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The Role of Place as a Potential *Influence on* the Experience of Presence in Virtual Environments

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The role of place as a potential influence on the experience of presence in virtual
environments

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Thesis submitted to the Faculty of Graduate and Postdoctoral Studies
In partial fulfillment of the requirements
For the MA degree in Communication

Department of Communication
Faculty of Arts
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Abstract

The growing popularity of massively populated online virtual environments raises questions about the nature of the human experience within these environments and offers new opportunities to explore existing concepts such as presence and place. The central research question addressed by this thesis is whether sense of place is a potential influence on the sense of presence in *Second Life*. In tackling this issue two sub-questions are posed: 1) *Do users of Second Life experience a sense of place when engaging with this medium and if so how is it manifest?* and 2) *What is the nature of the relationship between sense of place and sense of presence?* The findings of an empirical analysis of the contents of naturally occurring conversations between users in *Second Life* suggests that sense of place is primarily manifest through conversations relating to social interactions. In turn, these social interaction-based conversations appear to contribute to inducing an experience of presence in this virtual environment by contributing to the medium's social richness. This supports the view that that sense of place is a potential influence on the sense of presence.

Table of Contents

ACKNOWLEDGEMENTS.....	II
ABSTRACT	III
LIST OF TABLES AND FIGURES	V
CHAPTER 1 - INTRODUCTION	5
1.1 PRESENCE IN VIRTUAL ENVIRONMENTS.....	3
1.2 STRUCTURE OF THE THESIS.....	6
CHAPTER 2 – REVIEW OF THE LITERATURE	8
2.1 VIRTUAL ENVIRONMENTS	8
2.2 SECOND LIFE	11
2.3 THE CONCEPT OF PRESENCE	13
2.4 POTENTIAL DETERMINANTS OF PRESENCE.....	25
2.5 CRITICISMS OF THE CONCEPTUALIZATION AND OBSERVATION OF PRESENCE	28
2.6 THE ROLE OF SENSE OF PLACE IN THE EXPERIENCE OF PRESENCE.....	30
2.7 SUMMARY AND RESEARCH QUESTION	34
CHAPTER 3 – METHODOLOGY AND RESEARCH RESULTS	36
3.1 METHODOLOGY AND DATA COLLECTION	37
3.2 BREAKDOWN FOR EACH DIMENSION AND CATEGORY	49
3.3 CONVERSATION FRAGMENTS CODED OUTSIDE THE FRAMEWORK.....	60
3.4 CONCLUSION	61
CHAPTER 4 – ANALYSIS	63
4.1 CONCEPTUALIZATIONS OF PRESENCE AND SENSE OF PLACE	64
4.2 SENSE OF PLACE AS A FACTOR FOR THE SENSE OF PRESENCE	81
4.3 CONCLUSION	84
CHAPTER 5 – CONCLUSION	86
5.1 THE EXPRESSION OF SENSE OF PLACE IN NATURALLY OCCURRING CONVERSATIONS	86
5.2 REFERENCES TO PLACE AS A POTENTIAL INFLUENCE ON PRESENCE	89
5.3 SENSE OF PLACE AS A POTENTIAL INFLUENCE ON PRESENCE.....	92
5.4 LIMITATIONS AND STRENGTHS OF THE RESEARCH.....	95
5.5 FUTURE STUDIES.....	96
5.6 CONCLUDING REMARKS	97
APPENDIX I – UNIVERSITY OF OTTAWA ETHICS APPROVAL	99
APPENDIX II – REGIONS IN SECOND LIFE FROM WHICH DATA WAS COLLECTED.....	101
APPENDIX III – LIST OF COMMON CHAT/IM ACRONYMS.....	111
REFERENCES	114

List of Boxes, Figures, and Tables

Boxes

Box 3.1: Sample conversation logged by the <i>Second Life</i> interface	42
Box 3.2 : References to Avatars' Appearance	51
Box 3.3 : Conversation Fragments Referencing Space, Position, and Place	52
Box 3.4 : Conversation Fragments coded into the Meanings and Affect Dimension.....	56
Box 3.5 : Conversation Fragments coded into the Reactions to Other People Category.....	58
Box 4.1 : Conversation Fragments Referencing Events	70

Figures

Figure 1.1 – Second Life	12
Figure 3.1: Distribution of Conversation Fragments (n = 3076)	44
Figure 3.2: Distribution of Conversation Fragments coded into Turner and Turner's sense of place framework	59
Figure 4.1: Distribution of conversation fragments for presence as transportation	72

Tables

Table 3.1: Turner and Turner's sense of place framework	33
Table 3.2 – Data collection regions in <i>Second Life</i>	40
Table 3.3: Distribution of conversation fragments per region per dimension/category.....	46
Table 3.4: Distribution of conversation fragments per region per dimension/category as a percentage of total fragments (n=3076).....	46
Table 3.5: Distribution of coded conversation fragments per region.....	49
Table 3.6 Physical Attributes Conversation Fragments (n=345).....	51
Table 3.7 Activities Conversation Fragments (n=119).....	54
Table 3.8 Social Interactions Conversation Fragments (n=1503).....	57
Table 4.1 – Lombard and Ditton's Conceptualizations of Presence.....	64
Table 4.2 : Conversation Fragments relating to Social Richness.....	66
Table 4.3 : Conversation Fragments indicative of presence as transportation.....	73
Table 4.4 : Conversation Fragments constituting of system messages.....	79
Table 4.5 – Sense of place dimensions and total conversation fragments that related to a category of presence	82

Chapter 1 - Introduction

Millions of people worldwide are spending an increasing amount of their time in virtual environments (Floridi, 2005). While most of these virtual environments graphically represent some sort of space or place, many are mostly textual (such as online chat rooms) and some, like videoconferencing systems, do not graphically represent a place at all. This thesis

focuses on virtual environments that use computer graphics to represent places, people, and objects¹.

The increase in the number of virtual environments and of users makes it important to understand their growing popularity. An important part of the research on virtual environments centres upon understanding the various psychological and physical factors that influence the delivery of the purpose for which the virtual environment was designed. This includes, for example, factors that contribute, or detract, from successfully learning how to pilot a plane in a flight simulator, perform a teleoperated surgery or conduct a successful virtual meeting. One factor in particular, presence, has been identified as being particularly important within virtual environments because of its effect on the use and usefulness of said environments (Lombard & Ditton, 1997). Also referred to as telepresence and virtual presence, the experience of presence is commonly defined as “the psychological state of ‘being there’.” (Witmer, Jerome, & Singer, 2005, p. 298). The work of most researchers who are interested in presence is rooted in the assumption that a virtual environment capable of inducing presence in its users has a better chance of delivering the results for which it was designed (Lee, 2004a; Lombard & Ditton, 1997; Stanney, Mourant, & Kennedy, 1998). In other words, presence is believed to help the user feel that an experience within a virtual environment is real, natural, immediate, and direct (Lombard & Ditton, 1997). If the goal of a particular virtual environment, for example, is to teach something, the fostering of a sense of presence is hypothesized to enable the user to learn as he or she normally would in a real-life experience.

¹ Currently, the most popular of these by far are Massively Multiplayer Online Games (MMOGs). See, Yee, (2006).

Given that presence is a psychological state that can potentially be induced by a large number of physical and psychological factors, the actual experience of presence is difficult to observe and/or measure² (Ijsselstein, Freeman, & De Ridder, 2001; Lessiter, Freeman, Keogh, & Davidoff, 2000; Lombard & Ditton, 1997). Nonetheless, the desire to measure the experience presence has inspired a host of divergent research methods, ranging from observations of body movement to self-report questionnaires, that seek to shed light on this phenomenon. To date, however, no one has managed to conclusively measure moments of presence (Ijsselstein et al., 2001; Nash, Edwards, Thompson, & Barfield, 2000; Stanney et al., 1998). Consequently, the nature of presence and the role that it might play in the design, effects, and usefulness of virtual environments is subject to debate.

1.1 Presence in virtual environments

Since the 1960s, when computers with graphical displays emerged, people have been using these technologies to create virtual environments.³ Early uses of virtual environments consisted primarily of games and military simulations. While these types of usage persist, modern virtual environments have been expanded and employed to facilitate such activities

² This has led some to question its very existence. See for example, Reeves and Nass (1996) and Slater (2004).

³ Virtual environments also are referred to as synthetic worlds, virtual worlds, artificial reality, cyberspace, metaverse, artificial environments, immersive virtual environments, and virtual reality. Henceforth, the term 'virtual environment' is used to denote these online environments.

as surgical training, flight simulation, automobile prototyping, and distance learning. A common objective of the multiplicity of virtual environment applications is to “completely immerse a user inside a synthetic environment” in order to increase the perceptual illusion of nonmediation and potentially facilitate the intention of the virtual environment (for example: learning, training, and collaboration) (Azuma, 1997, p. 356).

Virtual environments designed for social networking offer new opportunities for understanding presence given that they combine, for the first time, of a large number of users and a three-dimensional space. These environments increasingly are being considered as naturalistic settings (Yee, 2006) and ideal grounds for controlled social experiments focusing on phenomena spanning from “learning new practices for business, governance, and strategy” (Castronova, 2005, p. 252) to medical communication skills training (Johnsen et al., 2006). *Second Life*, currently one of the most popular non-game, social virtual environment with a total user base of 13 million (“Second Life | Economic Statistics,” 2008) is “an Internet-based, multi-user, 3D world construction set that emphasizes creativity, collaboration, socializing, and self-government” (White, 2008, p. 4). It was selected as the test environment for this thesis because of the emphasis this environment places on socializing, the fact that it is freely accessible to anyone with an Internet connection who wishes to subscribe to the service, and because it provides users with a naturalistic setting within which to interact with one another.

One approach to observing and measuring the experience of presence that capitalizes on the opportunities afforded by new virtual environments such as *Second Life*, is to look for indicators of moments of presence in the conversations between users as they engage with

one another while they are in this virtual environment. This technique has the added advantage of capturing the rich qualitative data contained in conversations between users as a means of identifying moments of presence *in vivo*.

While the contents of conversations might be examined from a wide array of perspectives, the decision to focus on sense of place in this thesis is rooted in what seems to be a gap in the literature on presence with regard to its potential inducers and/or inhibitors. In other words, relatively few studies appear to examine whether sense of place might act as a potential determinant for the experience of presence.

The concept of place is constituted of four dimensions: its physical attributes, its activities, the meanings and affect attributed to it, the activities it affords, and the social interactions occurring therein (Benyon, Smyth, O'Neill, McCall, & Carroll, 2006; Turner & Turner, 2006). The link between sense of place and sense of presence is hypothesized to be rooted in the fact that these two phenomena are conceptually similar insofar as they both emerge from the interactions of the user and her/his environment as well as being subjective feelings (Benyon et al., 2006; Turner & Turner, 2006). Another reason for this thesis focusing on references to a sense of place in the conversations between *Second Life* users is because a dominant feature of this online environment is that it graphically represents in three dimensions, buildings, cities, landscapes and continents. The latter, constitute an important part of the conceptualization of presence as entailing the notion of 'being there' (i.e. in another place) and/or the perceptual illusion of non-mediation.

In order to address this gap, this thesis is guided by the following central research question: *Is the sense of place a potential influence on the sense of presence?* In tackling this issue two sub-questions are posed: 1) *Do users of Second Life experience a sense of place when engaging with this medium and if so how is it manifest?* and 2) *What is the nature of the relationship between sense of place and sense of presence?* The research strategy used to address this matter consisted of logging naturally occurring conversations in *Second Life* through non-participant observation and analyzing the contents of these conversations with the aim of identifying conversation fragments that potentially are indicative of sense of place..⁴ The findings suggest that the conversations, which take place online between users of Second Life, do, in general, contain references to sense of place. Furthermore, it is the conversation fragments referencing social interactions that most frequently are indicative of a sense of place.

1.2 Structure of the thesis

This thesis is separated into five chapters. This introductory chapter has provided a brief overview of the key concepts and issues at the heart of this research undertaking. Chapter 2 contains a detailed presentation of the status of virtual environments and of *Second Life* in particular. The bulk of the discussion, however, focuses on the differing conceptualizations of presence and challenges relating to its measurement. The chapter concludes by setting out the central research question guiding this study. In chapter 3, the discussion centers on the

⁴ Non-participant observation was chosen as a methodological approach in order to prevent self-censorship on the part of the participants and to avoid inhibiting their experience of place and of presence.

methodology used for this thesis, and a presentation of the data obtained through the logging of naturally occurring conversations in *Second Life*. The discussion in chapter 4 constitutes the analytical core of the thesis. Here, particular attention is given to the links between conversation fragments indicative of sense of place and those indicative of presence. Chapter 5 concludes the thesis by directly addressing the central research question guiding this study and the limitations of the thesis.

Chapter 2 – Review of the Literature

The goal of the discussion provided in this chapter is to set out the scope, breadth, and depth of virtual environments, the sense of presence, and the sense of place. The first part of the discussion sets out the history, uses, and research activities surrounding virtual environments, with particular attention given to the leading contemporary online environment, *Second Life*. The second part of the discussion focuses on the concept of presence and the challenges in measuring this phenomenon.

2.1 Virtual Environments

For Castronova (2005, p. 252), modern virtual environments hold great potential. To this end, he writes:

Now that we have this technology, we have the ability to build societies under any physical conditions we wish. Through the artful deployment of code we can structure social, economic, and political institutions to meet specific standards. This opens wide possibilities for teaching and training applications. Throw in sufficient and effective AI, and each person can relive any history whatsoever, and shape that history from any vantage point. Anyone can try her hand at building a church, an empire, or a business. Anyone can learn how to run a city.

A common misconception about virtual environments that needs to be clarified from the outset is that they are not synonymous with computers (Nash et al., 2000). Computers are only one of many elements comprising a virtual environment system. As Biocca (1992, p. 10) puts it “virtual reality is not composed of a single technology, but a synergistic combination of a host of technologies.” In addition to processing units such as computers and telecommunication systems, virtual environment interfaces include devices such as head-mounted displays, monitors, virtual cockpits, joysticks, keyboards, gloves, microphones as well as a variety of outputs including computer graphics, video, audio, photographs, and text.

This multiplicity of interfaces and outputs means that virtual environments need not be graphically represented or computer-generated. For example, chat rooms and text-based multi-user dungeons (MUDs)⁵ also are considered to be virtual environments as are videoconferencing systems (Rice, 1992; Taylor, 2006; Turkle, 1995).

This thesis, however, focuses on three-dimensional virtual environments created by computer graphics. These types of virtual environments are increasingly popular and some of their characteristics, specifically how they graphically represent the environment and their allowance of multiple concurrent users, provide new opportunities to understanding and researching existing concepts, such as space and communication, in virtual environment research.

An important distinction for this thesis is the difference between virtual environments and Massively Multiplayer Online Games (MMOGs) or Massively Multiplayer Online Role-Playing Games (MMORPGs). While virtual environments tend to be designed for a wide range of purposes (e.g., medicine, education, task training (Biocca, 1992; Lee, 2004a; Stanney et al., 1998))⁶, MMOGs are primarily designed for entertainment purposes and are characterized by their high number of concurrent users. In MMOGs, there can be hundreds

⁵ MUDs, also called Text-Based Virtual Environments (TBVEs), are text-based worlds, hosted on a computer server accessible to multiple users concurrently (Towell & Towell, 1997). Users navigate and interact with the environment by typing in commands such as 'Go East' and 'Open Door'. The world and the events occurring therein are described through text on the user's computer screen. Communication between users is typically done via a system similar to that of a chat room (Ito, 2005).

⁶ A good example of a non-MMOG virtual environment is one that was created to help rescue firefighters learn the layout of a building and to practice rescues under 'real' conditions (the virtual building is set on fire and filled with smoke) (Bliss & Tidwell, 1997).

of users concurrently while in most other virtual environments there usually is only a very limited number of users.

There are literally hundreds of MMOGs and millions of players worldwide.⁷ Typically, a MMOG consists of a world with geography, inhabitants, and a storyline wherein hundreds of people from across the real world meet, play, and compete in various quests and tasks. Yee (2006, p. 311) provides a clear description of MMOGs noting that “on a simplistic level, MMORPGs could be thought of as a scenic chat room with a variety of interactive tasks.”

The combination of multiple concurrent users and three-dimensional representations of space by computer graphics in a virtual setting is a relatively recent technological capability.⁸ These environments increasingly are being considered as ideal ground for undertaking controlled social experiments (Yee, 2006) because they afford control of variables in a way that is impossible in real life. Castronova labels this emerging field of research “computational social science” (Castronova quoted in Giles, 2007, p. 18).

⁷ Woodcock (2008) estimates that there are some 17 million subscribers worldwide. It should be noted, however, that this estimate might be low since it does not take into account all MMOGs. In December 2008 the most popular MMOG, World of Warcraft alone claimed to have 11.5 million subscribers (<http://www.blizzard.com/us/press/081121.html>). This popularity is due, in part, to the increasing quality and verisimilitude of the graphics and the interfaces in addition to the increasing number of concurrent users.

⁸ The first commercial massively populated synthetic world using three-dimensional graphics was called *AlphaWorld*. It was launched in 1995 (Taylor, 2006). Since then there have been hundreds of these worlds, most of them in the form of videogames (Bauman, Conklin, Martin, Yans, & Yee, 2006).

2.2 *Second Life*

One such online environment is the freely accessible, massively multiplayer *Second Life*,⁹ created by Linden Labs, a San Francisco based company that was established in 1999 by Philip Rosedale, the former Chief Technology Officer of Real Networks. Through the Internet, users download a free piece of software that, once installed, gives them free access to *Second Life*. And, as Linden Labs put it:

from the moment you enter the World you'll discover a vast digital continent, teeming with people, entertainment, experiences and opportunity. Once you've explored a bit, perhaps you'll find a perfect parcel of land to build your house or business. ("Second Life | What is Second Life?," 2008)

Second Life, therefore, is not a traditional virtual environment in that it allows for hundreds of concurrent users and does not use specially constructed interfaces such as head-mounted displays and control surfaces. Neither is it a MMOG since it is not built around formal game elements such as quests, storylines, or specific goals to achieve. For the purposes of this thesis, *Second Life* is considered a new type of virtual environment.

Upon entering *Second Life*, users (called 'Residents') typically create an avatar and spend some time modifying its appearance. The avatar and all other objects (including landscape) are generated graphically in real-time by computers. All people, objects, and places in this environment are represented in a way that gives the impression of three-dimensionality (see Figure 1.1). All interactions with objects in the environment and other users are done using a keyboard and a mouse. Users communicate with each other either through a typed chat

⁹ There are currently about 13 million people subscribed to *Second Life* although only a few thousands are logged in the world at the same time at any given moment ("Second Life | Economic Statistics," 2008).

system, pre-recorded animations (for example: waving, dancing, head-scratching) and as of very recently, through a live voice system.¹⁰

Figure 1.1 – Second Life



There are no quests or missions in *Second Life*. Users are free to do whatever they please. Those who decide to pay a monthly subscription fee are able to own land and to create permanent objects and structures. Thus, much of the world is user-created although Linden Labs have created, and continue to create, places and objects within this environment. *Second Life* is composed of several continents divided into more than 8400 regions which contain a variety of landscapes and objects ranging from representations of real world places

¹⁰ Although the voice system is available to all residents of *Second Life*, its use requires greater bandwidth. This can slow the experience of the world (by introducing slow loading and stuttering animations) and is one of the main reasons cited in the *Second Life* forums (<http://forums.secondlife.com/>) as to why its use is still not widespread.

such as a virtual Amsterdam to completely fantastical places such as floating castles (White, 2008).

Put simply, *Second Life* is not a game but it is, as Yee (2006, p. 309) defines most MMOGs, “a naturalistic setting where millions of users voluntarily immerse themselves in a graphical virtual environment and interact with each other through avatars.” As such, it may be argued that *Second Life* is more likely to be the type of virtual environment that Castronova (2005) and Yee (2006) consider to be conducive with undertaking social science experiments.

