

Cleveland State University
EngagedScholarship@CSU



Communication Faculty Publications

School of Communication

2005

Gamers' Sensations of Spatial, Social, And Co-Presence While Playing Online Video Games

Cheryl Campanella Bracken


Cleveland State University, c.bracken@csuohio.edu

R. L. Lange

James Denny

Cleveland State University, J.DENNY@csuohio.edu

Follow this and additional works at: https://engagedscholarship.csuohio.edu/clcom_facpub

 Part of the [Communication Technology and New Media Commons](#), and the [Science and Technology Studies Commons](#)

How does access to this work benefit you? Let us know!

Recommended Citation

Bracken, C. C., Lange, R. L., & Denny, J. (2005, October). Gamers' sensations of spatial, social, and co-presence while playing online video games. Presented to FuturePlay 2005: The First International Academic Conference on the Future of Game Design and Technology, Lansing, MI.

This Conference Proceeding is brought to you for free and open access by the School of Communication at EngagedScholarship@CSU. It has been accepted for inclusion in Communication Faculty Publications by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.

Gamers' sensations of spatial, social, and co-presence while playing online video games

Bracken, C. C., Lange, R. L., & Denny, J. (2005).

Presented to FuturePlay 2005: The First International Academic Conference on the Future of Game Design and Technology, Lansing, MI.

Abstract

There is an increasing number of video gamers who are playing games online. Previous research has demonstrated that off line gamers experience sensations of presence “the illusion of non-mediation” (Lombard & Ditton, 1997). The current study, explores through focus groups, the type of presence online gamers report experiencing. The results demonstrate that online gamers report having sensations that can be classified into all three main presence types: spatial (physical), social, and co-presence.

Introduction

Today's technology allows people to play video games together in shared mediated spaces, either by playing on-line or by networking their videogame consoles. This environment is similar to other collaborative environments, in the sense that players agree to meet in a mediated space and often work together in teams to meet the objectives of the games (e.g., to capture the other teams' flag, or to kill all the other teams' players). One difference between online video games and other collaborative environments is the task the players complete is something they choose to do because it has entertainment value for them.

Additionally, some of the video games allow the players to interact using a variety of their senses, ranging from text-based messaging to real-time audio. Many studies of social presence have focused on behaviors of media users online; these include collaborative problem solving (Anump, et. al, 1994), education (Roussos et al., 1999; Steeples & Jones, 2002), and e-commerce (Desharnais, Lu, & Radhakrishnan, 2002). While online video game environments

can be considered collaborative environments, there are few studies that specifically investigate video game interactions in this context (i.e., many videogame studies explore the level and impact of violent content). This study explores the types of presence (spatial, social, copresence) experienced by video gamers while they are in the video game environment.

Collaborative virtual environments – online games

The use of the Internet to facilitate multiplayer gaming has been widely cited as not only a way of creating even more value for gamers, but has the potential to bring together people from many different cultures to facilitate togetherness and mutual understanding (Martin, 2003). These online games can be understood as collaborative virtual environments (CVEs) (Benford et al., 2001). A CVE is classically defined as a medium which “allows geographically separated users to communicate and interact with each other within a shared environment through connected networks such as the Internet” (Lau, 2004). However, the emergence of CVEs did not begin with the graphical online games commonly seen now, but began decades ago with the creation of text-based multi-user dungeons (MUDs).

MUDs were, and continue to be, not used just for pure hack-and-slash gaming, but also were used as places where social activity could happen ranging from casual chatting to immersive role-playing. They are “social worlds”, places in which a distinct vocabulary, activities, interests, concepts of what is important in life – and what life itself ultimately is – exist (Cressey, 1969). Each MUD has individuals who fill specific social roles, which is stratified depending on the complexity of the social structure of the MUD.

