An Examination of a Theory of Embodied Social Presence in Virtual Worlds

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An Examination of a Theory of Embodied Social Presence in Virtual Worlds

ABSTRACT

This paper develops and offers the theory of Embodied Social Presence (ESP). We review the literature on place and space, presence and embodiment and demonstrate that the role of the body as a focal point for action during social interaction in multi-user virtual environments has been largely overlooked. We draw on Activity Theory to frame our model of embodied social presence. Activity Theory proposes that a learner (i.e., a social actor in a virtual environment) derives meaning during interactions with his or her environment through actions, context, and tools. Embodied Social Presence Theory focuses on the virtual body (i.e., the avatar) as the nexus of activity in social interaction within virtual environments. We explorethe implications of this focus on the ways in which actors derive meaning and understanding during social interaction. We examine this theory through a qualitative analysis of reflective data obtained from 59 first-time users of Second Life. The paper concludes with a discussion of Embodied Social Presence Theory and implications for future research and practice.

KEYWORDS: SOCIAL PRESENCE, ACTIVITY THEORY, EMBODIMENT, USER PERCEPTIONS, VIRTUAL WORLDS

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> "*In Second Life you get the 'being there' feeling, but the ability to see the other avatars makes you feel as though you are even closer than just being there. This closeness resulted in a more relaxed conversation among the group probably because of the feeling as though we were all in the same room."* (Subject's comment on the use of Second Life)

INTRODUCTION

What does it mean to have that "*being there* feeling" and why would a subject using Second Life, one of the most popular multi-user virtual environments, have such a powerful and salient presence experience? Researchers studying information and communications technologies (ICT) have for years looked at this questions of why and how people develop feelings and perceptions related to a sense of presence. Although the literature in this area is rich (Daft & Lengel, 1986; Lombard & Ditton 1997; Short et al., 1976), much still needs to be learned about why, how, and where ICT will enable social actors who use mediated communication tools to feel like they are present in some distant place, typically with some other person (Biocca et al., 2003; Davis et al., forthcoming). Of course, the subject's comments also highlight some of the characteristics of multi-user virtual environments that are unique compared to many other ICTs; for example, the presence of avatars, a shared space, and shared activities. But what is it about these features and affordances that so easily engenders a sense of presence in this and other subjects? This is the fundamental question we set out to address in this paper. To do so we offer Embodied Social Presence Theory (ESP Theory) as a framework for understanding interactions and communication activities in multi-user virtual environments and other ICTs.

Virtual environments like Second Life create a relatively unique 3-dimensional space that can be used for collaboration, decision making, entertainment, social engagement, and other forms

of communication. Although sharing commonalities with traditional mediated communication tools such as email, instant messaging, video conferencing, teleconferencing, and discussion forums, a virtual environment creates a unique realm where the user has the opportunity to leverage the spatial aspect of communication by re-creating the experience of physical proximity thereby enhancing interaction. Of course, proximity is often quite important for effective communication.[1] To effectively communicate, we frequently rely not only on words, but also phrases, gestures, objects, actions, tools and numerous other stimuli that are embedded in the context and that incorporate affordances derivative of our species' long history of communicating face-to-face or, put another way, body-to-body (BtB). This suggests an important set of questions about the spatial nature of virtual environments and the influence of space and embodied presence on communication in virtual worlds. Specifically, what is unique about the way we interact in virtual spaces and how does the embodied presence we experience in a virtual space influence user attitudes, perceptions, and behaviors? To answer this question, we build on the existing literature on presence, co-presence, and social presence and suggest that our theory of "embodied social presence" is well suited for describing how engagement is mediated and facilitated through a lived body whose movements we consciously and unconsciously model in virtual environments.

If one steps back and examines from a distance the research on information and communications technology (ICT) and particularly research based on media theories such as

[1] The study of linguistics has defined the communication act as a complex set of variables that includes the consideration of paralanguage and kinesics as well as proxemics. Although critical in the understanding of linguistic acts, the nuances of these studies remain beyond the scope of this article. Nevertheless, the consideration of space through the study of proxemics (Hall 1963) serves to corroborate spatial considerations as a vital aspect of communication.

Media Richness Theory (Daft and Lengel, 1986) and Social Presence Theory (Short et al., 1976), it becomes apparent that this theoretical stream is primarily focused on examining the degree to which any given communication medium compares to communication in a proximate, BtB setting (Lombard and Ditton, 1997). In other words, media are generally designed to provide communication experiences that draw on one or more stimuli that are used when communicating BtB. This, of course, is necessary because the stimuli transmitted via mediated communication technologies must be encoded by the sender and decoded by the receiver using one or more of the five bodily senses (i.e., auditory, visual, olfactory, haptic, gustatory). In this context, an understanding of user experiences when using media is best developed when an understanding of the nature of BtB communication is incorporated into the analysis because media are ultimately designed to reproduce, to one degree or another, some facet of the experience communicators have when meeting face to face.[2] Lombard and Ditton (1997), in their oft quoted description, put this more succinctly; that is, the concept of presence is best described as taking place when the communicator has "the perceptual illusion of nonmediation."

Although several definitions of virtual environment exist, most have in common the fact that they define the environment in terms of its 1) spatial characteristics and 2) activation of real-world stimuli. For example, Bowman and McMahan (2007) suggest that virtual environments are "…complex technologies that replaced real-world sensory information with synthetic stimuli, such as 3D visual imagery, spatialized sound and force or tactile feedback. The goal of immersive virtual environments was to let the user experience a computer-generated world as if it were real – producing a sense of presence, or 'being there,' in the user's mind" (Bowman &

[2] One might argue that, for example, an email is not derivative of a BtB encounter; however, written language is an extension of one form of body language, hand gestures. As most any person using sign-language would attest, written and drawn symbols are simply recorded illustrations of symbolic gestures.

