time effect is considered proportional rather than additive. The dependent variable was derived from the continuous 7-item MMORPG addiction scale score from gamers. This score was used to derive an ordinal measure of addiction scored as '0' for gamers classified as not addicted, '1' for gamers classified as addicted according to the polythetic criteria, and '2' for gamers classified as addicted according to the monothetic criteria. Modelling addiction in this way was seen to be a valid method as shown in the research findings of Lemmens et al, (2009). The predictors included in the model were seen to be indicative of causing addiction to MMORPGs.

The analysis revealed a statistically significant overall model ($\chi^2$ (10, $N$ = 553) = 818.327, $p < .001$, $R^2$ = .087; Cox & Snell, 1989). The test of parallel lines revealed the following result – ($\chi^2$(10) = 809.644, $p < .001$). Results showed that significant predictors included the logarithm of total time ($p < .001$), the employment status of student ($p < .001$), being employed ($p < .001$) and being self-employed ($p < .001$). However, a large number of cases had missing data, and this can lead to biased parameter estimates and tests. For this reason, it was decided that the detailed interpretation of the analysis was best left until after data imputation. Further analysis

involved the use of multiple imputation prior to regression to incorporate information from all cases (including those with missing values). Multiple imputation were used as there was a high proportion of missing values for some important variables within the data set. The common practice of deleting cases with missing values reduces the effective sample size. More importantly it biases the results because important information implicit in the excluded cases would be lost, but almost certainly not at random (Peugh & Enders, 2004).

Missing values can cause problems in statistical analysis so imputation attempts to solve such problems by replacing missing values with plausible values that can then be analysed to provide reliable results. As the imputed values are not known with certainty, it is good practice to add random noise to the imputed values (to reflect this uncertainty). This process – known as single imputation – produces slightly different results each time it is run. Multiple imputation deals with this by performing single imputation many times and aggregating regression output across each imputed analysis. This way, the uncertainty between imputations can also be estimated and used to adjust the analyses. With sufficient imputations, the between-imputation variability can be assessed with considerable accuracy and (unlike single imputation) results from multiple imputation should be consistent between analyses. Multiple imputation usually uses between ten and 20 single imputations (with ten likely to be sufficient when sample sizes are high and between imputation variability relatively small as in this case).

In the present analysis, the missing data were imputed ten times to generate ten complete imputed data sets. An inclusive strategy was used during the imputation where the specific predictors were used to impute missing values. The predictors were age, the number of times gamers played MMORPGs per week, the length of playing session (in minutes), how long gamers had been playing MMORPGs (in years/months), the 21 items from MMORPG Addiction scale, employment status, and server played on by gamers. Using as many predictors as possible for imputation – even if not used in the final analysis – is known to produce better results. Details of the within-imputation, between-imputation variance for all parameter estimates are given in Appendix 12.

Ordered logistic regression analyses were then performed on each data set using the same dependent variable and predictors as described above in the first regression analysis. *SPSS Version 15* was used and the expectation maximisation (EM) method setting was utilised (for a detailed description of the aggregation procedure, see Peugh and Enders [2004]). The results from the ten data sets were then combined to produce the final regression model. Table 12 shows this model with the predictive potential of the variables predicting MMORPG addiction after imputation. Table 12 shows that the 'unemployed' predictor was the strongest predictor of MMORPG addiction showing a positive relationship (*OR* = 1.5747), followed by 'being retired' (*OR* = 1.5692), Role-Playing (*OR* = 1.4090), the 'years of gaming' (*OR* = 1.3535) and the 'logarithm of total time' predictor (*OR* = 1.2408). The test of parallel lines revealed the following result - $\chi^2(10) = 20.889$, $p > .001$.

**Table 12: Logistic regression results for the 7-item MMORPG addiction scale using multiple imputation (imputed n=1,420)**

| | | | | *Odds ratio 95% CI* | |
|---|---|---|---|---|---|
| *Intercept* | *b* | *SE* | *Odds ratios* | *CI Lower* | *CI Upper* |
| *Addicted versus not-addicted* | 1.6226 | 0.3378 | 5.0666 | 2.6127 | 9.8252 |
| *Monothetic versus not monothetic* | 4.9724 | 0.3769 | 144.379 | 68.9728 | 302.226 |
| *Parameters* | *b* | *SE* | *Odds ratios* | *CI Lower* | *CI Upper* |
| *Age* | -0.0194 | 0.0090 | 0.9807 | 0.9635 | 0.9982 |
| *Years of gaming* | 0.3027 | 0.1050 | 1.3535 | 1.1016 | 1.6631 |
| *Total time (logarithm)* | 0.2157 | 0.0407 | 1.2408 | 1.1456 | 1.3438 |
| *Employed* | -0.2301 | 0.1546 | 0.7944 | 0.5867 | 1.0756 |
| *Self-employed* | -0.8328 | 0.3606 | 0.4347 | 0.2144 | 0.8816 |
| *Unemployed* | 0.4541 | 0.2224 | 1.5747 | 1.0182 | 2.4355 |
| *Retired* | 0.4506 | 0.6319 | 1.5692 | 0.4547 | 5.4154 |

| | | | | | |
|---|---|---|---|---|---|
| *PVP* | 0.1943 | 0.1241 | 1.2144 | 0.9521 | 1.5490 |
| *RP* | 0.3429 | 0.2123 | 1.4090 | 0.9294 | 2.1361 |
| *RP-PVP* | -0.1030 | 0.2484 | 0.9020 | 0.5542 | 1.4680 |

## Discussion

The present study set out to examine the impact of MMORPGs on the lives of gamers. The results showed that there was a significant positive relationship between the number of times gamers played online per week and the length of game playing session. This suggested that the more times a gamer plays online will lead to the length of playing session increasing. Past research has found similar findings (e.g., Chan & Rabinowitz, 2006; Griffiths, Davies & Chappell, 2004b).

The results also showed that the average length of gaming session was 179 minutes (almost three hours). Here the appeal of MMORPGs may have led to the increase in playing session. Research by Wood, Griffiths, Chappell and Davies (2004) suggested that the structural characteristics of character development, rapid absorption rate, and multi-player features are characteristics that can induce playing or can be an inducement to continue playing. All these structural characteristics (in addition to others such as skill development and online chat features) can be found in MMORPGs. Therefore, it could perhaps be speculated that these characteristics induce longer game playing sessions as gamers might enjoy engaging in the social and competitive aspects of MMORPGs.

There was a significant negative relationship between the age of gamers and the number of times gamers played MMORPGs per week. This suggested that as gamers get older, the number of times they play decreases. This finding was similar to the findings of Griffiths et al. (2004b) who found that the younger the gamer the more hours per week they played. There are a number of reasons that could account for this. Adolescents tend to have more leisure time, fewer responsibilities and more flexibility

in their weekly schedules than adults (Griffiths et al. 2004b). Consequently adolescent gamers are likely to dedicate more hours per week to playing MMORPGs than older gamers.

The analysis also revealed a significant positive relationship between the age of gamers and the length of game playing session. This suggests that as gamers' get older, the length of playing session increases. These were interesting findings and suggest that MMORPGs were being played by gamers who play fewer times per week as they got older, but when they did play, the playing session would be considerably longer in length. One of the reasons for this could be that gamers might play once or twice on weekday evenings or on weekends when they are not working. They may attempt to accomplish as much as they can before returning to work, so the playing session would be extended in order to accomplish more in-game tasks.

Considering the time investment needed to play MMORPGs and the general life commitments of people as they grow older, these findings are very understandable. A MMORPG can be played few times per week but the playing session can be very long as one quest can take a few hours to complete. Many gamers use MMORPGs to socialise (Hussain & Griffiths, 2008) and keep in contact with friends (Cole & Griffiths, 2007) so the length of playing session can sometimes be very long. However, it must be noted that the correlation findings reported here do not prove causality. There maybe many other unexamined variables that can explain why playing session time increases and the number of times played per week decreases. For instance, playing more than one MMORPG every week, gamers' commitment to a guild and their role within that guild, and/or gamers may be sharing computers so they have less time to play. A qualitative study or a longitudinal study may help explain such changes in playing behaviour. Further research is needed to explain prolonged playing session lengths as this would provide information about excessive play and possible health implications.

In relation to gamers' playing styles, the study showed that over three-quarters of gamers played with guild members, and just over a third of gamers did not like playing solo. MMORPGs encourage gamers to group with other players in order to advance in

the game. According to previous research, this type of playing style encourages interaction and teamwork (Hussain & Griffiths, 2008; Griffiths et al. 2004a, 2004b) as gamers enjoy the social and cooperative aspects of MMORPGs (Chen, Duh, et al. 2006). It can be speculated that the interaction involved in playing with others can be more stimulating than playing solo, although further research is needed to confirm this. It was also found that 43% of gamers did not like playing with a pick-up group. Playing with a pick-up group also involved group work but was usually restricted to the time it takes to complete a quest or one playing session. This finding suggests that gamers have the desire to develop networks of friends' in-game who they can group up with on more than one occasion. The wider implications of these findings about playing styles are that many of the social norms of meeting people and making friends that can be found in real life can also be found in virtual worlds.

The results examining gender differences revealed that female gamers played longer per session (a finding similar to that reported by Hussain and Griffiths [2008]) and played more times per week. They also had higher-level characters than male gamers. Although these findings were not statistically significant, they appear to show that female gamers are playing MMORPGs just as much as male gamers. Female gamers may prefer the socialising and entertainment aspects of MMORPGs (Hussain & Griffiths, 2008). There are also many other diverse activities within virtual environments that could be more appealing to males or females. For instance, the acquisition of virtual property, buying and selling virtual items, managing guilds, adventuring and helping gamers with in-game tasks or quests. Future research could examine male and female preferences for different in-game activities.

The results suggest that there are different percentages of addicted gamers depending on the classification being used to determine addiction to MMORPGs. The analysis revealed that 44.5% of gamers were classified as addicted according to the polythetic format whereas only 3.6% were classified as addicted according to the monothetic format. The former statistic was a very high percentage. These findings show that endorsement of just over half of the addiction criteria (polythetic format) leads to much higher levels of addicted gamers when compared to the endorsement of all the addiction criteria (monothetic format). The polythetic format findings were much

higher than previous research findings that have experimented with the polythetic criteria. For instance Griffiths and Hunt (1998) found that 16% of gamers were classified as addicted, whilst Charlton and Danforth (2007) classified 38.7% of gamers as addicted. When using the monothetic format, Charlton and Danforth (2007) found that 1.8% of gamers in their sample would have been classified as addicted. This shows that the polythetic criteria can lead to over-estimations of addiction that can lead to unnecessary concerns amongst social scientists and policy makers.

The logistic regression analysis revealed the strength of various predictors that may explain why some gamers experience dependence to MMORPGs. The results showed that certain variables (i.e., 'years of gaming', 'total time spent playing online per week', 'being unemployed', 'being retired', 'playing on a PvP server' and 'playing on a role-playing server') may have a major impact on the probability of MMORPG addiction. These variables can increase the odds of either shifting from not addicted to polythetic addiction or from polythetic addiction to monothetic addiction by 1.2-1.5 depending on the variable in question. For instance, the total time variable odds were 1.24, indicating that each unit increase in total time increases the odds of moving one step up the addiction outcome by 1.24. The distinction between the odds ratios for continuous variables and categorical variables is important. The continuous variables increase the odds by a factor of the odds ratio per unit increase. The likely range of the variable needs to be considered.

For the categorical variables, a unit increase corresponds to the difference in categories (e.g., unemployed vs. employed). For example, a 40-year old employed gamer who has played for five years and plays 10 hours a week on a PVE server has a predicted probability of around .007 of monothetic addiction, but if he played 60 hours a week the probability would be around .01. If he was 20 years old, unemployed, and played for 60 hours a week the probability would be around .03 (3% from 1%). Therefore, an odds ratio increase for a categorical variable is not large on its own but it may cumulate with other (categorical and continuous) variables. This illustrates the low base rate for monothetic addiction but the cumulative influence of risk factors. It is also important to bear in mind that the model is not causal, therefore it seems reasonable to compare the likely risk of different profiles of gamers in terms of odds ratios.