Interaction on a MUD takes place through the use of commands entered in a command line either through a special computer program, or client, designed for that purpose, or by directly connecting to the MUD computer and entering commands without a special interface. MUD communication often has two contexts: in-character and outof-character communication, which can either have dedicated “channels” given to it that can be turned on or off depending on player preference (Muramatsu and Ackerman, 1998) or through the use of local emits generated by MUD-specific syntax. On role-playing MUDs, the difference between in-character and out-of-character chat is essential, while on purely social MUDs it is relatively unimportant beyond what importance individuals decide to give to it.

Social interaction is a strong draw to MUDs and CVEs in general (Schiano, 1999). However, research has found that claims about gender and identity play (Turkle, 1995) may be

exaggerated in favor of small social groups interacting with each other on a regular basis. Navigating the virtual environment is much less important to people than being able to interact with others (Schiano, 1999).

Lin and Sun (2003) interviewed several MUD designers and derived two conclusions useful to our research: people will participate in CVEs as long as they are deriving fun from the experience, since it is much easier to leave unwanted experiences online than in real life, and simulated social systems in CVEs require time and commitment from a “fairly large” population, though this probably would vary depending on what is attempting to be simulated. According to Lin and Sun, systems that have a lot of rules are easier to simulate than systems which are less structured. Of course, in making any system on a social CVE, fun should trump all other concerns.

An anecdote from a text-based CVE: A rape in cyberspace

One social MUD which has received regular scholarly attention is Lambda MOO, a project generally credited to Pavel Curtis, a Xerox PARC researcher, though with large amounts of collaboration from other programmers. Lambda MOO features an extraordinary amount of virtual affordances, including interactive items (Turkle, 1995) and a quasi-government operated by the players (Mnookin, 1996).

One of the most infamous incidents in the scholarly history of CVEs occurred at LambdaMOO, and was chronicled in Julian Dibbell’s article “A Rape in Cyberspace”, published in *The Village Voice*. Dibbell recounts the incident, and the fallout that occurred on the MUD, that illustrates key factors in the parameters of CVEs: high levels of social presence caused the victim of the incident to feel post-traumatic stress from the incident, and aroused intense anger from other members of the community because of the perceived harm done, resulting in a heated internal debate. At the end of a lengthy debate, the character which perpetrated the act against another character was destroyed. Afterward, a complex system of petitions and ballots was put into place about any action requiring administrative powers over the database to execute, which has evolved over the years to behave in a similar way to a quasi-direct democracy.

This well-publicized incident not only shows us the power of social presence, but that environments with seemingly minimal media richness – a text-based MUD – can generate strong levels of copresence with the existence of strong content factors. Graphical games, while

having the ability to generate traditional presence through vivid images and other feedback mechanisms, do not have nearly the degree of customizability and environmental control that text games can offer. These factors allow MUDs to continue to exist today despite the existence of graphical alternatives.

While studies of the newer types of online games have not been extensively completed, we can make assumptions based on the volume of studies done with text-based MUDs that can help us to guide additional research into these newer games. *Virtual teams*

Virtual teams are traditionally defined in the computer-supported collaborative work (CSCW) research field as “groups of geographically and/or organizationally dispersed co-workers that are assembled using a variety of telecommunication and information technologies to accomplish an organizational task” (Townsend et al., 1998). A broader definition is used by Jennings (1997) in that virtual teams are groups of people who collaborate closely even though they may or may not be separated by space, time and organizational barriers.

Virtual teams have become increasingly popular in business since they allow the facilitation of information between people who may be geographically very far from each other more rapidly than would have been possible in the past. They provide benefits including allowing organizations to hire and retain the best people, regardless of location or physical ability (Johnson et al., 2001). Virtual teams are also an essential part of the online multiplayer gaming environment, and conclusions drawn from virtual teams which do work can also be useful for those virtual teams who take part in play.

Creating a successful virtual team

People who do well in virtual teams according to Johnson et al. (2001) are typically self-starters who are individually accountable and capable of being flexible to a variety of different situations. Trust is also very important, especially since many members of virtual teams may never actually meet their comrades outside of mediated settings. Rapid assimilation into the team and acceptance of its goals is also important, as without good team participation skills, conflict will slow its progress (Townsend et al, 1998). Naturally, good communication is critical to a virtual team’s success: the more open the channels, the more productive the team will be; flexibility in selecting communications channels has appreciable benefits (Pauleen & Yoong, 2001).