2.3 The Concept of Presence

The technology composing virtual environments is designed to give its users an experience that feels “real” and “natural” (Lombard & Ditton, 1997) in part because such an experience is believed to influence human performance and efficiency (Stanney et al., 1998). The discussion in the following section focuses on the concept of presence. The latter has been identified as an important factor in the use and usefulness of virtual environments and in inciting “real” and “natural” experiences within users (Lee, 2004a; Lombard & Ditton, 1997; Minsky, 1980).

When reading a book, or watching a movie some people report experiencing moments when they ‘forget’ that the experience is mediated. In cinema, this is called the diegetic effect, and for texts it is called transportation (Schubert & Crusius, 2002). In virtual

environment research, this phenomenon is most commonly referred to as presence.¹¹

Lombard and Ditton (1997) note that a sense of presence can affect a user's sense of enjoyment of, and involvement with a virtual environment as well as facilitating better task performance and training.

Minsky (1980, p. 47) originally used the term 'telepresence' to describe this phenomenon, and argued that it was characterized as generating a sense of "being there" when users were interacting with mediated environments. Later, Steuer (1992, p. 76) added the refinement that telepresence may be defined as referring to "the extent to which one feels present in the mediated environment, rather than in the immediate physical environment." More recent conceptualizations define presence as "a latent construct that roughly measures how 'real' one believes a mediated environment is in terms of nonverbal behaviors, physiological responses, and other measures," (Yee, Bailenson, Urbanek, Chang, & Merget, 2007, p. 116). The common link across these varying definitions is that the concept of presence is linked to a user's perceptual evaluation of her or his experience in a mediated environment.

The evolution of how presence is defined is, in large part, associated with the rapid growth and the diversity of technologies and virtual environments that might elicit an experience of

¹¹ The concept of presence is also referred to as 'telepresence', 'virtual presence', mediated presence', and many other specialized terms. Lee (Lee, 2004a, p. 30) argues for keeping the term 'presence' despite its possible ambiguity because it does not link the phenomenon of presence to a specific technology (like the terms 'telepresence' and 'virtual presence'), and thus does not limit its application to describing experiences that are neither virtual or involve teleoperation. According to him, the "technology-specific differentiation of presence (telepresence vs. virtual presence) is meaningless, because presence, by definition, is not about the characteristics of technology—it is a psychological construct dealing with the perceptual process of technology-generated stimuli."

'being there'. Today, virtual environments range from medical teleoperation devices (e.g., machines that allow a surgeon to perform surgery using a robot hundreds of miles away) to military and commercial simulators (such flight simulators), to MMOGs. Put another way, a lot of people around the world are using many different technologies toward many different ends, all of which may be, to varying degrees, presence-inducing. This makes it difficult to develop a universal conceptualization of presence that can serve as a common starting point for empirically grounded research into the factors that induce or inhibit presence in virtual environments.

Elaborating on the ambiguous nature of presence, Isselsteijn, Freeman, and De Ridder (2001, p. 181) note that it is “a complex, multidimensional perception, formed through an interplay of raw sensory data (sensations) and various cognitive processes”. Echoing this view, Floridi argues that it is “notoriously a polysemantic concept and a polymorphic phenomenon” (2005, p. 657). That said, one of the most commonly used conceptualization of presence distills this phenomenon down to “the perceptual illusion of nonmediation” (Lombard & Ditton, 1997).

The concept of presence, like the concept of justice or love, is difficult to operationalize because it means different things to different people. Its meaning and manifestation changes depending on the situation and the people involved. It is precisely this complexity and dynamism that has led to the promulgation of several, specialized, conceptualizations of presence, most of which are variations on Lombard and Ditton's (1997) notion of perceptual nonmediation.

Reeves and Nass (1996), for instance, argue that humans interact with media in the same way as they interact with any aspects of real life. In other words, humans respond to a mediated experience as they would to the real world since the medium is part of the real world. In other words, all experience of life is experienced as being nonmediated. These authors extend the argument to presence by asserting that, if presence is a constant state in real life then this does not change when interacting with a particular medium. To support their claim they draw upon the findings of their study of human-computer interaction, which revealed that humans are polite to computers and treat them differently depending upon the gender of computer animated voices. This, they suggest, indicates that humans have a tendency to treat mediated interactions as if they were non-mediated despite being cognitively aware that a process of mediation is occurring. What this does in terms of virtual environments is effectively disconnect presence from any specific technology and place it solely in the human mind.

The aforementioned example might also be interpreted as an illustration of Zahorik & Jenison's (1998) argument that studying presence is essentially about studying ontology and that it is from that field that the definition and determinants of presence are best developed. According to them, presence is "*tantamount to successfully supported action in the environment*" and there simply is no subjective component to this phenomenon and, therefore, no illusion of nonmediation (Zahorik & Jenison, 1998, p. 87 [emphasis in original]). In their view, successfully supported action (i.e., being able to do something and receive an expected result) in the environment becomes the only determinant needed to induce a feeling of presence. Put simply, studying presence can be understood as equivalent

to studying the nature of 'being'. As long as one can do something in an environment, then one understands that s/he is present (i.e. 'exists') in that environment.

The key point here is that in order for it to occur, the feeling of presence may not be dependent upon a specific technological medium or be related to a specific property or effect of a medium. This implies, in turn, that even when technology is central to an experience, as is the case with virtual environments, it may not be sufficient, or even necessary, in order to induce the experience of presence.

2.3.1 Conceptualizations of Presence

Lombard and Ditton (1997) sought to provide a unifying explication of the concept of presence by examining the various conceptualizations of this phenomenon. In so doing, they grouped presence into six categories that are listed and discussed below:

- Presence as social richness
- Presence as realism
- Presence as transportation
- Presence as immersion
- Presence as social actor within medium
- Presence as medium as social actor

Presence as social richness refers to the degree to which a medium is perceived by its users as "sociable, warm, sensitive, personal or intimate when it is used to interact with other people" (Lombard & Ditton, 1997). This categorization also includes the conceptualization of presence as "the degree to which a medium is perceived as conveying the actual physical presence of the communicating participants," (Rice, 1992, p. 476). In other words, the notion of presence as social richness focuses on a user's sense of being with

others in a metaphorical remote space (e.g. a teleconference) or in a computer-generated space as provided by the specific qualities of the medium. For example, De Greef and Ijsselsteijn (2001) found that the addition of full-sized video (on a large screen) to a communication system was correlated to an increase in reported feelings of social presence (e.g. feelings of being present with other people) by its users.

Zhao (2003) brings an important addition to this conceptualization which he renames 'copresence' by highlighting the need to consider *how* humans experience the presence of others as well as the characteristics of the medium. For example, the sense of presence experienced by two individuals together in the same room in a virtual environment, but in different locations physically, may differ from that experienced by two individuals together in the same room in a virtual environment *and* physically in the same room. This distinction, Zhao claims, may help to better isolate factors that play a role in the experience of presence as social richness.

For example, in their study of differences in gender-based communication strategies within electronic forums, Savicki and Kelley (2000) found that some users reported a sense of social presence despite the fact that these forums do not offer very rich communication features — an important one being that they are based on the use of asynchronous text. This suggests that the perception of presence as social richness may be related to gender-based differences in communication strategies as opposed to specific characteristics of a particular medium. However, not all virtual environments are designed for more than one person (e.g. some flight simulators) and therefore, other conceptualizations of presence are needed to account for its manifestation in multifactor environments.

Presence as realism describes “the degree to which a medium can produce seemingly accurate representations of objects, events, and people” (Lombard & Ditton, 1997). Lombard and Ditton argue that this conceptualization of presence often fails to distinguish between two types of realism: ‘social realism’ and ‘perceptual realism’. Social realism is related to how true to life something feels. Perceptual realism, by contrast, refers to how true to the senses something feels. For example, a computer might be able to generate realistic-looking dinosaur (i.e. perceptually realistic) but because one knows that these creatures no longer exist, it is not socially realistic.

Much of the empirically-grounded presence-related research that has been undertaken to date has been rooted in the notion of presence as realism. For example, starting from the assumption that stereo representation is more ‘real’ than mono representation, Hale and Stanney (2006) examined the relationship between reported sense of presence, task performance, and the quality of stereo representation from a head-mounted display. They found that manipulating stereo acuity had little effect on the user’s sense of presence. Empirically-grounded presence research also tends to focus on potential determinants of presence that are physiological and observable. For example, Hoffman, Richards, Coda, Richards and Sharar (2003) examined the effects of varying graphic elements in a virtual environment on a user’s sense of presence by observing magnetic resonance imaging (MRI) images of the user’s brain. In other words, this conceptualization of presence includes research that tends to focus on a narrow set of observable factors and effects of presence.

Taken together, the findings of the two studies discussed above suggest that although an experience may feel or look real, it does not guarantee a feeling of presence or of being 'there'. Images on a television screen or a computer screen can come from reality and yet fail to elicit a feeling of presence in the user. In an effort to account for this situation, other conceptualizations of presence focus on contexts in which there are no medium variables to manipulate or observe. It is to those that our attention now turns.

The notion of **Presence as transportation** is related to the feeling a user can experience of being transported from one place to another. Expounding on this notion, Floridi (2005, p. 664) argues that "making a remote space epistemically available locally is different from being present in that remote space as an entity." This implies that rather than the user being perceptually transported to a 'there' or feeling that a 'there' is brought 'here', the user's 'here' simply becomes extended. Although this seemingly removes the idea of transportation, it may be considered that the user's sense of location is nevertheless transformed.

Most of the research that is rooted in the 'transportation' conceptualization of presence is based on the use of questionnaires wherein the respondent is asked to report on feelings of transportation and being in a particular place (Durlach & Slater, 2000; Sas & O'Hare, 2003; Schubert, Friedmann, & Regenbrecht, 2001; Witmer et al., 2005; Witmer & Singer, 1998). For example, in a presence questionnaire such as the ITC-Sense of Presence

Inventory (ITC-SOPI) questionnaire¹² (Lessiter, Freeman, Keogh, & Davidoff, 2001), a general sense of physical space is assessed through the posing of such questions as "I had a sense of being in the scenes displayed" (Lessiter et al., 2000), or "I had a sense of acting in the virtual space instead of operating something from the outside" that indirectly test for transportation (Schubert et al., 2001, p. 271).

Lombard and Ditton's (1997) fourth category, **Presence as immersion** is a notion that can be divided into two subcategories: perceptual immersion and psychological immersion. *Perceptual immersion* is the degree to which the senses are immersed in the virtual environment (Blascovich et al., 2002). Someone experiencing a virtual environment through a head-mounted display (sometimes called a HMD or a virtual reality helmet) is considered to be more perceptually immersed in the environment than someone seeing the virtual environment through a computer monitor because an HMD prevents a person from seeing their immediate physical environment allowing them to see only the virtual environment.

The bulk of the research concerned with perceptual immersion tends to focus on the details and effects of specific technologies that immerse the senses, e.g. helmets, gloves, control panels, and even smell-producing devices.¹³ The effects of perceptual immersion on presence have been observed and measured through the use of questionnaires. For example, Richard

¹² The ITC-Sense of Presence Inventory questionnaire, developed by Lessiter, Freeman, Keogh and Davidoff (2000), seeks to measure users' experience of media through four factors that the authors argue are related to presence: four factors: Sense of Physical Space, Engagement, Ecological Validity, and Negative Effects. It has been tested on more than 600 participants as a cross-media presence measure.

¹³ Steuer (1992) reports an early example of a 1981 film called *Polyester* where viewers were instructed to scratch a card that released odors at specific points in the movie.

and Coiffet (1995) observed an increase in task performance¹⁴ when test subjects used a glove that gave haptic feedback (in this case, pressure on the fingertips) in a virtual environment. In another study designed to compare experiences of a real place and a virtual one, Benyon, Smyth, O'Neill, McCall and Carroll (2006) used a system that included an HMD that was capable of displaying high-resolution images and the tracking of the test subject's head movement in order to realistically change the point of view in the virtual environment. The use of the system and the comparison revealed that for the users experiencing the virtual environment through the HMD, the resolution was too poor and their movements too restricted to induce presence.

Psychological immersion on the other hand is concerned with the degree to which users feel immersed in a particular environment. Lombard and Ditton equate psychological immersion to feelings of being absorbed, involved, and engrossed within a particular context. They report that this experience is usually best measured by user self-reporting. For example, in their presence questionnaire, Witmer and Singer (1998, p. 232) posed questions such as "How much did the visual aspects of the environment involve you?" and "How compelling was your sense of moving around inside the virtual environment?" in order to evaluate this psychological sense of immersion. Their cluster analysis of the answers received from the study participants to these, and 31 other questions, led them to conclude that "both involvement and immersion are necessary for experiencing presence" (Witmer & Singer, 1998, p. 227). In a later experiment, Vora, Nair, Gramopadhye, Duchowski, Melloy, and Kanki (2002) administered Witmer and Singer's Presence Questionnaire (1998) to

¹⁴ Task performance is thought to be positively correlated to presence (Lombard & Ditton, 1997).

participants after they spent some time in an aircraft inspection virtual environment. The results suggested a significant correlation between the quality of the interface and the graphics (i.e. how 'real' they felt), the feeling of involvement, and reported sense of presence. This finding suggests that being immersed in a virtual environment may not be enough to induce presence if there are no activities for the user(s) to engage in.

In sum, immersing the senses of a user during a session with a virtual environment does not guarantee a user will *feel* immersed and in order to properly understand immersion as a factor in presence, research must take into account both perceptual and psychological factors. It must be noted however that a feeling of immersion may not always be sufficient to induce a feeling of presence. For example, it is possible that, as Groom, Sherman and Conrey (2002, p. 125) argue, even when exposed to an immersive virtual environment, "participants are still metacognitively aware that they are in an experiment, despite the perceptually compelling nature of the environment." In other words, awareness of the experiment or of the artificiality of the virtual environment when there is no experiment may impede a feeling of presence.

Presence as social actor within medium describes an inappropriate and illogical perception of presence that occurs when users treat social cues (e.g. people, voices or characters) presented by the medium as unmediated. This conceptualization of presence seeks to account for situations wherein a virtual environment's user feels present because of social cues despite the fact that what s/he is experiencing is completely computer-generated and does not come from direct human action. In virtual environments, this perception usually comes from computer-controlled avatars. For example, Garau, Slater, Pertaub and Razzaque (2005, p. 113) observed that virtual environment users often perceive avatars as real persons,

especially when avatars respond verbally and non-verbally to the users. They call this process “attribution of sentience”.

The final category of presence is **Presence as medium as social actor**. It “involves social responses of media users not to entities (people or computer characters) within a medium, but to cues provided by the medium itself” (Lombard & Ditton, 1997). A more recent understanding of this phenomenon, which Lee (2004a, p. 42) renamed ‘environmental presence’, defines this phenomenon as “the extent to which the environment itself appears to know your existence and react to you”. This perception occurs when “the user responds to the medium as if this was a social actor *per se*” (Sacau, Gouveia, Ribeiro, Gouveia, & Biocca, 2003, p. 3). For example, a user might feel present in a virtual garden where s/he plants and cultivates trees because of those trees or some perceived anthropomorphic feature of the garden. For Lombard and Ditton (1997), if a computer uses natural language in real time while fulfilling a social role (such as a teacher or a bank teller), users will tend to respond to the computer as if it were a social actor.

Each of the six categories of presence outlined above share two common traits. The first is that presence is associated with “the perceptual illusion of nonmediation” (Lombard & Ditton, 1997). The second is that presence is a property of a person rather than that of the medium. Taken together, these traits suggest that as much attention should be paid to the user of a virtual environment as to the environment’s characteristics.¹⁵

¹⁵ These traits also explain why, when attempting to measure, observe, and/or induce presence, both subjective and objective approaches have been employed.

In sum, it would appear that if the user of a virtual environment feels presence, this feeling may be a result of the fact, or some combination thereof, that:

- Other users make the mediated environment feel socially rich;
- The mediated environment, or a specific aspect of it, looks, sounds, smells, tastes and/or feels real;
- What happens in the mediated environment is believable;
- The mediated environment induces a feeling of transportation and place;
- The mediated environment immerses one or more senses in a way that makes the real world less perceptible; and/or
- The computer-generated people or the mediated environment itself makes the experience feel socially rich.

2.4 Potential Determinants of Presence

As the discussion in the previous section demonstrated, the manifestation of presence has psychological and physical determinants. Taking this into account, Lombard and Ditton (1997) further organized the many variables that encourage or discourage a sense of presence under the following topology: the form of the medium, the content of the medium, and characteristics of the medium user.

2.4.1 The form of the medium

The formal characteristics of a medium that have been identified by Lombard and Ditton (1997) as having the potential to promulgate an experience of presence in users include:

- The number and consistency of sensory outputs such as audio, tactile, or visual outputs;
- Visual display characteristics such as image quality, image size, viewing distance, motion and colour;
- Dimensionality (i.e., 2D versus 3D graphics);
- Camera techniques;
- Aural presentation characteristics (i.e., quality of sound);
- Stimuli for other senses (i.e., force feedback, smell);
- Interactivity;
- Obtrusiveness of medium;
- A live versus a recorded or a constructed experience; and
- The number of people one can (or must) engage with during the use of the medium.

It is important to note that these formal characteristics may be associated with several of the aforementioned conceptualizations of presence. For example, when they asked participants to move a slider up or down for various images, based on the perception of depth, the naturalness of that depth, and presence, Ijsselsteijn, De Ridder, Hamberg, Bouwhuis, and Freeman (1998) observed a positive correlation between perceived depth of stereoscopic images and the feeling of presence. In this instance, the formal characteristic of the medium, the stereoscopic quality of the images, could be linked with the conceptualization of presence as realism (when the participants felt the image as ‘natural’) or presence as transportation (when the participants felt the image had some depth). In other words, a given formal characteristic of a medium can be related to or induce more than one ‘type’ of presence in the user.

2.4.2 The content of the medium

The content characteristics of a medium may be subdivided into three categories: social realism, the use of media conventions, and the nature of the task or the activity. These characteristics include everything the medium contains—e.g., objects, humans, activities and stories.

Social realism in this context is linked to the believability and authenticity of the content of the medium rather than the believability of the appearance of the medium. Put simply, social realism is related to how true to life something feels. In a virtual environment, this can be as simple as a door opening realistically when activated or a sky being blue rather than yellow. Although Marsh (2003, p. 546) concedes that believability is an important part of the

experience of a virtual environment, especially in terms of engagement and presence, he recommends that: “like filmmakers, designers of IMEs [Interactive Mediated Environments] need to provide meaning in an unfolding story/narrative/environment through experience,” in order to fully engage the user.

For Biocca (1992) it is the syntax, the semantics, and the dramatic space of virtual environments that need further study because of their potential to affect perception and other high-order psychological processes. In other words, the way in which content is presented to the user of a medium, in addition to the nature of that content, may be seen to influence how socially real the content feels. Although there has been a lack of empirical research aimed at testing this hypothesis, to date, it seems plausible to conclude that, “socially realistic experiences are more likely to evoke a sense of presence,” insofar as they feel more natural to the user and foster (or at least do not inhibit) the perceptual illusion of nonmediation (Lombard & Ditton, 1997).

2.4.3 The characteristics of the medium user

For Lombard and Ditton media that are identical in both form and content that induce presence in one user but not in another may potentially be explained by inherent differences in certain user characteristics. These include the willingness to suspend disbelief, knowledge of, and prior experience with, the medium, personality type, personal relevance, the user’s preferred representational system, cognitive style, age, gender, and mood before use. Nash et al. (2000) extend this list of user characteristics that may influence the manifestation of presence to include adaptability, experience and practice, motivation, attentional resources, identification with avatar, and disturbances from the real-world environment. What is

implied by these characteristics is that instead of being universal to human nature, some people have them and some do not and some are the result of will, or a decision.