All the variables mentioned above may be viewed as risk factors for MMORPG addiction. The longer a person has been playing an MMORPG the more likely they are to be at risk of developing an addiction to MMORPGs. Furthermore, these risk factors are potentially cumulative. For instance, a gamer who has been playing for many years and becomes unemployed would – all other things being equal – have a greater risk of MMORPG addiction. One can see that being unemployed or retired can increase the likelihood of addiction as a gamer will have free time to play MMORPGs.

Playing on a PvP or a 'role-playing' server can increase risk of MMORPG addiction. This could be due to the competitive and immersive properties of MMORPGs. These virtual environments are designed to provide an intense psychological experience that encourages competition between gamers. Gamers compete with one another to complete quests, reach high levels, acquire new weapons, and/or build up a reputation. Role-playing has been linked to addiction in previous research (e.g., Hsu, et al. 2009; Hsu, Kao & Wu, 2006). A gamer's motivation to progress their character and their emotional attachment to a character that they have created may increase the risk of addiction as the gamer may feel that they must spend time playing with their character (Hsu, et al. 2009; Hsu, Kao & Wu, 2006). The role-playing aspects of MMORPGs tend to attract gamers by affiliating them with the virtual world through the use of their virtual characters (Hsu, et al. 2009; Hsu, Kao & Wu, 2006).

The more hours a gamer devotes to playing online also appears to increase the chances of becoming addicted. This may be because the reward systems within MMORPGs keep the gamer playing for longer periods of time and thus sustain gamer motivation (King & Delfabbro, 2009). The variable ratio reinforcement schedules within MMORPGs may shape future behaviour as well as maintain behaviour (Griffiths, 2009a). Those gamers who are unemployed or retired tend to have more free time and are thus more likely to devote their time to playing MMORPGs perhaps making themselves vulnerable to addiction. Past research (e.g., Kim, Namkoong, et al., 2008) suggests that employment status (which was one of the predictors in the present analysis) explains some of the variance in online gaming addiction.

Brown's (1997) Hedonic Management Model of Addiction is useful when attempting to explain the mechanisms underlying MMORPG addiction. The model attaches importance to the role of conscious subjective experiences, beliefs, and decisions of the addicted person. This model suggests that particular activities (such as MMORPG playing) can provide a strong stimulus to make people feel good or sustain a good hedonic tone (i.e., states of relative pleasure and euphoria). These activities disrupt the normal functions of planning for long-term goals. This is because the person attempts to sustain long periods of hedonic tone by engaging in the activity that for some will subsequently lead to addiction. Recovery is possible through improved self-awareness, vigilance, better decision-making, and reduction or extinction of the addictive activity (Brown, 1997).

Gamers may be manipulating their hedonic tone to sustain long periods of euphoria as they spend increasing amounts of time online. MMORPGs have the potential to provide longs periods of euphoria through quests and undiscovered content that can be appealing to many gamers as it can provide an escape from reality (Wood, Griffiths & Parke, 2007; Hsu et al., 2009). It is speculated that hedonic tone may also be sustained through the immersion of being in another world, social interaction, being part of an online community, gaining recognition and power in-game, character advancement, completing instances, and acquiring new gear. The reward systems within MMORPGs (e.g., new gear, weapons, levelling up, etc.) provide schedules of reinforcement that require gamers to keep playing, and this supports Brown's (1997) model. Future research could apply Brown's model to the investigation of MMORPG playing behaviour and its possible links to hedonic tone (Charlton & Danforth, 2007).

It is also important to recognise the limitations of the study. The addiction results do not prove causality and many other factors relating to MMORPG addiction were not examined. Some of the potential risk factors that were not investigated include individual differences amongst gamers, gamer motivations, personal life circumstances, perceptions, meanings people attach to MMORPGs, and the experiences of playing MMORPGs. These are all important risk factors that may influence whether an individual's playing will be problematic. Previous research suggests that the community aspects of online gaming (such as belonging to a guild,

participating in guild activities, developing social relationships with gamers) may help explain addiction to MMORPGs (Ducheneaut, et al, 2006; Seay, et al, 2004; Hsu, et al, 2009). This is a risk factor that was not investigated in the present study.

It is also important to note that it is not possible to imply that gamers with some signs associated with addiction suffer from problems, and that all MMORPGs are addictive. Further research is needed to identify other factors that contribute to problematic gaming behaviour. Researchers need to verify the results of this study by further investigating MMORPG addiction. Another issue to consider is whether gamers over-estimate their game playing time. This is difficult to investigate unless researchers use in-depth qualitative methods such as the diary method and/or interviews. However, most research tends to suggest that players underestimate the time they spend online playing games (Wood, Griffiths & Parke, 2007). In regards to determining the extent of addiction, longitudinal research that makes use of both quantitative and qualitative methods will most likely reveal the true nature of addiction to MMORPGs.

The online data collection methodology used in this study was helpful in obtaining a relatively large and diverse sample of online gamers from around the world. The phenomenon being examined warranted an online questionnaire to be used to gather data. There is the issue regarding truthfulness of responses but this issue is not limited to online studies as it affects all types of self-report research in general (Wood, Griffiths & Eatough, 2004). In the present study, exaggerated responses were removed from the data and IP addresses were checked to prevent multiple responses. One of the distinctive aspects of this study was that it did not focus on players of a particular MMORPG but rather it was interested in people who played all types of MMORPGs and so gamers were recruited from many different MMORPG fan sites and forums. However, it is not possible to make generalisations about all gamers from the study's findings as there are issues in regards to using a self-selected sampling strategy and not including gamers from many countries, and players of all MMORPGs. The present study is the first study of MMORPG addiction to make use of a validated gaming addiction scale. Further research could replicate the present study or adapt the measurement instrument to examine potential addiction to other online media such as social networking sites, online dating sites, and online gambling sites.

MMORPGs are complex graphical environments with enormous potential to attract millions of players worldwide. The present study revealed that while many gamers show characteristics that are associated with MMORPG addiction – using monothetic criteria a relatively small percentage of gamers could be considered addicted. However, some risk factors appear to dramatically increase the likelihood of being addicted. The polythetic classification led to larger numbers of gamers being classified as addicted, therefore it can be speculated that these gamers are likely to be more vulnerable to shifting to the monothetic classification. This is because they possess some of the core components of addiction and may possibly end up possessing the other components with the passage of time. Video game developers should implement safeguards to prevent excessive play. For instance, the use of in-game time monitoring systems that forces gamers to log-out if they have been playing for excessive amounts of time may help to prevent excessive gaming behaviour. Making avatars experience fatigue and lose points due to excessive play may also prevent excessive gaming (Hsu, et al, 2009). Understanding the difference between addiction, excess, and non-addiction is important in deciding what types of prevention programmes can help those who are in need (Griffiths & Meredith, 2009; Griffiths, 2009b). Thoughtful evaluation of the complex mechanisms of MMORPGs is the way forward as this will help provide the knowledge needed to advise those people who have gaming problems.

# Chapter 8: Discussion

This chapter discusses the implications of the research studies presented in this thesis and their findings in light of the initial aim and objectives of the research. A summary of the main findings that have emerged from the research as a whole is provided, along with the limitations of the research, possible future research and a conclusion. To reiterate, the main aim and objectives of the research were as follows:

**Aim**

- How do MMORPGs impact (psychologically and socially) on peoples' lives? (Addressed throughout all the research in this thesis)

**Objectives**

- What makes new and developing forms of MMORPGs potentially addictive? (Addressed in the scoping study)
- What types of MMORPGs currently exist, how are they located, accessed, and utilised by players? (Addressed in the scoping study)
- Are there any aspects of MMORPGs that may be linked to addiction? (Addressed in the scoping study, online interview study, and online questionnaire studies)
- Can excessive MMORPG playing lead to addiction? (Addressed in the online questionnaire studies)

By providing a detailed overview of MMORPGs, future researchers can develop theoretical propositions based on this research.

## Summary of the main findings

The four empirical research studies in this thesis provided some interesting themes and findings that have not been reported in the literature previously. As demonstrated throughout the empirical chapters (i.e., chapters 4 to 7), the studies have focused on specific areas of online gaming. This section provides a summary of the main findings of each study. Sub-headings are used to help put the findings into context and to

reiterate what each study found. The findings from each of these studies can be summarised as follows:

**The online scoping study**

***There were gaps in our knowledge base***

The scoping study revealed that there are extensive gaps in our knowledge with respect to the basic demographic data of MMORPGs. The study acquired data from a diverse range of academic and non-academic sources and found a considerable variety of information. The scoping study attempted to cover a larger spectrum of MMORPGs from a variety of sources, and as a consequence there was a greater breadth of MMORPG data (as opposed to depth) in terms of the sources utilised. The scoping study found that whilst some games had received moderate, or even substantial attention, others have had no research conducted upon them at all. This presented a problem since the growth in both the player base and the video game industry suggests that a single psychological profile of 'the gamer' cannot be relied upon, and as such further research is required. The results showed that it has not been proven that gamers of any one particular MMORPG are representative of MMORPG 'gamers' in general.

***There were a variety of activities that gamers engaged in whilst in the virtual world, and that such activities may lead to excessive gaming***

The scoping study provided detailed descriptions of the MMORPGs that were investigated. The descriptions of the MMORPGs provided insights into the types of activities gamers could engage in once they are in the virtual world (e.g., questing, adventuring, trading, etc.). The data that were available concerning hours played showed the amount of time that was being invested by gamers. This information coupled with the activities that gamers were engaging in showed the first signs of excessive play or what can cause excessive play (e.g., WoW players spend 22 hours per week playing WoW, over one-third of WoW gamers claimed they were addicted). This echoed previous research (e.g., Griffiths et al, 2004a, 2004b; Chappell et al, 2006) that have reported evidence of gamers playing for up to 80 hours a week.

***Gamers' motivations for playing provided an understanding of the different preferences of gamers***

Information regarding the motivations for playing (e.g., PvP experience, community experience, and competition) was psychologically interesting because it provided an understanding of how gamers prefer different aspects of game-play. It also showed the effects of online gaming on game-play. These findings were similar to those of Taylor and Taylor (2009) who found that social communication and group cohesion were the strongest motivators for game playing. The findings also supported the research of Klimmt, Schmid and Orthmann, (2009) who found gamers were motivated to play because of the social relationships involved in game play. Choi and Kim's (2004) findings were also similar to the scoping study findings as they reported that in-game goals and communication tools facilitated motivations for playing. The scoping study findings also concurred with the research findings of Yee (2006a) who found that achievement and relationship factors were strong motivating factors for gamers.

***The age range of gamers was diverse, virtual worlds allowed gamers to take control of their game-play experience, and more research into MMORPGs is needed***

The data also provided evidence to show the diverse age of gamers. Previous research has also highlighted the diverse age range of gamers. For instance, Griffiths et al (2003; 2004a) reported that gamers were aged from 10 years to over 60 years. Many MMORPGs provided gamers with the ability to do whatever they wanted to do in the virtual environment. Virtual worlds allowed gamers to take control of their game-play experience, gamers could create their own characters, choose a profession, join a guild and use their imagination to explore the worlds at their own will. This can be related to the findings of Ko, Yen, et al (2007) who reported that online gaming provided the freedom for self-representation and a feeling of control. Many MMORPGs had not been directly examined and little was known about the basic demographics of many MMORPGs. The main theme to emerge here was the need for more research that examined different genres of MMORPGs and the demographics of gamers.

## The online interview study

### *MMORPGs were used to alleviate negative feelings, and specific aspects of MMORPGs were highlighted as causing excessive play*

The results from the online interview study showed how gamers used MMORPGs to alleviate negative feelings and the data provided detailed descriptions of personal problems that had arisen due to playing MMORPGs. Furthermore, the study provided detailed accounts of gamers' day-to-day lives and how they integrated online gaming into their lives. The online interview study also found that more than half of the gamers thought their game playing is or was excessive. Specific aspects of MMORPGs (e.g., the 'end-game raiding' content, the community and competition) were highlighted as causing excessive play that could lead to adverse health effects for some gamers. The qualitative data also provided some insights into online gaming as an addiction. However, the qualitative data on excessive playing and addiction needed to be supported with quantitative data in order to provide a broader understanding of addiction but also to provide a rounded account and to demonstrate the prevalence, nature and extent of online gaming addiction.