A positive team climate, combined with regular opportunities for communication is among the factors found to be important to building virtual team collaboration. A shared vision for the outcomes of the virtual team is also important to fostering a desire to cooperate to achieve goals (Holton, 2001), which harkens back to our previous discussion of social presence.

Online gamers as virtual teams

We find the importance in making virtual teams work for a much less immediately “productive” end – facilitating the functioning of online game players in teams to achieve goals. Killing a “mob” of an enemy type to receive points and other rewards is surely as legitimate an organizational goal if any, albeit one where, arguably, there is more visceral satisfaction in completing the task. Just like in “traditional” virtual teams, personal initiative, trust, accountability and the ability to adapt to a rapidly changing environment are indicators of personal and group success, as are open lines of group communication about needs, wants and goals. The costs for failure, while perhaps not as catastrophic as in business, are equally high – failure in completing group tasks means the potential loss of points, prestige, resources and most especially time.

Team play has become an increasing part of online gaming – once an anomaly in a very competitive one-on-one (or free for all) environment, team play is now an accepted and important part of the online gaming scene. For instance, “City of Heroes” (<http://www.cityofheroes.com>), a massively multiplayer online role playing game (MMORPG), encourages the formation of teams to handle missions against enemies such as zombies, aliens or menacing robots. Other MMORPGs, such as EverQuest (<http://www.everquest.com>) follow a similar model, in which it is possible to “solo”, or not work with a team, but greater benefits and glory come to those who work with others. These types of games are tremendously popular. Yee (2005) has documented that people from all walks of life and of a wide span of ages play MMORPGs. Yee also found that people reported playing their chosen MMORPG for an average of more than 22 hours a week.

Presence

The concept of presence, variously defined as a sense of “being there,” a “sensation of reality,” “involvement,” and more generally as “an illusion of nonmediation,” has been examined in research and theory in diverse fields. Lombard and Ditton (1997) defined presence as the

“perceptual illusion of nonmediation” (“Presence Explicated” section; paragraph 1). Various researchers categorized the dimensions differently: Lombard and Ditton (1997) title them invisible medium (forgetting about the medium) and transformed medium (reacting to the medium socially), while IJsselsteijn, de Ridder, Freeman, & Avon (2000) used the terms physical (being in the mediated environment) and social (being near someone) types of presence. This study will explore videogame players’ sense of spatial (physical), social presence, and copresence.

Types of presence

Spatial (physical) presence. While physical presence has been generally defined as “being there”, it includes both a physical sense of being somewhere else (in a virtual environment) as well as a psychological competent (i.e., feeling immersed, engaged, engrossed). The findings related to this type of presence have been largely consistent. The more realistic, interactive, and the more senses involved the stronger the sense of spatial (physical) presence.

Prior research has demonstrated that gamers experience varying levels of physical presence while playing offline video games (Tamborini, 2000). This physical presence helps to create increased states of physiological arousal (Dillon, Keogh, Freeman, & Davidoff, 2001; Lang & Lee, 2002), which may encourage psychological involvement in the experience (Witmer & Singer, 1998). It stands to reason that physical presence will also be generated in online multiplayer games, as the experience is very similar to playing a game offline. Similarly, social presence can be generated by offline video game play (Lee, et al., 2005), through means such as engaging characters and a rich virtual environment (Slater & Wilbur, 1997).

Social Presence. Social presence and how it is defined has changed over time. Originally it was introduced by Short, Williams, and Christie (1976) and was the term used to indicate the amount of information or the perceived social richness of a medium. Today is it usually (but not always) defined as the sense of “being together with another” (Biocca, Harms, & Burgoon, 2003) or as a sense of being together (deGreef & IJsselsteijn, 2000). The current study employs this definition of social presence.