Other researchers such as Lee (2004b) and Reeves and Nass (1996) however, argue that humans are fundamentally predisposed to nonmediation insofar as perceiving any experience, mediated or not, as equally part of real life. In terms of mediated experiences such as those with virtual environments, Lee (2004b, p. 496) argues that, rather than willingly suspending disbelief, users “automatically and naturally accept incoming virtual (mediated or simulated) stimuli as if they were real,” unless there is strong counterevidence. If this is the case, it suggests that the characteristics of the medium user, and of the medium itself, that become important are not those that potentially induce the experience of presence (such as willingness to suspend disbelief or the quality of the graphics) but rather those that would inhibit the medium user’s natural predisposition to nonmediation.

In sum, it is clear that there are many potential determinants and/or inhibitors of presence and that they can be attributed to several conceptualizations of presence. The complexity this creates in terms of the structure of presence, accounts, in large part, for the continuing debates surrounding the definition of presence, its measurement, and even its very existence.

2.5 Criticisms of the conceptualization and observation of presence

Based on the discussion thus far it may be concluded, in line with the claims of (Ijsselstein et al., 2001), that certain claims about the state of knowledge of presence continue to hold true insofar as:

- The structure of presence is still largely unclear;

- There is no generally accepted explanatory model of presence;
- Measuring presence reliably remains a challenge; and
- The effects of presence are largely unclear.

Given that the structure of presence is unclear and that it has no generally accepted conceptualization, some researchers argue that the existing research on presence “lacks coherence” (Lee, 2004a, p. 28) and that it is “fragmentary and unsystematic” (Lombard & Ditton, 1997). Slater (2004, p. 492) goes so far as to assert that the imperfect knowledge of determinants, user characteristics, and especially the lack of reliable measurement and observation methods with regard to presence may mean that it only exists “because it has been conjured up by the researchers, who call it into being through their questions”. Despite these limitations, however, many people nevertheless report feelings of presence while interacting with virtual environments. Moreover, and despite the ambiguities associated with the notion of presence, this phenomenon is considered central to the use, usefulness, and profitability of new technologies such as virtual environments (Barfield & Weghorst, 1993; Lombard & Ditton, 1997; Yee, 2006). To this end, Lombard and Ditton (1997) argue that “a better understanding of what presence is, what encourages and discourages it in users, and its effects, should save valuable time and money and improve the end-product in the design of new and the redesign of current media technologies.”

On a more theoretical note, it may be argued that studying presence may help to “better understand psychological and physiological processes as they occur in nonmediated settings” (Lombard & Ditton, 1997). In other words, understanding the factors that contribute to the experience of presence in mediated experiences, such as interacting with a virtual

environment, is likely to enhance our understanding of presence (and possibly similar psychological states) in real life. This, in turn, could benefit human endeavours where processes such as the way humans organize and interpret information, store and retrieve memories, and make decisions, are integral to their success (Lombard & Ditton, 1997).

Echoing this view, Lee (2004a, p. 33) argues that the feeling of presence, understood as a psychological phenomenon caused by various cognitive mechanisms, is generally desirable because “the special information-processing mechanism enabling subjective perception of the world out of pure sensation has given humans enormous survival advantages in the course of human evolution”. In other words, presence, in his view, is a natural way by which humans make sense of the world and it is important in our survival. It seems plausible to hypothesize, therefore, that a better understanding presence therefore, could result in better understanding how humans perceive the world.

2.6 The role of sense of place in the experience of presence

One thing most of the aforementioned conceptualizations of presence have in common is that they are in relation to an experience in, or with, a place. Indeed, the two most common definitions of the sense of presence reflect this idea. The first explicitly mentions a place: presence as a sense of being ‘there’ (Lee, 2004a; Reeves & Nass, 1996; Witmer & Singer, 1998) and the second, presence being “the perceptual illusion of nonmediation” (Lombard & Ditton, 1997), evolved from “the *natural* perception of an environment” (Steuer, 1992, p. 76).

An important feature of the increasingly popular modern virtual environments is that they graphically represent a place—i.e., a world of some sort with geography, landscapes, people, and buildings—usually in three-dimensions. This is, in large part, what differentiates them from the previous generation of massively populated online virtual environments such as chat rooms, forums, and MUDs. According to Benyon, Smyth, O’Neill, McCall, and Carroll (2006), sense of place has been extensively studied in several fields such as environmental psychology, geography, and media theory. This multidisciplinary interest in the sense of place is likely related to the fact that place is composed of three elements: the physical setting, activities afforded by the place, and meanings and affects attributed to the place (Relph, 1976). However, it would appear that sense of place has not often been a subject of study in the field of presence research.

However, some elements of sense of place have been examined in terms of their potential to induce a sense of presence. For example, Bailenson, Blascovich, Beall and Loomis (2001) tested the spacing behaviour (proxemics) of users in a virtual environment and found that users maintained more space between their avatar and a computer-generated human than other objects in the environment that were approximately the same size. They attributed this phenomenon to a sense of social presence.¹⁶ Place-related activities afforded by virtual environments also have been researched in studies that generally focus on play, performance, and training (Danet, Ruedenberg, & Rosenbaum-Tamari, 1998; Hale & Stanney, 2006; Lok, Naik, Whitton, & Brooks Jr., 2003; Nash et al., 2000). A common finding emerging from

¹⁶ Bailenson et al. (2001) explain that social presence is experienced when a user behaves as if interacting with other real human beings in an environment. Lombard and Ditton (1997) have named this conceptualization of presence ‘Presence as Social Actor Within Medium’.

this line of research is that the more a place is perceived as being real, either through a stereoscopic effect or haptic feedback, the greater is the user's performance at the task the virtual environment was designed to enable.

Two recent studies have specifically examined possible correlations between the sense of place and the sense of presence. Given that they are among the first study of their kind, they are *ipso facto* exploratory in nature. In the first, Turner and Turner (2006) conducted two experiments wherein they compared data collected through post-experiment interviews with comments that some participants were asked to provide as they were experiencing a photo-realistic virtual environment (i.e., 'vocalizations'), and another in which they focused solely on vocalizations. According to Turner and Turner (2006, p. 207), the concepts of place and presence are "*an emergent property* of interaction between an individual and the environment". The emergent quality of sense of place and presence implies that an ideal way to study these phenomena is precisely at the moment the individual experiences the environment.

On the basis of their findings these authors developed a framework in which they categorized the vocalizations and interview comments according to four dimensions: Physical Attributes, Activities, Meanings and Affect, and Social Interactions (see Table 3.1).

Table 3.1: Turner and Turner’s sense of place framework

<p style="text-align: center;"><u>Physical Attributes</u></p> <p>Comments about the features and qualities of the environment</p> <ul style="list-style-type: none"> ➤ Buildings ➤ Geography ➤ Appearances ➤ Sounds ➤ Smells 	<p style="text-align: center;"><u>Activities</u></p> <p>References to activities the user participated in or would like to be able to participate in</p>
<p style="text-align: center;"><u>Meanings and Affect</u></p> <p>Memories, associations, connotations, and denotations a user has about the place.</p>	<p style="text-align: center;"><u>Social Interactions</u></p> <p>References to other people in the environment, reactions to other people and references to joint activities.</p>

Equally important for the purposes of this thesis, Turner and Turner conclude that “from our review of the place literature, we propose that the sense of place might be reasonably and usefully considered as a further content factor [in influencing presence]” (2006, p. 208). However, this conclusion was based largely on their literature review of the place and presence literature as apposed to the empirical evidence garnered from existing presence questionnaires.¹⁷

In the second, Benyon et al. (2006) conducted several experiments wherein participants experienced virtual environments through various technologies such as head-mounted displays. According to these authors, sense of place and sense of presence are both subjective feelings and psychophysical measures of presence (such as MRIs) do not capture the qualitative nature of presence. Therefore, Benyon et al. sought to capture the sense of

¹⁷ There are 4 predominant presence questionnaires. They are Witmer, Jerome, and Singer’s (2005) *Presence Questionnaire*, Lessiter, Freeman, Keogh, and Davidoff’s (2001) *ITC-Sense of Presence Inventory*, Slater, Usoh, and Steed’s (Slater, Usoh, & Steed, 1994) *SUS questionnaire*, and Witmer, and Singer’s (1998) *Immersive Tendencies Questionnaire*.

presence (and the sense of place) fostered through the interactions of the participants populating a space and the objects in that space by eliciting comments from the participants about their experience as it was happening. Benyon et al. call this approach the ‘Talk Aloud’ technique. Through the application of a place probe¹⁸, Benyon et al. were able to uncover aspects of the medium that interferes with the feeling of presence. Their findings, they claim, “will be of use to the designers of virtual environments that aim to recreate real places” Benyon et al. (2006, p. 682).

Despite the paucity of research on the role of sense of place as a factor of presence, the results of the two above studies suggest that there may be a link between sense of place and sense of presence. Given the predominance of space as a feature of the current generation of virtual worlds such as *Second Life*, the nature of the relationship between these two phenomenon appears to warrant further investigation.

2.7 Summary and research question

Despite being composed a host of technologies, being represented and accessed in many different ways, and designed for a large variety of purposes, virtual environments share a factor believed to be important to their use and usefulness: a user’s experience of presence. Understood as a sense of ‘being there’ and the perceptual illusion of nonmediation, presence is a complex concept that is, among other things, a subjective property of a person. There are many factors that potentially incite as well as inhibit its manifestation. This makes presence

¹⁸ A place probe is a qualitative tool developed by Benyon et al. (2006, p. 682) in order to study the sense of place by gathering “a mixture of qualitative and quantitative data to give a rich description of people’s experiences of a place—whether real or virtual.”

very challenging to measure. One potential influence on presence that has yet to be studied in depth is sense of place. Given the latter's conceptual similarity to the sense of presence and the fact that predominant feature of virtual environments is the notion of place, it seems plausible to hypothesize that investigating sense of place is likely to contribute to advancing our understanding of the structure and manifestation of presence.

With this in mind, the central research question that this thesis seeks to address is as follows: Is sense of place a potential influence on the sense of presence in virtual environments? In tackling this issue two sub-questions are posed: 1) *Do users of Second Life experience a sense of place when engaging with this medium and if so how is it manifest?* and 2) *What is the nature of the relationship between sense of place and sense of presence?*

Chapter 3 – Methodology and Research Results

In most of the studies discussed in chapter 2, sense of presence was evaluated through participant self-report or by observing a very specific behaviour or physiological response. The key conundrum underpinning much of this work appears to be how to obtain the rich, subjective data provided by questionnaires with the more objective data obtained from a user at the very moment s/he is experiencing presence. Likewise, most research, to date, focusing on the relationship between place and presence in virtual environments attempts to measure the experience of presence through the use of questionnaires.

In order to investigate how presence is manifest in a virtual environment, this thesis focuses on references to the spatial environment in the naturally occurring conversations between users of *Second Life*. There are two principal reasons why references to space and sense of place are examined. First, the representation of detailed graphical environments combined with the bringing together of multiple concurrent users is a central feature of *Second Life* and an important dimension of the sense of place. Second, the feeling of ‘being there’ encapsulates *ipso facto* the notion of place. Therefore, it is plausible to assume that a sense of place as manifest in speech acts may be indicative, and possibly even an inducer, of a sense of presence.

The discussion in this chapter sets out how the data for this study was collected, the methodological approach used to guide the data collection process, and the research findings obtained.

3.1 Methodology and Data Collection

At a conceptual level, the approach adopted for this thesis juxtaposes Lombard and Ditton's (1997) conceptualizations of presence with Turner and Turner's (2006) sense of place framework. Turner and Turner's study is one of the first to examine the sense of place framework.

As was noted in the previous chapter, administering questionnaires and direct empirical observation are the two dominant approaches to understanding and measuring presence and each has distinct limitations in this context. A principal disadvantage of using questionnaires for presence research is that they "can be subject to distortion by participants attempting to make sense of their experience, or omitting material that may seem inappropriate, irrelevant, or simply silly" (Turner & Turner, 2006, p. 209). In much of the questionnaire-based presence research therefore, it is unclear whether participants faithfully report their experience, self-censor, or modify their reports (Frey, Botan, & Kreps, 2000). While direct observational techniques¹⁹ may, by contrast, be more objective than questionnaire-based methods, it is difficult "to establish the expected correlation of these 'objective' indexes with the inner sense of presence" (Spagnolli et al., 2003, p. 799). The main weakness here, as Witmer, Jerome and Singer (2005) argue, is that observational studies tend to be too narrow in scope and provide only an incomplete understanding of the structure of the concept of presence.

¹⁹ Direct observations of presence have tended to measure and observe a range of user responses such as physical movement during a session in a virtual environment (Freeman, Avons, Meddis, Pearson, & Ijsselstein, 2000) and changes on a functional Magnetic Resonance Imaging (fMRI) brain scan in order to detect the part of the brain that activates when the user reports feeling presence (Hoffman, Richards, Coda, Richards, & Sharar, 2003).

In an effort to circumvent such limitations, the methodological approach adopted in this thesis combines data gathered at the moment the user is experiencing the environment with subjective reports in the form of conversational data, regarding her or his experience. This hybrid method of data collection serves to provide information about the phenomenon of presence that is not available through exclusive reliance on questionnaires or direct observations. A similar approach was used by Jacobson (2001) in his investigation of the role of imagination, competence, and activity in the incitation or inhibition of presence in text-based environments (MUDs). For that study, he interviewed virtual environment users *in situ* using open-ended questions. This enabled him to “seek fuller responses than those characteristic of the fixed questions and limited answers of prepackaged surveys” (2001, p. 658) and to apply to the principles of social information processing theory in the interpretation of his findings. However, while Jacobson did gather rich qualitative information while participants were experiencing the virtual environment, the fact that the participants were aware of the interviewer may have inhibited them from experiencing presence at the moment of the interview.

The objective of the methodological component of this thesis is to identify references to place in the speech acts of *Second Life* participants, and to ascertain how the contents of these speech acts relate to different conceptualizations of presence. The primary data for this thesis was collected over a two week period in March 2009 using a laptop computer, a broadband Internet connection, a free *Second Life* account, and version 1.22.11.113941 of the *Second Life* client for Macintosh OS X operating systems. Ethics approval for the undertaking of this study was obtained from the University of Ottawa’s Research Ethics Board prior to the data being collected (see Appendix I).

Second Life offers “a naturalistic setting where millions of users voluntarily immerse themselves in a graphical virtual environment and interact with each other” (Yee, 2006, p. 309). It is divided into some 8400 regions (Linden, 2009). In order to maximize the opportunities for observing groups of users having public conversations, the ten most popular public regions or ‘Hot Spots’, as listed by Linden Labs on their main website (<http://secondlife.com/showcase/hotspots/>) initially were chosen to undertake the data collection process. These public regions, ranked in descending order were:

1. Weather Channel Island
2. Visit Mexico
3. Splitsville
4. Lost Lake Balloon Tour
5. Black Swan
6. Memorial Wall
7. Gossip Girl
8. Botanical @ Straylight
9. S.I.C.
10. Tahoe Mountain Ski Resort

However, given that each of the above regions was practically devoid of users at the time of the data collection, ten alternative regions were chosen. The ten alternative regions were selected on the basis of a live population count indicator that is provided on a map application in the *Second Life* interface. The regions from which data was collected are described in Table 3.2. In order to observe groups of two or more users having public conversations, each of the above public regions was accessed for a period of 60 minutes. Screenshots of each region are provided in Appendix II.

Table 3.2 – Data collection regions in *Second Life*

1. Artisan Haven	Artisan Haven is a series of small islands interconnected by bridges, mostly covered by buildings but with a few trees and some beaches. The data was collected in the Star Bar Martini Club on April 6, 2009 from 7:30 pm to 8:30 pm. The Star Bar itself is mainly a dance floor with a stage at one end and a bar at near the entrance. There was a live musical performance taking place on the night the data was collected.
2. Barcola	Barcola is an urban area with commercial and residential buildings, rivers and canals, and small public parks. The observation took place at one of the public parks where a large group (over 20 people) was gathered.
3. Bonifacio	Bonifacio is a region of one of the main landmasses in <i>Second Life</i> . The area where the observations took place is a central square surrounded by four open buildings. There were no particular activities taking place and the conversations observed were from several small groups.
4. Classic Rock	Classic Rock is an urban zone with stores and clubs. The observation took place in The Rock Club, an open dance floor with posters on the walls, with a stage against the back wall and benches along the other walls. There was a live performance on stage at the time of the observation.
5. Help Island Public	Help Island Public is an island with few structures and many public parks and areas. It is a place designed to help users new to <i>Second Life</i> to learn how to use its features. The observation took place outside in a public square near the middle of the island.
6. Laguna Bay	Laguna Bay is an island consisting mostly of beaches with some buildings in the middle. The observations took place on one of the beaches.
7. Misfits Cove	Misfits Cove is an urban zone with many commercial buildings. The observation took place in a club called The Orgy Room. The club is an open space with a bar, several booths, stages, and several areas where avatars can sit or participate in sexual activities. The observations took place near a circular stage where a stripper was dancing around a pole and several patrons were sitting on couches in a ring formation around the stage.
8. Sleek	Sleek is an island mostly covered with buildings. The observation took place at the Sleek Beach Club; an open structure with a dance floor, a few stages and a bar on the northern edge of the island. There was a live DJ spinning music at the time of the observation.
9. The Shelter	The Shelter is described as “a haven for those new to SL” in the <i>Second Life</i> interface. It is situated on one of the main landmasses. It is a large complex of buildings with several rooms, including a pool area, a dance floor and a theater. The observation took place in one of the main rooms, an open room with a loft, a bar, and a dance floor.
10. Waterhead	Waterhead is a region of one of the main landmasses. It is a wooded area with few buildings. The observation took place in an open cross-shaped building in the southwestern corner of the region.

With regard to the participants in this study, it is important to note that they were not recruited per se. Rather, they were selected using nonrandom, convenience sampling.²⁰ During each of the observation sessions, the researcher placed his avatar near the groupings of other users' avatars thereby enabling him to log participant conversations using the automatic logging feature provided in the *Second Life* interface.²¹

The conversation logger automatically creates a text file containing a complete record of the public conversations (which includes the name of the avatars, the time and the date) that occur within a certain radius of one's avatar.²² The logged conversations are 'chat-type' conversations, meaning that the conversation logs consist of a long column of small exchanges, each typically less than one line in length (see Box 3.1). A total of 10 hours of conversations was logged, involving a total of 307 people across the 10 different regions.²³

²⁰ Random sampling could not be used because there is no available list of the entire population of Second Life.

²¹ For the purposes of this thesis, the identity, gender, and other personal characteristics of the participants are not relevant to the assessment of a sense of place and presence through conversations. That said, with the exception of one avatar that had the form of a dragon, all of the participants observed had human-shaped avatars.

²² Users in Second Life can choose to communicate over public or private channels. With the chat-type interface, the user types a message using his/her keyboard and the message is sent either to everyone as in the case of public conversations or only to specific individuals (i.e., private conversations).

²³ Both the author of the thesis and the thesis supervisor have complete copies of the conversation logs.