### *There were both positive and negative effects associated with online gaming*

One of the distinct themes that emerged from this study was the data showing the positive and negative effects of online gaming. More than two-thirds of gamers commented upon the positive effects of online gaming. Some of the positive effects included meeting new people, learning about new cultures, facilitating teamwork, and building friendships. Similar types of positive effects have been found by Longman, O'Connor and Obst (2009). Their findings revealed that gamers derived social support from playing, and a positive relationship was found between game engagement and levels of in-game social support. There is evidence showing the positive aspects of video games. For instance, video games (including MMORPGs) have been found to promote social interaction (e.g., Cole & Griffiths, 2007; Hussain & Griffiths, 2008).

Video games also have potential therapeutic benefits (Griffiths, 2005a). Gardner (1991) used video games in his psychotherapy sessions and found that they provided common grounds between him and his child clients and the games improved the therapy sessions. Gardner observed that video game playing allowed his child clients to release aggression and also allowed them to develop problem solving strategies and hand-eye co-ordination skills.

Coyle, Matthews, Sharry, et al (2005) reported their use of Personal Investigator (PI), a 3D video game specifically designed to help adolescents overcome mental health problems and to help them engage more easily with mental health care services. Coyle et al (2005) argued that PI was an effective therapeutic tool. Video games have been shown to help children undergoing chemotherapy, psychotherapy, and they have helped children with particular emotional and behavioural problems (Griffiths, 2004). However, one of the problems with the research showing the positive effects of video games is that many of the findings have been found with specially designed video games rather than commercially available video games. Further research is needed to investigate the positive effects of all types of video games.

Online gaming was also seen as a medium that allowed people to exercise their imagination by allowing gamers to do whatever they wanted to do. Online gaming could teach teamwork and planning skills. Such positive effects lend support to the literature showing online games can be educationally useful (de Freitas & Griffiths, 2008). Research by Subrahmanyam & Greenfield (1994) showed that video game playing can improve spatial visualization ability skills (i.e., mentally, rotating and manipulating two- and three-dimensional objects). Griffiths (2002a) has outlined many ways in which video games may be useful educationally. For instance, video games can be fun and stimulating for children, may help in the development of transferable IT skills and can provide elements of interactivity that may stimulate learning (Griffiths, 2002a). It would appear that video games may be able to facilitate learning in an educational environment. However, research is needed to support these claims. Furthermore, research that focuses on evaluating the objective and content of video games, and whether the video game requires passive or active involvement is

warranted. The transferability of skills outside the game-playing environment remains a questionable issue that requires further investigation.

The negative effects of online gaming that were found by the study included excessive MMORPG playing being associated with the breakdown of friendships, relationships, and the neglect of personal hygiene. These findings can be related to research by Smyth (2007) who found that excessive MMORPG playing led to interferences in 'real life' socialising amongst gamers and negative health consequences. The findings are also related to the research findings of Lo, Wang and Fang (2005) who found that the quality of interpersonal relationships decreased as time spent playing online increased. There is case study evidence reporting the adverse effects of playing video games. For instance, Griffiths (2010) has reported excessive use of video game playing. Graf et al (1994) reported experiences of seizures in some video game players due to rapid scene changes and flickering in video games. Some of theses adverse effects tend to be rare and can be resolved with decreasing the amount of time spent playing (Griffiths, 2008). Further research examining the adverse effects of video games and possible ways of resolving such effects is very much needed.

***The time spent playing MMORPGs can cause detachment and time loss***

The online interview study also provided evidence showing that excessive MMORPG playing can cause detachment and time loss. Gamers described how they delayed real-world tasks due to playing online and how MMORPGs made them feel as though they were in a different world. Gamers felt time went by quickly when playing online and they played longer than intended. Time loss had both positive and negative outcomes for gamers. These findings supported the findings of past research (Wood, et al, 2007; Wood & Griffiths, 2007d) that showed that gamers experienced time loss and that losing track of time was a positive experience and one of the main reasons for playing. The experience of time loss was associated with particular structural characteristics of video games such as their multiplayer interaction, multi-levels, and their complexity.

The findings are also related to the research of Dauphin and Heller (2010) who found that daydreaming and psychological absorption was related to video gaming engagement. The interview study also yielded data on how gamers had used online gaming to alleviate negative feelings. Gamers used online gaming to relieve loneliness and boredom and also to alleviate frustration. Hence, MMORPGs appeared to have the capability to bring about positive behavioural changes as noted in past video game research in psychotherapeutic settings (Gardner, 1991). The data also supported the observations of Spence (1988) who found that video game playing could bring about positive behavioural changes in the development of relationships, motivation, cooperative behaviour, and self-esteem.

## The pilot online questionnaire study and the online MMORPG questionnaire study

### *'Dependent' gamers appeared to possess some of the core components of addiction, and these gamers sometimes used online gaming to change their mood*

The online questionnaire studies focused on excessive play and addiction. The pilot online questionnaire study found signs of excessive play and addiction amongst a small sample of gamers. The results revealed that 7% of gamers were classified as 'dependent' individuals. When compared to previous research, the percentage of dependent gamers was far less than the percentage found by Griffiths and Hunt (1998) who found that 19% of gamers were dependent on video games. These gamers were at risk of developing a psychological and behavioural dependence to online gaming. The mean scores of dependent gamers were higher than non-dependent gamers scores on questions regarding mood modification, tolerance and relapse. This suggested that dependent gamers appeared to possess some core components of addiction to MMORPGs (e.g., mood modification, tolerance and relapse). These characteristics may be indicative of a tendency for some gamers to use online gaming as a mood modifier. The gamers may also engage in online gaming as a means of coping with problems in their everyday lives. These findings echoed the findings of Hussain and Griffiths

(2008) who found that 34% of gamers stated that they used online gaming to change their mood. These findings also support Jacobs's (1986) general theory of addiction that suggests people use reinforcing behaviours such as online gaming to relieve negative mood states.

***Many gamers showed signs of addiction to MMORPGs, but when using the monothetic format to measure addiction the results showed that relatively few gamers could be considered addicted***

The 'dependent' individuals in the pilot online questionnaire study played online for an average of six hours per session (almost twice the amount of other 'non-dependent' gamers). This finding was similar to that of Gentile (2009) who found that pathological gamers spent twice as much time playing as non-pathological gamers. The online MMORPG questionnaire study followed on from the pilot questionnaire study and revealed an important theme regarding the classification systems used to determine addiction to MMORPGs. The study revealed that many gamers show characteristics of MMORPG addiction, but when using monothetic criteria the results showed that very few gamers could be considered addicted. The use of polythetic criteria was regarded as leading to over-estimations of addiction. This supported the findings of past research which showed that the polythetic criteria can lead to higher numbers of gamers being classified as addicted (e.g., Charlton & Danforth, 2007; Lemmens et al, 2009).

***Some risk factors increased the likelihood of becoming addicted to MMORPGs***

The online MMORPG questionnaire study showed there were some risk factors (e.g., years of gaming, time spent playing, employment status, 'PvP', and 'role-playing') that appear to increase the likelihood of becoming addicted. Some of these risk factors have been mentioned in the video game literature previously. For instance, Hsu et al, (2009) has suggested that 'role-playing' is a critical factor that can be used to predict MMORPG addiction. Wan and Chiou (2006b) have reported that online game addicts have shown a strong interest in role-playing when playing online as it allows them to

do things which they cannot do in real-life. Kim et al (2008) found that the extent of online game addiction could be predicted based on a person's employment status.

MMORPG playing appears to provide a unique experience for users when compared to other online activities such as emailing, web searching, online shopping, and online gambling (Young, Pistner, et al, 1999). MMORPGs allow those who use them to control their game playing experience and to create their own reality by using their imagination to do things that are not possible in the real world. The themes that have emerged from the studies show that there are gaps in our knowledge in regards to online gaming. MMORPGs have many capabilities and the four research studies in this thesis have only brought some of those capabilities to light.

**Theoretical insights and applications**

In terms of the research findings, there are a number of theories that the findings appear to confirm. The findings confirm the cognitive theories of addiction in regards to the thinking processes and cognitive biases of people. The scoping study findings showed that over one-third of gamers claimed they were addicted to MMORPGs and there were signs of excessive play amongst some gamers. The cognitive labelling model (Cooney, Baker, et al, 1984) can be applied to the research findings as a gamer will experience arousal when exposed to the cues associated with MMORPGs. They may interpret the arousal they experience when faced with MMORPG related cues as an urge to play.

The outcome expectancy model (Marlatt, 1985) can also be applied to the results as gamers beliefs/expectancies about MMORPGs and their behavioural outcomes are linked to MMORPG use**.** Gamers may think that by playing MMORPGs they will get to socialise with people from around the world, develop strong links and compete against other gamers, this will then form an expectancy. Environmental cues will also influence game playing intentions. People are influenced by environmental cues such as friends and advertisements that promote the use of MMORPG playing (or video

game playing in general) as a common form of entertainment. Thus a person will develop an expectancy that MMORPG playing causes pleasurable feelings (as can be seen from the online interview study findings). The expectancy links MMORPG playing to pleasurable feelings, so this expectancy will influence future game playing behaviour.

The findings from the online interview study provided detailed accounts of how some gamers played MMORPGs on a daily basis and how they had integrated their MMORPG playing in to their daily lives. Many gamers would schedule time to play MMORPGs on a daily basis. The findings also showed that some gamers delayed real world tasks due to playing online. These findings showed that the game playing behaviour of some gamers might have become 'automatised' due to playing MMORPGs for many years and now required little attention. This would support the cognitive processing model (Tiffany, 1990). When an obstacle does come in the way of playing online then non-automatic processes would be activated (e.g., frustration) that generate craving for MMORPGs. However, this theory needs to be investigated further so that it can be linked more strongly to MMORPG playing.

The data gathered from the online questionnaire studies and the online interview study revealed that gamers were influenced by the different aspects of MMORPGs (e.g., end-game raiding content, quests, social interactions, PvP playing style) which could lead to playing MMORPGs at addictive levels. The continuation of MMORPG playing appears to be linked to the intermittent rewards that are given to gamers. Furthermore, some of the risk factors that were revealed in the online MMORPG questionnaire study (i.e., years of gaming, time spent playing, 'PvP', and 'role-playing') may be increased by the influence of intermittent rewards in MMORPGs. These findings support Brown's (1997) Hedonic Management Model of Addiction. The model attaches importance to the role of conscious subjective experiences, beliefs and decisions of the addicted person. MMORPG playing can provide a strong stimulus to make people feel good or sustain a good hedonic tone (states of relative pleasure and euphoria). MMORPG playing can disrupt the normal functions of planning for long-term goals as the person will attempt to sustain long periods of hedonic tone by engaging in the activity which subsequently leads to addiction.

Gamers may be manipulating their hedonic tone to sustain long periods of euphoria as they spend increasing amounts of time online. MMORPGs have the potential to provide longs periods of euphoria through quests and undiscovered content which can be appealing to many gamers as it can provide an escape from reality. Hedonic tone may also be sustained through the immersion of being in another world, social interaction, being part of an online community, gaining recognition and power in-game, character advancement, completing instances and acquiring new gear. The reward systems within MMORPGs (e.g., new gear, weapons, levelling up, etc.,) provide schedules of reinforcement required to keep gamers playing. This could then lead to excessive playing and addiction. However, recovery (regaining normal functions of planning for long term goals) is possible through improved self-awareness, vigilance, better decision making and reduction or extinction of the addictive activity (Brown, 1997).

## Limitations

This section reviews the limitations of the research studies as a whole. In general terms, the limitations include gamer dissatisfaction, selection bias, self-selection, technical limitations, self-report issues, and sampling issues.

