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# Handbook of Research on Effective Electronic Gaming in Education

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# Chapter III

## Massively Multiplayer Online Role–Play Games for Learning

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### **ABSTRACT**

*This chapter explores whether massively multiplayer online role-play games (MMORPGs) can be used effectively to support learning and training communities. The chapter aims to propose that cross-disciplinary approaches to the study of game-based learning are needed to support better synthesis of our current understanding of the effectiveness of learning with games. The chapter therefore includes a brief literature review of online gaming research to date, taken from psychological and educational research perspectives. The chapter explores the main types of online games and highlights the main themes of research undertaken through a consideration of the use of online gaming in current learning and training contexts where online gaming is being used to support experiential and discovery learning approaches. This chapter indicates future directions for cross-disciplinary research approaches in this field and considers how collaborative learning could best be supported through this approach.*

### **INTRODUCTION**

By way of an introduction to the subject of online gaming, the chapter will explore the main types of online games and highlight the main themes of research undertaken through a consideration of the use of online gaming in current learning and training contexts where online gaming is being used to support experiential and discovery

learning approaches. This chapter will indicate future directions for cross-disciplinary research approaches in this field and consider how collaborative learning could best be supported through this approach.

The use of MMORPGs in educational contexts is a relatively new research area; indeed the first online games have only become established in the last five to ten years, and for these reasons there are specific problems in terms of data collection and

validation (Wood, Griffiths, & Eatough, 2004). In addition, it has been noted that the field requires analytical techniques and frameworks for evaluation, some of which are being developed (de Freitas & Oliver, 2005, 2006). However, it is envisaged that this field of inquiry is set to expand, and as such, applications of multiplayer online gaming may become more numerous over the next five years, producing a wider evidence-base of research and allowing for more effective evaluation and validation (Pelletier & Oliver, 2006).

While the numbers of online games used for training and education purposes are limited at present, many of those that are available tend to center on military contexts and requirements, due to the large associated development costs. However, beyond the growing number of military applications of online gaming for training, there are an increasing number of small-scale research-based experimental projects that also fall into this area of study (Lee, Eustace, Fellows, Bytheway, & Irving, 2005; McLaughlin, Kirkpatrick, Hirsch, & Maier, 2001; Jones et al., 2004). Although online gaming is a relatively new area of activity, its success at engaging large groups of remotely located users has meant that early research projects and military training organizations have already begun to use multiplayer online role-play gaming approaches as a means for engaging and retaining large remotely located learner groups, and for supporting collaborative learning objectives and 'communities of practice' (Wenger, 1998).

While there are clearly central issues emerging in the review of existing literature, particular challenges lie in the fact that single disciplinary perspectives have often precluded more interdisciplinary, cross-thematic approaches that lend better to opportunities for synthesis. This chapter brings together a review that combines literature from psychology and educational theory, and practice disciplinary perspectives in an attempt to problematize key issues emerging with respect to using online gaming in educational contexts. The second section of the chapter therefore provides

a general review of what online gaming is, the third section provides a review of psychological perspectives on the literature of online gaming, and the fourth section introduces examples where online gaming is currently being used in educational and training contexts. The conclusions bring together the main themes and problems raised in the chapter.

The chapter aims to propose that cross-disciplinary approaches to the study of a game-based learning approach are needed to support better synthesis of our current understanding of the effectiveness of learning with games. The chapter will include a brief literature review of online gaming research taken from psychological and educational research perspectives. The chapter will explore a range of terms including the following: online gaming, standalone games, local and wide area games, massively multiplayer online role-playing games (MMORPG), and flow.

## **WHAT IS ONLINE GAMING?**

Due to the rise of computer games as a leisure phenomenon, there has been increasing research into this area over the last few years (e.g., Bonk & Dennen, 2005; de Freitas, 2005; Dickey, 2003; Sandford, Ulicsak, Facer, & Rudd, 2005). Prior to 2003, a majority of the research had concentrated on adolescent players, and on the more negative aspects such as excessive play and addiction, the effects of playing aggressive games, and the medical and psychosocial consequences (Griffiths, 2005). However, there have been a few psychologically based studies on personality and computer game-play (e.g., Douse & McManus, 1993).