Box 3.1: Sample conversation logged by the *Second Life* interface²⁴

[2009/04/04 11:44] Chipis Gupte: What do you do to a place like this?
[2009/04/04 11:44] Gemma Jardberg: i dnt know curiosity,
[2009/04/04 11:44] Chipis Gupte: (come here if you want to ..avoid the..sitters
[2009/04/04 11:45] Gemma Jardberg: ok , im coming
[2009/04/04 11:45] Chipis Gupte: !!!
[2009/04/04 11:45] Chipis Gupte: *his heartbeat reaches 352
[2009/04/04 11:45] Gemma Jardberg: :) ,
[2009/04/04 11:45] Gemma Jardberg: hahahaa lol
[2009/04/04 11:45] Gemma Jardberg: ur so funny
[2009/04/04 11:45] Chipis Gupte: you look Exacly like my ex
[2009/04/04 11:45] Chipis Gupte: (really..!!)
[2009/04/04 11:46] Gemma Jardberg: wow, is that a gd thing
[2009/04/04 11:46] Chipis Gupte: Thank you! you ll make me blush (in the wrong places
too :P)
[2009/04/04 11:46] Plain Ferryhill: i will
[2009/04/04 11:46] Gemma Jardberg: ha lol, :)
[2009/04/04 11:46] Chipis Gupte: or... the right ones ;)
[2009/04/04 11:47] Chipis Gupte: Well, your dress maches my eyes ;)
[2009/04/04 11:47] Gemma Jardberg: o ye it rily, duz, :()

The text file created by the *Second Life* client logger was transferred into *Nvivo 7*, a Windows-based software suite designed to import, sort, and analyze qualitative information ranging from text to videos. The text file was separated per region into ten parts and saved as ‘sources’ in *Nvivo*. The four dimensions of Turner and Turner’s (2006) framework and their constituent categories, as well as two additional categories created specifically for this thesis were used to create hierarchical collections of references and to categorize information obtained. Each conversation fragment (the ‘references’ in this case) was individually evaluated and copied from its source into a node; a process *Nvivo* calls ‘coding’. This process yielded 3076 coded conversation fragments.

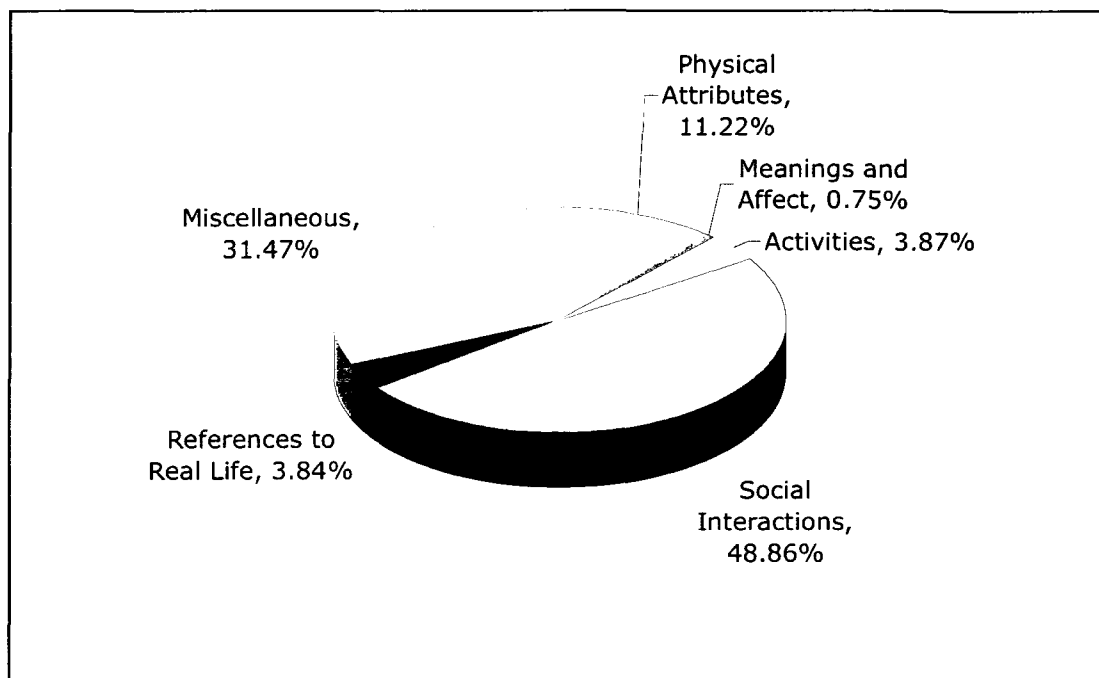
²⁴ A list of acronyms commonly used in *Second Life* is provided in Appendix III.

For each conversation fragment, six properties were examined in order to identify the dimension or category of Turner and Turner's sense of place framework in which to categorize it (e.g., Physical Attributes, Activities, Meanings and Affect, and Social Interactions). The six properties used in this thesis were inspired by Strauss and Corbin's (2004) work on grounded theory, which recommend their use when coding this type of qualitative data:

1. The phenomenon (the central idea);
2. The causal conditions (what influenced the central phenomenon such as events and incidences);
3. The strategies (how people addressed the phenomenon);
4. The context (locations of the events);
5. The intervening conditions: (what was facilitating, shaping, or constraining the strategies); and
6. The action/interaction: (strategies devised to manage, handle, carry out, respond to the phenomenon under a set of perceived conditions).

The process used in this regard was as follows: First, the text was read reflectively in order to identify which dimension of Turner and Turner's framework (e.g., physical attributes, activities, meanings and affect, social interactions) it was best categorized as falling under. This categorization process identified 1990 out of the 3076 conversation fragments as falling into one of the four dimensions. Second, an analysis of the contents of the remaining 1086 conversation fragments revealed that they could be subsequently grouped under either a 'miscellaneous' or a 'references to real life' dimension. In Figure 3.1 the distribution of conversation fragments according to these six dimensions is presented. The information shows that the distribution of conversation fragments was weighted heavily toward social interactions.

Figure 3.1: Distribution of Conversation Fragments (n = 3076)



Third, drawing upon Turner and Turner's description of the constitutive elements of their framework (see Table 3.1), the conversation fragments were further sub-divided in accordance with the sub-categories applied to three of the four dimensions.²⁵ The categories employed in this process were as follows:

1. For the Physical Attributes dimension:
 - a. Geography
 - b. Sounds
2. Activities:
 - a. Actual Activities
 - b. Desired Activities
3. Social Interactions
 - a. References to other people
 - b. Reactions to other people
 - c. References to joint activities

²⁵ Based on Turner and Turner's (2006) research results, all references associated with the Meanings and Affect dimension involved memories and feelings. Given that none of the six categorizations of presence specifically deals with memories and feelings, no sub-category was created for the Meanings and Affect dimension.

The final distribution of the conversation fragments per dimension per region is presented in Tables 3.2 and 3.3. The information presented in these two tables shows that more than a third of all conversation fragments dealt with reactions to other people and roughly another third of the conversation fragments were not coded into a dimension of the sense of place framework.

Table 3.3: Distribution of conversation fragments per region per dimension/category

	Artisan Haven	Barcola	Bonifacio	Classic Rock	Help Island Public	Laguna Bay	Misfits Cove	Sleek Nightclub	The Shelter	Waterhead	Total
Physical Attributes											345
General	18	5	31	22	19	17	51	5	23	29	220
Geography	13	7	9	2	11	1	1	1	14	10	69
Sounds	5	6	4	18	4	4	0	3	11	1	56
Activities											119
Actual	41	0	4	19	6	6	5	11	10	1	103
Desired	6	0	6	0	0	0	0	0	1	3	16
Meanings and Affect											
Social Interactions	2	0	1	3	2	4	4	3	4	0	23
Reactions to Other People											1503
Reactions to Other People	59	225	190	214	217	64	74	27	82	69	1221
References to joint activities	1	14	17	7	11	0	0	0	12	19	81
References to other people	19	49	18	23	12	14	4	6	23	33	201
Miscellaneous											968
Miscellaneous	0	70	112	145	105	55	46	112	57	266	
References to Real Life											118
References to Real Life	3	13	24	15	34	1	5	1	7	15	
Total	167	389	416	468	421	166	190	169	244	446	3076

Table 3.4: Distribution of conversation fragments per region per dimension/category as a percentage of total fragments (n=3076)

	Artisan Haven	Barcola	Bonifacio	Classic Rock	Help Island Public	Laguna Bay	Misfits Cove	Sleek Nightclub	The Shelter	Waterhead	Total
Physical Attributes											
General	0.59%	0.16%	1.01%	0.72%	0.62%	0.55%	1.66%	0.16%	0.75%	0.94%	11.22%
Geography	0.42%	0.23%	0.29%	0.07%	0.36%	0.03%	0.03%	0.03%	0.46%	0.33%	7.15%
Sounds	0.16%	0.20%	0.13%	0.59%	0.13%	0.13%	0.00%	0.10%	0.36%	0.03%	2.24%
Activities											
Actual	1.33%	0.00%	0.13%	0.62%	0.20%	0.20%	0.16%	0.36%	0.33%	0.03%	3.87%
Desired	0.20%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.10%	3.35%
Meanings and Affect											
Social	0.07%	0.00%	0.03%	0.10%	0.07%	0.13%	0.13%	0.10%	0.13%	0.00%	0.75%
Interactions											
Reactions to Other People	1.92%	7.31%	6.18%	6.96%	7.05%	2.08%	2.41%	0.88%	2.67%	2.24%	48.86%
References to joint activities	0.03%	0.46%	0.55%	0.23%	0.36%	0.00%	0.00%	0.00%	0.39%	0.62%	2.63%
References to other people	0.62%	1.59%	0.59%	0.75%	0.39%	0.46%	0.13%	0.20%	0.75%	1.07%	6.53%
Miscellaneous											
References to Real Life	0.00%	2.28%	3.64%	4.71%	3.41%	1.79%	1.50%	3.64%	1.85%	8.65%	31.47%
Total	5.43%	12.65%	13.52%	15.21%	13.69%	5.40%	6.18%	5.49%	7.93%	14.50%	100.00%

In terms of speech acts taking place within specific regions of *Second Life*, each of the ten regions used in this study generated, on average, 307.6 coded conversation fragments. As the information presented in Tables 3.3 and 3.4 reveals, it was the Classic Rock region that generated the largest number of conversation fragments (468 from 35 unique participants or 15.21 percent of the total conversation fragments obtained). However, it was the Waterhead region, which had the smallest total number of participants, that generated the second-highest number of conversation fragments ($n = 446$).

Given the limited number of regions examined, it cannot be determined with statistical certainty whether the type of region (e.g. indoors vs. outdoors) had an influence on the total amount of conversation fragments obtained. However, according to the frequency counts, more conversation fragments were obtained from outdoor locations ($n=1838$) versus indoor locations ($n=1238$). Likewise, it is unclear whether the total amount of conversation fragments obtained was influenced by specific events taking place in some regions. On average, regions with events generated 268 conversation fragments while regions without events generated 324.57 conversation fragments. The Classic Rock, Sleek, and Artisan regions, for example, all hosted live events. Yet, on average, participants in Classic Rock generated 13.4 conversation fragments per person, whereas those in Artisan and Sleek generated 6.2 and 5.8 conversation fragments per person respectively (see Table 3.5).

Table 3.5: Distribution of coded conversation fragments per region

Region	Conversation fragments	Percentage of total fragments	Unique participants
Artisan Haven - Star Bar Martini Club	167	5.43%	27
Barcola	389	12.65%	41
Bonifacio	416	13.52%	42
Classic Rock – The Rock Club	468	15.21%	35
Help Island Public	421	13.68%	43
Laguna Bay	166	5.40%	21
Misfits Cove	190	6.18%	20
Sleek - Sleek Nightclub	169	5.49%	29
The Shelter	244	7.93%	33
Waterhead	446	14.50%	16
Total:	3076	100%	307

The information presented in the above table shows that the three regions with the most unique participants – Help Island Public, Bonifacio, and Barcola – represent 41.04 percent of the total number of participants and 39.9 percent of the conversation fragments.

In the next section, the results obtained from the analysis of the conversation logs are discussed in accordance with the four dimensions of the Turner and Turner framework in order to examine in detail how the observed participants expressed a sense of place through their conversations.

3.2 Breakdown for each dimension and category

Turner and Turner provide a means of classifying and examining those portions of the participants' conversations that relate to a sense of place as well as the relationship between these conversation fragments and, more broadly, the sense of presence.

The evidence obtained from the analysis of the conversation logs suggests that 65 percent of the observed conversations (i.e., 1990 of 3076) were related to some aspect of sense of place insofar as they could be categorized as falling into one of the four sense of place dimensions proposed by Turner and Turner.²⁶ Of this 65 percent, approximately three quarters (i.e., 1503 of 1990) entailed some form of social interactions. The remaining quarter of the conversation fragments break down as follows:

- 17 percent referred to the physical attributes of *Second Life*;
- Six percent to the activities in *Second Life*; and
- One percent to the meanings that participants attribute to *Second Life* and its regions.

The remaining 1086 conversation fragments that did not fall into Turner and Turner's framework (i.e., the 1086 of 3076) fragments were organized under either the miscellaneous or reference to real life categories.

3.2.1 The Physical Attributes Dimension

The Physical Attributes dimension comprises conversation fragments that identify and/or describe features in the environment experienced by the participants, including sounds and smells. It also includes comments made about the absence of particular features in the environment. For example, a user comment about a lack of trees or a lack of colour in a particular setting would be coded as a reference to the physical attributes of a place. As such, all specific mentions of geographic features of the *Second Life* environment (e.g. objects, structures), spatial location (e.g. 'here', 'upstairs', 'North'), the appearance of avatars, and

²⁶ Recall that these are: Physical Attributes, Activities, Meanings and Affect, and Social Interactions.

sounds were coded into this dimension in order to analyze the emergent quality of the sense of place and the sense of presence.

Of the 3076 conversation fragments obtained from the logged conversations, 345 were coded into the Physical Attributes dimension. These conversation fragments represent 17.3 percent of all fragments coded into Turner and Turner’s sense of place framework, and 11.2 percent of the total conversation fragments coded.

Table 3.6 Physical Attributes Conversation Fragments (n=345)

Category	Conversation Fragments	% of total fragments
General	220	63.77%
Geography	69	20.00%
Sounds	56	16.23%

The conversation fragments coded as ‘General’ included all of the Physical Attributes fragments that reference neither the geography of *Second Life* or its sounds. Of the 220 fragments in this category, 140 fragments or 63.6 percent directly or indirectly referenced the appearance of other users’ avatars. Some illustrative examples of these references are presented in Box 3.2.

Box 3.2 : References to Avatars’ Appearance

Direct References to Appearance	Indirect References to Appearance
<ul style="list-style-type: none"> ➤ noblesse Beauchamp: tal you got a cute hat ➤ goriff Lennie: hahaha look at the funny little midget ➤ Eloise Baily: Never noticed the socks Chas. Tres chic ➤ Remko Haller: because of all that hair Jody Jaxxon: hair what hair? Remko Haller: your cubic hair.....lmao” 	<ul style="list-style-type: none"> ➤ goriff Lennie: get dressed ➤ Elizabeta Taov: KEEP YOUR EYES TO YOURSELF!!! ➤ Kri Winsmore: I like..lost a couple mins from SL....at least I can back dressed 0.o

Fifty or 22.7 percent of the conversation fragments in coded as ‘General’ referenced space or position. Included here are all conversation fragments using prepositions such as ‘there’, ‘here’, and ‘where’ as well as other fragments indicating the location of something or someone. The remaining 30 conversation fragments in this sub-category referenced other places in *Second Life* or were conversation fragments wherein users referred to their current location as a place. Some illustrative examples are provided in Box 3.3

Box 3.3 : Conversation Fragments Referencing Space, Position, and Place

Conversation Fragments Referencing Space or Position	Conversation Fragments Referencing Place and other Places
<ul style="list-style-type: none"> ➤ Ryokashi Revestel: I didn't orb him because he was standing too close to Star and I was afraid it'd hit her. ➤ Ken Meridoc: want to go some where ➤ Inara Marquette: whos touching you? ➤ Lovely Firehawk: i got lost so i came here ➤ Elizabeta Taov shouts: PORTABELLO WELCOME TO YA OVER THERE!!!! ➤ Siobahn Marville: coz i'm right behind him...giggle 	<ul style="list-style-type: none"> ➤ The Rock Donation Flame: Support this place ... ➤ Raspberry Kiwi: FRIENDS DONT LET FRIENDS STAY HOME AND PLAY WITH THEMSELVES ➤ Axle Bookmite: sorry i just came from a sim ARing something for copyright infrigment ➤ pagan Gloom: i need to find some more places to get free clothes ➤ Lysette Andel: i have some landmarks for some

The Geography sub-category comprises conversation fragments that reference actual geographical and physical features (e.g. buildings, gardens, objects, etc.) in the ten regions from which the data was collected. In total, 69 references, or 20 percent of total conversation fragments in the Physical Attributes dimension, were coded into this sub-category. Of these, 69 references to physical features of the environment, 11 were produced by automated scripts (i.e., messages delivered by the system) that are triggered when a user’s avatar moves to a specific location in a region or that are broadcast to all users at specific intervals. The

remaining 58 fragments were generated by the participants and included statements such as “step away from the box” and “the river is running the wrong way.”

Only 56 conversation fragments, or 16.2 percent of the total conversation fragments in the Physical Attributes dimension, referenced sound. The sounds to which participants referred were either music or voices. Nine of these references were about the voice chat²⁷ feature of *Second Life*, with the remaining 47 conversation fragments referring to music (despite the fact that the participants were communicating through typed text). This may be explained, in part, by the fact that three of the ten regions had live musicians performing or offered live music at the time that the conversations were logged. No mentions of the ambient sounds one hears in most *Second Life* regions (e.g., birds chirping, wind blowing, or of the sound effects produced by other users such as comedic sound effects, the noise generated by a user’s jet ski, etc.) were identified.

3.2.2 The Activities Dimension

The Activities dimension of Turner and Turner’s framework centers upon actual activities that are afforded by the medium being investigated and activities that users would like to do or be able to do. Such references might include comments about wanting to move about and/or more fully explore the environment they are experiencing. Of all the conversations logged, some 119 referenced ongoing, past, or desired actions related to games, hobbies, work, and other specific pursuits (see Table 3.7).

²⁷ It was discovered during the observations that some groups mixed voice and text-type chatting. Because the voice chat feature had not been activated, not all questions and replies were captured in some conversations.

Table 3.7 Activities Conversation Fragments (n=119)

Category	Conversation Fragments	% of total fragments
Actual	103	86.55%
Desired	16	13.45%

The conversation fragments that were coded into this dimension fall into two categories: those relating to actual activities and those referring to desired activities.

In total, 103 of the conversation fragments, or 86.5 percent of all conversation fragments in the Activities dimension, directly referred to actual activities that users were participating in at the time when the conversations were logged or had participated in the recent past.

There were only 16 instances in which the participant mentioned an activity that s/he wished to engage in. None of the conversation fragments in the ‘desired’ sub-category entailed users expressing frustration or discontent about not being able to do something in *Second Life*. Instead, all of these references were comprised of statements such as:

- “13 Jun: why do you want to have sex?”
- “Talatha Larnia: we need to do something really fun
Valerie Allerhand: like what?
Valerie Allerhand: buzz the tower?
Talatha Larnia: we could do that”
- Rigamortis Titanium: woo hoo love this song , anyone wanna dance
- Marleina Baily: man I wanna get married SL tayle

3.2.3 Meanings and Affect

The Meanings and Affect dimension is difficult to code for given its subjective nature. In their study, Turner and Turner (2006) included references wherein users mentioned being reminded of other similar places or associated specific emotions (e.g., positive or negative)

with the environment they were experiencing. These authors explain that this dimension is meant to include connotations, denotations, and associations about the environment in question. For example, using a virtual botanical garden environment, Turner and Turner coded into this dimension references that contained mentions of being reminded of holidays or other botanical gardens.

For this thesis, conversation fragments that mentioned emotions or attributed emotional qualities to the *Second Life* environment were coded into the Meanings and Affect dimension. Of the 3076 conversation fragments collected, only 23, or less than one percent of all the conversation fragments coded, were coded into this dimension and they are all listed in Box 3.4.