### *Gamer dissatisfaction*

There were approximately 30 cases of gamer dissatisfaction with the online pilot questionnaire study and the online MMORPG questionnaire study when recruiting participants via web forums/discussion boards and in-game in the *World of Warcraft*. Gamers posted their comments and opinions about the studies on the discussion boards. Some gamers reacted negatively to the recruitment posts inviting gamers to take part in the studies. As can be seen in the quotes below:

Gamer 1: *"What is with people studying us? It makes me feel like a test subject, screw you people and your tests! You're not getting in my mind!"*

Gamer 2: *"Why are we some weird bug you want to put under a microscope and try to figure out what it is that makes us enjoy playing games? wtf is there to study?"*

Gamer 3: *"*sigh* Yet another one of these…*[studies]*."*

Gamer 4: *"Most…*[studies] *though, already have their conclusions formed, and are just fishing for enough people to support it, rather than take a non-biased view. It's usually a questionnaire that asks in several ways, "Are you a lonely shut-in that plays to avoid your problems or life?"*

Approximately 40 gamers voiced their dissatisfaction with the research by participating in the online surveys and providing repeated and purposefully invalid data (such as filling a response box with lots of 9's, e.g., 99999999,) as well as using profanity. As can be seen from the quotes above, some gamers appeared to be unhappy with the postings and were not too keen on taking part in the questionnaire studies. This type of gamer dissatisfaction was handled by emphasising that the research was value-free and had to adhere to the ethical guidelines of the *British Psychological Society*. Also by offering to provide gamers with a copy of the findings helped to reduce dissatisfaction. Another method was to state that the researcher was also a gamer and not just an outsider looking for gamers to fit specific stereotypes. All of these methods proved successful in preventing further dissatisfaction.

In the future, gamer dissatisfaction could be assessed before recruitment via the use of focus groups with forum moderators and gamers. This would help to acquire feedback that would show the possible reaction to certain types of research topics and then steps could be taken to minimise complaints/dissatisfaction from gamers. Another way of minimising gamer dissatisfaction would be to have Stakeholder (e.g., video game companies, researchers and clinicians) engagement in the design and execution of a research project, this is seen as the best way forward (Griffiths & Wood, 2008).

### *Selection bias*

Participants for the online interview study and questionnaire studies were primarily recruited from online forums, it is not clear what percentage of gamers participate in online forums. Many 'hardcore' and addicted gamers may not have taken part in the studies as they spend more time in-game and less time in the forums. This may have resulted in a lower percentage of 'hardcore' and addicted gamers participating in the studies. It can be difficult to recruit these types of gamers as they tend to be engrossed in the virtual worlds (Wood, 2008). There is also the issue of gamers being apprehensive to take part in any type of academic research that attempts to gain insight into their lives. Many gamers may have avoided participation due to a lack of trust for academics or may be they felt intimidated by the investigative nature of research studies.

### *Self-selection*

There is a possibility that the sample of gamers who did participate in the online interview study and questionnaire studies were people who were interested in the topic area. As mentioned above, it is not clear what percentages of gamers participate in online forums. A random sample of gamers was not obtained, and this may have led to a larger than normal percentage of MMORPG addicts in the sample. This may lead to unreliable estimates of the prevalence of MMORPG addiction.

### *Technical limitations*

In regards to the online interview study, there was a technical limitation when trying to conduct an online interview in-game within the *World of WarCraft*. It was not possible to save the chat log conversation between the interviewer and interviewee without installing special software that was not easily available. Consequently, interviews were

conducted via *MSN Messenger* or email instead. The online scoping study and online survey studies did not suffer from any noticeable technical limitations.

### *Self-report issues*

There are issues regarding validity of responses when self-report data is gathered. The data could have been distorted due to exaggerated responses by gamers, demand characteristics, social desirable responses, and fatigue or due to a general disliking of research examining MMORPGs.

## Mixed methods approach to examining the impact (psychologically and socially) of MMORPGs on peoples' lives

There were differing research aims and objectives within each study so the application of different methods to achieve the objectives of each study was necessary. The application of mixed methods (Tashakkori & Teddlie, 1998, 2003) to identify and explore phenomena regarding the impact of MMORPGs was beneficial. The use of different methods within the thesis produced different types of knowledge such as the positive effects of MMORPGs and the different risk factors that can increase the likelihood of becoming addicted to MMORPGs. This collection of data enables the proposition of several hypotheses to be explored in future research which will be discussed below. Furthermore, the use of mixed methods provided the opportunity to approach MMORPGs in multiple ways (e.g., the use of a scoping study and online interview study).

Mixed methods research has become increasingly popular as it allows researchers to enrich their results in ways that one form of data does not allow (Hanson, Cresswell, et al, 2005; Brewer & Hunter, 1989). Hanson, Cresswell, et al (2005) argue that using both quantitative and qualitative data allows researchers to simultaneously generalise results from a sample to a population and to gain a deeper understanding of a research topic. There is a consensus amongst researchers that mixing methods can strengthen a

research study (Cresswell, Plano Clark et al, 2003; Greene & Caracelli, 1997). Mixed methods approaches have been utilised by a number of researchers to study a variety of research areas. These areas include the evaluation of HIV prevention programs (Miller, Khamarko & Beard, 2005), the investigation of the experiences of pre-school children with disabilities (Odom, Zercher, et al, 2006), child development (Yoshikawa, Weisner & Lowe, 2006), and group support systems (Feather, 1999). Using a variety of methods to test hypotheses and explore research questions leads to richer, more accurate, and useful findings (Rocco, Bliss, et al, 2003).

Hanson, Cresswell, et al, (2005) recommend that researchers work in teams when conducting mixed methods studies. This is because mixed methods research requires knowledge of quantitative and qualitative methods, involves multiple stages of data collection, and analysis that can extend over long periods of time. Knowledge and expertise of different methods is very important. When conducting the present research, the researcher had to be competent at developing and utilising questionnaires and interview schedules and then analysing both quantitative and qualitative data.

In regards to the field of online gaming and future research, it can perhaps be speculated that researchers will use mixed methods in order to expand the scope of research and to offset weaknesses of individual methods (Driscoll, Appiah-Yeboah et al, 2007; Blake 1989; Greene, Caracelli & Graham 1989; Rossman & Wilson, 1991). For example, in the present research the detail provided by the online interview study revealed insights that could not be obtained through the questionnaire studies. Such as the insights into gamers perceptions, attitudes and personal problems that had arisen due to playing MMORPGs. One of the advantages of using mixed methods in the present research was that it allowed the researcher to develop a design that would answer the research questions of the thesis within the boundaries of the research context. A disadvantage with the mixed methods approach used in this research was that there was a loss of depth when analysing the qualitative data that was gathered from the online interview study. This may have been due to the lack of qualitative expertise on the part of the researcher or due to a research design that intended to gather snapshots of data from using various methods.

A mixed methods approach can be useful when addressing complex research questions. However, the process can be time-consuming and may require the use of various resources and the expertise of researchers from different research backgrounds. It may be suited to research that does not require deep analysis of qualitative data. In essence, a mixed methods approach provides quantitative and qualitative open-ended data which is what the present research has provided. Also, the phenomenon that were examined in this study (i.e., MMORPGs, online gaming) were best examined using a mixed methods approach. It is hoped that the present research will provide guidance to researchers who may be thinking about merging quantitative and qualitative data into a single study (Cresswell, Plano Clark et al, 2003).

**Practical implications of the research: Social responsibility**

Video game developers are designing MMORPGs that appear to be potentially addictive to some players (Bartle, 2003), therefore video game developers should give some thought to the negative effects of MMORPGs. Many MMORPGs make use of variable ratio reinforcement schedules that increase the addictiveness of the virtual world. These MMORPGs provide a very intense experience which gamers enjoy and want to repeat again and again (Bartle, 2003). Many MMORPGs allow gamers to be whoever they want to be and through the social interaction with other gamers this can create an experience that keeps them playing. Personal and social problems can result from using these virtual worlds for excessive amounts of time. Video game developers must take responsibility for what they have designed although the addictive design features of MMORPGs might not be intentional there is an obligation on the developers to consider ways of limiting harm.

If the problem of video game addiction grows, video game companies should fund education and prevention programmes, telephone helplines and treatment facilities as has happened in the field of gambling addiction (Griffiths & Wood, 2008). Video game companies should be dedicated to good social responsibility practices. For instance, they should provide good customer support that helps staff to understand player

behaviour (e.g. ongoing staff training) and helps gamers get any help they need in relation to their playing behaviour (e.g. staff intervention and good referral services to helping agencies) (Griffiths & Wood, 2008). Video game companies are responsible for the ways in which people are attracted to play their video games. This includes the ease of accessibility to MMORPGs, advertising to attract custom and the design of the video game itself (e.g., game speed, reward structure). Thus, MMORPGs should be designed to limit excessive play and advertisements should not appeal to vulnerable members of society (such as minors and those with severe learning difficulties) (Griffiths & Wood, 2008). Identifying and understanding how video games are structured (i.e. game design and associated features) will require the video game industry to work closely with researchers.

Video game companies should take an active role in assisting gamers to address any concerns about their game playing behaviour. This can be done by displaying telephone helplines and the addresses of support agencies on video game covers, leaflets inside covers, online forums and in the virtual world. MMORPGs can blur the boundaries between fantasy and reality until the two become one and the same (Bartle, 2003). This could prove too much for some people who find it difficult to separate reality from fantasy, as they may neglect important tasks in their lives in order stay in the virtual world. They may view the virtual world as more important and may become emotionally attached to it. People who view virtual worlds in such a light could cause their health and social networks to deteriorate. MMORPG moderators should observe gamers playing behaviour via the use of behavioural tracking technology to see if there are signs of problematic play (e.g. logging in to the game world for very long periods of time without rest breaks, getting into disputes with other gamers, the use of verbally aggressive comments).

The use of behavioural tracking technology has been successfully used by online gambling operators to monitor player behaviour on Internet gambling sites (Griffiths, 2009c). Griffiths (2009c) has suggested that tracking technologies can reliably identify problem gambling without the use of problem gambling screening instruments thus eliminating the weaknesses of self-report methods (such as lying and socially desirable

responses). This technology should be used by video game companies to examine problematic video game playing as it would allow for the examination of real-time game playing behaviour.

Gaming companies could possibly employ psychologists to monitor forum posts and gamers' conversations in-game. If they suspect that a gamer is behaving in an odd way then the psychologist could contact the gamer to provide expert advice to help manage any problems they may be having. An email could be sent to the gamer providing them with general advice about any problems they may be having. The email could also include hyperlinks at the bottom to support agencies and to a self-diagnostic gaming checklist like that proposed by Griffiths (2003) which assesses excessive game playing. Putting such measures into place would be one way of showing that video game companies are helping their customers and that they are not just interested in making profit. Offering specialist help may perhaps become a common practice in virtual worlds that attract millions of gamers worldwide. Many video games developers will accept a duty of care for gamers whilst they are in their virtual world (Bartle, 2003).

MMORPG developers have the power to add content to the virtual world that can make a gamer feel good (e.g., chat features that can be used to help someone in need or to provide social support to someone who is upset) or make them feel bad (e.g., a virtual virus passed on by player-to-player that kills all game characters). Virtual worlds have a strong psychological element to their design, the virtual world acts as a trigger, and it is the gamer that experiences either positive or negative effects due to being induced by the world (Bartle, 2003). In large-scale virtual worlds, gamers who experience neurotic feelings and thoughts may go undetected by gamers and moderators. Putting mechanisms in place for detection and prevention of problems (such as mental healthcare schemes) would help gamers and their families (Griffiths & Meredith, 2009; Bartle, 2003).

Griffiths and Meredith (2009) state that it is important that parents talk to children about video game content and that they understand the difference between make-

believe and reality. Parents should monitor the game playing habits of their children and should play an active role in choosing suitable video games for their children. The partners of gamers should also take an active role in selecting video games for their gamer partners. Video game developers should help parents by providing clear and unambiguous information on the possible risks associated with their games (King & Delfabbro, 2010). Video games, and MMORPGs in particular, could perhaps carry health warning messages on the game covers and on the load up screen (Van Rooij, Meerkerk, et al, 2009). Some online support forums/self-help groups may be useful in providing help and support to parents, gamers and practitioners. Online groups such as 'Online Gamers Anonymous', '*WoW* widows' and '*EverQuest* widows' provide practical advice and experiential case accounts to help those affected by excessive game playing (Griffiths & Meredith, 2009). Online Gamers Anonymous promotes the use of the '12-steps' Minnesota model to help deal with problematic game playing (Griffiths & Meredith, 2009). Some of these self-help groups are run by parents or partners of gamers, ex-gamers who are recovering from MMORPG addiction, and professional organisations. They do not tend to provide a full programme of treatment, therefore professionally developed treatment programmes for video game addiction are now needed (Griffiths & Meredith, 2009).