As the 1990s came to a close, a new generation of machines with increasingly sophisticated processing power began to replace the early 1990s' consoles. However, an even more revolutionary development was also occurring involving the Internet as a gaming forum. New games emerged that enabled people to link up online to game

together, allowing greater potential for collaborative learning and working. The games varied in their mode of operation. Griffiths, Davies, and Chappell (2003) outlined the three main types of social virtual gaming over the Internet: standalone games, local and wide network (LAWN) games, and massively multiplayer online role-playing games (MMORPGs).

### Standalone Games

Standalone games are single-player-orientated games for the PC with the option to go online to seek a human opponent. Until recently, the main use of standalone games was to pitch player vs. computer (e.g., *Black & White*, *Dungeon Keeper II*, and *Diablo II*). If played online, these games (by definition) do not immerse a player into a virtual, narrative-enriched world. Where players choose to represent themselves as a single character, they are usually fixed in the view offered (e.g., over the shoulder), and rarely do players engage in grouping behavior. Player communication is possible, but the depth of the social immersion in the game is restrained by the lack of a clear game narrative.

### Local and Wide Network (LAWN) Games

LAWN games arose from the desire to link players together in support of tournaments (e.g., *Quake III* and *Counterstrike*). The main style of play involved in these games is tactical combat. These games have a limited game narrative and character development, with an emphasis on tactical play. This style of gaming has given rise to grouping in 'clans'. For example, in *Counterstrike* their identity is akin to an army's special operation forces or terrorist group. The clans then meet in cyberspace to compete in deadly combat. The aim of these clans is to kill or destroy opponents. The kill is usually denoted by the term 'frag' and the view is first person. The clans may also have a

real existence (i.e., people living together in the real world) or may be a virtual grouping. This form of gaming has grown in popularity to such an extent that 'LAN parties' are now regularly held where hundreds to thousands of individuals meet and link up transported PCs to compete over a weekend. A further development has been professional games' tournaments and the emergence of professional gamers.

### Massively Multiplayer Online Role-Playing Games (MMORPG)

MMORPGs are the latest Internet-only gaming experience. These are typically represented by large, sophisticated, detailed, and evolving worlds based in different narrative environments. Examples of such games are *Everquest* (heroic fantasy), *Anarchy Online* (futurist science fiction), and *Motor City Online* (classic car racing). In these games the non-player characters (NPCs) are designed with advanced AI that offers a rich and unpredictable milieu 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. This game form is a fully developed multiplayer universe with an advanced and detailed world (both visual and auditory). Popular MMORPGs include games such as *Everquest* and *World of Warcraft*.

Although computer gaming is becoming an integral part of mainstream cultural pastimes, very little is known about the psychology of the more recent phenomenon of online gaming. There is very little data even on the basics. For example, the relationship between personality and amount of time spent gaming (or the type of gaming pursued) has received little attention. What data there is suggests that gaming in general, particularly online fantasy gaming, is associated with introversion and lower empathic concern (Douse & McManus, 1993). There has been very little research into these online gaming communities,

although a number of disciplines are beginning to generate research from different perspectives including the psychological, the sociological, and the economic.

## **ONLINE GAMING: A BRIEF OVERVIEW**

Bartle (1996) studied multi-user virtual environments (MUDs) and classified players into four different subgroups (i.e., achievers, explorers, killers, and socializers), formulated from the inter-relationship of two dimensions of playing style: action vs. interaction and world-oriented vs. player-oriented. He concluded that each of these four subgroups views the playing of MUDs differently. More specifically, MUDs were games (like chess, tennis, etc.) to achievers, pastimes (like reading, gardening, etc.) to explorers, sports (like hunting, shooting, fishing, etc.) to killers, and entertainment (like television, going to nightclubs, etc.) to socializers.

Using Bartle's (1996) classification of MUD players, Andreasen (2003) surveyed players from all major online gaming communities. Among the 4,380 *Everquest* players polled (3,672 males, 618 females), 34% were explorers, 25% were achievers, 23% were socializers, and 15% were killers. As reported, over a third of all *Everquest* players (34%) were explorers in the game. One of the main criticisms is that a player has to do all of these actions (exploring, killing, socializing, etc.) if they want to advance in the game. In a number of unpublished studies on his Web site, Yee (2003) has collected demographic data about *Everquest* players (with sample sizes ranging from 1,240 to 2,470). The main findings he reported were that 84-88% of players are male, the average age of players is 25.6 years old, 30% of players are students and 36% work in the IT business, players spend an average of 22.4 hours playing the game a week, and 25% play the game with their partner.