Social presence has been of interest to researchers of CMC or ICT (other than videogames). The main findings are that people do experience a sense of social presence (feel they are with another person in CVEs). Sensations of social presence have been found in several scenarios ranging from media users reaction to text-based messages (Bracken & Lombard,

2004) to interaction with avatars in graphical virtual reality environments (Schroeder, 20002). There is also a wide array of effects due to experiencing a sense of social presence: in CMC sensations of social presence have been found to improve the perceived quality of online education (Aragon, 2003), increase the gratification of instant messaging (Sung, 2005), impact effectiveness of virtual environments (Gamberini, Spagnoli, Paolo, Massimiliano, & Bua, 2004), and lead to higher levels of enjoyment (Phillips & Lee, 2005). The current study anticipates that social presence will be experienced by video game players.

Co-Presence. Copresence is a sub-division of social presence. It has been defined as a feeling of “being *socially present* with another person” (Sallnas, Rasmus-Grohn, & Sjostrom, 2000; Nowak, 2003). Earlier (nongaming) studies have found that participants in collaborative virtual environments experience sensations of copresence (Slater & Steed, 2002; Slater, Sadagic, Usoh, & Schroeder, 2000) and that a sense of copresence can enhance/strengthen the overall experience of presence (Gerhard, Morre, & Hobbs, 2005; Slater, Sadagic, Usoh, & Schroeder, 2000). These studies explored copresence as the feeling one has when they are physically separated from others but still feel a sense of togetherness in an “electronic communication network.” This is what Zhao (2003) refers to as “corporeal telecopresence” (p. 447). This study is focused on these types of response in online videogame environments.

Presence and video game studies

There are a small but growing number of studies investigating presence and videogames. Recently, Tamborini and Skalski (2005) have argued that there is a natural fit between the videogames and presence that is the likely explanation for the “appeal and consequences” of videogame usage (p. 27). It should be noted that the bulk of presence and video game studies have focused on the spatial (physical) presence.

One study that has examined videogames and experiencing a sense of presence was an exploratory study using the “autoconfrontation method” (Rétaux, 2002). In this study participants were video taped as they played a videogame. Afterwards the participant was shown the film and asked to rate a variety of presence dimensions, including immersion. The participants reported feeling varying levels of presence, often based on their performance and the challenges the game provided. Other studies have explored the use of narrative (within games) and players’ sense of presence. Video games were found to be able to generate

sensations of presence (Lee, Jin, Park, & Kang, 2005; Schneider, Lang, Shin, & Bradley, 2004). Further, Lee et al. specified that players reported experiencing both spatial and social presence.

Additionally, online virtual chess has been studied by Hoffman, Prothero, Wells, and Groen (1998), who found that all players (including no-chess players) experienced a sense of presence. However, the greater the skill of the players the more fully immersed they were able to become in the environment. This finding has been replicated by Bracken and Skalski (2005), who have created a skill scale to evaluate a videogame players' skill level and propose it be employed as an intervening variable when measuring gamers' sensations of presence.

Research Questions

Research Question 1: Do gamers experience the effects of spatial (physical) presence while playing online multiplayer games?

Research Question 2: Do gamers experience the effects of social presence while playing online multiplayer games? Research Question 3: Do gamers experience a sense of copresence while playing online multiplayer games?

Method

A total of 20 participants were recruited from a communication department in a mid-western urban university. Participants were limited to those who had played either online videogames (with other people) or who networked a video console game unit (i.e., Sony PlayStation or Microsoft X-box). The participants were provided with lunch for their participation and were entered into a lottery with the possibility of winning \$50 USD. There were a total of four focus groups conducted with group size ranging from 3 to 9 participants. The focus groups lasted approximately 1 hour.

Results

Overall the gamers reported experiencing sensations of each of the three types of presence included in this study: spatial, social, and co-presence. This section details the responses provided in the focus groups. *Spatial (physical) presence*

There was general agreement that the gamers feel immersed in the video game environment. One gamer stated, "...you are into it, and you get into the story, and you don't

[know] that there is a reality around you because you're so sucked into the game." They also reported that they experience these gaming environments with "all [their] senses."