McMahan, 2007, p. 2). This sense of presence is important in terms of understanding how and why users react to virtual environments as they do. A rich literature already exists that has examined the concept of presence in virtual environments and immersive virtual reality technologies.[3] Much of this literature is derived from the human computer interaction (HCI) field and has focused on perceptions of the user's physical presence within a virtual space (e.g., Benford et al., 1995; Benyon et al., 2006; Conroy, 2001; Lathrop & Kaiser, 2005; Lee, 2004; Sandamas & Foreman, 2007; Waller et al., 1998), his or her perceptions of copresence with other users (e.g., Bailenson et al., 2001; Bailenson et al., 2002; Bailenson et al., 2005; Bailenson et al., 2006; Bailenson & Yee, 2005; Durlach & Slater, 2000; Gerhard et al., 2004; Zhao, 2003), and the development of perceptions of social presence (e.g., Biocca et al., 2003; Lombard & Ditton, 2007; Schroeder, 2006). Additionally, concepts related to embodiment and the nature of embodied presence have also been introduced into the discussion of avatars and avatar interactions (e.g., Benford et al., 1995; Biocca, 1997; Bowers et al., 1995; Gerhard et al., 2004; Schroeder, 2006).

This broader presence literature is useful in expanding the discussion about what computer-mediated presence means beyond the relatively limited view of media affordances that are specified in oft used theories in the Information Systems field such as Media Richness Theory (Daft & Lengel, 1986; Dennis, Fuller, & Valacich, 2008; Lombard & Ditton, 1997; Short et al., 1976). Nevertheless, although several authors have discussed the nature of embodiment and

3 A difference does exist between the concept of immersion and presence. For example, Slater (2003) suggests that immersion refers to an objective and measurable experience while the concept of presence is largely context-dependent. In other words, immersion is generated through the technical capabilities of virtual reality technologies and is based on the technology's affordances for rendering sensory stimuli (e.g., the degree of realism of the environmental settings, the display size, the resolution of the display, etc.). On the other hand, presence is based on an individual's subjective perceptual response to a virtual environment and it depends on factors such as the observer's state of mind, visual acuity, spatial perceptual ability, and similar factors. The focus of this paper is on the perceptions of presence rather than the technical concept of immersion.

perceptions about the avatar body in the virtual environment (e.g., Benford et al., 1995; Biocca, 1997; Bowers et al., 1995; Gerhard et al., 2004; Schroeder, 2006), the concept of the role of the body, body image, identity, and body presentation have not been fully explicated in the context of multi-user virtual environments. The purpose of this paper is to fill this gap by bringing together frameworks and models from two theoretical perspectives - the presence literature (Lombard & Ditton, 1997) and Activity Theory (Engeström, 1987; Leont'ev, 1978; Vygotsky, 1978) - that help to identify and define the role of the user's body, body perceptions, and virtual embodiments in the development of user attitudes, perceptions, and behaviors in multi-user virtual environments. To do so, we propose a model of embodied social presence that defines the major elements and theoretical constructs that are relevant for understanding the nature of embodied interactions in virtual worlds like Second Life.

The paper is organized as follows. The next section presents the literature on presence, co-presence, and social presence. This is followed by a review of the literature on Activity Theory. Next, the model of embodied social presence is presented and explained. Following this, a discussion is presented of our qualitative analysis of user reflections on embodiment and identity developed while using Second Life. The paper concludes with a discussion of the model and its implications for research and practice.

THEORIES OF PRESENCE

Numerous theories have been used in the IS literature to frame research examining the selection and use of ICT. Arguably, the two most frequently used theories are Media Richness Theory (MRT) (Daft & Lengel, 1986) and Social Presence Theory (SPT) (Short, Williams, & Christie, 1976). Both of these theories have been useful, to one degree or another, in framing research and defining a useful set of constructs for empirical study; however, these theories are by no

means the only theoretical perspectives that have been used to study concepts related to the construct of presence.

The concept of presence has been studied in fields such as human computer interaction, sociology, media studies, education, and numerous other fields. In each of these areas the term *presence* has been used to connote slightly different, albeit largely overlapping, concepts. For example, Lombard and Ditton (1997) reviewed the presence literature and identified a total of six applications of the term presence. Similarly, Biocca and his colleagues (Biocca et al., 2003) identified several types of presence, each of which were classified into three broad groupings, copresence, psychological involvement, and behavioral engagement. These reviews along with a number of other articles that have dealt with the concept of presence have pointed to several categorizations, which we will refer to as levels of presence, that incorporate varying degrees of psychological and physiological immersion in the media by which the communication is mediated. Because the concepts of presence and copresence imply, to one degree or another, that the presence occurs in a place, we will begin our review with concepts associated with place theories. We will then review the various definitions of presence highlighted by Lombard and Ditton (1997). Following this, we will discuss the concept of copresence, that is, the sense or feeling that you are present in the proximity of another entity. Finally, our review of the presence literature will include how the issue of embodiment, as the term is used in the presence literature, has been defined and how this concept has been applied to studying the ways in which a virtual representation of a body influences perceptions of presence and copresence.

Place Theories

Numerous scholars have discussed concepts related to place, sense of place, identification with place, and similar constructs that relate people to geospatial locations. In fact, place as a concept

has been expressed in fields as disparate as art and literature, on one hand, and military theory and history, on the other. Place has also been recognized as being an important construct in understanding whether and how people respond to virtual environments. Deconstruction of a virtual world such as Second Life to identify the essential characteristics that differentiate this genre from other communication media, reveals (a) shared virtual space—in which objects, avatars, actions, and higher level associations (e.g., meanings associated with place) can be created and manipulated—with (b) selective temporal persistence. These place-based features in virtual environments are quite similar to, and sometimes perceptually indistinguishable from, those features we associate with real-world places. As such, place creates a context where the milieu of place-based features, associations, and accoutrements provide a richer mix of perceptual and attitudinal factors than the simple concept of place as a geographic location.