In an attempt to establish some benchmark data, Griffiths et al. (2003) collated data from two online gaming fan sites for *Everquest* players—*Everlore* ([www.everlore.com](http://www.everlore.com)) and *Allakhazam* ([everquest.allakhazam.com](http://everquest.allakhazam.com)). Each of these sites conducts a regular poll where one question is asked. Griffiths et al. (2003) examined every poll question on both fan sites from their inception (in 1999) up until June 2002. 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 the 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 master's 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. Each individual question from the poll sites had a different sample. Therefore, in a follow-up study, Griffiths et al. (2004) collected some primary data and compared it to the secondary data collected in the previous study (see Table 1).

Using an online questionnaire survey, they examined basic demographic factors (i.e., gender, age, marital status, nationality, education level, occupation, etc.) of online computer game players who played the most popular online game *Everquest*. The survey also examined playing frequency (i.e., amount of time spent playing the game a week), playing history (i.e., how long they had been playing the game), who they played the game with, whether they had ever gender swapped

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*Table 1. Comparison of online gamers between primary (Griffiths et al., 2004) and secondary (Griffiths et al., 2003) data*

	<b>Griffiths et al. (2003)</b>		<b>Griffiths et al. (2004)</b>	
Variable studied				
<b>Game played</b>	Everquest		Everquest	
<b>Year data collected</b>	1999-2002		2002	
<b>Sample sizes</b>	range: 2,536-15,788		540	
<b>Gender</b>	Male	(85%)	Male	(81%)
	Female	(15%)	Female	(19%)
<b>Age</b>	Less than 13 years	(1%)	12 to 17 years	(8%)
	10 to 30 years	(71%)	18 to 30 years	(59%)
	31 to 40 years	(20%)	31 to 40 years	(22%)
	Over 40 years	(8%)	Over 40 years	(11%)
<b>Nationality</b>	North America	(81%)	North America	(76.7%)
	United Kingdom	(4%)	United Kingdom	(12%)
	Germany	(2%)	Germany	(1.7%)
	Sweden	(2%)	Sweden	(1.3%)
	France	(2%)	France	(0.7%)
	Australia	(2%)	Australia	(2.2%)
	All other countries	(7%)	All other countries	(5.4%)
<b>Education level</b>	Primary	(17%)	Primary	(13.9%)
	Secondary	(14%)	Secondary	(19.8%)
	Further	(23%)	Further	(23.5%)
	Higher	(33%)	Higher	(29.3%)
	Postgraduate	(11%)	Postgraduate	(12.8%)
	Other	(2%)	Other	(0.7%)
<b>Play frequency (hours per week)</b>	Up to 9 hours	(8%)	Up to 10 hrs	(16%)
	10 to 20 hours	(25%)	11 to 20 hours	(36%)
	21 to 30 hours	(25%)	21 to 30 hours	(24%)
	31 to 40 hours	(18%)	31 to 40 hours	(14%)
	41 to 50 hours	(9%)	41 to 50 hours	(5%)
	Over 50 hours	(15%)	Over 50 hours	(5%)

*continued on following page*

Table 1. continued

<b>Gender swapping*</b>	Yes	(15.5%)	Yes	(60%)
	No	(84.4%)	No	(40%)
	(main character)		(any character)	
<b>Favorite aspects of play</b>				
	Social contact/grouping	(23%)	Social contact/grouping	(35%)
	Solo play	(26%)	Solo play	(6.5%)
	Guild membership	(10%)	Guild membership	(10%)
	Role-playing	(5%)	Role-playing	(5%)
	Player vs. player	(2%)	Player vs. player	(3%)
	Combat/killing	(2%)	Combat/killing	(5.5%)
	Other aspects	(32%)	Other aspects	(35%)
<b>Least favorite aspects of play**</b>				
	Slow advance for casual players	(14%)	Slow advance for casual players	(13%)
	Difficult to play solo	(11%)	Difficult to play solo	(4%)
	Death penalty	(13%)	Death penalty	(6%)
	Too much camping	(11%)	Too much camping	(15%)
	Helping inexperienced	(4%)	Helping inexperienced	(2%)
	Other aspects	(47%)	Other aspects	(60%)

\* These questions were not the same. One asked whether the player had ever swapped the gender of their main character. The other asked if they had ever swapped gender at all

\*\* The two studies used different 'forced choice' boxes, therefore many of the answers were different.

their game character), the favorite and least favorite aspects of playing the game, and what they sacrifice (if anything) to play the game. 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 appears 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 (see Table 1).