Residential treatment programmes for online gaming addiction have been set up in South Korea and the Netherlands (Wood, 2008; Griffiths & Meredith, 2009). These programmes incorporate aspects of family therapy, social skills training, time management skills and cognitive behaviour therapy (CBT) (Orzack & Orzack, 1999; Young, Pistner, et al, 1999). However, there is no research evidence to show their effectiveness (Griffiths, 2005c). The use of CBT has been shown to be effective for the treatment of internet addicts (Young, 2007). Griffiths and Meredith (2009) have suggested that CBT may be the most effective method to deal with online gaming addictions. CBT helps identify problematic cognitions associated with video game addiction and can help people to learn coping strategies to deal with these negative cognitions and to prevent relapse (Orzack, Voluse, et al, 2006; Young, 2007; Griffiths & Meredith, 2009). However, CBT on its own may not be effective in the treatment of online gaming addiction, and other therapeutic interventions (such as the use of

motivational interviewing) in conjunction with CBT are likely to be more effective (Griffiths & Meredith, 2009). Gamers, parents, practitioners and video game companies can all provide different types of treatment options for those affected by video game playing.

Based on the limited empirical research base, there appears to be a need to enhance awareness about video game related problems within the general public and the health professions (Griffiths & Wood, 2000). Different stakeholders (i.e., video game companies, psychologists, researchers, health professionals, government agencies) could all play a role in setting up and maintaining the following online gaming prevention initiatives:

- General awareness raising (e.g., public education campaigns through advertisements)
- Training material (e.g., training videos about problematic video game use shown in schools)
- Training of video game industry personnel (e.g., training managers, video game developers and customer service staff)
- Internet prevention (e.g., the development and maintenance of problem video game playing websites)

All the stakeholders outlined can be of direct help in setting up these initiatives. These initiatives would help to minimise the adverse health and social consequences of problematic video game playing and would form the foundations of good social responsibility practices.

**What is the difference between excess and addiction?**

The question of excessive play and addiction is an important one. A gamer can play MMORPGs excessively but they might not be addicted. In order to determine whether a person's game playing is excessive, Griffiths (2003) devised a brief diagnostic

checklist to assess excessive video game playing amongst children; Does the child: (1) Play video games almost every day? (2) Play video games for long periods (over 3–4 hours at a time)? (3) Does he/she play video games for excitement or a 'buzz'? (4) Get restless, irritable, and moody if he/she can't play video games? (5) Sacrifice social and sporting activities to play video games? (6) Play video games instead of doing his or her homework? (7) Try to cut down video game playing but can't? Griffiths' (2003) checklist proposes that answering 'yes' to more than four of these questions would mean that the child may be playing too much. This diagnostic checklist can also be applied to adult gamers. This checklist provides general pointers that outline what it means to play video games excessively. If a person is playing videogames to an unhealthy extreme, there are a number of steps that can be taken by parents and partners. This includes limiting the amount of time a person plays video games, replacing video game playing with alternative recreational activities, and enforcing video game manufacturers' recommendations for safe playing (Griffiths, 2003).

It is important to highlight the fact that just because some gamers play excessively it does not mean that they are addicted. Griffiths (2010) has argued that excessive activity and addictive activity are not the same, although they may overlap. Griffiths (2010) has also argued that the difference between healthy excessive enthusiasms and addictions are that healthy excessive enthusiasms add to a person's life whereas addictions take away from it. This is an important distinction between excessive activity and addictive activity. The present research has shown support for the arguments of Griffiths (2010). Some of the themes that emerged from the interview study showed signs of addiction to MMORPGs. However, when the game addiction scale was used to measure for addiction during the online questionnaire study, very few gamers were classified as addicted (according to the monothetic format).

Griffiths' (2010) case study evidence of two gamers outlined the importance of context in the life of a gamer and demonstrated that excessive playing does not necessarily mean that a gamer is addicted. Both gamers in Griffiths' study claimed to be playing for up to 14 hours a day, both gamers playing was behaviourally identical but they were different in terms of psychological motivation and the meaning and experience of

gaming within their lives. The key issue in the case studies was to what extent excessive gaming impacts negatively on other areas of the gamers' lives. Griffiths applied the core components of addiction to each of the two case studies and found that only one of the two gamers was addicted. This gamer displayed all the core components of addiction (e.g., online gaming was the most important thing in his life, he built up tolerance to gaming over time, he experienced conflict in his life as a result of playing online). In contrast to this, the other gamer did not suffer from any withdrawal symptoms, or relapse when unable to play, and he did not experience conflict or negative problems in his life as a result of his excessive gaming. This gamer played excessively due to having lots of free time (he did not have a job or partner). When other things came along in his life (a job, a girlfriend) his playing decreased dramatically. The two case studies presented by Griffiths showed that a person might play excessively but this does not mean they are addicted. Researchers must examine the context in which gaming is taking place and if there any negative consequences associated with gaming behaviour.

Earlier research by Griffiths (2000b) that examined five case studies of excessive computer usage also considered the context in which internet and/or computer use took place. The analysis revealed that only two of his five participants were addicted according to the core components of addiction. Excessive internet/computer usage in the majority of cases was a symptomatic response to counteract other deficiencies in their lives (e.g., relationship problems, lack of friends, physical appearance, disability, coping, etc.). Case studies provide information that is not usually accessible to the researcher, and details about excessive behaviour are revealed that allows for a more informed opinion to be reached. In summary, there is a difference between excess and addiction, and excessive behaviour should be examined against the core components of addiction, The extent to which the excessive activity impacts on other parts of a person's life should also be considered, and then a decision should be reached on whether the person is addicted or not.

**Does video game addiction exist?**

The notion of whether video game addiction really exists has been a recurring theme throughout this thesis. In order to answer this question it is necessary to review the findings that emerged from the four studies concerning addiction. The scoping study revealed signs of addiction in some gamers from the empirical evidence that was gathered. For instance, Griffiths, et al (2004a) found that a small minority of players appeared to play excessively (over 80 hours a week, although as mentioned in the previous section, excess does not necessarily mean addiction). Chappell et al (2006) reported accounts of gamers that appeared to show that they were addicted. The scoping study also found online poll evidence to show that 38% of *WoW* players were 'totally addicted' and that 30% were 'somewhat addicted' (although these were of course self-report data).

The online interview study revealed a theme of addiction that highlighted the potential addictiveness of MMORPGs as viewed by some of the players (n = 14). As highlighted in the quotes in Chapter 5, the social interaction, competition, and the in-game tasks were some of the triggers to addiction according to these gamers. The online pilot questionnaire study showed that 7% of gamers were classified as 'dependent' individuals who were at risk of developing a psychological and behavioural dependence for online gaming using an adapted 'addiction' scale. Further analysis showed that excessive online gaming was significantly correlated with psychological and behavioural 'dependence'. It was also found that 'dependent' gamers appear to possess some core components of addiction to MMORPGs (e.g., mood modification, tolerance and relapse).

The online MMORPG survey study revealed findings showing that 3.6% of gamers were classified as addicted to MMORPGs according to the monothetic format. The results also showed that certain variables or risk factors (i.e., 'years of gaming', 'total time', 'unemployed', 'retired', 'PvP' and 'role-playing') appear to have a major impact on the probability of MMORPG addiction. With all this said, researchers must verify

the results of all four studies by further investigating addiction to video games and MMORPGs. The current research suggests that video game addiction exists. However, very few people appear to be classified as addicted to video games and verification of the findings of the research needs confirmation in order to be sure that video game addiction exists.

**What has the research found overall?**

The present research has found that there are both positive and negative consequences attached to online gaming. The psychology of MMORPGs is an important topic that requires further in-depth investigation. The present research has revealed valuable information about the impact of MMORPGs on the lives of gamers that can be built upon by other researchers. This research focused on gamers who played all types of MMORPGs and thus recruited gamers in general. This is something that many previous studies (such as those reviewed in Chapters 1 and 2) have failed to do and thus the information contained within the thesis is valuable. Furthermore, the research tells a story of MMORPGs by providing different pieces of knowledge embedded in the different types of studies that have been conducted. However, the findings of the research will soon become outdated due to the nature of scientific knowledge and advancements in technology. The findings will lose their value, further research will need to be conducted to understand the impact of whatever new video gaming technology is released.

**Future research**

Suggestions for future research have been intermittently dispersed throughout the empirical chapters (i.e., Chapters 4 to 7), often highlighted as part of the discussion. The suggestions presented in this section will adopt an overarching perspective to consider the avenues for future research given the summary of the main findings. There are several possible avenues for future research. An in-depth qualitative exploration of MMORPG addiction, perhaps using grounded theory, would bring greater meaning to

researchers, health professionals and video game companies. There is a lack of longitudinal qualitative studies examining the experiences of gamers, and this type of methodology would provide a different perspective and would highlight the psychosocial consequences of online gaming. Further case study research (like that of Griffiths [2010]) is warranted as this type of research method reveals information that is not normally available using many other types of research methods.

Assessing the playing behaviour of gamers using diary methods may be a useful way of making gamers aware of their daily patterns of play. This type of method could help gamers to avoid problematic game playing behaviour as it would allow gamers to reflect upon their game playing behaviour and then make changes. Quantitative self-report data could also be gathered alongside dairy data to assess daily gaming behaviour. These methods would allow the gamer to take an active role in the gathering of data and would provide an accurate record of gaming behaviour. Although the diary method relies on self-report which can be open to distortion, the daily recording of data is likely to reduce error based on memory retention.

Another possible research opportunity could be to assess whether more experienced gamers can disseminate educational information highlighting risk factors for addictive gaming and provide strategies for gaming responsibly. This would position more experienced members of the gaming community as influential sources from whom to provide responsible gaming information. This could be examined by using participant observation methods or interview methods. The use of experienced members has been successfully used to educate novice members of a community of intravenous drug users about strategies for harm avoidance (Power, Jones, et al, 2008). Gaming, similar to the consumption of narcotics, is a behaviour that is associated with potential risk. Like drug prevention campaigns, it may be possible to educate members of the gaming community about potential hazards to avoid and present strategies that enable the individual to play safely.

It can be argued that the responsibility to educate online gamers about responsible gaming behaviour lies with the video game companies (King & Delfabbro, 2010; Bartle, 2003). As mentioned above, it is recommended that experienced health professionals and psychologists work with video game companies to disseminate responsible gaming information regarding risk factors to be aware of and strategies to employ to play safely. The information could be advertised on websites associated with particular MMORPGs and in the game world. The effectiveness of this intervention could be measured in a number of ways. Gamers who visit the websites and play the MMORPGs could be surveyed to measure the value they place on such disseminated information and whether it influenced their gaming behaviour. Fundamentally, video game companies have a social obligation to protect their customers from developing maladaptive gaming behaviour.

Ethnographic research of online gamers and communities is warranted in order to provide a detailed examination of gaming culture that discerns patterns of behaviour and language. This can only be accomplished by researchers spending time in the virtual worlds. In other words, researchers must become gamers. They must join guilds, carry out and complete quests, advance their characters abilities by 'levelling up' and learn about the language and culture of gamers. The online gaming community is an interesting phenomenon. Hsu et al's (2009) findings have shown that the social factors of belonging and obligation are related to the online community experience. Hsu et al (2009) suggested that the online community created relationships (through belonging and obligation) that increased gamers time spent online. Seay, Jerome, et al (2004) have suggested that online communities can exert 'social pressure' on their members so that they play for longer. Other researchers have (Ng & Wiemer-Hasting, 2005; Li & Chung, 2006; Song, Larose, et al, 2004) suggested that the online community is a critical factor that leads to increased time being spent online and could lead to online gaming and internet addiction.

Many of the behaviours and customs that are seen in the real world have also been replicated in-game. For instance, gaining recognition in the real world through achievements and popularity is something that is also seen within virtual worlds.

Gamers gain recognition in-game by achieving high levels, acquiring virtual wealth, and power (Yee, 2006b). But why have real world behaviours and customs been replicated in the virtual world? Why do people perceive recognition and status as something that has to be achieved? These are questions that can be investigated by using a social constructionist approach and qualitative inquiry. The investigation of learning in MMORPG and other virtual worlds is an interesting research topic. For instance, gamers must use cognitive maps to travel from one location to another. Lynch (1960) has described how people build up a cognitive map of the real world environment. This work can be extended to the study of virtual worlds and it would provide much needed knowledge for educators who now use online provisions for teaching purposes.