Scholars studying presence in virtual reality and virtual environments have explored concepts associated with place and drawn on theories from fields such as neurology, environmental psychology, geography, and several other disciplines (e.g., Brotons-Mas et al., 2006; Canter, 1997; Gustafson, 2001; Relph, 1976; Turner & Turner, 2006). For example, Turner and Turner (2006) applied theories from geography (Relph, 1976), environmental psychology and sociology (Gustafson, 2001), and psychology (Canter, 1997) to examine sense of place and presence in virtual environments. They suggest that the literature on place and sense of place can be enriched by considering the issue from a first-person perspective (i.e., individual attitudinal and perceptual constructs). This is consistent with much of the presence literature as well as literature from MIS that has considered other communication and information processing technologies. Nevertheless, while considering sense of place and its relation to presence, it is useful to look at models that attempt to define, at least in part, those objective

characteristics that help to make a place what it is and that allow places to be differentiated one from another.[4]

An important perspective on place is that offered by Relph (1976) who focused primarily on a concept that has come to be known as place identity, which relates to an individual's sense of association with a place. For example, we might associate home with comfort, sleep, kids, chores, and other place-associated elements that help us to identify a particular place with the feelings and things that are located in that space. He specifically suggests that individuals develop a place identity by associating physical settings with activities and meanings that occur and are historically associated with those settings. The first component, physical settings, is associated with the objects in the space and would conform to some facets of the literature associated with physical geography, architecture, interior design, and similar fields. Of course, identification by an individual with a place implies that the individual associates the other two components of place identity—activity and meaning—with a space. Place identity is useful in considering perceptions of space, presence, copresence, and ESP because it highlights that, from the user perspective, place is not merely objects in space but rather objects in context.

Work by Gustafson (2001) builds, in part, on the work of Relph (1976) by defining how meanings are associated with place. Gustafson used a grounded theory approach to identify how place becomes meaningful. Specifically, his model considers three factors: environment, self, and others (see Figure 1). While this model is useful in defining important aspects of ESP, it is a

4 In many ways the discussion of sense of place versus place is similar to the literature on task where issues related to perceptions of, say, task complexity are considered in relation to task qua task requirements. Wood (1986), for example, notes that to differentiate tasks from one another it is useful to identify characteristics of task requirements that are independent of the task actor. A task actor may perceive a task to be complex, but that could be due to a myriad of reasons that have less to do with the task than with the actor. Similarly, it is important to distinguish between the place qua place features of a space versus the perceptions of the space. The former are objectifiable; the latter subjective and variant. As the models offered by various scholars illustrate, it is difficult to parse out objective characteristics from actor-related perceptions and attitudes.

synthesis of work done by earlier authors who offered similar perspectives (e.g., Canter; 1997; Agnew, 1987; Massey; 1994; 1995). Canter, defined what he termed Facet Theory, which included four *facets* of place: 1) functional differentiation (i.e., activities), place objectives (i.e., individual, social, and cultural associations with place), scale of interaction (i.e., environmental scale of place), and aspects of design (i.e., the physical features of the space). Similarly, Agnew (1987) defined place as consisting of locale (i.e., the local environment), location (i.e., the locale in the broader geographic, environmental, and economic context), and sense of place (i.e., the perceptions held by the actor). Massey (1994; 1995) added to this mix the notion of history and the relationship of place with a broader world *outside* the context of the space. These perspectives, and particularly the synthesis by Gustafson, offer an important framework for understanding how and why place is relevant to more than just the physical (or virtual) environment associated with geography. People assign meaning to places, even places to which they have previously never visited, the objects in it, its historical and contextual characteristics, its occupants, owners, or visitors, based on their perceptions of self and others. This suggests that understanding concepts associated with presence involves developing an understanding of the milieu of factors that cause users of virtual worlds to sense and comprehend place.

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Figure 1 about here

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Presence

In their thorough review of the presence literature, Lombard and Ditton (1997) provide a useful synopsis of the literature on presence, including a summary of how presence has been defined in the literature, the causes of presence, and the effects that presence engenders in those who

experience this phenomenon. They note that presence has been used by scholars in different fields to imply slightly different concepts that coalesce under the notion that a sense of presence implies that the user of the communication medium is captured by an illusion that there is no mediation in the communication channel. This illusion can be manifest in multiple ways, for various reasons, via a number of media, and, depending on how one frames the research and task context. That is, the illusion of presence is not a dichotomous state but rather a graded perception that responds to a variety of factors. Because several of these diverse concepts are relevant to our discussion of embodied social presence, we will briefly summarize their findings below.[5]

First, Lombard and Ditton suggest that presence has been used in communications studies, such as those examining information communication technologies (ICT) in the management information systems (MIS) field, as a construct that focuses on the media's conveyance of social cues. In other words, to what degree does any given medium have the capacity to transmit information that is used by a participant to perceive and process the social cues exhibited by others in the communicative transaction. In general, these theories assume that a medium has a capacity for conveyance of these cues and therefore they have been used to predict that the use of any given medium will have certain predictable, as well as consistent, set of outcomes associated with the act of communication. As noted earlier, the two theories that are representative of this perspective are Media Richness Theory (Daft and Lengel, 1986) and Social Presence Theory (Short, Williams, and Christie, 1976). The notion that much of communication is centered on, at least in part, the social acts and cues is important for virtual

5 The reader is encouraged to review Lombard and Ditton's work for a more complete description of these concepts of presence.

worlds and the concept of ESP. Furthermore, while controversial, the idea that each medium has a given capacity for conveying certain types of information is relevant to identifying a threshold capacity that is required for a medium to enable ESP.