*Everquest*, *Asheron's Call*, and *Ultima Online* are just a few of the MMORPGs that are available.

However, with more sophisticated and advanced technology, and with increased Internet speeds, MMORPGs are certain to become a very popular gaming format. There is clearly much research needed in this area of the gaming world, as there is little research even on the most basic aspects of online gaming. There has also been some other psychological research examining other psychological characteristics of online gamers who play MUDs (multi-user dungeons, or multi-user dimensions), particularly in the area of 'flow' experiences. This research is based on the work of Csikszentmihalyi (2000), who describes these experiences as "flowing from one moment to the next, in which he is in control of his actions, and in which there is little distinction between self and

environment, between stimulus and responses, between past, present, and future” (p. 34). Csikszentmihalyi (2000) has argued that flow may accompany almost every type of human behavior. The major characteristics of flow are:

- Temporary loss of self-consciousness and a sense of time;
- High concentration on the task and a high level of control over it;
- Objectives become clear and distinct, and actions merge awareness;
- Experience brings full satisfaction and seems worth doing for its own sake (i.e., intrinsic motivation); and
- Immediate feedback.

What is especially important is that the flow rests upon the matching between the available skills and the task challenges. Research by McKenna and Lee (2005) showed that MUDding fits the flow model and that the social interaction while playing MUDs is inseparable from the flow experience. Subsequent empirical research has also shown that online gamers undergo flow experiences, and that these experiences are critical in forming long-term attachments to some games (Choi & Kim, 2004).

Research by Voiskounsky, Mitina, and Avelisova (2005) examined ‘flow’ experiences in Russian gamers (n = 347) who play MUDs. Using a specially designed online questionnaire, they reported that online gaming environments help facilitate ‘flow’ experiences. Their research also showed that there were three-dimensional subsets to flow while MUDding. There was a universal subset (dimensions describing flow experience irrespective of any particular type of activity), a gaming subset (describing flow experienced while playing computer/video/online games), and a MUDs-related subset of dimensions specifying flow experienced while MUDding.

This overview of recent research implies that the use of MMORPGs may support collaborative

learning approaches effectively by supporting ‘flow’ between separate learning experiences; this could both support new opportunities for developing learning content and create opportunities for group work (Inal & Cagiltay, 2007). The following section reviews some examples of how MMORPGs are currently being used in experiential practice in order to explore what the potential for learning with these collaborative games might be in learning and training contexts.

### **EXAMPLES OF HOW MMORPGS ARE CURRENTLY BEING USED TO SUPPORT LEARNING AND TRAINING**

The following section will explore some examples of these early applications and pilots in training and learning contexts. MMORPGs are currently being used in training and learning contexts often to support collaborative experience-based and exploratory learning approaches (Kolb, 1984), and to support learning through real-time experiences.

#### **Multiplayer Online Games for School Education**

While the use of ‘off-line’ games (including standalone and single-player over local and wide area networks) in school contexts is growing in popularity with tutors and learners (de Freitas, 2004; de Freitas & Levene, 2004; Kirriemuir & McFarlane, 2004), development of the use of MMORPGs to support learning for school children is clearly in its earliest stages. Snyder (2007) has used *Second Life* to help teach mathematics and science concepts. In *Second Life* (or any other metaverse), the real advantage is using the platform to do innovative things that could not otherwise be done in a classroom that reach into the pupil’s imaginations. This could include such

examples as shrinking down and walking through the human body, becoming another gender or race, or manipulating financial markets and observing the outcome.

One research project undertaken by a Research Team at Charles Sturt University in Australia involving a pilot study (called *Rochester Castle*) at Swan View Senior High School in Perth, Western Australia, demonstrates potential for supporting collaborative learning processes, such as those associated with problem- and experience-based learning (Lee et al., 2005).

The Rochester Castle project is original not only because it uses a MMORPG to support learning in a school, but also in that the learners designed and developed the game themselves (Lee et al., 2005). The teachers and research team initially created the virtual environment for Society and Environment students to explore the history of Rochester Castle (1087-1100AD) in England in a more interactive way. The role-play online game was based upon a Multi-User Domain Object-Orientated (MOO) and was used to support English and History students. The learners designed and developed the game based upon a scenario presented by their teacher.