Cybertherapy is a rapidly growing field that has been influenced by technological advancements. Increasing numbers of people are now turning to online health services (Smith & Reynolds, 2002). There is evidence suggesting that mental health practitioners report increased caseloads of clients who have problems involving internet applications such as online gambling and video games (Young, Pistner et al, 1999). Psychological problems involving interactive technologies have emerged with varying names such as ‘cyber disorders’ (Young, Pistner et al, 1999), ‘net addiction’ (Young, 1998), ‘technostress’ (Brod, 1984), and ‘online depression’ (Young, 1998). Young, Pistner et al’s (1999) research showed that common treatment strategies for ‘cyber disorders’ included cognitive behavioural approaches, marital and family therapy, and social skills training. New areas of research should include the evaluation of ‘cybertherapy’; providing therapy via the internet. Can health practitioners provide therapeutic help via the use of websites, online interviewing, email or web conferencing? Research should compare online therapy with face-to-face therapy. The internet can be seen as a place where people socialise and reveal their inner feelings (Ookita & Tokuda, 2001). It can be speculated that the internet will be used more often as a therapeutic tool.

The exploration of gender and MMORPG use is an under-researched topic. Future research could attempt to understand the role of gender in online gaming given that the

online MMORPG questionnaire study found that female gamers played longer per session and more times per week. They also had higher-level characters than male gamers. However, the results were obtained from a self-selected sample of gamers. Future research could examine male and female game play experiences, preferences, perceptions and attitudes towards online gaming. This would reveal insights in to how males and females use MMORPGs. An interesting area of research would be to examine the cognitive abilities of both genders on various tasks in the virtual worlds. This type of research could have implications for online teaching and learning by helping to develop new ways of using virtual worlds to improve cognitive skills.

The present research findings as well as the further research ideas will have implications for video game development. Video game developers will have to design video games with appropriate safeguards to prevent adverse effects. They will have to consider customer subscriptions to video games and social responsibility so that gamers do not experience negative effects. Social responsibility in video gaming has implications for government, social scientists, educators, parents, video game companies and developers as they all can play a part in preventing the adverse effects of video games. For example, when new video games are developed and are ready for release, government regulatory bodies could ask educators and social scientists to evaluate the positive and negative effects of the video game. This would be done by studying the effects of the video game by using randomly selected samples of gamers. The use of warning messages on video games and automatic 'time-out' mechanisms in-game could also prevent excessive play. Also, video games could have regular self-help group advertisements and links to self-help websites in-game making it easy for gamers to seek advice for problematic playing behaviour. Many of these prevention measures could be implemented with relatively little effort and then studied by social scientists.

Drawing upon the various research opportunities for future research and the various discussions throughout this chapter and the thesis as a whole it can be seen that the increased use of MMORPGs and the Internet opens up possibilities for their use as a research tool. The present research would urge researchers to use innovative online

research methods. This would involve the development of new means of researching and collecting data. By understanding the structure of online virtual worlds and the internet in general, diverse research methods can emerge. The Internet is a flexible tool that can be used to enhance the research process.

## Conclusions

Many MMORPG players spend large amounts of time in-game, and other aspects of their life, such as work, family and school are likely to be affected when this occurs. The research studies in this thesis have shown that 3.6% of gamers can be classed as 'addicts'. These addicts may find it difficult to control how much time they spend online. The research indicates that excessive use of MMORPGs is associated with MMORPG addiction. What is not known is which comes first – does excessive use cause MMORPG addiction or does MMORPG addiction lead to excessive use? The nature of this complex relationship and the issue of causation needs to be investigated. Other links to mental illness such as depression and anxiety also needs investigating. Substituting offline meaningful friendships and socialising with online socialisation may have adverse effects on mental wellbeing (Morrison & Gore, 2010). It must also be noted that MMORPGs have many beneficial aspects to them they can encourage meaningful friendships and social connections. Addiction to MMORPGs should not be the focus of all research as there is vast scope for future research in many areas connected to online gaming.

There is still much to be learned about MMORPGs, virtual worlds, and the impact of technology on people's lives. The present research revealed findings about the various activities gamers engage in once they are in the virtual world. Findings relating to the motivations of gamers examined the psychology of online gaming. MMORPGs have the potential to captivate the imagination of those who play them, and as the research showed, the age range of gamers is very diverse. The qualitative data that was obtained from the online interview study showed that some gamers used MMORPGs to alleviate negative feelings. Gamers highlighted some of the positive effects of online gaming

that included meeting new people, learning about new cultures, facilitating teamwork, and building friendships. The present research has investigated MMORPGs with the use of different research methods and has showed that MMORPGs have a diverse impact on the lives of gamers. Video games in general have drawn a lot of attention, and as video game technology continues to develop there is likely to be increasing focus on this new form of entertainment. The present research has contributed to existing knowledge by revealing findings on the positive and negative effects of MMORPGs and has opened avenues to potentially new and exciting future research studies.

The limitations of the research such as selection bias, self selection, and self-report issues are recognised, and therefore the results should be treated with caution. The use of a mixed methods approach showed how different methods can be adopted and best used within a research project, and this was one of the strengths of the present research. Social responsibility on the part of video game companies is an important issue that could lead to the reduction of negative health problems for gamers if certain recommendations are put in place. Researchers should take the step towards examining excessive behaviour against the core components of addiction, the extent to which excessive activity impacts on other parts of a person's life should also be considered, and then a decision should be reached on whether the person is addicted or not. The context in which gaming is taking place and if there are any negative consequences associated with gaming behaviour should not be ignored. Further exploration of the positive and negative effects of online gaming using innovative research methods will help shape the future of psychology.

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# Appendices

**Appendix 1. Complete list of websites visited whilst conducting the scoping study**

Allakhazam.com (http://www.allakhazam.com/)
All the Web: Search Engine (http://www.alltheweb.com/)
Alta Vista: Search Engine (http://www.altavista.com/)
AOL Search: Search Engine (http://search.aol.com/aol/webhome)
Ask.com: Search Engine (http://uk.ask.com/?o=312&o=0&l=dir)
Battleclinic.com (http://www.battleclinic.com/)
BBC News (http://news.bbc.co.uk/)
Beaucoup: Search Engine (http://www.beaucoup.com/)
Caster Realm (http://www.castersrealm.com/index.php/everquest/)
DAOC Allakhazam (http://camelot.allakhazam.com/)
DAOC Vault (http://camelotvault.ign.com/)
DAOC Warcry (http://daoc.warcry.com/)
ESA.com (http://www.theesa.com/facts/gamer_data.php)
Excite.com: Search Engine (http://www.excite.co.uk/)
EQ Interface Forum (http://www.eqinterface.com/index.php?s=e30358bf11cd55ec1790ced13283e103&)
EQ Links (http://www.eqlinks.com/)
EQ Stratics (http://eq.stratics.com/)
EQ Trader Forums (http://www.eqtraders.com/articles/news_page.php?menustr=010000000000)
EQ Vault Forums (http://eqvault.ign.com/)
FFXI Vault (http://ffvault.ign.com/)
Final Fantasy (FFXI) Stratics (http://ffxi.stratics.com/)
Forum Planet (http://forumplanet.gamespy.com/)
Gamespy (http://uk.gamespy.com/)
Gaygamer.net (http://gaygamer.net/)
Guild Wars Guru (http://www.guildwarsguru.com/forum/)
IGN Network/IGN.com (http://vault.ign.com/)
Illia's EQ Bestiary (http://eqbeastiary.allakhazam.com/)
International Game Developers Association (http://www.igda.org/)
Lost in WoW: Information, discussion and assistance (http://wowrecovery.com/)
Lycos.com: Search Engine (http://www.lycos.co.uk/)
MMOGCHART.COM (http://mmogchart.com/)
MMORPG.COM (http://www.mmorpg.com/index.cfm?bhcp=1)
Mmorpg.net (http://www.mmorpg-net.org/)
Mpogd.com (www.mpogd.com/)
Netscape Search Engine (http://www.aol.co.uk/?src=netscape.aol.com)
Planet EQ (http://www.planeteq.com/)
Research: MMORPGs (http://research.chekyang.com/index.html)
Runescape.com (http://www.runescape.com/)
Search.com: Search Engine (http://www.search.com/)
Spong.com (http://spong.com/index.jsp)
StarWarsGalaxies.net (http://www.swgalaxies.net/)
Star Wars Galaxies Realm (http://www.swgrealm.net/index.php?sid=680b7e7cb3fa9afc296de57a890a77fb)
SWGCraft Forum (http://www.swgcraft.com/home.php)=
SWG Warcry (http://swg.warcry.com/)

Star Wars Galaxies Stratics (http://swg.stratics.com/)
Star Wars Lore (http://www.sithlore.com/)
Star Wars Vault (http://swvault.ign.com/)
Tentonhammer.com (http://tentonhammer.com/)
The Daedalus Project (http://www.nickyee.com/daedalus/)
The Guardian Unlimited (http://www.guardian.co.uk/)
The Times Online (http://www.timesonline.co.uk/tol/news/)
Tip.it Runescape Help (http://tip.it/runescape/)
VHI Lab (http://vhil.stanford.edu/pubs.html)
Voice of Internet Gaming (VOIG) (http://www.voig.com/Home.html)
WebCrawler: Search Engine (http://www.webcrawler.com/)
Wikipedia.com (http://en.wikipedia.org/wiki/Main_Page)
Wired.com (http://www.wired.com/)
Womengamers.com (http://www.womengamers.com/index.php)
WoW.europe.com (http://www.wow-europe.com/en/index.xml)
Yahoo.com: Search Engine (http://uk.yahoo.com/)

**Appendix 2. Complete list of websites and forums posted on whilst recruiting for the online interview study**

MMORPG.COM
Allakhazam.com
Womengamers.com
WowVault.ign.com
Wowrecovery.com
Online Gamers anonymous (olganonboards.com)
Forums.wow-europe.com/boards
VNboard.ign.com (COH/COV, Warhammer, Guild Wars, FFIX vault, Asheron's Call Vault, off-topic forums)
Gaygamer.net
UO Stratics.com
Gaymer.org
Tabula Rasa Stratics.com
Sims Online Stratics.com
Gamer.experimentations.org
Spong.com
GorgeousGamers.com
GuildWarsGuru
SWGStratics.com
EverQuestWidows@yahoogroups.com
WoW_Widows@yahoogroups.com

## Appendix 3. Online interview study consent form

This form will provide you with information about the research.
Please read through all the details carefully.

The purpose of this research is to examine how Massively Multiplayer Online Role-Playing Games (MMORPGs) impact (psychologically and socially) on peoples' lives.

You are being asked to take part in an interview lasting approximately twenty minutes to one hour. The interviewer will ask a series of questions about your own experience of playing MMORPGs, what impact (positive and/or negative) did these MMORPGs have on you, and your own opinions on the future of online video gaming. Your responses will be recorded and saved as a text file. During the interview, please let the interviewer know if you would rather not answer some of the questions put to you.

You have the right to withdraw without giving a reason to do so. If you wish to withdraw you should contact the researcher (or their supervisor) and ask for your data to be withdrawn from the study. Contact details can be found at the end of this document.

To protect your anonymity all names, places and organisations will be changed. Only the interviewer and supervisor will have access to recordings. All recordings will be destroyed after completion of research.

Upon completion of the interview you are free to ask any questions you may have about the interview or research in general.

Participation is voluntary and greatly appreciated. By taking part in this study it will be assumed that you are giving consent and that you agree to the statements below. If you have any questions or concerns before, during or after your participation in this research then please feel free to get in contact with me.

### Agreement to consent

I have read and understand the purpose of this research and my part in it.

I have asked questions if needed and understand that I can contact the researcher at any time with queries or concerns.

I have the right to withdraw my data at any point during or after the interview and I know that all materials will be destroyed.

I am aged 18 years or over and I voluntarily agree to take part in this study.

---

**Researcher contact details:**

Zaheer Hussain
Email: zaheer.hussain@ntu.ac.uk

Supervisor: Professor Mark Griffiths.
Email: mark.griffiths@ntu.ac.uk
Tel. 0115 8485528

Nottingham Trent University
Burton Street,
Nottingham NG1 4BU

## Appendix 4. Online interview study participant information sheet

Thank you for the interest you have shown in taking part in this research project. Before you agree to participate, I would like you to read through the following information which will help to explain the project in more detail and what I'd like your input to be. If you have any questions about the project, or the nature of your participation which are not answered here, please do feel free to get in touch (contact details can be found at the end of this document).