A second type of presence relates to the degree to which a communication medium creates imagery and other sensory input that has high fidelity relative to the target person, place, or thing that is the focus of communication. In other words, is the medium producing a realistic representation?[6] Of course, while this concept of presence is quite pertinent to the electronics industry as it relates to selling HDTV's at, for example, Best Buy™, it is also an important concept at a theoretical level and for other practical reasons related to where and how the medium is used. As Lombard and Ditton (1997) point out, this concept of realism is multidimensional with a distinction being drawn between what they call social and perceptual realism. Social realism relates to the plausibility of the communication content (e.g., science fiction imagery of, for example, an Ewok in Star Wars is not plausible while imagery of Donald Trump standing in front of the Trump Towers is plausible) while perceptual realism pertains to the degree to which the imagery possesses an accurate representation of the content of the communications (i.e., does an image of Donald Trump have high fidelity relative to what you would see if you were physically present with Mr. Trump?). This definition of presence is relevant to virtual worlds because most existent virtual worlds have neither high levels of social or perceptual realism (e.g., World of WarCraft, Second Life, and other virtual worlds are cartoonish, avatars can be configured in a variety of fanciful and often implausible forms, and avatars can engage in behaviors that violate, for example, physical laws). Nevertheless, highly

6 This calls to mind the now somewhat dated commercials involving the slogan, "Is it live or is it Memorex?" The point of this slogan being to suggest that the recording device had high fidelity; the higher the fidelity, the more realistic was the sound and/or imagery.

realistic models can routinely be generated in virtual reality systems (Isgro et al., 2004; Sequeira and Goncalves, 2002); therefore, it is likely that the fidelity and realism present in dedicated VR applications will continue to be integrated into virtual worlds such as Second Life.[7]

The third type of presence identified in the literature is related to the notion that the user of the medium can function as a transport mechanism (Lombard and Ditton, 1997). As they note, media can create different perceptions in the user related to relocation and transportation. In particular, a medium can give a user a sense that they are transported elsewhere (i.e., "you are there"), it can bring a place or objects to the user's location (i.e., "it is here"), or one user can be brought to a "place" to which another user has been transported with the result that they share a space and experience copresence. This notion of transportation is common in both the literature and in popular conceptions of media with high levels of realism. For example, HDTV and other products are often marketed with a focus on the high levels of realism and the promise that you will feel like you are there (or it is here). This concept, primarily a psychological phenomenon, is not limited to technologies that offer high realism, however. For example, storytelling and other non-visual forms of communication (e.g., surround sound) can take the observer away to other places even when their eyes are closed (Gerrig, 1993) (i.e., users can experience imaginal presence). Much of the literature related to virtual worlds and, particularly, immersive virtual reality systems (e.g., VR caves) has been focused on creating virtual mockups of real places to support training, desensitization, and decision making (e.g., decision making simulations) with the goal of improving the learning and performance of the participant in the real world (e.g., Benford et al., 1995; Benyon et al., 2006; Conroy, 2001; Lathrop & Kaiser, 2005; Lee, 2004;

7 Research has shown that hyper-realistic avatars can cause users to sense less presence and, in some cases, report lower attraction and ratings of the avatar (Nowak & Biocca, 2003). In other words, while the places and spaces that are hyper-realistic will likely increase a sense of presence, it may be counterproductive to offer users the opportunity to render high fidelity representations of avatars.

Sandamas & Foreman, 2007; Waller et al., 1998). While high degrees of realism (i.e., via visual, auditory, etc. channels) are not necessary for ESP to be manifest, an important criterion needed for a user to develop a sense of copresence and, therefore, ESP is for sufficient realism to exist to enable the user to suspend disbelief and allow himself to perceive that he or she is present in a space (Turner & Turner, 2006).

Lombard and Ditton's (1997) fourth categorization of presence is related to the notion of immersion within the space or environment represented within or through the communication medium. Immersion can refer to either physical immersion (i.e., immersing sensory organs into physical devices like head mount displays and headphone) or psychological (i.e., creating a sense that one is inside the space). Of course, psychological immersion is generally the objective of creating virtual reality environments (e.g., caves and head mounted displays), virtual worlds, and, for that matter, big screen televisions. But physiological immersion is not necessary to create psychological immersion. In fact, immersion has been conceptualized as something that can happen to varying degrees depending on the level of physical immersion and the characteristics of the user. For example, Lee (2004) observed that too much immersion can be problematic when, for example, it leads to disorientation, motion sickness, dizziness, and other problems (Azar, 1996; Biocca, 1993; Biocca & Rolland, 1998). However, a minimum level of physiological immersion is needed to achieve a perception of immersion (Isgro et al., 2004).[8] Big screen monitors, high resolution screens, and immersive audio systems are generally the technologies of choice for video game enthusiasts who see their ability to immerse

8 This variation in levels of immersion as well as technological thresholds for achieving psychological immersion is illustrated by not only the literature, but also by hardware manufactures. For example, on Samsung's 3D HDTV page the first line of the product description notes, "…now television is more immersive than ever" (http://pages.samsung.com/us/hd). Similarly, Intel's suggests that their InTru™3D is designed allow movie studies to create a hyper-realistic 3-D experience that "immerses" the moviegoer into the action and the place.

their psyche in the game experience limited by a lack of physically immersive devices. The concept of psychological immersion is important in virtual worlds because a user must develop minimal perception of psychological immersion in order to develop a sense of copresence and ESP.

The fifth type of presence offered by Lombard and Ditton (1997) relates to treating a character in a medium as a social actor regardless of whether that actor can respond or is controlled by a human actor. In other words, when observers talk back to the news caster on the television, to the voice coming from their computer, or to a computer-generated character in a video game they are behaving in a manner suggesting that they perceive some degree of social presence with the medium generating the stimuli. People frequently treat what they know to be inanimate objects, even objects with little or no resemblance to the human form, as though they are other social actors. In a study to examine the effect of anthropomorphic realism of an avatar in a virtual reality system as well as the perceived agency of the avatar (i.e., whether the subject thought the avatar was controlled by a computer or human agent), Nowak and Biocca (2003) found that subjects responded to both perceived computer and human agents as social actors. Furthermore, when the anthropomorphism represented in the avatar was either low or high the subjects developed lower perceptions of copresence and social presence compared to when anthropomorphism was moderate. This is supportive of the notion that perceptions of presence, copresence, and ESP can be achieved in virtual environments with lower levels of realism and where the identity of other avatars is not known (i.e., I don't know whether that avatar is a person or a bot).