The researchers conducted an interim analysis of online gamer behavior and found that 53 student online gamers were using *Rochester Castle* for a total of 223 student hours, which averaged 5.2 hours per student. Interestingly, the average time spent by teachers supporting the game was nine hours (about typical teacher preparation time). The project was successful in engaging the school children in a more interactive approach to learning, which also supported collaborative and team-building skills—skills that could then be applied to real life. Students using the MMORPG found that they had gained new skills in learning collaboratively online, while teachers found that they had developed new ICT skills and enhanced teaching practices (Lee et al., 2005). The MMORPG piloted here indicates important implications for producing collaborative learning

content through content authoring interactive environments that gaming offers teachers and learners. The project also indicates the potential of gaming for supporting collaborative learning approaches that support ‘flow’ between learning groups and throughout the learning experience, helping to engage learner cohorts but also contributing to skills development.

### **Online Multiplayer Role-Play Games for Post-16 Learning**

Although the potential for MMORPGs to be used in higher education is clearly significant, it is notable that there were few examples of this approach found in the literature searches carried out for this chapter. While simulations have been taken up fairly widely in higher education, particularly in business education and medical training, the use of games has remained largely limited to smaller flash-based games—or for self-directed learning rather than for supporting specifically collaborative learning (Mitchell & Savill-Smith, 2004).

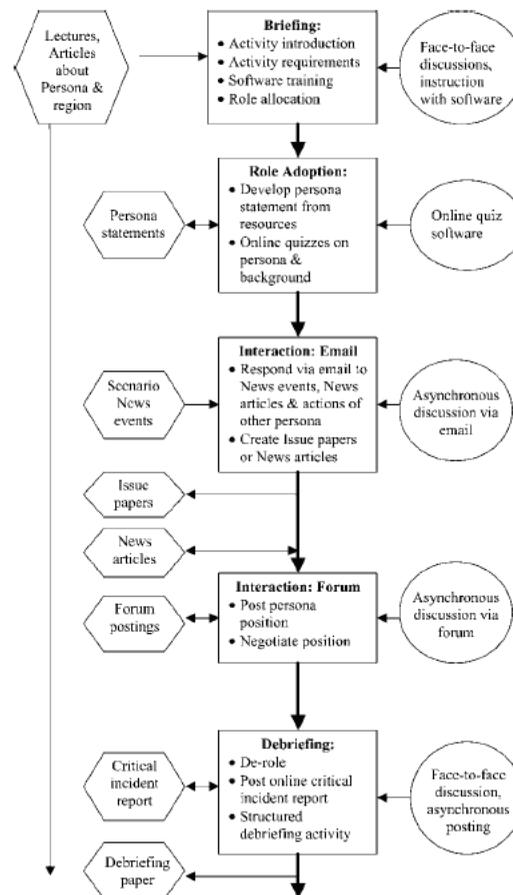
The greater use of simulations over games, particularly in learning contexts, has led to simulations becoming an accepted aspect of the teaching toolkits, particularly for simulating real-life experiences in low-cost, low-impact training situations. The wider use of games—and games engines for authoring immersive and interactive three-dimensional environments—has led to the development of serious gaming (or edugaming) promoting the sensible use of games, often for engaging learners and keeping motivation levels high. However, there has been a perceived convergence between games and simulations, or ‘gamesims’, that combines elements of both forms together, for example, the scenario-based role-play of simulations with the rule-based elements of gaming, ideally providing the intrinsic motivation of gaming with the proven instructional outcomes of well-designed simulations (de Freitas, 2004; de Freitas & Levene, 2004).

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This convergence may be due to the overlap of functionality as perceived by educationalists. However, it may also be attributable to the fact that simulations provide a tried-and-tested pedagogic method, while games in education have yet to be fully embedded and tested in empirical studies (Egenfeldt-Nielsen. 2005). For these reasons, as well as the significant cost associated with games development, the instances of online gaming for learning in post-16 contexts, apart from those associated with military training, have tended to center upon simulation-based rather than games-based approaches. The following example of this trend (*Mekong e-Sim*) highlights this more simulation-based approach.