The gamers discussed experiencing a loss of time while playing online videogames. Several of the gamers mentioned losing several hours on more than one occasion. One gamer even stated that once he starts playing it is difficult to stop. He then stated that he has played "from two in the afternoon till two in the morning, went to the bathroom once, and didn't eat, just sat there and played." There are even "urban legends" surrounding these types of practices. Several players said they heard of an unknown gamer who allegedly died while online after three days of continuous play without eating, drinking, or even taking a restroom break. A number of participants mentioned ways in which they limit their playing time, to remind themselves to leave the game (see discussion of sound below).

Participants discussed the extent to which form variables (screen size and image quality) impact their immersion. There was agreement that they have found themselves immersed while playing on a variety of screen sizes, and that larger screens are not necessary for them to feel immersed.

Emphasis was placed on sound, as it was felt to impact both realism and immersion. Several gamers reported that they manipulate the level of sound to change their experience. In some instances, they prefer playing with surround sound because it assists them in completely immersing themselves and improve their playing ability because you can hear when "some guy is walking up, and you just turn around... [because you can hear] the effects of footsteps coming." At other times, gamers reported manipulating their experience was to turn to sound down to avoid being too immersed in the game. One gamer reported stated that he used sound to control his level of immersion, by lowering the sound to remind him that the content of the game was not real. "Even if you're playing a scary game and turn the volume down, its not nearly as scary if you turn it [the sound] way up." *Environmental Realism*

The gamers agreed they felt they were in a separate world together with other video game players while they are playing online games. Even as they acknowledged they felt a sense of being in a different place when playing video games, the gamers generally did not feel as if the environment itself was "real," and were able to delineate between the real world and the video game world clearly. Environmental realism was not as significant to them as an engaging and

interesting gaming experience. Personal enjoyment was the priority for most gamers more so than realism.

However, one player went so far as to make specific references to video games environments being a different, separate world from the physical world. “Sometimes I really hate coming back to this world,” he said. “[Even though] you’re so good at [playing the game], you walk outside [and are] not recognized for it...that’s why sometimes I get disappointed because ... when I walk outside people just know me for being a quiet loner person.” Some gamers played online video games for the role playing aspect. One gamer commented about wanting to get as far into character as possible to increase the fun of play. Being in character increased their perceived realism, as well as being able to have a lasting impact on the game world. In most cases, this appears to be achieved by possessing above-average combat abilities, such as optimized armor or weapons.

All the gamers reported that they could tell a “bot” (a robot or program that operates as a character) from a person in an online game based on a “player’s” performance. The consensus was that bots have a pattern(s) they follow while in the game and that humans are more unpredictable.

Social Immersion

There was considerable variance between gamers about their perceived levels of social immersion. Some gamers did not develop strong immersion, while other gamers detailed intense immersion experiences. Some gamers also expressed the feeling that avatars/characters were extensions of the gamers themselves. More than one gamer commented on the feeling of connection with the character. The most intense immersion into character experiences came from individuals who engaged in online role playing games, such as EverQuest.

I guess I like getting into my games. I know it’s not real, and I know it’s [just] a game, but I think it’s more fun when you [involve yourself in role play] ... it’s like you’re experiencing something different, something out of this world.

An element of skill appeared to be involved in creating social presence. Individuals who were proficient at specific types of gaming and developed strong immersive involvement also

reported that they found themselves not developing a sense of social presence when playing other kinds of gaming – especially ones where they were not as skilled.

One gamer discussed their experiences with a text-based game versus a game which involved a fully three-dimensional environment.

A long, long time ago I played a game called “Trade Wars” ... you form alliances with other players to maximize your earning potential. I would get involved in trying to form trade alliances and block off the other people who wanted to blow up our asteroids, and go and blow up their asteroids when they weren’t looking. [Compared to that], there hasn’t been anything I’ve done online that has gotten me [that] involved. I have to admit that just watching people play “Grand Theft Auto” [overwhelms me] because I am incapable of doing [well in that game]. I have no hand and eye coordination [for those kinds of video games].