The last categorization of presence addresses the tendency of people to treat inanimate objects that do not resemble human actors in a socially sound manner. In this respect, Nass and Moon's

(2000) research supports the notion that human behavior toward computers responds to a "mindless" application of social rules to computers. In an effort to reject the notion that individuals' social actions and reactions to computers can be caused by anthropomorphism, they argue that we tend to overuse our learned social scripts. That is, when devices such as the computer provide certain "cues" that are construed as intelligent behavior, we tend to extend the way we behave with humans to these devices. The cues that seem to trigger this response include the elicitation of language, the potential for interaction, and the replacement of humans by technological implements. For example, an individual dealing with an ATM, a role traditionally filled by a human teller, answers the questions by inputting data when prompted by the device. Nowak and Biocca's (2003) study of telepresence mentioned above ratifies Nass and Moon's (2000) findings.

As this review highlights, presence is a concept that is multidimensional and that spans multiple literatures. Our focus will be primarily on the psychological perceptions of presence and the relationship of this variable to the more comprehensive concept of ESP. It is important to note, however, that the definitions of presence as reviewed above do not require that a user engage in activities with other human or computer-agent entities. In other words, presence can occur when a user is in a space, such as a Second Life island, when no one else is present. When one enters a virtual space such as a Second Life island, interacts with objects in that space, and develops perceptions of *being there*, the user has developed a sense of presence. This raises a question, what is it about a shared place that is important in developing a sense of presence and what happens when other avatars arrive? In this next section we explore the concepts of copresence and follow this with a brief review of the literature on embodiment.

Copresence

The notion of copresence in virtual reality systems and virtual environments is a natural extension of the concepts associated with presence due to the fact that the media are generally used for communication between users. In fact, many of the concepts associated with presence relate to defining how people perceive presence in the context of other social actors. For example, the fifth presence concept offered by Lombard and Ditton (1997) relates specifically to notions of being present with other social actors. Nevertheless, presence and copresence are distinct constructs and have been examined as such in much of the literature (e.g., Bailenson et al., 2006; Biocca, 1997; Chen and Börner, 2005; Durlach and Slater, 2000; Gerhard et al., 2004; Nowak and Biocca, 2003; Regenbrecht and Schubert, 2002; Schroeder, 2006; Slater et al., 2000; Zhao, 2003).

Zhao (2003) suggests that copresence has been used by researchers to refer to two distinct interactive contexts. First, copresence can refer to being together in physical proximity in the physical environment (e.g., Slater et al., 2000). Alternatively, copresence can refer to being together with another person in a technology-mediated environment and the sense of togetherness, or being together, one perceives in that context (e.g., Durlach & Slater, 2000; Schroeder, 2006; Slater et al., 2000). Based on this distinction, he defines a typology of copresence that is based on the degree to which the actors are physically collocated (i.e., the mode of copresence) and the degree to which they develop feelings of one another (i.e., sense of copresence). The majority of researchers studying virtual environments use the term copresence to refer to technology-mediated copresence. While Zhao's (2003) review discusses modes of copresence which, by definition, includes physical copresence, we will use the term copresence henceforth to refer to a technology-mediated sense of togetherness.

As with the construct of presence, an important question about copresence is why does it occur?

In considering presence, researchers have suggested that users suspend disbelief while using computers to interact with virtual objects in virtual spaces (e.g., Moon & Nass, 1996; Nass et al., 1996; Nass & Moon, 2000; Reeves & Nass, 1996). Gilbert (1991) suggests that this is because humans are predisposed to accept stimuli as real or true unless there is a strong contravening reason suggesting that the stimuli is false. Specifically, he notes the following, "People are especially prone to accept as true the things they hear and see - but why is this so? The explanation … is that people are Spinozan systems that, when faced with shortages of time, energy, or conclusive evidence, may fail to unaccept the ideas that they involuntarily accept during comprehension" (p. 116). In other words, it is easier to believe than to reject when presented with realistic or near realistic stimuli. Reeves and Nass (1996) referred to these behaviors as "The Media Equation" (TME), and suggest that media such as television, movies, and computer-generated stimuli are believed to be real because of this tendency. In explaining these phenomena in relation to perceptions of presence and copresence, Lee (2004) categorizes TME into two different groupings, folk physics and folk psychology (p. 499). Folk physics involves the process of automatically accepting stimuli associated with virtual objects and spaces and folk psychology involves the automatic acceptance of virtual social actors. Perceptions of copresence exist when the user experiences presence in the environment (i.e., folk physics is enacted) and the user also senses the presence of the "person behind the mask" represented by the virtual social actor (i.e., folk psychology is enacted). The "Theory of the Mind" (ToM) (Gordon, 1996) suggests that a social actor's objective when interacting with other social actors is to make sense of and relate to the other actor's behaviors, feelings, and motivations; that is, the user attempts to look behind their virtual mask and read the other person's thoughts and intentions.

In the context of folk physics and folk psychology, both concepts, presence and copresence, can best be understood as two sides of one coin associated with perceptions people develop of stimuli they encounter in virtual environments. The heads side of the coin, the one associated with social interaction, reading of the mind, and copresence, is much more complicated and, in virtual environments, is predicated on having a sense of presence. The literature also suggests that the perceptions of both presence and copresence will vary depending on a number of factors. For example, the user's readiness to suspend disbelief, the degree of physical immersion, the quality and fidelity of the media, the appearance and realism of the virtual objects and actors, distractions and noise in the channel (and presumably the user's physical surroundings), and others. In addition, though, an important characteristic of the stimuli present in virtual environments is an embodied representation of the social actors; that is, the avatar. To address this issue, we review the literature on embodiment in virtual environments.