Described as a ‘role-play simulation’, *Mekong e-Sim* (electronic simulation) was developed to support the learning requirements of geography and engineering undergraduate university students. The role-play is set in the Mekong area of South East Asia and involves “decision-making and conflict resolution regarding natural resource development” (McLaughlin et al., 2001; Kirkpatrick, McLaughlin, Maier, & Hirsch, 2002). Interestingly, the game was developed as a tool to aid students from different disciplines, including geography, technological engineering, and environmental engineering, to work collaboratively to learn about environmental decision making. Based upon earlier work (McLaughlin & Kirkpatrick,

Figure 1. Learning design of *Mekong Sim* (McLaughlin & Kirkpatrick, 2004)



2001), *Mekong e-Sim* attempted to integrate shared online role-play with established teaching practices, using collaborative approaches to teaching. As the authors themselves noted:

*We wanted to develop a learning activity in which students would work collaboratively to develop mastery of fundamental discipline-based knowledge while developing transferable skills such as negotiation, decision-making and an understanding of the range of perspectives that could be taken with regard to complex situations.* (McLaughlin & Kirkpatrick, 2004, p. 479)

*Mekong e-Sim* was designed to bring together students from different disciplines to allow them to understand the different perspectives involved in engineering, and to help them understand the complex relationships involved in real-life engineering situations, using collaborative strategies to ensure that learners would work effectively together (e.g., Johnson & Johnson, 1996; Goodsell, Mather, & Tinto, 1992). The simulation accounted for 35% to 50% of the total course marks.

The design of the simulation role-play “was guided by principles of collaborative peer learning and experiential learning” (McLaughlin & Kirkpatrick, 2004, p. 480). Like simulations, *Mekong e-Sim* relied on debriefing to provide an opportunity for critical reflection. Five key stages of the simulation include: briefing, role adoption, e-mail interaction, forum interaction, and debriefing (see Table 1). The simulation used a blended learning model, bringing together face-to-face sessions (for briefing and debriefing) with online sessions.

Students appreciated the approach: 91% agreed that the simulation developed an awareness of multiple dimensions to natural resource decision making, four-fifths of the students said it benefited their team-building skills (80%), and more than two-thirds (71%) of the students said it supported their electronic communication skills. The simulation was also found to improve their learning

about the discipline and about the complexities of environmental decision making (McLaughlin & Kirkpatrick, 2004).

### **MMORPGs for Military Training**

Multiplayer online role-play games are currently being used to support military training in a number of areas. Online games such as *America's Army*, *Full Spectrum Command*, and *StrikeCOM* provide a powerful model for how online collaborative communities can be supported through specially designed task-related activities (Kyda, 2005; Swartout & Van Lent, 2003; Twitchell, Wiers, Adkins, Burgoon, & Nunamaker, 2005). These online games are examined in more detail in the following sections.

*StrikeCOM* is a multiplayer online strategy game developed by the Center for the Management of Information (CMI) at the University of Arizona as a research tool ((Twitchell et al., 2005). The game was designed to research and teach group interactions, dynamics, and processes. The game was developed in order to investigate deception detection within large groups of people (Biros et al., 2005), by examining group performance and perceptions of deception in face-to-face communications and real-time text chat (Biros et al., 2005). The two forms of communication are manipulated to make participants more suspicious of one another, according to scenarios taken from practice and developed through *StrikeCOM*.

*StrikeCOM* imitates military-based Command, Control, Communication, Intelligence, Surveillance, and Reconnaissance (C3ISR) scenarios and information gathering in collaborative activities. For example, the system has been used by the U.S. Department of Defense for teaching Network Centric Warfare to Battle Commanders. In addition, the tool has been used to research leadership and deception in collaborative group decision making. Not only is the game designed to examine the development of shared awareness and communication in distributed groups (Twitchell

et al., 2005), the system also allows trainees to develop more critical stances and to become more reflective about deceptive strategies that might be used against them in real-life situations.

However, although *StrikeCOM* has been used with business and military students, the game lacks the immersive 3D quality that most learners who are familiar with leisure gaming expect, and is based more upon scenario-based approaches to learning than engaging with truly interactive and immersive experiences, as have been developed more recently.