Player Togetherness

There was also some discussion about of feeling they know people they play with online. Several players expressed feeling a connection to other players, even though their interaction is limited by the game. There was occasionally a feeling of extreme closeness where the players reported feeling part of a family. The reason given for this was “they have so much in common with you, and when you play with them, you [watch out] for their life”. The longer individuals played with team members, the more connected they reported feeling to them. Members of teams which concluded after one session did not report as strong of a connection to team members as members of longer lasting teams.

This was particularly true of online “clans”. Clans are groups of individuals who band together in a persistent organization to play a game together. The clans have rules that vary in strictness depending on the internal organization of the group. However, the players who were part of clans reported strong ties to clan members.

Gamers who were very involved with their clans reported developing the ability to anticipate the movements and strategies of other clan members, and react accordingly. At times they

reported successfully used non-verbal communication, such as avatar gestures or other movements, to coordinate their activities.

As would be anticipated, gamers did not report having a strong connection to their adversaries. Sharing the same goal, or having a shared destiny of some variety, appeared to encourage interpersonal connection between gamers. Opponents, being opposed to the goal of the player, tended to be depersonalized. One gamer reported feeling no connection to the other person, and considered their challenger to be equivalent of playing against the computer: "I just go in there, that's the opponent, let's play".

Length of time playing against the opponent did tend to increase the social presence reported by gamers, but overall players reported more of a sense of social presence from their team members than their enemies. "I can hop on Yahoo games and play a game of Literati [a Scrabble-like game] with somebody, and I don't know who they are," one gamer said. "I play the game with them, and it's great, but it could be my next door neighbor ... but they are not playing with me [so I do not feel a connection]."

The degree of communication between players was influenced to some extent by the type of interaction allowed by the game. However, the game environment was not the only thing influencing what could be done in terms of clan or team coordination. Some gaming environments use in-game maps which can locate all the players, while other environments do not have that degree of coordination available to them. However, there are third party technologies such as TeamSpeak which allow for real-time voice chat between individuals.

Discussion

It is obvious from the gamers' statements that they are experiencing all three of the types of presence explored in this study: spatial, social and co-presence while playing online videogames. Specifically, they feel a sense of physical presence while being immersed in the videogame environment. They also report experiencing a sense of social and co-presence while playing, and for some of the gamers these sensations are allow them to feel that they have established close relationships with other gamers they only know online.

What is particularly interesting is that the gamers are able to articulate not only that the experience sensations of presence but are able to identify when they feel "present" and when they do not. They reported having intense presence experiences with the circumstances and interactions to some extent determining the type of presence.

Future Research

Focus group data is useful for acquiring rough ideas about a concept, but expanded quantitative study is required to gain a broader knowledge of how gamers experience presence when playing online games. Based on the focus group discussions detailed here, we propose a study which varies levels of visual and aural richness in a gaming situation. This study could be used to determine the impact different levels of various output types may have on spatial and physical presence.

Of particular interest is how establishing “flow” may influence both spatial and social presence, and what attributes in video games either encourage or discourage achieving a flow state. How flow and skill interact will be especially important to understand in future gaming research; the present work in this area is an excellent start, but more must be done.

The differences between role playing games and other kinds of games should be explored in more detail. While it appears that the potential for social presence appears to be greater in role playing games, it may be easier to achieve spatial presence in non-role playing games due to the lack of possible social distractions. The social dimension of gaming may even overwhelm traditional ideas of visual and aural richness being the most important attributes to focus on in establishing spatial or social presence.

Conclusion

Overall, this exploratory study demonstrates that online video game players have sensations of spatial, social, and co-presence. This study provides the ground work for examining video games as collaborative virtual environments, and as a rich area for presence research.