Embodiment

While the notion of virtual bodies and embodiment has been touched on to some degree in the literature addressing virtual environments, the literature related to embodiment in the context of presence is surprisingly limited. Most authors appear to take for granted the presence of a body image but offer limited discussion of the role and nature of this image in creating a sense of presence and copresence.[9] Nevertheless, one of the most wide-reaching synopses of issues relating to embodiment in virtual environments is that offered by Biocca (1997). As he notes, the notion of presence became "theoretically intriguing, practical, and urgent with the advent of

9 This statement should be taken in the context of the discussion of perceptions of copresence, reading of the mind, and the formation of conclusions and impressions based on body image, gestures, and similar stimuli. Most scholars who discuss copresence will refer to the avatar or body representation, but most scholars skim over the subtleties associated with, for example, issues like impression formation, perceptions of identity, and other reactions to stimuli that are socially constructed or defined.

immersive virtual reality" (p. 19). In fact, he argues that presence became a goal in and of itself because of the immersive nature of these technologies. This is due, at least in part, to the fact that the virtual environment tied the user's physical body to the stimuli received from the virtual environment. This, in turn, meant that simulations generated in the virtual environment could be tied back to the physical world in a way that offered opportunities for learning, training, motivation, pleasure, and real-world consequences (p. 20). While he contextualized his discussion of the relationship of body and immersion in the environment to immersive virtual reality technologies, the perspectives on body and embodiment offered in this seminal work have relevance to less physically immersive virtual environments such as Second Life.

Biocca suggests that the body offers opportunities to foster a sense of presence in three forms: being there, being with another body, and having a feeling of self presence (i.e., does that avatar represent me?). The first two forms of presence are equivalent, respectively, to the notions of presence and copresence reviewed above; the third conceptualization of presence is dealt with less directly in the presence literature. However, before moving into a discussion of Biocca's third form of presence, it is worth noting that he ties perceptions of the body to the development of a sense of presence in a useful way. Specifically, he notes that users will experience oscillations in their sense of presence because the sensation of presence is unstable. As users experience a virtual environment, their sense of presence will switch between one of three "places;" the physical environment, the virtual environment, and the imaginal environment. This last conceptualization of how the user perceives space and, by extension, the body, when not attuned to the physical and virtual stimuli is important in considering how users respond to others. For example, embodiment not only of one's self but also of someone with whom one is communicating will be largely based on physical stimuli when you see her face-to-face, but that

embodiment will take place in the imaginal realm when using mediated communication technology that does not include high fidelity representations of the social actors (e.g., telephone communication, email, virtual worlds with stylistic avatars, etc).

When discussing the conceptualizations of the body, the focus of Biocca's discussion is primarily on the perceptions that the user has of his or her own representation in the virtual world. In immersive virtual reality systems, the notion of "self presence" became salient because the degree to which the user's sensory system is immersed in the virtual environment influences his or her identification with the avatar representing the self. Biocca notes that this has a profound effect on the user's mental model of self. Specifically, two things are happening when one is immersed in a virtual environment. First, "the mental model of the user's body (body schema or body image) may be influenced by the mapping of the physical to the geometry and topology of the virtual body" (p. 23). Second, "The virtual body may have a different social meaning (i.e., social role) than the user's body" (p. 23). Thus, the avatar body as manifest in the virtual environment creates perceptions in the user of that avatar and of the user himself (or herself). Furthermore, the manifestation of the avatar has a social meaning not only for the user but for other users who see that image and interpret it in the social context in which it is manifest. To resume, when users experience embodiment in a virtual world there are three bodies involved in the interaction: the objective physical body of the user, the virtual body as manifest in the virtual environment, and the body schema that is part of the user's mental model. We would add that a fourth body is sometimes part of a user's interaction with a virtual environment; that is, the body schema of the user created in the mind(s) of an observer (or set of observers). Furthermore, while Biocca's perspective on embodiment was offered in the context of immersive virtual environments, the factors he identifies will still operate in other virtual

environments such as virtual worlds and video games. As such, this is a useful framework for considering the influence of perceptions of embodiment on user perceptions of self as well as other users.

While a number of studies have dealt specifically with embodiment (e.g., Bailenson & Yee, 2005; Bailenson et al., 2006; Benford et al., 1995; Bowers et al., 1996; Durlach et al., 2000; Ehrsson; 2007; Gerhard et al., 2004; Regenbrecht & Schubert, 2002; Reiner, 2004; Thomas, 2008), Biocca's view of embodiment in virtual environments is the most pertinent to the development of the concept of embodied presence and ESP.

Summary of Theories of Presence

This review was begun with a statement about a sense of presence being an "illusion that there is no mediation in the communication." As explained above, we argue that the concept of presence is inexorably tied to concepts such as place, the user's body, the environment in and around the physical and virtual space, and the presence of other social actors. Nevertheless, an important question is whether and how this illusion is created and the effect it has on the user's perceptions, actions, and attitudes. Biocca and colleagues (2003) discuss the issue in their review of the presence and social presence literature. They note that, "A central concern of social presence theory has to be whether technologically mediated social interaction is or is not different from unmediated interaction. If mediated interaction is different than unmediated interaction, in what way is it different and what is it about technology that causes this difference? Although mediated and unmediated social interaction may draw upon the same cognitive mechanisms, there is an assumption in all presence research that 'technology has an effect'" (p. 473).

Thus, the question is still open; that is, it is still not entirely clear whether and how mediated

communication differs in its influence on perceptions of social presence and the factors that influence the development of this perceptual state are not fully understood. While Biocca and colleagues offer several criteria that will define the characteristics of a more robust theory of social presence,[10] they do not offer the specifics of such a model. We suggest that a portion of the solution is hinted at in their discussion of these criteria. First, a more robust theory of social presence must be multidimensional. Second, they note the following, "It may be that a full understanding of social presence may benefit from being informed by a larger theory of how we automatically interpret physical forms and nonverbal and verbal codes to simulate and infer the content of other minds. A theory of social presence may need to simultaneously address both the technology questions about media form and the psychological question about reading minds in representations" (p. 472).

We suggest that Activity Theory, when combined with the concept of embodiment, offers a path to a more robust theory of social presence, Embodied Social Presence. Activity Theory frames our thinking as we regard all communication as mediated - whether by language, body, tools or context - and reject Biocca's articulation of a dichotomy of mediated versus unmediated interaction because the body itself is an artifact of mediation. We propose that our lived body is key in the evocation of embodied social presence and that these are bodily movements and sensory abilities of our bodies whether we consciously or unconsciously model them in virtual worlds that make us aware of space and contextual properties of digital environments.