### Aims of the project

The broad aim of the project is to examine how Massively Multiplayer Online Role-Playing Games (MMORPGs) impact (psychologically and socially) on peoples' lives, by exploring attitudes and views towards online gaming, uncovering the motivating factors, and highlighting any differences between different groups of people. The main focus is on the different types of MMORPGs that are now available, because I think that different MMORPGs can produce different experiences for the gamers who play them. The project also aims to examine what makes new and developing forms of MMORPGs potentially addictive and can these MMORPGs lead to excessive online video gaming and addiction. By understanding these experiences, it is hoped that I will be able to show that MMORPGs can provide a unique experience for those who play these types of video games. These findings may help the gaming industry in terms of future developments in video game technology.

### The researcher

My name is Zaheer Hussain and I am a student at the Nottingham Trent University in England. I have an interest in psychology, video games and new technology. A combination of all of these interests led to the conception of this research project.

### Funding for the project

The Nottingham Trent University is the funding body for this research. However, the research project is an independent piece of work conducted by the researcher.

### Your contribution

I would like to conduct an online/offline interview (of up to an hour long), in which I would like to discuss your own experiences of MMORPGs. I'd like to talk to you about things such as how you felt when you first played online, and what impact (positive and/or negative) did these MMORPGs have on you. I would like to keep a written record or audio record of the interview. This will enable me to listen to what you are saying more at the time, rather than having to write lots of notes. It also means that I will have a precise record of what you have said.

**Storage and use of the data**

Once your interview has been recorded, it will be transferred on to my PC as a digital recording/data file. The data will be transcribed and then imported into a qualitative analysis package as a text document. I will keep the recordings until the end of the project, after which they will be destroyed. It is intended that the research be published in one or more academic journals. Quotes from your interview may appear in such a publication, where they are deemed relevant to the interpretation of the data.

**Anonymity and confidentiality**

I will use a number of measures to ensure your data is kept confidential, and that you remain anonymous. Any files (digital audio and textual) which contain data will be kept securely on a password protected PC and back-up storage device in a password protected folder.

Your name will be removed from any data that is included in the results and will not be linked to your name, or initials. In addition, anything you mention in your interview that could be used to identify you will not be used.

**Your rights**

There is absolutely no expectation that you *must* take part in this research project. Participation is entirely voluntary, and should you wish to withdraw at any time, you may do so and any data recorded up to that point will be destroyed.

**Are there any disadvantages to me taking part?**

You will need to give up an hour of your time, but it is hoped that you find the interview interesting and useful enough to outweigh this draw upon your time. If you feel that at any time you would prefer not to answer a question, that is absolutely fine. The project has also been approved by the Nottingham Trent University's Ethics Committee.

**What's in it for you?**

It is hoped that you will find participating in the research an interesting and useful experience. Simply talking to someone about your own experiences of playing MMORPGs can be a useful way of reflecting upon those experiences, and some players might find that this can help them improve their game play.

**Contact details**

Postal address:

Zaheer Hussain
Nottingham Trent University
Burton Street

Nottingham
NG1 4BU

Email: zaheer.hussain@ntu.ac.uk

Telephone: 0115 8485631

## Appendix 5. Interview schedule for the online interview study

This project attempts to examine the impact of MMORPGs on peoples' lives. Please answer the questions below as truthfully as possible. All replies are confidential. Your answers can be as long as you want them to be. Please provide as much descriptive detail as possible. Please type in your reply below each question. By taking part in this study it will be assumed that you are giving consent. However, you have the right to withdraw your consent at any time by e-mailing me at zaheer.hussain@ntu.ac.uk.

**What is the name of the MMORPG(s) that you play?**

**Are you male or female?**

**What is your age?**

**What is the name of your country of residence?**

**What initially got you interested in playing MMORPGs? (EXAMPLE: "I wanted a change", the hype, etc.,)**

**What attracted you and led to your continuation of online video gaming? (EXAMPLE: The Community, PvP, Role-Playing, An Online Relationship)**

**How long have you been playing MMORPGs?**

**How many times per week do you play online? (EXAMPLE: Twice per week)**

**How long does each game playing session last (in minutes)? (EXAMPLE: 1 hour 30 minutes = 90 minutes)**

**How do you integrate MMORPGs into your life (e.g., do you play while at work or do you play with your partner)?**

**Do you think that your MMORPG playing is excessive? If yes, what aspects of MMORPGs do you think may have caused you to play excessively?**

**Do you think your MMORPG playing behaviour is a good thing or a bad thing? And why do you think this?**

**How have MMORPGs had an impact on your life? (EXAMPLE: Have you made new friends? Are you now more proficient at using computers?)**

**In your opinion, what are the positive and negative effects of MMORPGs?**

**Do you think that you differ in your use of MMORPGs compared to someone of the opposite sex? If yes, why?**

**What do you do on a typical day (i.e., do you go to work, come home and log-on straight away)?**

**When you play online do you feel a sense of detachment from your offline tasks or duties (i.e., homework, household tasks)? If yes, why do you feel this way?**

**When you play online do you feel as though time goes by quickly or that you have less time to do other tasks when you finish playing online? If yes, why do you feel this way?**

**Do you or have you ever used MMORPGs to alleviate negative feelings or to bring about positive feelings? What types of feelings were they and how did you do this?**

**Do you play online longer than you intend? If yes, why do you think you do this? (EXAMPLE: Raid times are longer than expected)**

**Have you ever lost track of time when you have played online?**

**Do you think losing track of time when playing MMORPGs is a good experience or a bad experience? (Please provide reasons for your answer)**

**What do you do to prevent time loss when you play online?**

**What types of online games do you think cause time loss? (EXAMPLE: Medieval Fantasy, Sci-Fi, Real-Life MMORPGs)**

**Do you think that MMORPGs provide enough distraction to prevent you from engaging in problem behaviours such as drug-taking or excessive alcohol use?**

**Do you play other types of offline video games, such as games on the PlayStation 3, Nintendo wii, Xbox 360?**

**How do you use these offline games in relation to MMORPGs (i.e., do you play both or one of them more than the other)?**

**Would you be willing to take part in any future research that we carry out?**

**If you have any comments about this project or about MMORPGs in general then please type them in below:**

The aim of this project is to examine the impact of MMORPGs on peoples' lives. Your contribution will help in providing a better understanding of the impact of MMORPGs.

In accordance with ethical regulations, if you wish to withdraw the information you have provided from the study then you may do so by e-mailing me at zaheer.hussain@ntu.ac.uk.

All the information that you have provided will remain confidential (including your email address). If you require any other information please do not hesitate to email me.

Please save and send this document as an attachment to me at zaheer.hussain@ntu.ac.uk. I will then send you a debriefing sheet.

Thank you for participating in the study.

**END**

**Appendix 6. Debriefing sheet for the online interview study**

Thank you for participating in the study. Your contribution will help provide a better understanding of the impact of Massively Multiplayer Online Role-Playing Games (MMORPGs) on peoples' lives.

In accordance with ethical regulations, if you wish to withdraw the information you have provided from the study then you may do so by getting in contact with me. My contact details can be found below. However, all the information that you have provided will remain confidential.

If you have any other queries or concerns then please do feel free to get in contact with me. If you require support or advice in regards to your online game playing then please visit the Samaritans (www.thesamaritans.org), Online Gamers Anonymous (www.olganonboard.org) or the Centre for Internet Addiction Recovery (www.netaddiction.com).

Thank you for participating in the study.

Zaheer Hussain.

**Researcher contact details:**

Zaheer Hussain
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NG1 4BU
Email: zaheer.hussain@ntu.ac.uk
Telephone: 0115 8488870

Supervisor: Professor Mark Griffiths.
Email: mark.griffiths@ntu.ac.uk
Tel. 0115 8485528

**Appendix 7. Online questionnaire used in the pilot online questionnaire study**

**The Psychosocial Effects of Online Gaming**

This study attempts to examine the psychosocial effects of online gaming. Please answer the questions below as truthfully as possible. All replies are confidential. Please tick or add the appropriate answers that apply to you. By filling in this questionnaire you are giving your consent to take part in this study. However you have the right to withdraw your consent at anytime by e-mailing me at zaheer.hussain@ntu.ac.uk.

1. Please enter your country of residence;

2. Are you:
Male
Female
No answer

3. Please enter your age:

4. On average, how many times per week do you play online video games?
(EXAMPLE: Twice per week)

5. On average, how long does each game playing session last (in minutes)?
(EXAMPLE: 1hr 30mins = 90 minutes)

6. During which part of the day do you tend to play online games the most?
Morning
Afternoon
Evenings
Late evening to early morning
Other (e.g. combination of above)

7. Does the time of day during which you play online affect your experience in any way?
Yes
No
No answer
If yes, why?

8. Where do you do most of your online gaming?
At home
At work
Friend's home
Internet café
Wi-fi / On the move
Other place (please state where):

9. Does the location in which you play effect your gaming experience?
Yes
No
No answer
If yes, why?

10. Do you play online video games because you want a challenge?
Yes
No
No answer

11. Do you play online video games because you want some entertainment?
Yes
No
No answer

12. Do you play online video games for stress relief?
Yes
No
No answer

13. Do you play online video games to socialise with other gamers?
Yes
No
No answer

14. Do you play online video games because there's nothing else to do?
Yes
No
No answer

15. Do you play online video games because you want to escape from other things?
Yes
No
No answer

16. Please state any other reason for playing online video games:

17. Would you rather spend time with friends:
Online
Offline
No answer

18. Do you find it easier to converse:

Online
Offline
No answer

19. Do you find the socialising aspect of online virtual worlds more pleasant and satisfying than offline socialisation?
Yes
No
No answer
If yes, why?

20. Do you find online gaming stimulating?
Yes
No
No answer
If yes, why?

21. Does online gaming satisfy your social needs that are not satisfied in the real world?
Yes
No
No answer
If yes, how?

22. Do you feel as though you are absorbed in to a different virtual environment when you play online?
Yes
No
No answer
If yes, why?

Please tick the most appropriate answer that best describes your response to the statements below. The answers are as follows (from left to right):
1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree.

23. I feel anxious when I play online:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

I play online in order to avoid feeling anxious:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

Online gaming is the most important thing in my life:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

Conflicts have arisen between me and my family and/or my partner about the amount of online gaming I do:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

I use online gaming as a way of changing my mood (e.g. to get a buzz, to escape etc):

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

Over time I have increased the amount of online gaming I do in a day:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

If I have to miss an online gaming session I feel moody and irritable:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor | Agree | Strongly agree |

| | | | | |
|---|---|---|---|---|
| | | disagree | | |

If I cut down the amount of online gaming I do, and then start again, I always end up gaming as often as I did before:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

I play online longer than I intend:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

24. How would you describe your social class?
    - Upper class
    - Middle class
    - Working class
    - Other

25. What is the highest educational qualification that you hold?
    - Doctorate (e.g. PhD)
    - Masters (e.g. MSc, MBA, MPhil)
    - Bachelors Degree (e.g. BSc, BA)
    - A-levels/GNVQ/NVQ
    - GCSE's/O-levels
    - Other

26. What would you say is the main attraction of playing online?
    - Being able to develop your own character
    - Being able to communicate with other gamers
    - Being able to join guilds or clans
    - The excitement of playing online
    - Being in another world
    - Being able to escape or lose track of time
    - Other (please state):

27. What is your favourite type/genre of online video game?
    - Action/Adventure
    - Sci-fi
    - Shooters

Puzzlers
Fantasy role-playing games
Fighting/beat ‘em ups
Other (please state):

28. What is the name of the online game you play the most? (EXAMPLE: 'Eve', 'Unreal')

29. Does playing online provide a different type of game stimulation compared to other gaming formats?
Yes
No
No answer
If yes, why?

30. When playing online, what is the gender of your main character?
Male
Female
Other
If other, please state how you would describe the gender of your main character:

31. Have you ever played online with a character that was of the opposite gender to yourself?
Yes
No
No answer
If yes, why?