References

- Anupm, V., Bajaj, C., Bernardini, F., Cutchin, S., Chen, J., Schikore, D., Xu, G., Zhang, P. & Zhang, W. (1994). Scientific problem solving in a distributed and collaborative multimedia environment. *Mathematics and Computers in Simulation*, 36, 433-542.
- Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult & Continuing Education*, 100, 57 – 69.
- Benford, S., Greenhalgh, C., Rodden, T., Pycock, J. (2001). Collaborative virtual environments. *Communications of the ACM*, 44 (7), 79-86.

- Biocca, F., Harms, C., & Burgoon, J. (2003). Towards a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators and virtual environments*, 12(3), 456-480.
- Bracken, C. C., & Lombard, M. (2004). Social presence and children: Praise, intrinsic motivation, and learning with computers. *Journal of Communication*, 54(1), 22-37.
- Bracken, C.C., & Skalski, P. (2005). *Presence Reactions to Video Games: The Impact of Image Quality and Skill Level*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Cressey, P. G. (1969). *The Taxi-Dance Hall: A sociological study in commercialized recreation and city life*. Montclair, NJ: Patterson Smith.
- DeGreef, P., & IJsselsteijn, W. A. (2000). *Social presence in the photoshare tele-application*. Paper presented at the Third International Presence Workshop, Techniek Museum, Delft, The Netherlands.
- Desharnais, P., Lu, J., & Radhakrishnan, T. (2002). Exploring agent support at the user interface in e-commerce applications. *International Journal on Digital Libraries*, 3, 284-291.
- Dibbell, J. (1993, December 23). A rape in cyberspace. *The Village Voice*, 36-42.
- Dillon, C., Keogh, E., Freeman, J., & Davidoff, J. (2001). *Presence: Is your heart in it?* Paper presented to the annual Presence Workshop, Philadelphia, PA.
- Eastin, M., Griffiths, R., Lerch, J. (2005). *Beyond Shooter Games: How Game Environment, Game Type, and Competitor Influence Presence, Arousal and Aggression*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Gerhard, M., Moore, D., & Hobbs, D. (2005). Close encounters of the virtual kind: Agents simulating copresence. *Applied Artificial Intelligence*, 19, 393-412.
- Galimberti, C., Ignazi, S., Vercesi, P., Riva, G. (2001). Communication and cooperation in networked environments: An experimental analysis. *CyberPsychology & Behavior*, 4(1), 131-146.

- Gamberini, L., Spagnolli, A., Cottone, P., Martinelli, M., & Bua, L. (2004). The "presence of others" in a virtual environment: different collaborative modalities with hybrid resources. *Cognition, Technology & Work*, 6(1), 45-49.
- Hoffman, H.G., Prothero, J., Wells, M. J., & Groen, J. (1998). Virtual chess: Meaning enhances user's sense of presence in virtual environment. *International Journal of Human-Computer Interaction*, 10, 251-263.
- Holton, J. (2001). Building trust and collaboration in a virtual team. *Team Performance Management*, 7 (3/4), 36-47.
- IJsselsteijn, W.A., de Ridder, H., Freeman, J. & Avons, S.E. (2000). Presence: Concept, determinants, and measurement. *Proceedings of the SPIE, Human Vision and Electronic Imaging V*, 39, 59-76.
- Jennings, L. (1997). Virtual teams transcend time and space. *Futurist*, 31 (5), 59-60.
- Johnson, P., Heimann, V., & O'Neill, K. (2001). The 'wonderland' of virtual teams. *Journal of Workplace Learning*, 13 (1), 24-29.
- Lang, A., & Lee, S. (2002). *Measuring Presence: Pictures, Words, and Sweat*. Paper presented to the Information Systems Division at the annual conference of the International Communication Association, Seoul, Korea.
- Lau, R. (2004). Advances in collaborative virtual environments: Guest editor's introduction. *Presence: Teleoperators and virtual environments*, 13 (3), 3-4.
- Lee, K.M., Jin, S.A., Park, N., Kang, S., (2005). *Effects of Narrative on Feelings of Presence in Computer-Game Playing*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Lin, H., & Sun, C. (2003). Problems in simulating social reality: Observations on a MUD construction. *Simulation and Gaming*, 34 (1), 69-88.
- Lombard, M., & Ditton, T. B. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, 13(3). Available: <http://www.ascusc.org/jcmc/vol3/issue2/lombard.html>
- Martin, A. (2003). Adding value to simulation/games through Internet mediation: The medium and the message. *Simulation & Gaming*, 34 (1), 23-38.