ACTIVITY THEORY

The literature review in the preceding sections illustrates that theories of presence, including co-

10 Their criteria are, 1) it must span different classes and generations of ICT, 2) it must accommodate various mediated interactions, 3) it must span interactions with human and nonhuman others, and 4) it must apply to real and illusionary social interactions.

presence and social presence, are insufficient to provide for a full description of factors explaining use of virtual environments and other ICTs. While the literature on presence has proven useful to describe a variety of factors influencing the establishment of some degree of presence, it fails to demonstrate the richness, depth and multidimensional character of interactions associated with presence and co-presence. This point was made by Biocca and his colleagues (2003) when they noted that limitations of the concept of social presence include "…defining the limited scope of psychological phenomena that constitute social presence", "...defining the scope of social behavior that elicit social presence," and "…setting criteria for measurement…" (p. 471). In other words, what are the antecedents, the psychological phenomena, and the outcomes of presence in all its forms? Of course, the psychological component of this question is most difficult to understand, and while our goal is not to offer a unifying theory of the mind as it relates to presence, we do suggest that Activity Theory offers a useful framework for beginning to address open questions highlighted by Biocca and colleagues (2003).

Activity Theory has been considered to examine issues related to communication systems in the context of computer supported collaborative work (CSCW); however, this application has focused primarily on issues related to explicating how to better build technologies in order to support communication.[11] The application of Activity Theory to communication is promising, particularly if we extend the components of the model to the social acts of communication.

[11] For example, a workshop at the 8th European Conference of Computer-Supported Cooperative entitled, "Applying Activity Theory to CSCW research and practice" (visit http://www.uku.fi/tike/actad/ecscw2003-at/) included four thematic tracks: 1) methodologies and frameworks, 2) understanding collaborative work activities, 3) understanding system development activities, and 4) instruments for design in CSCW. Each of these tracks focused on issues related to building CSCW systems. While some of the focus in the papers presented in these tracks was on actors using CSCW systems, these papers dealt primarily with understanding system requirements based not so much on the communication process but rather on the "…intentions and motives of … diverse user groups." This is understandable if we consider the origins of the CSCW field, which is in the human computer interaction (HCI) field. HCI theory and practice is strongly influenced by an engineering perspective.

Activity Theory understands living as engagement in collective outcome-driven and socially determined activity that is mediated through context, tools and symbols. The theory developed from the historical and cultural perspective on individual mental processes (Vygotsky, 1935) to encompass communities of practice and their complex interaction within and with the environment (Engeström, 1987). The linkage between the individual and social is central to understanding the major premise of this theory: it is only within the context of the community and by participation in mediated activity that individuals come to realize themselves. As social beings, individuals direct activity toward each other and the environment, and thus become both the shaping forces of the environment and the recipients of environmental effects.

In Vygotskian terms, individuals engage in deliberate thinking and performing, both of which nurture the development of conscious awareness, an ability to actively examine one's own thinking. It is through conscious thinking that humans become cognizant of the reality that presents itself as both objective, existing without individuals, and constructed (negotiated) socially, within individuals. Conscious awareness is achieved by participation in activity and mastery of tools and symbols, where the latter two are created to reflect the experiences of others, accumulate and preserve social knowledge and enhance the activity system of a community. By using tools and symbols, individuals not only modify both their mental process and external behavior, but also exercise their agency.

Engeström (1987) particularly emphasized the role of human agency in shifting the focus from the individual to the social in that individuals negotiate their practices within social contexts by defining rules and labor divisions. The community relies on rules to explicate the conventions for social relations, while labor divisions guide the activity processes and achievement of desired outcomes. Activity consists of conscious interrelated actions that

become unconscious as habitual routines are established.

Activity Theory defines our thinking of how humans code and decode the others who exist within the social context and through the mediation of culture, tools and symbols. As individuals develop, master and modify the functions and pragmatics of tools, rules and labor divisions' within their communities, they act as a joint force whose goals and objectives are conveyed as individuals communicate and share meanings. Whether in face-to-face communication or via technology, humans encode messages with information that is developed and framed by their own internal and contextual understanding of reality. Furthermore, the recipients of the message engage in cognitive acts that attempt to derive meanings through lenses that mediate their interpretation in the context of culture, tools and symbols. The process of deriving meaning happens within each individual during comprehension and is shaped by the external cues that are present in a social context.

The role of the human body is fundamental to communication in that it serves to mediate and aid participation in activity. Intimately acquainted with their own bodies and the way sensory stimuli work within bodies and assimilated into the societal forms of thinking about body, humans use bodily movements to perform deliberate actions and interpret the bodily actions of the others. With regards to virtual environments, bodies serve as a basic frame of reference that functions very effectively to satisfy the needs of the real world and transfers quite effectively to digital spaces, where movement is modeled and imitated after the real world sensations (e.g. pilots use virtual simulations that are designed to elicit their bodily reactions necessary to solve an emergent situation in the air).

Virtual worlds not only call for the physicality of human body, but also act as social contexts within which individuals and communities participate in joined activity, interact with the

context, internalize tools and symbols embedded in the digital culture as well as transform and re-consider social rules and divisions of labor. During such processing of virtual worlds, humans master virtual tools via deliberate acts of generalization and systematization and open a gateway to conscious thinking, which appreciates the complex matrix of virtual worlds. Thus, as with any medium of communication, people learn to appropriate the tool in its context through both generalizing and systematizing acts, which is consistent with how Activity Theory suggests that actors learn about their environment.

Thus, we see that Activity Theory posits of mix of factors that are useful for defining those features of virtual worlds that are important in the communication process. In the next section, we explicate the ESP model by tying the specific affordances offered in virtual worlds to the context, tools and symbols embedded in communication.