Box 3.4 : Conversation Fragments coded into the Meanings and Affect Dimension

1. Joi Shepherd: ,ô •-'-¥-®',Ä ¢-∞ Star Bar -∞,Ä ¢-¥-®'-ª,ô •
Joi Shepherd: Dance, Love, and Friendship
- Joi Shepherd: ,ô •-'-¥-®',Ä ¢-∞ Romance and Class-∞,Ä ¢-¥-®'-ª,ô •
2. Announcer V3.0: OUR GOAL IS TO PROVIDE OUR GUESTS A STYLISH AND REFINED CLUB TO ENJOY MUSIC, DANCING AND FRIENDLY CHAT.
3. 13 Jun: what does this mean
4. Wysper Sweetwater: very significant apparently
5. Kai Thorkveld: We rz therfore we are?
6. Dayvid Elton: I iz, therefore I Rizz?
7. Thebeadfairy Constantine: Please give what you can to our beautiful DJ Iveah and our Club....They ONLY exist for our entertainment, Thank you :)
8. Inara Marquette: and it made me feel like crap
9. Sippie Andel: No - we're in a PG area
10. Nikki Redgrave: its more fun
11. Jody Jaxxon: o this place is dead
12. Remko Haller: no fun here
13. Levaunt Villiers: im rich! i got 100 credits already lol
14. Carrey Parkin: Enjoy your stay.
15. Chipis Gupte: What do you do to a place like this?
Gemma Jardberg: i dnt know curiosity,
16. Chipis Gupte: Do you like this place ?
Gemma Jardberg: its ok , u ?
Chipis Gupte: Well.. there are pretty women around so..yes :)
Chipis Gupte: But can be kinda..distracting..
Gemma Jardberg: ye i guess so,
17. Gemma Jardberg: its interesting here
18. Carrey Parkin: Mmm, is it getting hot up here?
19. SLeek Beach Club: + + + Please don't forget to Tip our DJ and the sexy Performers. We love YOU + + +
20. Gasas Turbo: FUCK ALL OTHER CLUBS
21. Gasas Turbo: THIS CLUB IS THE BEST
22. Rigamortis Titanium: i love this place ;)
23. Rigamortis Titanium: hehe you look like your having fun Kaeli

3.2.4 The Social Interactions Dimension

Any conversation fragments that were identified as mentioning other people (present or not), commenting on the absence of people, being replies to questions or reactions to what someone else said or did, and references to joint activities were coded into the Social Interactions dimension. More conversation fragments were coded into this dimension than into any of the other three dimensions of the Turner and Turner framework (1503 of 1990 conversation fragments). This finding holds for every region observed independent of the

total number of people observed therein, ongoing activities, and/or the physical attributes of the region.

The conversation fragments coded into this dimension can be divided into three sub-categories: Reactions to other people, References to other people, and References to joint activities.

The ‘Reactions to Other People’ category comprised any conversation fragments that contained obvious reactions to something another user did or said. A majority of the conversation fragments (1221 out of 1503 or 81.2 percent) coded into the Social Interactions dimension fell into this category (see Table 3.8). A large portion (294 or 24.07 percent) of these fragments was greetings and goodbyes.

Table 3.8 Social Interactions Conversation Fragments (n=1503)

Category	Conversation Fragments	% of total fragments
Reactions to Other People	1221	81.24%
References to Joint Activities	81	5.39%
References to Other People	201	13.37%

An additional 417 conversation fragments (34.2 percent of the conversation fragments in this sub-category) contained exclamations such as ‘brilliant’, ‘thanks’, and ‘applause’ that were in reaction to someone else rather than the environment. Another 255 conversation fragments (20.9 percent) consisted of reactions to people through the use of acronyms and emoticons (e.g. ‘lol’, ‘lmao’, ‘rofl’).²⁸ The remaining 255 conversation fragments in this sub-category

²⁸ A list of the most common acronyms used in text-type chat is provided in Appendix II.

comprised responses to questions. Some examples of the conversation fragments coded into the Reactions to other people sub-category are presented in Box 3.5.

Box 3.5 : Conversation Fragments coded into the Reactions to Other People Category

- Fio Frangilli: Awesome Z!
Ixmal Supermarine: Brilliant!!!!!!
Brickhouse Frog: you will be after Z sings it
- Veronica Weksler: lmao
- Madmax Huet: Hiya everyone :)
- Kaitlyne Karu: *GIGGLES* :)~~~~ Ryo
- angie Inventor: fine
- 13 Jun: hahahaha
13 Jun: I have heard that before
- Jernae Sweetwater: ahaha we do
Jernae Sweetwater: oh yeah?
- isabou Avro: APPLAUSE!!!

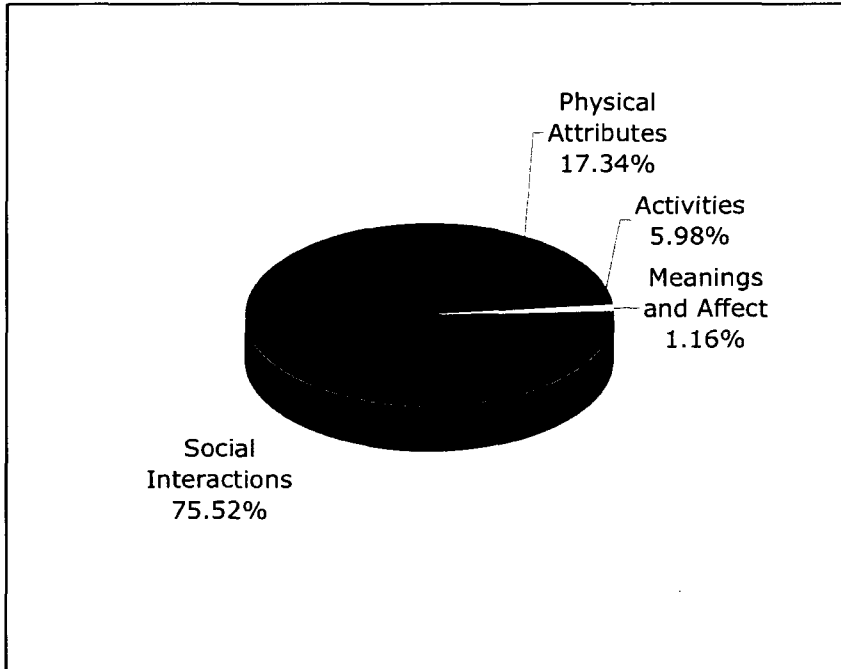
The conversation fragments coded as ‘References to Other People’ include statements that explicitly mentioned someone else by name or used a pronoun such as ‘he’ or ‘she’, or that used allusions to groups of people. Some 201 conversation fragments (13.37% of the conversation fragments coded into the Social Interactions dimension) were classified as falling into this sub-category.

In order to minimize overlap between the Activities dimension and the ‘References to Joint Activities’ sub-category, only references that specifically used the pronouns ‘we’, ‘us’, and ‘they’ or that referenced activities involving more than one person were coded into the References to Joint Activities sub-category. This process yielded 81 conversation fragments, representing 5.3% of total fragments coded into the Social Interactions dimension.

In sum, the coding of data generated by the conversation logger provided in the *Second Life* interface yielded 3076 conversation fragments. A little more than two-thirds or 64.69

percent of these conversation fragments (n=1990) fell into one of the four dimensions of Turner and Turner's sense of place framework (see Figure 3.2).

Figure 3.2: Distribution of Conversation Fragments coded into Turner and Turner's sense of place framework



The remaining 1086 conversation fragments were classified as either 'Miscellaneous' or 'References to Real Life'. These two categories created specifically for this thesis to account for conversation fragments that did not fall directly into Turner and Turner's sense of place framework but which nevertheless had the potential of relating to a sense of place or a sense of presence. The discussion in the next section provides a detailed overview of the conversation fragments placed into these 'new' categories.

3.3 Conversation fragments coded outside the framework

Some 1086 conversation fragments, or 35.3 percent of the total conversation fragments did not reference the physical attributes of *Second Life*, its activities, the social interactions taking place therein or the meanings the participants expressed about their experiences.

Therefore, two new categories – References to Real Life and Miscellaneous – were created in order to organize these conversation fragments and to examine whether their contents might nevertheless have implication vis-à-vis the relationship between sense of place and sense of presence.

3.3.1 References to Real Life

The category ‘References to Real Life’ emerged out of the literature review on the concept of presence and was created specifically to identify those conversation fragments containing references that clearly indicate that a participant is not experiencing presence at that particular moment.

It was created because of its potential relevance to both the sense of presence and the sense of place. Specifically, references to the real world or to real life while a user is immersed in a virtual environment imply that the user is not experiencing a sense of place or a sense of presence at that particular time insofar as their perception of ‘here’ becomes the real world. Judging from the analysis of the conversation fragments collected, it would appear that *Second Life* essentially is transparent to its users. Put simply, very few comments about the medium itself (e.g. about the interface, the features, or the world itself) were identified.

Likewise, relatively few mentions of the real world were identified in the logged conversations. In total, 117 fragments of the total 3076 or 3.8 percent were coded into this new category. These conversation fragments consisted of either direct references to people, things, or events in real life or to what the participant was doing or going to do outside of *Second Life*. Also included in this new category were conversation fragments that specifically used the terms 'real life' or 'RL'. Some examples are provided below:

- "Cambria Mimulus: Z, we'll see you, Fio has some RL stuff to do... have a great night :)"
- "Pirate Graves: I just a sweet pc and it lags 4 me so i can only imagine for others"
- "maz Perian: must be hard to deal with rl"
- "Cauchy Verne: are you italian?
Tanglecosm Steamweaver: No american"
- "Summer Burt: what is wrong with Canada"
- "noblesse Beauchamp: i have a horse in rl....i never heard about that"
- "13 Jun: scientology is not so much seen in australia"
- "Christi Magic: sry was on the phone"
- "Jernae Sweetwater: yeah he's gonna be huge"

3.3.2 Miscellaneous

Any conversation fragment that could not be coded into one of the four dimensions of Turner and Turner's framework or the References to real life category was placed in this category. The 968 conversation fragments coded into this category consist of system messages, statements, random exclamations and onomatopoeia, reactions where it was unclear whether or not it was to a person or something occurring in the environment, and fragments in languages other than English.

3.4 Conclusion

The evidence presented in this chapter suggests that within *Second Life* the sense of place experienced by users is closely linked to the social interactions in which they engage. Indeed,

the conversation fragments coded into the Social Interactions dimension of the Turner and Turner framework represent approximately three quarters of all the place-related conversation fragments coded for this thesis. Moreover, the sense of place also is evident in the reactions of *Second Life* users to other users of the medium. Reinforcing the notion of a potential link between sense of place and the social aspect of *Second Life*, is the finding that some 40 percent of the conversation fragments coded into the Physical Attributes dimension of the Turner and Turner framework reference the appearance of other users' avatars.

However, not all of the conversation fragments logged could be coded in accordance with the dimensions of place set out by Turner and Turner's framework. Consequently, two new analytical categories were created. First, a 'References to Real Life' category was created to identify conversation fragments that indicate when participants most likely do not experience a sense of place or a sense of presence. Second, a 'Miscellaneous' category was created in order to account for the remaining collected conversation fragments.

In sum, using the sense of place framework as an analytical tool permitted the organization of the raw conversation logs provided by the *Second Life* interface on the basis of specific categories. It also provided a means of identifying specific portions of user conversations relating to the sense of place and, to some extent, how the participants experienced sense of place. The implications of this categorization and identification process are discussed in the next chapter.

Chapter 4 – Analysis

The discussion in this chapter examines the role that references to place play as an influence on the experience of presence. Particular attention is given to:

1. Whether a particular dimension of the sense of place recurred more often than others and what this means in terms of sense of place as a factor in the sense of presence;
2. Whether a particular conceptualization of presence is more often associated with specific dimensions of sense of place and the implications thereof;
3. Whether, globally, sense of place indicators in naturally occurring conversations in *Second Life* are indicators or potential influences on the sense of presence; and
4. Whether conversations between users in a virtual environment can contain indicators of presence.

As was discussed in the previous chapter, the data collected for this thesis suggests that the participants observed in *Second Life* experience a sense of place, especially through social interactions. Specifically, 64.7 percent of the content of the observed participants' conversations reference the some aspect of place. Given that space and place is a predominant feature of *Second Life* and that the structure of presence and its potential determinants are still largely unclear (Ijsselsteijn et al., 2001; Lombard & Ditton, 1997), the discussion focuses on the relationship between each dimension of Turner and Turner's sense of place framework and each of the six conceptualizations of presence, provided by Lombard and Ditton (1997), in accordance with the empirical data obtained from the conversation logging exercise.

4.1 Conceptualizations of presence and Sense of Place

As was discussed in Chapter 2, Lombard and Ditton (1997) point out that research about presence-related research and theorizing can be divided into six categories (See Table 4.1).

Table 4.1 – Lombard and Ditton’s Conceptualizations of Presence

1. Presence as social richness	The medium provides rich verbal and nonverbal information for social interactions.
2. Presence as realism	Objects and entities in a medium should appear perceptually (if not socially) vivid and real.
3. Presence as transportation	There is no border between “this side” and “the other side” of the medium so users can perceive that they have moved to the other side, that objects/entities from the other side have entered their immediate environment, or that they and other users are sharing a real or artificial environment.
4. Presence as immersion	The illusion of nonmediation is believed to be more complete if the medium is perceptually immersive (i.e. it immerses the senses) and psychologically immersive (induces feelings of engagement).
5. Presence as social actor within medium	People or entities in the medium are responded to just as they would in nonmediated communication even if there is no possibility of true social interactions with them.
6. Presence as medium as social actor	The medium itself presents the users with social cues normally reserved for human-human interaction and is thus perceived not as a medium but as an independent social entity.

It is important to recall that the six categories of presence listed in Table 4.1 are not mutually exclusive. In other words, a user in a virtual environment may experience any one, or any combination, of these six conceptualizations of presence. This is due, in part, to the fact that the central idea pervading each of these conceptualizations is that “a person fails to

perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there” (Lombard & Ditton, 1997).

Turner and Turner (2006) argue that because the sense of place, much like the sense of presence, emerges from the interactions between an individual and the virtual environment, the sense of place is a content factor²⁹ for the sense of presence. In other words, the sense of place is a factor that might influence the sense of presence, much like other contents of virtual environments such as objects, events, actors, and interactivity are considered to be (Ijsselstein, De Ridder, Freeman, & Avons, 2000).

With this in mind, the relationship between sense of place and each of the six categories of presence is examined below.

4.1.1 Presence as social richness

The notion of presence as social richness is linked to whether, how, and the extent to which a particular medium provides verbal and nonverbal information for social interactions.

Lombard and Ditton (1997) explain that presence as social richness “is related to two important concepts originally applied to nonmediated interpersonal communication: intimacy and immediacy.” In other words, during mediated communication, a participant might feel presence as social richness if s/he feels that the medium is sociable, warm, or personal. For example, in a study comparing the effect of text-chat, audio-, and video-conference technologies on collaboration in a virtual environment, participants reported perceiving more

²⁹ Recall, Lombard and Ditton (1997) organized the potential determinants of presence into three categories: Form of the medium, Content of the medium, and Characteristics of the medium user.

presence as social richness with the audio- and video-conference systems than with the text-chat one (Sallnäs, 2005). This finding supports Rice's (1992) argument that a medium that can transmit more social and nonverbal cues of conversations will increase the feeling of presence as social richness (which he calls 'social presence') in the communicating participants. Some of those social and nonverbal cues are physical proximity, eye contact, and the intimacy of the conversation topic.

The evidence obtained from the analysis of the conversation fragments of *Second Life* participants suggests that this virtual world may be perceived by its users as being highly personable and social insofar as almost one half of the total conversation fragments were identified as referencing some form of social interactions (see Table 3.2). Some 64 percent of the conversation fragments (966 of 1503) coded into the Social Interactions dimension of Turner and Turner's framework consisted of greetings, expressions of gratitude, the use of acronyms (e.g., LMAO, LOL, ROFL), encouragements, and the use of gestures (see Table 4.2). The remaining 537 conversation fragments in this dimension consisted of various reactions and responses to other users.

Table 4.2 : Conversation Fragments relating to Social Richness

<i>Type of Activity</i>	<i>No. of Conversation Fragments (n=1503)</i>	<i>% of Total Sense of Place Fragments (n=1990)</i>
Greetings and goodbyes	294	14.77%
Use of acronyms	255	12.81%
Encouragements	45	2.26%
Expressions of gratitude	341	17.14%
Use of gestures	31	1.56%
Various reactions	537	26.98%

Other place-related indicators of presence as social richness were identified through the participants' use of emoticons, which were present in conversation fragments classified into each of the activity types listed in Table 4.2. In total, 178 conversation fragments (or 11.84% of the 1503 conversation fragments in the Social Interactions dimension) contained emoticons.

Given that the activities identified in Table 4.2 are generally used to create, or raise, immediacy and intimacy in both mediated and non-mediated interpersonal communication, it is reasonable to conclude that their identification in the logged conversations suggests that the *Second Life* environment may be seen as being 'socially rich' and, therefore, likely to help foster a sense of place and a sense of presence among users. This observation is consistent with Heeter's claim (1992, p. 270) that

people want connection [with other people] more than any other experience. Placing more than one person in a virtual world may be an easy way to induce a sense of presence regardless of the other perceptual features of the world.

4.1.2 Presence as realism

In order for this category of presence to manifest itself in a virtual environment such as *Second Life*, objects and entities, as experienced by users, should appear to be perceptually and/or socially vivid and real.³⁰ In terms of identifying conversation fragments referencing a sense of place that are also indicative of presence as realism, it is expected that most of these will be found in the Physical Attributes dimension of Turner and Turner's framework. From

³⁰ Perceptual realism is usually evaluated by the user in terms of how realistic is the stimuli being perceived. Since *Second Life* is accessed through a personal computer with a standard keyboard, mouse, screen and speakers, there is no stimulus of the senses of smell, taste, and touch.

the outset, it must be acknowledge that in visual terms, *Second Life*'s graphics are not photo-realistic. However, most of the regions where participant conversations were logged were 'life-like' insofar as they contained features that one encounters in real life (e.g., buildings, trees, bottles, people, etc.). Moreover, almost all of the observed participants' avatars had a human form.

Given that the Physical Attributes dimension of Turner and Turner's framework focuses specifically on features and qualities of the medium being investigated, conversation fragments coded into this category contained comments pertaining to the realism of the environment that the participants were experiencing at the time that the conversations were logged. Only one of the 345 conversation fragments coded into this dimension directly expressed a view about the realism of the environment. In this instance, the participant observed that, "the river is running the wrong way", thus implying that s/he did not perceive the environment to be very realistic.

In three of the regions at which the conversations were logged for this study, live musical events were taking place concurrently with the logging process. A total of 56 conversation fragments were identified as commenting on the sounds in *Second Life*. All of these comments were either about the music playing (n=40), the voices of other users (n=15) or sounds made by other users (n=1). No conversation fragments commenting on sounds being realistic, or not, were identified.

In terms of the potential of a virtual environment to generate a sense of presence, the lack of comments – positive or negative – about the realism of the graphics and sounds in *Second*

Life is important because the identification of such comments would suggest that users were experiencing/evaluating the environment from an outsider's perspective. Put simply, the lack of realism-related comments suggests that users may have been experiencing presence or at least some semblance thereof at the time when the conversations were logged.