- Mnookin, J. (1996). Virtual(ly) law: The emergence of law in LambdaMOO. *Journal of Computer-Mediated Communication*, 2 (1). Retrieved on September 15, 2004 from <http://www.ascusc.org/jcmc/vol2/issue1/lambda.html>
- Muramatsu, J., & Ackerman, M. (1998). Computing, social activity, and entertainment: A field study of a game MUD. *Computer Supported Cooperative Work*, 7 (1/2), 87-123.
- Pauleen, D., & Yoong, P. (2001). Facilitating virtual team relationships via Internet and conventional communications channels. *Internet Research*, 11 (3), 190-202.
- Phillips, B., & Lee, W.N. (2005). Interactive animation: Exploring spokes-characters on the Internet. *Journal of Current Issues and Research in Advertising*, 27.
- Retaux, X. (2002). A subjective measure of presence feeling: the “autoconfrontation” method. *Proceedings of the Fifth International Presence Workshop*, 161-173.
- Riva, G., & Galimberti, C. (1998). Computer-mediated communication: Identity and social interection in an electronic environment. *Genetic, Social, & General Psychology Monographs*, 124(4) XX-XX.
- Roussos, M., Johnson, A., Moher, T., Leigh, J., Vasilakis, C., & Barnes, C. (1999). Learning and Building Together in an Immersive Virtual World. *Presence: Teleoperators & Virtual Environments*, 8, 247- 264.
- Sallnas, E., Rasmus-grohn, K., & Sjostrom, C. (2000). Supporting presence in collaborative environments by haptic force feedback. *AMC Transactions on Human-computer feedback Interaction*, 7, 461-476.
- Schiano, D. (1999). Lessons from LambdaMOO: A social, text-based virtual environment. *Presence*, 8 (2), 127-139.
- Schneider, E. F., Lang, A., Shin, M., & Bradley, S. D. (2004). Death with a story: How story impacts emotional, motivational, and physiological responses to first-person shooter video games. *Human Communication Research*, 30, 361- 376.
- Slater, M., & Steed, A. (2002). Meeting people virtually: Experiments in shared virtual environments. In R. Schroeder (Ed.), *The Social Life of Avatars*. New York:Springer.

- Slater, M., Sadagic, A., Usoh, M., & Schroeder, R. (2000). Small-group behavior in a virtual and real environment: A comparative study. *Presence: Teleoperators & Virtual Environments*, 9(1), 37-51.
- Sung, H. (2005). *Predictors of instant messaging use: Gratifications sought, gratifications obtained, and social presence*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Tamborini, R., & Skalski, P. (2005). *The Role of Presence in the Experience of Electronic Games*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Townsend, A., DeMarie, S., & Hendrickson, A. (1998). Virtual teams: Technology and the workplace of the future. *The Academy of Management Executives*, 12 (3), 17-29.
- Turkle, S. (1984). *The second self: Computers and the human spirit*. New York: Simon and Schuster.
- Turkle, S. (1995). *Life on the screen*. New York: Simon and Schuster.
- Wilson, P. (1991). *Computer supported cooperative work: An introduction*. Oxford, England: Kluwer Academic Publishers.
- Yee, N. (2005). *The demographics and derived experience of users of massivesl mulit-user online graphical environments*. Paper presented to the Communication & Technology division at the annual conference of the International Communication Association, New York, NY.
- Zhao, S. (2003). Toward a taxonomy of copresence. *Presence: Teleoperators and virtual environments*, 12(3), 445-455.