*Full Spectrum Command* is an online game, which in common with *America's Army* (reviewed elsewhere—see de Freitas, Savill-Smith, & Attewell, 2006) is a more immersive style of MMORPG. The University of Southern California's Institute of Creative Technologies and Quicksilver Software developed *Full Spectrum Command* as an educational tool for the U.S. Army (Swartout & Van Lent, 2003). Drawing upon the real-time strategy game genre, *Full Spectrum Command* aims to teach cognitive skills, such as leadership and decision-making skills to infantry company commanders. As with *America's Army* and other real-time strategy games, the format centers upon training in the form of a series of missions, each of which have a designated training objective. In common with training simulations, these missions are instructor designed. However, rather differently, these missions include extensive background stories, including a detailed history of the current situation and enemy personalities (with fictional images and profiles). As the learner advances through the missions, the stories become more complex with greater surprises and twists designed to put the student under greater pressure, thereby testing their abilities to keep calm under increasing pressure (Swartout & Van Lent, 2003).

Interestingly, work is currently underway to convert *Full Spectrum Command* into a VR environment for treating victims of post-traumatic stress disorder (PTSD), indicating the broad range

of potential uses of online gaming for therapeutic purposes:

*A prototype of a 'Wizard of Oz' type clinical interface has also been created. This interface is a key element for the application in that it will provide the clinician with the capacity to monitor a patient's behavior and customize the therapy experience to their individual needs by placing them in VE locations that resemble the setting in which the traumatic events initially occurred. The interface also allows for the gradual introduction and control of 'trigger' stimuli in the VE in real time that is required to foster the anxiety modulation needed for therapeutic habituation. (Rizzo et al., 2004, p. 2)*

### MMORPGs for Leadership Training

O'Driscoll (2006) has been researching the potential applications of synthetic worlds and MMORPGs to real-world corporate applications. He has investigated avatar-mediated 3D environments on a number of fronts. He believes the immersion and interactivity that the 'metaverse' provides creates a medium for true experiential learning. For instance, a Level 60 guild leader in *World of Warcraft* has to spend about 500 hours in-world. In this time the leader will be strategizing, calculating risks, recruiting guild members, planning and executing raids, allocating winnings, and so forth. In essence, the process of becoming a *World of Warcraft* guild master amounts to a total immersion course in leadership.

Yee (2007) also reports that MMORPGs can be used by individuals to learn leadership skills, and he highlights the possibility of "emergent learning" where the pedagogy is not dictated as in traditional training software, but emergent in the sense that it occurs because of the rich system mechanics. Yee (2007) claims that MMORPGs allow provocative scenarios. For instance, in MMORPGs, job candidates can be asked to join a group and persuade the group to move to a differ-

ent hunting spot to gauge a candidate's persuasion skills. In another situation an individual could be asked to join a group and then attempt to take over the leadership role while gaining the loyalty of the existing group members. Yee (2007) contends that the power of MMORPGs is the ability to place individuals in different ad-hoc groups every time they play; it makes sense to explore whether people are able to learn complex social skills from their experiences. Yee's (2007) research demonstrates that MMORPGs can and should be thought of as potential educational mediums for complex social skills including leadership.

## **CONCLUSION AND IMPLICATIONS**

These and other case studies of practice indicate that multiplayer online games are being piloted in a range of learning and training areas (de Freitas, 2006; McLaughlin & Kirkpatrick, 2004; Sandford et al., 2006). Although the use of MMORPGs is clearly more established in military training contexts, new research projects and collaborative examples from learner communities indicate that experimental take-up of online gaming is being explored in wider learning and training contexts. Although there is evidence that these online games are being used in practice, the need for the development of tools for evaluation and validation of the use of serious games to support learning outcomes is ongoing and experimental (de Freitas & Jarvis, 2007). If serious gaming follows the same route as the use of simulations, its employment may be characterized by usage in pockets of learning and training contexts, rather than as a generic tool used across different disciplines and learning contexts.

Clearly, further research is needed that will both explore the psychological benefits of using games to support collaborative learning, but also to build up an evidence-base that can be used by researchers from a range of different disciplines, including psychology and sociology. In order

for serious gaming to benefit the wider learning communities, they will be an important next step to establish whether effective learning outcomes are supported by the use of serious games; work such as that conducted on the Serious Games Engaging Training Solutions (de Freitas & Jarvis, 2007) aims to start this analysis. Should this be established, then learning design will need to encompass experience design approaches, where 'simulated' shared experiences become the basis for learning objectives and outcomes, and this may well have profound implications for learning (and game) design (Dickey, 2005), with substantial challenges for tutors (de Freitas, 2006).