As was discussed in Chapter 2, a second dimension of presence as realism relates to the issue of social realism, or "the extent to which a media portrayal is plausible" (Lombard & Ditton, 1997). The question here is whether a user can believe in what happens in the medium and/or how the medium behaves, including the consequences to the user's actions (e.g., how a door closes, how an object falls). With this in mind, attempts were made to identify conversation fragments were sought that contained a mention of an event (i.e. something that is happening in the environment) or a participant's reaction to an event (as opposed to a reaction to a person). For example, a participant might react to the many events and/or activities taking place in *Second Life* that are not socially realistic; the most common being the ability of every avatar to fly.³¹ In total, 14 of the 119 fragments coded into the Activities dimension referenced a specific event. However, further analysis suggests that the mere mention of an event is not indicative of presence as social realism insofar as such a mention offers no indication as to whether the participant feels the event is plausible. The following examples illustrate this conclusion:

- Fio Frangilli: MAAAAAAAAAAAAAAAAAIN EVENT
- Raspberry Kiwi: Come party with us around the clock!

³¹ Many regions disable this feature. Although none of the 10 regions visited for this thesis disabled flying globally, it was not possible to fly while inside the buildings in Classic Rock, Misfits Cove, The Shelter, and Artisan Haven.

- Xen Zelnik: woot! one of my toys is being put in an easter egg, for a hunt in Furnation. :3

In actuality, 9 fragments that can be related to presence as social realism were coded into the Miscellaneous and References to RL categories. This occurred because the fragments coded into these categories contain mentions of events that could not happen in the real world and thus may be seen as indicative of the user not experiencing presence as social realism (see Box 4.1).

Box 4.1 : Conversation Fragments Referencing Events

- comorn Ireto: is laggin bad
- Nikki Redgrave: probably not as laggy where she is
- Lucie Scorbal: REZ DAMNIT! >:(
- Astra Paris: Needs to rez it.. first.
- ok...i just tried to rez a poseball....nothing is happening
- Pirate Graves: lag city
- Flying Low: lag
- Raspberry Kiwi: LAG IS OUR FRIEND!!!
- Footem Tidewater: particles=lag

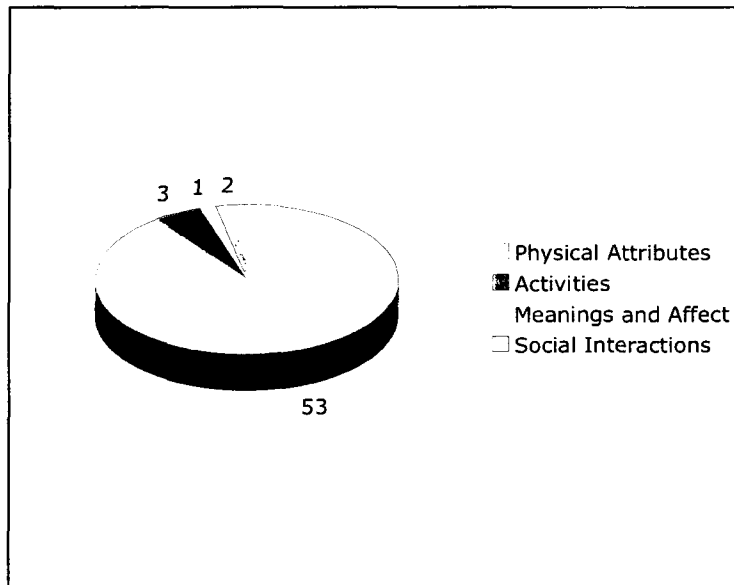
In the first two conversation fragments provided in Box 4.1, the participants mention ‘laggin’ and ‘laggy’, which often is referred to as ‘lag’. This refers to a slowdown of the system and a stuttering of the graphics in *Second Life*. This issue tends to arise when there are too many people in a specific region or when the *Second Life* server experiences difficulty in processing information. The mention of ‘REZ’ (or ‘rezzing’) in the next two fragments refers to the activity of making objects that one has created (e.g., clothes, buildings) appear in the environment. Conversation fragments of this nature may be seen as suggesting that the user is not experiencing presence as social realism at that particular moment because it implies that they are focusing on problems with the medium itself. And, as such, the medium may no longer be considered to be transparent.

Overall, none of the conversation fragments coded into the Activities dimension of the Turner and Turner framework made direct mention of the perceived realism of the *Second Life* environment. The implication of this finding vis-à-vis the relationship between sense of place and the experience of presence is ambiguous. On the one hand, it could be interpreted as suggesting that sense of place is not a determinant factor in the manifestation of presence as realism. This is because when an environment feels real, people will not vocalize this feeling to others. On the other hand, with the exception of one user observation, the absence of any comments relating to the realism of the *Second Life* environment may be indicative of the ‘naturalness’ of this virtual world and, therefore, indicative of the participants experiencing a sense of presence.

4.1.3 Presence as transportation

Presence as transportation manifests itself when users can perceive that they have moved to the ‘other side’ of a medium (‘I am there’), that objects/entities from the other side have entered their immediate environment (‘there is here’), or when they and other users are sharing a common environment (‘we are here’). A total of 59 conversation fragments spanning all four dimensions of Turner and Turner’s sense of place framework were identified that suggested presence as transportation (see Figure 4.1).

Figure 4.1: Distribution of conversation fragments for presence as transportation



In total, 45 out of the 59 conversation fragments (or 76.27 percent) were identified as representing presence as transportation involving a feeling of being on the other side ('I am there'). For example, in a conversation fragment coded into the Geography category of the Physical Attributes dimension of Turner and Turner's framework, a participant said 'come here next to me'. What s/he meant by 'here' was the location where her/his avatar was, not the room in which s/he was physically sitting while at the computer. Effectively, this participant was on the 'other side' and may have been experiencing presence as transportation at that specific moment.

Failing to distinguish between an image and its referent is a necessary condition for the manifestation of presence as transportation where the user feels that objects and people from another place are brought into the participant's environment ('There is here'). Given that

Second Life is experienced through a standard personal computer, it is unlikely that an adult will feel that the people and objects in *Second Life* come into her or his immediate physical environment. The fact that no conversation fragments supporting this type of presence as transportation were identified suggests that this is indeed the case. Fourteen conversation fragments were identified that might indicate the third type of presence as transportation; that of the sense of sharing a common place ('We are here'). Although there was only one conversation fragment in which a participant explicitly stated "we are here", it is reasonable to assume that most fragments containing the pronoun 'we' and a reference to a specific or general location might also be indicative of this type of presence as transportation. Table 4.3 lists the fourteen conversation fragments that were found to combine those the pronoun 'we' and a reference to a location.

Table 4.3 : Conversation Fragments indicative of presence as transportation

Originating Dimension	Conversation Fragments
Physical Attributes	<ul style="list-style-type: none"> ➤ 13 Jun: which country are we in Rich ➤ Alitell Offcourse: Inara ...can we switch locations for a couple days ➤ Ronan Sharktooth: what is this place? ➤ Lovely Firehawk: where we started ➤ Joi Shepherd: We hope you are enjoying The beautiful Star Bar, and this amazing artist. ➤ Announcer V3.0: WE HAVE A "COUPLES" DANCEBALL ABOVE THE STAGE, A "SINGLES" DANCEBALL ABOVE THE BAR AREA AND OTHER DANCES AROUND THE DANCE FLOOR. ➤ Raspberry Kiwi: LET'S SEE IF WE CAN PACK THIS PLACE TONIGHT ➤ Marleina Baily: Over here we have a gay lion.
Activities	<ul style="list-style-type: none"> ➤ Kai Thorkveld: we make a lot of good music up here :) ➤ Jan Szarbark: Next time we go to a nude beach! ➤ Inara Marquette: know whats weird Inara Marquette: someone said we are all anti social... Inara Marquette: but we are here and being very social?
Meanings and Affect	<ul style="list-style-type: none"> ➤ Sippie Andel: No - we're in a PG area
Social Interaction	<ul style="list-style-type: none"> ➤ Raspberry Kiwi: TP EVERYONE ON YOURFRIENDFS LIST LET'S SEE HOW MANY PEOOPLE WE CAN GET HERE ➤ maz Perian: ah well there we are then

In sum, although the majority of conversation fragments referencing some form of the sense of presence as transportation (53 out of 59 or 89.8%) had been coded into the Physical Attributes dimension, with the remaining 6 distributed across the other three dimensions of Turner and Turner's framework. This is noteworthy insofar as only presence as transportation and presence as immersion have sense of place associated conversation fragments in all four dimensions of the framework. This suggests that sense of place is potentially better indicative of presence as transportation and/or immersion than of the other four conceptualizations of presence.

4.1.4 Presence as immersion

The illusion of nonmediation is more complete if the medium is perceptually and psychologically immersive. Presence as immersion is divided into two sub-categories: perceptual immersion and psychological immersion. The former refers to the degree to which the senses are immersed in the virtual environment, whereas the latter refers to feelings of being involved, absorbed, engrossed, and engaged in the medium and/or that the medium (or the experience of it) is "intense," "fun," "competitive," "addictive," and "exciting." As is the case for notions of presence as realism, direct mentions of how immersed one feels in *Second Life* would imply that the user is evaluating the environment from an outside perspective and, therefore, not experiencing presence as immersion (or any kind of presence for that matter).

The complete or partial immersion of the senses when experiencing a virtual environment may also help induce a sense of place insofar as it becomes more difficult for its users to be aware of their immediate surroundings. Given the adjectives used to determine the

experience of presence as psychological immersion, the Activities dimension of Turner and Turner's framework is the most likely to contain conversation fragments that indicate both a feeling of sense of place and feeling of presence as psychological immersion.

Assuming that the participants for this study accessed *Second Life* through a typical home computer setup, the only sense that could be completely immersed would be the sense of hearing if s/he used headphones. It is unlikely, therefore, that the participants in this study felt a strong sense of presence as perceptual immersion given that that phenomenon usually is measured in terms of how many senses are completely immersed within a particular environment (Lombard & Ditton, 1997). Particular attention was paid therefore to the 56 conversation fragments identified as referencing sounds in the *Second Life* environment. Of these, 46 were considered to be indicative of presence as perceptual immersion because they were characterized by comments such as, "wow i love this song, too", and "thats loud lol thanks". The common trait shared by these 46 conversation fragments was that they all could conceivably come from someone in a nonmediated environment. This finding suggests that at the particular moment the conversation fragments were logged, the participant's sense of hearing was immersed in the environment of *Second Life* and that s/he may have been experiencing presence as perceptual immersion or some semblance thereof.

Conversation fragments specifically mentioning sounds or other sensorial stimuli coming from outside the *Second Life* environment are clear indicators that the participant is not immersed in the environment. These fragments are noteworthy as they most likely also indicate that the participant is not experiencing a sense of presence and/or a sense of place.

Four such conversation fragments were coded into the References to Real Life category.

They were:

- "Valky Oldrich: yes brb my boss needs me"
- "Robin Roar: sorry Im watchign CNN"
- "Robin Roar: and yes there is a game going on"
- "Robin Roar: not at all sorry -- on the phone"

Since it is also possible for a participant to feel psychologically immersed in an environment even when none of her or his senses are immersed, conversation fragments containing the keywords "intense," "fun," "addictive," "exciting," and "competitive" also were scanned for in the data collected for this thesis. In total, only 18 conversation fragments were identified that might be considered to be indicative of psychological immersion insofar as they contained one or more of the keywords listed above. Seventeen of these conversation fragments contained the word 'fun' and one contained the word 'exciting'. However, in six of these conversation fragments, the participant was using 'fun' as an expression (e.g., "have fun"; "I have Noooooo! fun bitz"; "have fun!"; "you have fun sugar, going to walk around some"; "you happy kwazy peeps have fun - I gotts to run"; and "bye m8 have fun"). By contrast, the remaining 12 conversation fragments suggest that a process of psychological immersion may be occurring insofar as they indicate that the participant is having fun. They are:

- "Ryokashi Revestel: Wow. Speech recognition is fun to mess with."
- "Kri Winsmore: Well..that was fun"
- "Songstra Soothsayer: ok - my fun tank has been refilled - now I have to work"
- "Ryan Hydraconis: did i miss anything exciting while i was out?"
- "Talatha Larnia: we need to do something really fun"
- "Nikki Redgrave: its more fun"
- "Remko Haller: no fun here"
- "Rigamortis Titanium: hehe you look like your having fun Kaeli"
- "Jan Szarbark: I have done it and it was fun and pretty"
- "Sky Shamen: and more fun"
- "Rigamortis Titanium: always dates no fun for me when i log in"
- "Bronx Nirvana: OH I HAVE EVEN MORE FUN IN RL THO.. LOL"

Taken as a whole, the evidence obtained from the analysis of the logged conversations with regard to presence through immersion suggest that the *Second Life* environment is more likely to foster psychological immersion than perceptual immersion. This likely is due to the fact that *Second Life* is accessed through a personal computer, which is a technology that does not completely immerse any of the senses.

4.1.5 Presence as social actor within medium

This conceptualization of presence is seen to manifest itself when a participant responds to people or entities in the medium just as s/he would in nonmediated communication yet there is no possibility of true social interactions between parties. This interaction can be verbal communication, non-verbal communication and activities. In *Second Life*, this situation could arise if a participant attempted to engage in a conversation with one of the many representations of humans that are not directly controlled by humans. These representations, called 'bots', which usually serve as mannequins, greeters, and information kiosks, are activated by a script when an avatar is detected to be in specific locations or in the proximity of specific objects. There were no bots in the regions where the conversations for this thesis were logged.

Nonetheless, there is one set of circumstances in *Second Life* that might constitute an example of presence as social actor within medium. When a user steps away from the computer, s/he can indicate that they are away and a notice will float above their avatar. This user is considered to be 'Away From Keyboard' (AFK). The following exchange between

users that was logged from the Barcola region, is the only conversation fragment in the entire data set that illustrates what can happen when user does not indicate that they are away:

- “Ryokashi Revestel: You're talking to someone who is AFK”
- “Ryokashi Revestel: Arguing with a person who is AFK. That takes a special kind of person.”
- “maz Perian: yeh well when he come back tell the prick”

This example suggests that conversation fragments coded in accordance to the four dimensions of Turner and Turner’s Sense of Place framework may not account for presence as social actor within *Second Life* given that none of these dimensions (Physical Attributes, Activities, Meanings and Affect, and Social Interactions) can accommodate a one-sided conversation between a human and a bot.

4.1.6 Presence as medium as social actor

This conceptualization of presence is experienced when a user perceives social cues emanating from the medium as instead coming from a person. For example, a computer may be programmed to display text messages on the screen that appear to be social in nature. A user attributing a personality or personhood to the computer because of these messages may be experiencing presence as medium as social actor.

In total, 130 of the conversation fragments were identified that contained automated messages from the *Second Life* system. Twenty-one of these fragments were coded as ‘Miscellaneous’, 32 were coded into the Physical Attributes dimension, 12 into the Activities dimension and 65 into the Social Interactions dimension. The following examples presented in Table 4.4 are representative of system messages or object messages:

Table 4.4 : Conversation Fragments constituting of system messages

<p>In the Physical Attributes dimension:</p> <ul style="list-style-type: none"> ➤ Profile Pick Money Orb: Siobahn Marville got 9L\$, just for being here and having our place in the Profile-Picks! ➤ Announcer V3.0: TO DANCE: PLEASE "TOUCH" THE RED & BLACK "SINGLES" DANCEBALL HOVERING ABOVE THE BAR AREA, THE "COUPLES" DANCE BALL ABOVE THE STAGE, OR SELECT ONE OF THE POSEBALLS ON THE DANCE FLOOR. ➤ Height detector 1.0.4: Yumi Liotta is 1.982532 m (6 feet 6 inches) tall. (counting your shoes) 	<p>In the Activities dimension:</p> <ul style="list-style-type: none"> ➤ “Wicked Titrer: Its time to give Tiara Skinstad a new title! Set their title by typing /142 <title> in chat. (where <title> = their new title)” ➤ Announcer V3.0: FOR SOME GREAT SHOPPING, VISIT OUR OCEAN WALK VENDOR KIOSKS JUST OUT IN FRONT OF THE CLUB! ➤ The Rock Donation Flame: Thank you for your donation and for Helping keep the Party Alive., Spenser Greggan
<p>In the Social Interactions dimension:</p> <ul style="list-style-type: none"> ➤ Shelter Greeter: Everyone give a warm welcome to: Vivke Emerald who is 18 days old!! ➤ Shelter Greeter: Welcome to the Shelter, Trinney Yheng! ➤ Shelter Greeter: Everyone give a warm welcome to: sparkle Zeminoba who is 26 days old!! 	<p>In the Miscellaneous category:</p> <ul style="list-style-type: none"> ➤ Tonight&Forever (single) whispers: AutoSync in 18 seconds ➤ Job Island Promoter ver2.0c(wear): MaKayla Garnet Click GOTO PAGE for free L\$. ➤ Profile Pick Money Orb: Cash Crossair does not have our Club in the Profile-Picks! No reward payment!

There were only two conversation fragments containing participant reactions to messages coming from objects. They are presented below:

1. Message from an object:	2. Message from an object:
Dance Ball: SweetKiss Vyper is a dancing machine! Welcome.	Height detector 1.0.4: User A is 2.182544 m (7 feet 2 inches) tall. (counting your shoes)
Response: Jimmy Strathearn: DAMN DANCE BALLS	Response: BeckyLynn Silverweb: im 6 3 according to the height box
	Rigamortis Titanium: wow Rigamortis Titanium: 6' 2" BeckyLynn Silverweb: your about 8 feet rig
	BeckyLynn Silverweb: im 5 10, add the extra height in my heels
	Ash Meersand: In Second Life, everyone wants to be tall, so they make the buildings taller! It's a vicious cycle. Anyone that suddenly stops logging in and comes back 10 years later is going to be walking around through everything like on the Greenies sim when they come back!

The small number of conversation fragments identified as reactions to messages coming from the virtual environment suggests if the *Second Life* environment elicited feelings of presence as medium as social actor or of sense of place in the participants observed, they did not express those feelings through their conversations.

The objective of the discussion presented in this section was to assess whether there is a relationship between the sense of place and the sense of presence in *Second Life*.

Specifically, the conversation fragments logged and coded into the four dimensions of Turner and Turner's sense of place framework were examined in order to determine if, in

addition to being indicative of a particular dimension of sense of place, they also were indicative of any of the six conceptualizations of presence.

To varying degrees, conversation fragments were identified in the sense of place framework that could reference any of the six conceptualizations of presence. The conceptualization of presence with the highest number of indicative conversation fragments was Presence as Social Richness. A total of 966 conversation fragments (or 48.54 percent of all the conversation fragments coded into the sense of place framework) were associated with this conceptualization. The conceptualization with the least amount of conversation fragments was Presence as Social Actor within Medium, with one conversation fragment. In terms of the specific dimensions of Turner and Turner's framework, both Physical Attributes and Social Interactions contained conversation fragments indicative of four out of the six conceptualizations of presence. In sum, each dimension of the framework contained conversation fragments referencing at least one category of presence indicating a potential link between the sense of place and the sense of presence, suggesting that sense of place may be a potential influence on presence.

4.2 Sense of place as a factor for the sense of presence

The concept of presence has been described as complex, multidimensional, polysemantic and polymorphic (Floridi, 2005; Ijsselsteijn et al., 2001). The same appears to be true for the sense of place. Indeed, both sense of place and sense of presence are perceptual constructs for which location is a central idea. Moreover, neither can be directly observed or measured. The methodological approach used in this thesis was an attempt at observing the experience

of presence indirectly through references to sense of place as they appeared in participants' conversations *in vivo* while they were experiencing the virtual environment.

The information presented in Table 4.5 summarizes the overall findings of this study. It suggests that conversation fragments potentially indicative of at least one category of presence were present in each of the four dimensions of Turner and Turner's Sense of Place framework. What is immediately striking, however, is that apart from Presence as Social Richness and Presence as Medium as Social Actor (two categories of presence focused on the social qualities of a medium), very few of the 1990 total conversation fragments coded into the sense of place framework reference a conceptualization of presence. Indeed, as shown in Table 4.5, in five cases out of 13 (or 38.46%), only one conversation fragment references the particular conceptualization of presence.