32. If you have any comments about this study or about online video games in general then please type them in below:

33. Please type in your email address below. This is to prevent any duplicate responses:

34. Would you be willing to take part in any future research that we carry out?
Yes
No
No answer

**End of study briefing**

The aim of this study is to examine the psychosocial effects of online gaming. Your contribution will help in providing a better understanding of the psychosocial factors in online gaming. In accordance with ethical regulations, if you wish to withdraw the information you have provided from this study, then you may do so by emailing me at zaheer.hussain@ntu.ac.uk

All answers given on this form will remain confidential (including your email address). If you require any other information please do not hesitate to email me. Thank you for participating in the study.

Zaheer Hussain, a postgraduate student at the Nottingham Trent University.

**Submit:**

**Appendix 8. Online recruitment post for the MMORPG online questionnaire study**

Subject: MMORPG Project: Gamers Wanted

Hello,

Firstly I've been browsing through the forum and didn't see anything wrong with posting this, if there is then remove it moderators!

I'm currently gathering data for my thesis. I'm using an online questionnaire to explore MMORPGs. If anyone has any free time could you please fill it in? It's confidential and it's exploring the psychosocial effects of online game playing.

I want as many participants as possible. So your participation would be greatly appreciated.

The link below provides you with more details about my project;

http://ess.ntu.ac.uk/surveys/zhussain.htm

Here is the link to the questionnaire;

http://www.surveymonkey.com/s.aspx?sm=yfZy7a7cTXqznydfN9iqmQ_3d_3d

Sorry for the shameless plug,

Thank you for your time.

See ya

## Appendix 9. Participant information sheet for the MMORPG online questionnaire study

Thank you for the interest you have shown in taking part in this research project. Before you agree to participate, I would like you to read through the following information which will help to explain the project in more detail and what I'd like your input to be. If you have any questions about the project, or the nature of your participation which are not answered here, please do feel free to get in touch (contact details can be found at the end of this document).

### Aims of the project

The broad aim of the project is to examine how Massively Multiplayer Online Role-Playing Games (MMORPGs) impact (psychologically and socially) on peoples' lives, by exploring attitudes and views towards online gaming, uncovering the motivating factors, and highlighting any differences between different groups of people. The main focus is on the different types of MMORPGs that are now available, because I think that different MMORPGs can produce different experiences for the gamers who play them. The project also aims to examine what makes new and developing forms of MMORPGs potentially addictive and can these MMORPGs lead to excessive online video gaming and addiction. By understanding these experiences, it is hoped that I will be able to show that MMORPGs can provide a unique experience for those who play these types of video games. These findings may help the gaming industry in terms of future developments in video game technology.

### The researcher

My name is Zaheer Hussain and I am a student at the Nottingham Trent University in England. I have an interest in psychology, video games and new technology. A combination of all of these interests led to the conception of this research project.

### Funding for the project

The Nottingham Trent University is the funding body for this research. However, the research project is an independent piece of work conducted by the researcher.

### Your contribution

I would like you to complete an online questionnaire, which will take 10-to-15 minutes to complete. The questionnaire asks questions about the reasons you play online, where you play and do you think that MMORPGs can facilitate problems such as excessive play. I would like to keep a record of your responses to these questions so that I have a precise record of what you have said.

**Storage and use of the data**

Once your questionnaire has been recorded, it will be transferred on to my PC as a digital recording/data file. Quantitative data will be transported and analysed in a quantitative analysis package. I will keep the recordings until the end of the project, after which they will be destroyed. It is intended that the research be published in one or more academic journals.

**Anonymity and confidentiality**

I will use a number of measures to ensure your data is kept confidential, and that you remain anonymous. Any files (digital audio and textual) which contain data will be kept securely on a password protected PC and backup storage device in a password protected folder.

Your name will be removed from any data that is included in the results and will not be linked to your name, or initials. In addition, anything you mention in your questionnaire that could be used to identify you will not be used.

**Your rights**

There is absolutely no expectation that you *must* take part in this research project. Participation is entirely voluntary, and should you wish to withdraw at any time, you may do so and any data recorded up to that point will be destroyed.

**Are there any disadvantages to me taking part?**

You will need to give up approximately 15 minutes of your time, but it is hoped that you find the questionnaire interesting and useful enough to outweigh this draw upon your time. If you feel that at any time you would prefer not to answer a question, that is absolutely fine. The project has also been approved by the Nottingham Trent University's Ethics Committee.

**What's in it for you?**

It is hoped that you will find participating in the research an interesting and useful experience. Simply talking to someone about your own experiences of playing MMORPGs can be a useful way of reflecting upon those experiences, and some players might find that this can help them improve their game play.

**Contact details**

Postal address:

Zaheer Hussain
Nottingham Trent University
Burton Street

Nottingham
NG1 4BU

Email: zaheer.hussain@ntu.ac.uk

Telephone: 0115 8488870

**Appendix 10. Online questionnaire used in the MMORPG online questionnaire study**

This study attempts to examine the impact of Massively Multiplayer Online Role-Playing Games (MMORPGs) on peoples' lives. Gamers who are over 18 years of age and are currently playing a MMORPG need only complete the questionnaire.

The questionnaire consists of 2 parts, please complete all parts of the questionnaire. It should take approximately 20 minutes to complete. Please answer the questions as truthfully as possible. All replies are confidential. Please tick or add the appropriate answer(s) that apply to you. By filling in this questionnaire you are providing consent to take part in this study. However you have the right to withdraw your consent at anytime by closing the web browser or by e-mailing me at: zaheer.hussain@ntu.ac.uk.

**Part 1**

**1.** **I**

**n which country do you live?**

**2. Are you:**

**Male**
**Female**

**3. What is your Age?**

**4. On average, how many times per week do you play MMORPGs?**

**5. On average, how long does each game playing session last (in minutes)?**
(EXAMPLE: 1hr 30mins = 90 minutes)

**6. How many MMORPGs are you currently subscribed to?**

**7. What is the name of the MMORPG you are currently playing the most?**

**8. What is your current social status:**

**Student**
**Employed**
**Self-employed**
**Un-employed**
**Retired**

**9. What is your highest attained level of education:**

**Primary/Kindergarten education or lower**
**Secondary/College education**
**University education of any level**
**Other**

**10. What is your marital status?**
**Single**
**Married,**
**In an intimate relationship?**

**11. How long have you been playing MMORPGs?**

**Year(s)** **month(s)**

**12. What class do you play as your main character/avatar (e.g., warrior, rogue, priest, mage)?**

**13. What race do you play as your main character/avatar (e.g., Dwarf, Human, Night elf, Undead)?**

**14. What level is your main character?**

**15. How many characters/avatars do you have on your main MMORPG account?**

**16. I would like to be like my online character in real-life**
1.Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree

**17. Which type of realm/server do you play on:**
PVE
PVP
RP
RP-PVP

**18. When playing a MMORPG I like to play solo**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

**19. When playing a MMORPG I like to play with my guild members**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

**20. When playing a MMORPG I like to play with a Pick-up Group (PuG)**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |

**Part 2**

**The following questions attempt to discover the effects of MMORPGs. Please answer the questions as honestly as possible.**

**How often during the last six months…**

**1. Did you think about playing a MMORPG all day long?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**2. Did you spend a large amount of free time on MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**3. Have you felt addicted to a MMORPG?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**4. Did you play longer than intended?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**5. Did you spend increasing amounts of time on MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**6. Were you unable to stop once you started playing a MMORPG?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**7. Did you play MMORPGs to forget about real life?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**8. Have you played MMORPGs to release stress?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**9. Have you played MMORPGs to feel better?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**10. Were you unable to reduce your game time?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**11. Have others unsuccessfully tried to reduce your MMORPG use?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**12. Have you failed when trying to reduce game time?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**How often during the last six months…**

**13. Have you felt bad when you were unable to play?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**14. Have you become angry when unable to play?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**15. Have you become stressed when unable to play?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**16. Did you have fights with others (e.g., family, friends) over your time spent on MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**17. Have you neglected others (e.g., family, friends) because you were playing MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**18. Have you lied about time spent on MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**19. Has your time on MMORPGs caused sleep deprivation?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**20. Have you neglected other important activities (e.g., school, work, sports) to play MMORPGs?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**21. Did you feel bad after playing for a long time?**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | Very often |

**If you have any comments about this study or about MMORPGs in general then please type them in below:**

| |
|---|
| |

**End of study briefing**

The aim of this study is to examine the impact of MMORPGs on peoples' lives. Your contribution will help in providing a better understanding of the psychosocial factors in online gaming. In accordance with ethical regulations, if you wish to withdraw the information you have provided from this study, then you may do so by emailing me at zaheer.hussain@ntu.ac.uk.

If you have any other queries or concerns then please do feel free to get in contact with me. If you require support or advice in regards to your online game playing then please visit the Samaritans (www.thesamaritans.org), Online Gamers Anonymous (www.olganonboard.org) or the Centre for Internet Addiction Recovery (www.netaddiction.com). If you require any other information please do not hesitate to email me. Thank you for participating in the study.

Zaheer Hussain

**Researcher contact details:**

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Tel. 0115 8485528

**Appendix 11. Complete list of websites and forums posted on during the MMORPG online questionnaire study**

Allakhazam.com
MMORPG.com
Onlinegamersanonymous.com
Womengamers.com
gaygamer.net
WoWvault.ign.com
WarhammerVault.com
FFXI Vault.com
COH/V Vault.com
AgeofConanVault.com
AsheronscallVault.com
DAOCVault.com
LotRoVault.com
gamers.experimentations.org
wow-europe.com
Gaymer.org
Corpnews.com
Ou.stratics.com
GuildWars Guru
GorgeousGamer .com
Spong .com
MMOsite.com
GamerDNA.com
GamespotUK.com
Onrpg.com
GamingVerdictForum .com
TenTonHammer.com
7MMO .COM
Jref .com/ Japan Forum
PS3Trophies .org
Xbox360forum .com
Eqinterface forum .com
ForumPlanet.com / Sims forum
ForumPlanet.com / Planet Vampire forum
DAOC warcry .com
Warhammered .com
Only-War .com
Bigredkitty .com
ElitestJerks .com
WiiTalk .co.uk /forum
GamesForum .com
CoHGuru.com
DarkFallonline.com
freetoplay .org / forums
secondskinfilm.Com / fourm

eq2 guru .com
WoW guru .com
L2 guru .com
EGN.COM.AU
jolt.co.uk
Gaiaonline .com
RottenTomatoes.com
ForumPlanet.com / Planet Halo forum
ToonTown Stratics.com
BlizzPlanet.com
Neoseeker.com
Genmay.com
GamePlanet.com - gpforums.co.nz
nwnbioware.com/forums
d2jsp.org / diablo forum
TribalWar.com/forum
forum.civfanatics .com
codemasters.com /forums
bbs.co.91.com ConquerRPG forum
forums eyesonff com
electronicart.co.uk
shoryuken.com
dndonlinegames.com
tip.it /runescape.com
ForumPlanet.com / GameSpy forum
ForumPlanet.com / GameSpy PC forum
ForumPlanet.com / Battlefield 2
Forum Planet.com / Call of Duty4
off-topic .com
Game Pro.com
FiresOfHeavenGuildmessageBoard.com
runescape.com
GameFAQS.com

**Appendix 12: Between, Within and Total Imputation Variance for Variables Predicting MMORPG Addiction using the 7-item MMORPG addiction scale (n=1,420)**

| *Intercept* | $\hat{\sigma}^2_{within}$ | $\hat{\sigma}^2_{between}$ | $\hat{\sigma}^2_{total}$ |
|---|---|---|---|
| *Addicted versus not-addicted* | *.029* | *.093* | *.114* |
| *Monothetic versus not monothetic* | *.021* | *.129* | *.142* |
| *Parameters* | $\hat{\sigma}^2_{within}$ | $\hat{\sigma}^2_{between}$ | $\hat{\sigma}^2_{total}$ |
| *Age* | *<.001* | *7.44* | *<.001* |
| *No. of years gaming* | *.002* | *.009* | *.011* |
| *Total time (logarithm)* | *<.001* | *.001* | *.001* |
| *Employed* | *.003* | *.021* | *.024* |
| *Self-employed* | *.026* | *.113* | *.130* |
| *Un-employed* | *.009* | *.031* | *.051* |
| *Retired* | *.008* | *.039* | *.41* |
| *PVP* | *<.001* | *.015* | *.025* |
| *RP* | *<.001* | *.044* | *.055* |
| *RP-PVP* | *<.001* | *.065* | *.062* |