While the use of MMORPGs for military training are rather more embedded into training practice, their use in the wider educational contexts are at the pilot and trialing stages; due to small pilot numbers and with the varied approaches to data collection, it is too early to state with any certainty how effectively these communities are being supported by the use of multiplayer online games, or whether the stated learning outcomes are being effectively addressed.

However, as these early case studies indicate, the *potential* for supporting effective collaborative learning does merit further experimentation and study, and early indications suggest that this form of gaming could provide a rich vein of potential for training and learning in groups, particularly where they build upon the tried and tested methods associated with simulation-based learning approaches. Furthermore, there is more than anecdotal evidence that gaming can support intrinsic motivation and so help to engage learners and collaborative processes (de Freitas et al., 2006).

In addition to the need to improve the evidence-base for the field of inquiry, there is also the need for developing methods, and frameworks for analyzing these complex interrelations between game players are just being developed. It is envisaged that in these two areas (i.e., improved evidence-base and development of analytical

tools for evaluation), significant work will be undertaken by the authors and other researchers to support what promises to be an important and rich field of cross-disciplinary enquiry (de Freitas & Oliver, 2005, 2006).

The need to provide better synthesis across different single disciplinary perspectives with regards to online gaming is demonstrated in this chapter. The key issues emerging from the practice case studies reveal that motivation and flow from the use of games demonstrate the real potential for using games with learners, particularly those that may be underserved using traditional means, or that are aiming to support particular communities of practice, or professional development where hands-on experiential learning would be best suited. Further attempts to support more synthesized approaches to the study of game-based learning may need to utilize literature findings from other related disciplines.

The implications of these new forms upon general formal education are difficult to assess at this stage. The widespread use of games to support learning, as evidenced in this chapter, indicate that games can be used to support exploratory learning, peer interactions, and higher cognition, but clearly have challenges for standard pedagogic practices and for how institutions are organized. The wider use of multiplayer games and immersive world applications make also have an impact upon the physical organization and use of the university campus, with the emergence of 'cybercampuses' (or virtual representations of campuses) where seminars and lectures in virtual spaces are becoming part of the wider learning activities (Prasolova-Førland, Sourin, & Sourina, 2006).

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## KEY TERMS

**Exploratory Learning:** Learning through exploring environments, reality, and lived and virtual experiences with tutorial and peer-based support. This notion of learning is based upon the idea that learning patterns can be helpfully transferred to dissimilar situations through meta-reflection. Unlike Kolb's experimental learning, this process is not always circular (although it may be) and does not rely upon lived experience. Rather the approach acknowledges the cognitive process that helps individuals to use their imagination and creativity to draw out lessons from interactions, as well as extracting meaning from data. This process can be complicated and happen on different levels of understanding. That is, learning can be supported through different media, and through multimedia, interactions, and textual engagement.

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

**Immersive World Applications:** Simulations, games, and other interactive, often 3D virtual spaces or crossover spaces (e.g., between virtual and real).

**Massively Multiplayer Online Role-Play Game (MMORPG):** Typically represented by large, sophisticated, detailed, and evolving worlds based in different narrative environments. Examples of such games are *Everquest* (heroic fantasy), *Anarchy Online* (futurist science fiction), and *Motor City Online* (classic car racing). The nature of these games is to offer a rich three-dimensional world where typically players have some sort of a mission or goal. For example, in *World of WarCraft* one of the quests is to battle Ragnoros—a type of fire god. In MMORPGs, all the characters are fictional, rather than actual persons.

**Metaverse:** An online virtual world in which there are no specific goals or objectives. A virtual world in which a user creates an avatar and then explores the world as that avatar. Users are able to chat with others in the world and interact with the avatars. Typically an inhabitant can create buildings, clothes, habitats, or any other items they can imagine. Metaverses do not typically have non-player characters (characters that are computer generated). In a metaverse all the characters are tied directly to an actual person.

**Serious Games:** Games that integrate gaming elements with learning or training objectives. The name also refers to a movement of researchers and developers who are working towards developing games specifically aimed at educational audiences.

**Simulations:** Non-linear synthetic training environments that allow learners to rehearse different scenarios, tasks, problems, or activities in advance of real-life interactions or to update skills.