As for the dimensions of sense of place, the Physical Attributes and the Social Interactions dimensions received the most conversation fragments potentially indicative of a conceptualization of presence (in fact, between these two dimensions, all six of the conceptualizations of presence are represented).

Table 4.5 – Sense of place dimensions and total conversation fragments that related to a category of presence

	Activities	Meanings and Affect	Physical Attributes	Social Interaction	Total
Presence as Social Richness				966	966
Presence as Realism	14		1		15
Presence as Transportation	3	1	53	2	59
Presence as Immersion	1	3	48	1	53
Presence as Social Actor within Medium				1	1
Presence as Medium as Social Actor			109		109

As a whole, 64.69 percent of all the conversation fragments logged can be categorized as falling into the four dimensions of Turner and Turner's Sense of Place framework. In other words, more than two-thirds of the observed participants' conversations referred to the sense of place that *Second Life* inspired in them through the activities and social interactions it afforded, the meanings and affect it elicited and its physical attributes.

The dimension of the sense of place framework into which was coded the most conversation fragments was the Social Interactions dimension with a total of 48.86 percent of all the conversation fragments. What it means is that if sense of place plays any role as a factor for the sense of presence in *Second Life*, it is principally through the participant's social interactions, specifically their reactions to other people, their references to other people, and their references to joint activities.

While all six of the conceptualizations of presence had sense of place conversation fragments associated to them, the one with the most was Presence as Social Richness with 966 conversation fragments. This represents 80.3 percent of the 1203 conversation fragments associated to the six conceptualizations of presence. The other five conceptualizations of presence had considerably less associated conversation fragments, with Presence as Social Actor within Medium having only one. This finding serves to reinforce the view that if sense of place acts as a factor in the sense of presence in the observed participants in *Second Life*, it is principally through its social interactions dimension.

Globally, the conversation fragments that constitute sense of place in naturally occurring conversations in *Second Life* appear to be influences on the sense of presence insofar as 60.45 percent (1203 out of 1990), or approximately two-thirds of these conversation fragments can be associated with a conceptualization of presence.

While the focus of this thesis has been whether together, the conversation fragments coded into Turner and Turner's Sense of Place framework constitute a factor of presence, the analysis of the data collected and coded into the 'Miscellaneous' and 'References to Real Life' categories suggests that conversation fragments that can be indicative of a sense of presence can be found outside the sense of place framework. Put simply, and as the evidence has shown, conversations between the participants observed in *Second Life* may contain indicators of presence that are not related to sense of place.

These findings suggest that when the participants experience a sense of place in *Second Life*, it is the physical attributes and the social interactions constitutive of that sense of place that have the greatest potential for eliciting a sense of presence in said participants. In particular, if the participants experience presence, it tends to be rooted in a socially focused conceptualization of presence, specifically Presence as Social Richness and Presence as Medium as Social Actor.

4.3 Conclusion

Several questions guided the discussion presented in this chapter. The most important, in terms of answering the central research question as to whether sense of place is a potential

influence on presence in virtual environments, was the second research sub-question: What is the nature of the relationship between sense of place and sense of presence?

In order to answer this question, particular attention was given to the significance of the fact that the majority of the conversation fragments coded into Turner and Turner's Sense of Place framework that indicated presence originated from the Social Interactions dimension. This finding suggests that if the participants experienced a sense of place, it was principally through the social interactions afforded by *Second Life* and/or that within naturally occurring conversations. Among other things, this implies that sense of place is more easily expressed through social exchanges.

Another significant finding is that the conceptualizations of presence with the highest number of indicative conversation fragments were presence as immersion and presence as transportation. This suggests that when participants experience a sense of presence related to a sense of place, it is more likely that it will be a sense of presence stemming from a feeling of perceptual or psychological immersion and/or from a feeling of being transported to another location.

Overall, the findings discussed in this chapter reveal that, at the very least, the conversations logged in *Second Life* appear to contain indicators that the participants experienced both a sense of place and a sense of presence. As such it seems plausible to conclude that a relationship exists between the participants' experience of sense of place and sense of presence, especially in terms of their interactions with other participants.

Chapter 5 – Conclusion

The central research question which this thesis has sought to address is whether sense of place is a potential influence on presence in virtual environments. In order to do so, this central question was broken down into two specific research questions:

1. *Do users of Second Life experience a sense of place when engaging with this medium and if so how is it manifest?*
2. *What is the nature of the relationship between sense of place and sense of presence?*

The discussion in the pages that follow sets out the conclusion arising from the empirical examination of these questions.

5.1 The expression of sense of place in naturally occurring conversations

The first sub-question this thesis sought to address focused on how the sense of place is manifest in the participants' naturally occurring conversations taking place in *Second Life*. In other words, how do the participants in *Second Life* experience a sense of place? The focus on this issue was rooted in the need to deal with a gap in the presence literature regarding the ways in which participants in a virtual environment experience the 'being there' or the perceptual illusion of nonmediation which defines presence (Heeter, 1992; Minsky, 1980).

For this thesis, sense of place was understood as being constituted of four dimensions: physical attributes, activities, meanings and affect, and social interactions (Turner & Turner, 2006). The conversation fragments obtained through the logging of user conversations in *Second Life* were therefore analyzed in terms of their representation of, or association with, one or more of these dimensions.

The ten 'regions' in *Second Life* from which the data was collected generally resemble places in real life insofar as the geography, objects, people, and the physics (e.g. the effect gravity on objects, the way doors opened) of the regions are analogous to what one encounters in real life (e.g., no green skies or flying elephants). Five of the observation sessions took place in simulated indoor public environments, and five in simulated outdoor public places such as beaches and squares. Each of the ten regions were populated with an average of 30 participants throughout the observation sessions.

The conversation fragments collected from those regions were classified in accordance with Turner and Turner's Sense of Place framework (see Table 3.1) and two additional categories, 'References to Real Life' and 'Miscellaneous', created specifically for the purposes of this study. This approach resulted in 64.69 percent of the conversation fragments being coded into the four dimensions of Turner and Turner's framework, 31.47 percent into the Miscellaneous category, and 3.84 percent into the References to Real Life category.

The analysis of the data suggests that sense of place, in the naturally occurring conversations of the 307 unique participants observed, is referred to mostly through those parts of the conversations relating to social interactions. Specifically, of the 1990 conversation fragments coded into the sense of place framework, 1503, or 75.53 percent, were identified as being consistent with the parameters of the social interactions dimension. In other words, rather than talking about *Second Life* as a place by directly referring to its geography, appearance³², sounds, the feelings it evoked, or the activities it provided, the

³² That being said, 140 of the 345 conversation fragments in the Physical Attributes dimension (or 40.58%) related to the appearance of avatars rather than to the physical attributes of the environment.

participants mostly talked about other participants and reacted to what others did or said. In fact, conversation fragments containing reactions to other people, which include greetings and goodbyes, exclamations, emoticons, and responses to questions, made up the majority of conversation fragments coded into the sense of place framework (1220 out of 1990 or 61.36%). In light of these findings, it is reasonable to argue that the predominance of the expression of sense of place through social interactions may be due to the fact that a conversation is, in itself, a social interaction. This would mean that if the participants experienced a sense of place because of the physical attributes of the virtual environment, the meanings it evoked and the activities it afforded, the analysis of the contents of their conversations may not be the ideal approach to detect sense of place thusly experienced.

That being said, conversation fragments were identified that related to each of the four dimensions of Turner and Turner's sense of place framework. In total, 345 conversation fragments fell into the Physical Attributes dimension, 119 into the Activities dimension, and 23 into the Meanings and Affect dimension.³³ This finding suggests that the participants may have experienced a sense of place in *Second Life* outside of social interactions.

Apart for one conversation fragment commenting on a river 'running the wrong way', conversation fragments indicating that participants felt that the environment was artificial, unreal, or limited in some way (clear indicators that the participant is not experiencing sense of place at that moment) were notably absent.

³³ The conversation fragments placed into the Miscellaneous and References to Real Life categories will be examined in the following section on presence.

In sum, in answer to the first research sub-question, the result of the analysis of the conversation fragments collected from *Second Life* suggest that the observed participants did indeed experience a sense of place, perhaps even a majority of the time they spent there, and the way in which it was experienced can be attributed in large part to their interactions with other participants. If they did experience a sense of place through the physical attributes of the environment, its activities, and the meanings it evoked, it was either much less frequently or simply not expressed often in the logged conversations.

5.2 References to place as a potential influence on presence

Once the analysis of the data established that the logged conversations did indeed contain references to sense of place, it was possible to answer the second research sub-question of this thesis: What is the nature of the relationship between sense of place and sense of presence? In addition to the conceptualizations of presence that include a notion of place in their definitions, sense of place and sense of presence are argued to be linked by their similar natures. Turner and Turner (2006) argue that these two phenomena are linked by how they each emerge from interactions between an individual and the environment. Echoing this view, Benyon et al. (2006) argue that they are linked through the fact that they are both subjective feelings.

The conversation fragments were assessed in accordance with the six conceptualizations of presence established by Lombard and Ditton (1997): presence as social richness, presence as realism, presence as transportation, presence as immersion, presence as social actor within medium, and presence as medium as social actor. The aim of this analysis was to identify any conversation fragment, from either the four dimensions of the sense of place framework

or the two adopted categories, that was indicative of one or more of the six aforementioned conceptualizations of presence.

The analysis of the 1990 conversation fragments coded into the sense of place framework revealed that 1203 (or 60.45 percent) were indicative of a conceptualization of presence. The majority of the conversation fragments (966 out of 1203 or 80.3%) were indicative of presence as social richness. The remaining 237 conversation fragments were unevenly distributed across the five other conceptualizations of presence.

The conceptualization of presence with the second-highest amount of related conversation fragments (n=109), was presence as medium as social actor. This finding appears to be related to the fact that broadcasted messages sent by objects and locations in the regions where conversations were logged also were indicative of social interactions in the sense of place framework. Part of the reason why these messages were determined to be indicative of this conceptualization of presence, despite a low number of reactions to them in the logged conversations, was because they were worded in such a way as to appear to come from a human. In other words, although it was not determined how they were received, these messages were nevertheless created and sent with the intention of anthropomorphizing the source of the message.

Initially, it was expected that the category of presence as transportation would have had the most related conversation fragments given that it is meant to include experiences where the participant feels transported to another location. However, only 59 of the conversation fragments coded in the sense of place framework were indicative of this conceptualization of

presence. This suggests that either sense of place may not be a particularly a strong factor for presence as transportation. Alternatively, it may simply imply that users of *Second Life* (and perhaps even in the real world) do not frequently express feelings of transportation in naturally occurring conversations.

It is not surprising that the conceptualization of presence as immersion had few related conversation fragments given that, accessing *Second Life* through a personal computer does not immerse many of the senses. Similarly, since the graphics of *Second Life* are not photo-realistic and are still somewhat primitive, it is understandable that few comments about these graphics were identified in the logged conversation. Consequently, very few conversation fragments were identified that could be associated to the conceptualization of presence as realism.

The 119 conversation fragments placed into the References to Real Life category were also taken into account insofar as they clearly indicate moments where the participants did not feel presence. However, since these fragments, and the 968 in the Miscellaneous category, are not directly related to the experience of sense of place, they do not help answer the principal research question. The necessity of these two categories do however raise questions about the need to perhaps modify Turner and Turner's Sense of Place framework so that it at least accounts for indicators where the participant clearly does not experience sense of place.

What can be said about the role of the references to sense of place in the conversations logged in *Second Life* as a whole, is that the conversation fragments coded into the sense of

place framework indicated all six conceptualizations of presence. In other words, if one does not differentiate between the conceptualizations of presence and the dimensions of sense of place, it appears that participants in this study feeling a sense of place also may feel a sense of presence. It is reasonable to argue, therefore, that inducing a sense of place in a participant may also induce a sense of presence.

In sum, in answer to the second research sub-question, the analysis of the research findings suggest that sense of place and sense of presence are indeed related, at least in terms of their manifestation in logged conversations from *Second Life*, and that the manner in which they are related is mainly through conversation fragments that are social in nature. Given that such conversation fragments also form the majority of those that indicated sense of place, it appears that sense of place and sense of presence are experienced by the participants observed in *Second Life* mainly through their interactions with others.

5.3 Sense of place as a potential influence on presence

Having identified how sense of place is manifested and how the experience of sense of place by the participants observed in *Second Life* relates to their experience of presence, it is now possible to answer the central research question of this thesis as to whether sense of place is a potential influence on the sense of presence.

As Yee et al. (2007, p. 116) put it, presence is “a latent construct that roughly measures how ‘real’ one believes a mediated environment is in terms of nonverbal behaviors, physiological responses, and other measures.” It is logical to presume therefore that a sense of place contributes to how real a virtual environment feels insofar as real environments

generate a sense of place in people. However, what the results of this thesis demonstrate is that it is extremely difficult to determine, solely on the basis of conversation fragments, if the participants in the study felt a sense of place, felt a sense of presence or felt a sense of presence because they experienced a sense of place without also explicitly asking them “did it feel like a real place?” or “did you sometimes forget that you were sitting at a computer and feel like you were really there?”

Nonetheless, the analysis of the data obtained in this study appears to confirm that sense of place and sense of presence are, if nothing else, conceptually similar. Indeed, Isselsteijn et al.’s (2001, p. 181) definition of presence as “a complex, multidimensional perception, formed through an interplay of raw sensory data (sensations) and various cognitive processes” could easily apply to the sense of place especially when one considers that a majority of the conversation fragments identified as being indicative of sense of place also were identified as being indicative of a sense of presence. Furthermore, the fact that the majority of conversation fragments identified as being indicative of sense of place and sense of presence related directly to social interactions appears to support Zahorik and Jenison’s (1998) assertion that successfully supported action in an environment is the only determinant of presence needed to induce its manifestation as well as the only way to measure its occurrence. Indeed, very few of the conversation fragments representing feelings or comments about the geography of the *Second Life* environment were identified in the final distribution of conversation fragments indicating presence. If sense of place and sense of presence truly are conceptually very similar, the notion that presence is best measured through successfully supported action in the environment would suggest that sense of place is also determined and best measured by successfully supported action in the environment,

which would also explain, in part, why the social interactions dimension of the sense of place framework received the most conversation fragments.

The conceptual closeness of sense of place and sense of presence might also mean that, as Lee (2004b) and Reeves and Nass (1996) argue, there is a natural tendency in humans toward nonmediation when it comes to a sense of place. Lee (2004b, p. 496), for example, claims that rather than users willingly suspending disbelief, they “automatically and naturally accept incoming virtual (mediated or simulated) stimuli as if they were real,” unless there is strong counterevidence. In other words, if humans are naturally inclined to feel presence unless there is strong counterevidence, the same might apply to the sense of place. If this is indeed the case, it would imply that the characteristics of the medium user and of the medium itself that become important are not those that are potential determinants of presence and of sense of place but rather those that inhibit this hypothesized natural predisposition to nonmediation.

Lombard and Ditton (1997) grouped the potential determinants of presence into three categories: the form of the medium, the content of the medium, and the characteristics of the medium user. If one follows this taxonomy, sense of place as a factor of presence is more of a collection of potential determinants than a single one; the Physical Attributes dimension of sense of place would fall into the form of the medium and the content of the medium, the Social Interactions and Activities dimension would be part of the content of the medium category and the Meanings and Affect dimension would be part of the characteristics of the medium user. This makes sense of place as a factor of presence better suited to qualitative approaches to studying presence than quantitative approaches. This also makes sense of

place a difficult potential influence on presence to deliberately implement in the design of a virtual environment in order to potentially induce presence in its users.

In sum, in answer to the central research question of this thesis as to whether sense of place is a potential influence on presence, it may be concluded that, based on the analysis of the data collected for this thesis, it is not possible to claim that sense of place *determines* the experience of sense of presence, either for the participants observed in *Second Life* and certainly not for users of virtual environments in general. However, due to the conceptual similarity between the sense of place and the sense of presence and the similarity of the nature and distribution of the conversation fragments that indicated their manifestation in the naturally occurring conversations of the *Second Life* participants observed, sense of place and sense of presence may indeed be related.

5.4 Limitations and strengths of the research

This thesis has some limitations. One is that the results of this study cannot be generalized either to the population of *Second Life* or more broadly to virtual environments writ large. Part of the issue here is that the participants and the regions used in this study were not randomly selected but rather were a product of nonrandom convenience sampling. It would be extremely challenging, if not impossible however, to be able to do true random sampling of the population of *Second Life* given that it is constantly changing as people log on and off and as people join or leave.

Second, the coding for this thesis was performed by only one coder whereas established practice requires at least two coders in order to establish inter-observer reliability (Frey et al.,

2000). In other words, more coders may have changed the distribution of the fragments coded within the sense of place framework dimensions and, thus, potentially increased its reliability.

Another limitation of this thesis is that the participants were never directly asked whether they felt presence or experienced a sense of place during the time of the observations. The resulting analysis of the contents of their conversations is thus, somewhat subjective.

Nonetheless, and despite the fact that this thesis did not set out to directly answer the criticisms of the state of presence research presented in chapter 3, the work presented here does advance our current knowledge about the structure of presence by clarifying the nature of the relationship between presence and sense of place as well as potentially offering a new approach toward measuring presence.

5.5 Future Studies

Given the nature of the sense of place framework, the recent arrival of virtual environments such as *Second Life*, and the limited research to date focusing on sense of place as a factor for presence, this thesis was consequently mainly exploratory. The results suggest that there is a wealth of information to be accessed and studied inside the conversations of virtual environment users. Mining this information source has the advantage of providing presence researchers with 'live' data rather than the reported data questionnaires provide. This being said, it is clear that for both the sense of place and the sense of presence, there are advantages in using questionnaires pre and post experiment as this makes the analysis of the data collected in the conversations more reliable. In this case however, the administration of a

post experiment was not done due to logistical reasons, namely the difficulty and the near impossibility of tracking down participants in Second Life after the observation session. It also is clear that Turner and Turner's Sense of Place framework needs to be further refined in order to account for the many features, events, and possibilities of modern, massively populated virtual environments such as *Second Life*.

There are several unanswered questions about sense of place as a factor of presence that could be answered by studies investigating if or how the former can be manipulated to induce or inhibit presence, how important sense of place is to the sense of presence compared to other factors and whether sense of place is simply an umbrella concept that groups other, known factors of presence.

The data analysis also suggests that for future presence studies, it is not necessary to approach the conversations uniquely from a sense of place perspective as other potential factors, involvement for example, may yield interesting results. In fact, many known factors such as image quality or depth of perception could be further examined by observing the effect a manipulation of the factor has through the participants' conversations. This supports Yee (2006) and Castronova's (2005) observation that virtual environments allow researchers to control many variables that would be difficult if not impossible to control in the real world.

5.6 Concluding remarks

The analysis of the data emerging from this thesis suggests that virtual environments are a place wherein the participants feel presence principally because other people are present.

Understanding the sense of presence and the sense of place in virtual environments goes beyond the instrumental goal of making better virtual environments. Virtual environments as places where people feel present constitute virtual communities and, as Sherry Turkle (1995, pp. 267-268) puts it:

Virtual communities offer a dramatic new context in which to think about human identity in the age of the Internet. They are spaces for learning about the lived meaning of a culture of simulation. Will it be a separate world where people get lost in the surfaces or will we learn to see how the real and the virtual can be made permeable, each having the potential for enriching and expanding the other?

APPENDIX I – University of Ottawa Ethics Approval



Université d'Ottawa University of Ottawa

Université d'Ottawa / University of Ottawa

Ethics Approval Notice

Principal Investigator(s) / Supervisor:	Daniel Paré dpar2@uottawa.ca
Co-Investigator(s):	Thierry Plante tplan005@uottawa.ca
File Number:	10-08-18
Title of Research Project:	Presence and references to spatial environment in Second Life
Type of Project:	<input checked="" type="checkbox"/> Professor's research <input type="checkbox"/> Use of Secondary data <input type="checkbox"/> Course outline
Department and Institution:	School of Communications, University of Ottawa
Research Ethics Board:	<input checked="" type="checkbox"/> Social Sciences and Humanities Chair: Dr. Peter Beyer <input type="checkbox"/> Health Sciences and Sciences Chair: Dr. Daniel Lagarec
Ethics Approval Date:	January 9, 2009
Expiry Date:	January 8, 2010
Documents Reviewed and Approved:	Protocol
Approval Granted:	<input checked="" type="checkbox"/> Ia (Approval) <input type="checkbox"/> Ib (Approval for initial stage only) <input type="checkbox"/> II (Delayed approval) <input type="checkbox"/> III (Decision deferred)
Special Conditions:	

This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement and other applicable laws and regulations in Ontario, has examined and approved the application for ethical approval for the above named research project as of the Ethics Approval Date indicated above and subject to the conditions listed the section above entitled "Special Conditions".

During the course of the study the protocol may not be modified without prior written approval from the REB except when necessary to remove subjects from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the study (e.g. change of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, information/consent documentation, and/or recruitment documentation, should be submitted to this office for approval using the "Modification to research project" form available at: http://www.rces.uottawa.ca/ethicsapplication_dwn.asp

Please submit an annual status report to the Protocol Officer 4 weeks before the above-referenced expiry

Université d'Ottawa / University of Ottawa
 Bureau de l'éthique de la recherche / Research Ethics Board
 100, rue Jean-Jacques, Ottawa, Ontario K1N 6N5
 Téléphone: (416) 593-9100 / (613) 593-9100
 Télécopieur: (416) 593-9101 / (613) 593-9101
 Courriel: ethics@uottawa.ca / ethics@uottawa.ca



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date to either close the file or request a renewal of ethics approval. This document can be found at:
http://www.rges.uottawa.ca/ethics/application_dwn.asp

If you have any questions, please do not hesitate to contact the Ethics Office at extension 5841 or by e-mail at ethics@uOttawa.ca.

Gilles Morier
Director, Research Grants and Ethics for Chair of the REB

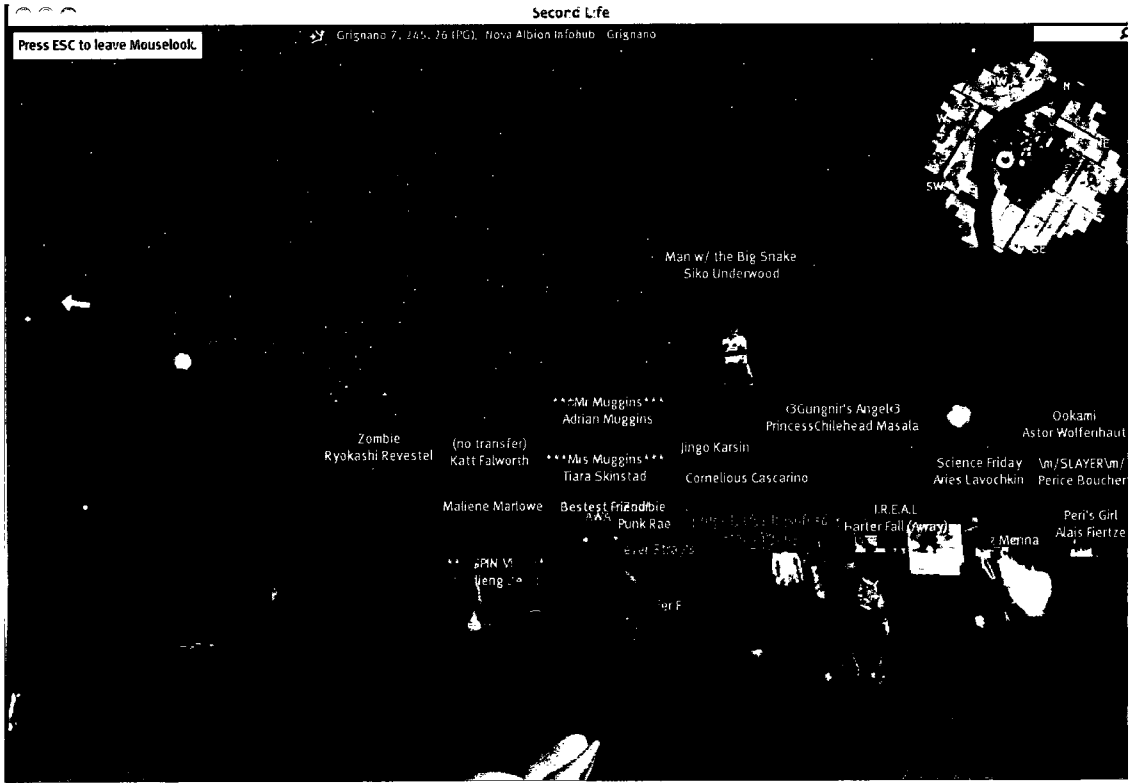
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APPENDIX II — REGIONS IN SECOND LIFE FROM WHICH DATA WAS COLLECTED

Artisan Haven is a series of small islands interconnected by bridges, mostly covered by buildings but with a few trees and some beaches. The data was collected in the Star Bar Martini Club on April 6, 2009 from 7:30 pm to 8:30 pm. The Star Bar itself is mainly a dance floor with a stage at one end and a bar at near the entrance. There was a live musical performance taking place on the night the data was collected.



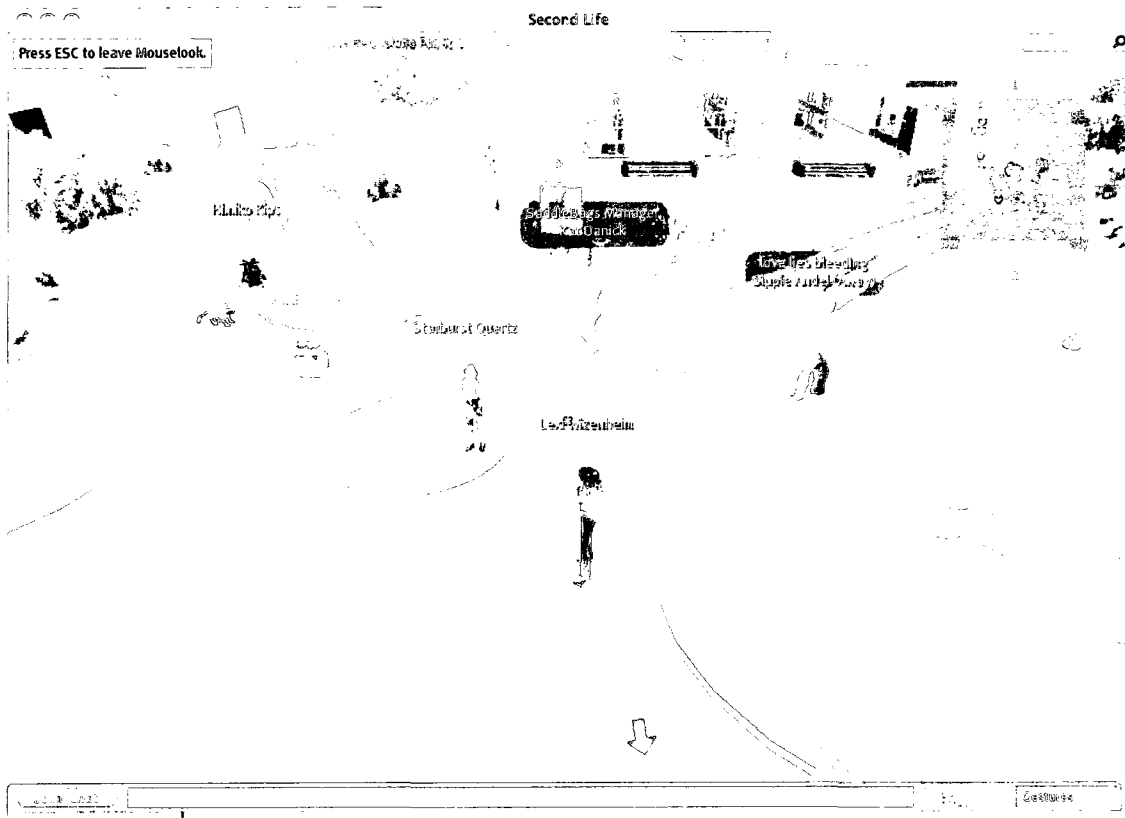
Barcola is an urban area with commercial and residential buildings, rivers and canals, and small public parks. The observation took place at one of the public parks where a large group (over 20 people) was gathered.



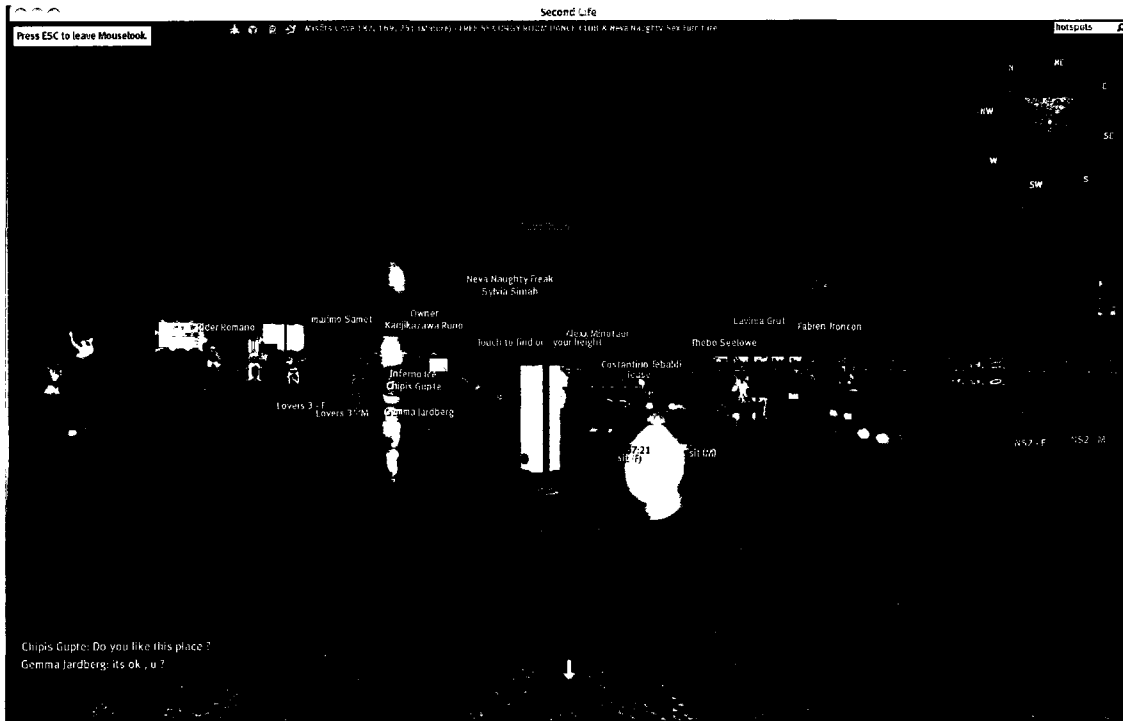
Bonifacio is a region of one of the main landmasses in *Second Life*. The area where the observations took place is a central square surrounded by four open buildings. There were no particular activities taking place and the conversations observed were from several small groups.



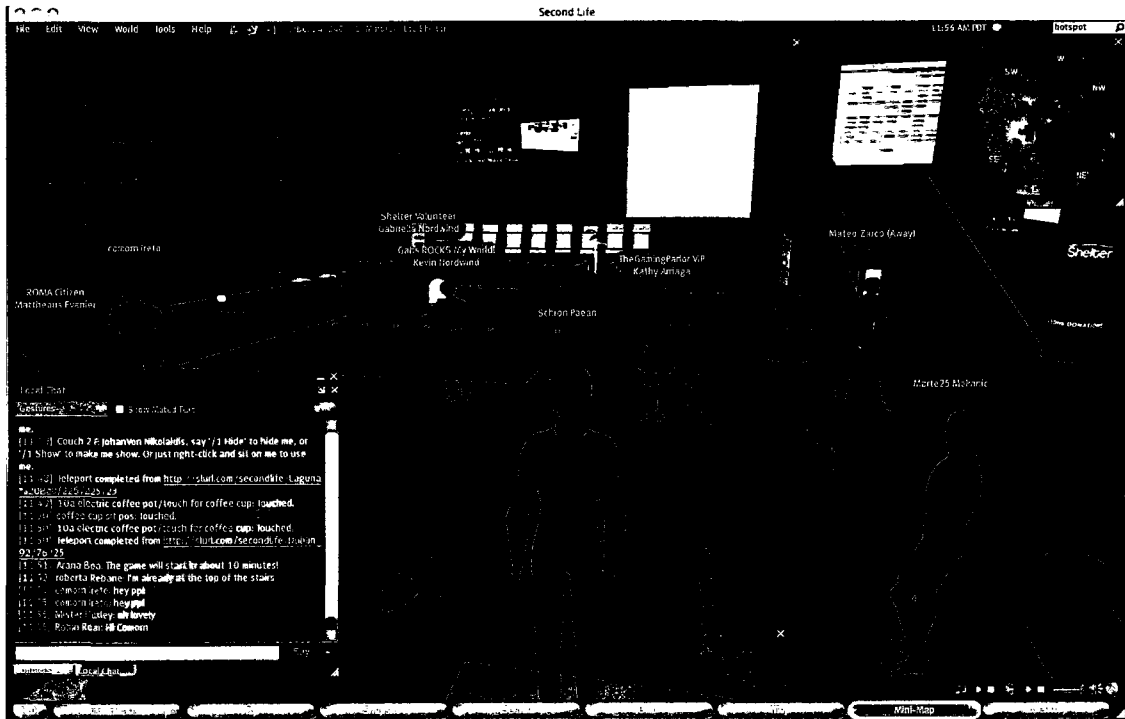
Help Island Public is an island with few structures and many public parks and areas. It is a place designed to help users new to *Second Life* to learn how to use its features. The observation took place outside in a public square near the middle of the island.



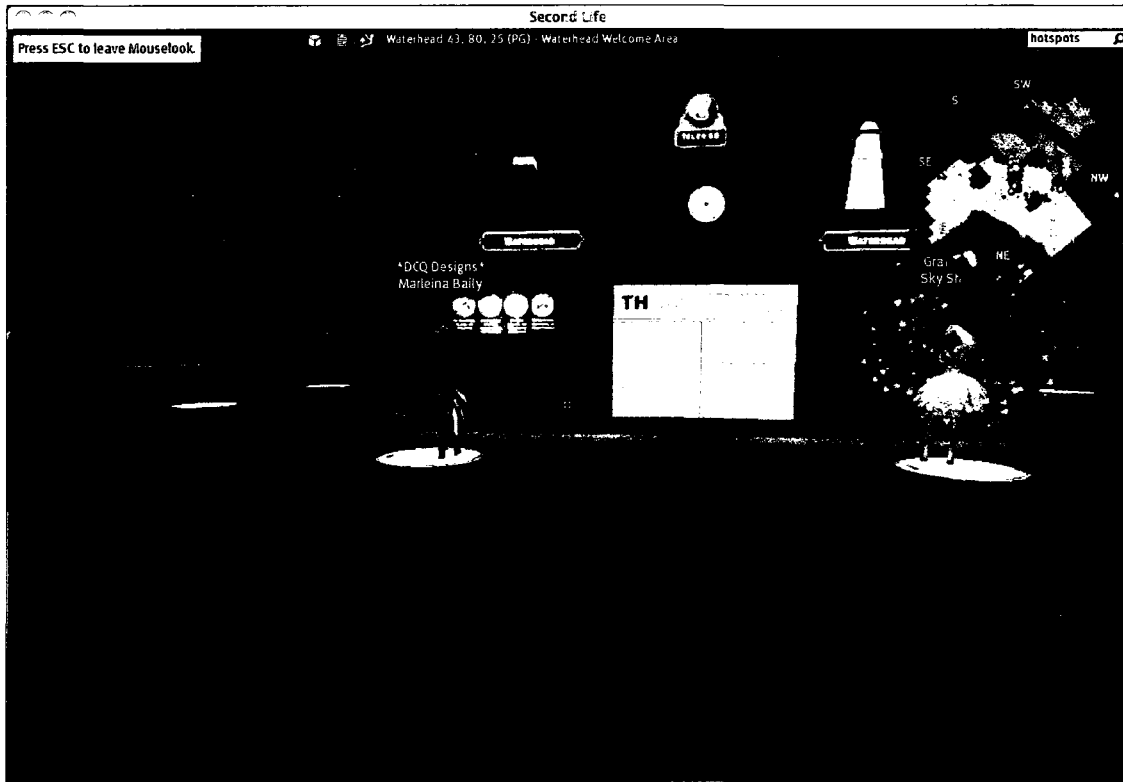
Misfits Cove is an urban zone with many commercial buildings. The observation took place in a club called **The Orgy Room**. The club is an open space with a bar, several booths, stages, and several areas where avatars can sit or participate in sexual activities. The observations took place near a circular stage where a stripper was dancing around a pole and several patrons were sitting on couches in a ring formation around the stage.



The Shelter is described as “a haven for those new to SL” in the *Second Life* interface. It is situated on one of the main landmasses. It is a large complex of buildings with several rooms, including a pool area, a dance floor and a theater. The observation took place in one of the main rooms, an open room with a loft, a bar, and a dance floor.



Waterhead is a region of one of the main landmasses. It is a wooded area with few buildings. The observation took place in an open cross-shaped building in the southwestern corner of the region.



APPENDIX III – List of common chat/IM acronyms

Acronym	Definition	
A	AFAIK	As far as I know
	AFK	Away from keyboard
	ASAP	As soon as possible
	ASL or A/S/L	Age/Sex/Location
	ATM	At the moment
B	B	Back
	B4	Before
	BBL	Be back later
	BBS	Be back soon
	BC	Because
	BG	Big grin
	BICBW	But I could be wrong
	BMG	Be my guest
	BRB	Be right back
BTW	By the way	
C	CUL	See you later
D		
E		
F	FWIW	For what it's worth
	FYI	For your information
G	GG	Gotta Go
	GL	Good luck
	GMTA	Great minds think alike
	GR8	Great
	GRA	Go right ahead
H	HAND	Have a Nice Day
	HT	Hi there
	HTH	Hope this helps
I	IAC	In any case

	IC	I see
	IDK	I don't know
	IIRC	If I recall correctly
	IM	Instant message
	IMHO	In my humble
	IMO	opinion
	IMS	In my opinion
	IOW	I am sorry
		In other words
J	JIC	Just in case
	JK	Just kidding
	JTLYK	Just to let you know
K	K	Okay
L	L8R	Later
	LMAO	Laughing my a** off
	LOL	Laughing out loud
M	MSG	Message
N	NBD	No big deal
	NM	Never Mind/Not
	NP	Much
	NW	No problem
		No way
O	OIC	Oh I see
	OMW	Oh my gosh
	OMW	On my way
	OTOH	On the other hand
	OTP	On the phone
P	PLS or PLZ	Please
	POS	Parent(s) over
		shoulder
Q	QT	Cutie
R	ROTFL	Rolling on the floor
		laughing

S	SYS SYL	See you soon See you later
T	TAFN TBH THX or THNX TIA TTYL	That's all for now To be honest Thanks Thanks in advance Talk to you later
U		
V		
W	WB WFM WK WKD WRK WTF WU?	Welcome back Works for me Week Weekend Work What the f*** What's up?
X		
Y	YT? YW	You there? You're welcome
Z		

Source: (IMAcronyms.com, 2005-2009)

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