A MODEL OF EMBODIED SOCIAL PRESENCE THEORY

Embodied Social Presence in Context

Before defining the specific features of ESP, it is important to frame this model in the context of virtual worlds and the social presence literatures. Specifically, ESP is premised on the notion that certain communication acts and interactions take place in the context of embodied states that create a sense of presence that is derivative of human cognitions associated with physical, real world BtB interactions. To achieve this sense of embodied social presence, the actor must first achieve and perceive sufficient levels of embodied presence and copresence. This process is presented in the model shown in Figure 2 and represents our summarization of the actions, requirements, and constraints that the presence literature has previously identified and that culminate with the development of perceptions of ESP.

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Figure 2 about here

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The process of establishing ESP begins, of course, with the user. Nevertheless, the user is positioned in the context of a physical space. The user in his or her world is defined by the corporeal existence of that actor, the psychological processes and frames in which the user is operating at the time of interaction, plus other historical and societal contextual elements that create in the user a psychological readiness to engage in presence and, ultimately, ESP. It is important to note that the physical place where the user operates can have a profound influence on the psychological readiness of the user to engage in the virtual world and, most importantly, achieving a sense of ESP. The literature as well as our own experience shows that factors such as background noise, the presence of other social actors, and other elements that exist impinge on the user because of their venue in the physical world can influence the level of ESP achieved by the user (Biocca et al., 2003; Witmer & Singer, 1998).[12]

To enter the virtual world, the user must use a physical communication channel. This channel could include text, images, audio, video, chat, avatar controls, and kinesic (e.g., haptic) devices. It is not necessary for all of these channels to be present for the user to achieve meaningful ESP. For example, current open virtual worlds like Second Life are limited to only a few of these channels (e.g., primarily text, audio, imagery, and avatar).[13] Nevertheless, to achieve ESP in a

12 A salient example of this occurred when one of the students in a course taught by one of the authors met with the class at a Panera's. The background noise, the distractions from other people, and the attention on the student from gawkers all reduced his ability to engage in meaningful ESP.

13 IBM recently announced that they have integrated their Sametime 3-D represents an integration of their multifaceted instant messaging tools with 3-D worlds. As they note, "The application creates a virtual meeting space on the fly leveraging the typical properties found in a virtual environment, including avatars, presentation

virtual world such as those enabled by current technology, an important channel is the visual interface that shows the image of the user's avatar, the virtual space, the other user's avatar, and the events, actions, and gestures that occur within the environment. As we will discuss later, ESP can take place without channels supporting this visual stimuli, but this moves the model into the imaginal realm of embodiment, a topic which we will discuss in more detail in the conclusion of the paper. In context, the specific channel components that are aggregated and used over a transmission medium to engage with the virtual world represent, when considered in total, a space in and of itself. As with the physical space, the technological space can have a profound effect on achieving ESP. For example, low bandwidth, malfunctioning devices, software errors, and other factors that may impede the user's ability to receive sensory perceptual feedback will negatively influence ESP. It is not surprising then that there are a number of technology companies that market high fidelity headphones, high precision mice and keyboards, high resolution monitors, and similar "gaming" technologies; much of the packaging and marketing efforts associated with these products suggests that they are designed to facilitate the players' ability to properly engage their psychological state with the game environment.

Assuming that the user's channel space provides adequate mediation to accomplish the connection with the virtual environment, then the user will be presented with the stimuli representing the virtual space. This does not guarantee that the user will experience a sense of presence, but it does afford the user with that opportunity. As the literature points out, factors such a image quality, resolution, color, spatial characteristics of the environment, and numerous other factors will influence whether the user develops a sense of presence and the degree to

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tools and access to 3-D objects." The point is that there appears to be a continual push in virtual environments to integrate additional channel spaces and affordances to make the virtual environment more representative of the physical spaces in which we normally collaborate and communicate.

which that occurs. An important point is that the contents of existing[14] virtual worlds are largely built with the assumption that users are stimulated primarily through their visual sensory channel. Given this, the visual features of the environment that have been identified in the literature as being of importance in influencing perceptions of presence will be important in influencing ESP. This is due to the fact that ESP can be attained only when the user first experiences a sense of embodied presence and embodied copresence.

It should be noted that our representation of this process is consistent with the presence literature in that the user's avatar could be present in the virtual space without other social actors. In such a case, the user is presented with stimuli representing the virtual environment, the objects in that environment, and their own avatar's representation. If they engage with these stimuli they will experience, to one degree or another, embodied presence. As Biocca (1997) suggested, when a user of a virtual environment is presented with a body representing himself or herself in the virtual world, this will have an influence on perceptions of self, perceptions of one's own identity, and the user's actions associated with that representation. Thus, embodied presence creates for the user an opportunity to create and extend his or her identity in the virtual environment in a way that is not present in most other communication environments. This might be done with or without the expectation that he or she will interact with others in that virtual space. For example, someone might want to experiment with identities that he or she has no intention of exposing to other people with the goal, for example, of exploring his or her own feelings or reactions to various embodied identities.

14 The word "existing" is important. It is conceivable that virtual worlds could be built to rely in part or whole on other sensory inputs. For example, virtual environments could be developed that rely, for example, on haptic or auditory stimuli. For example, a research unit at the authors' institution has built a robotic arm that provides force feedback cues that provide the observer with the impression that a box is present in space near the robotic arm. As one tries to move the arm it provides resistance when the arm approaches the virtual box. Such interfaces could be built to augment or replace the visual stimuli.

Once a user develops a sense of presence in a virtual environment, the opportunity exists for that user to share that space with other users. When multiple users share a virtual space they have the opportunity to experience perceptions of embodied copresence. At its basic level, embodied copresence is an awareness that another entity is present and, in virtual environments, this is accomplished at its rudimentary level through visual, auditory, and other action-oriented stimuli manifest by the avatar. As with presence, copresence is a perception. The fact that two avatars are present one with another in a virtual environment does not necessarily represent embodied copresence because while avatars might share a place or space within a virtual environment the user who controls an avatar may or may not develop a perception of co-presence. For embodied copresence to exist, one or more of the social actors whose avatar is in the shared space must experience this perception.

It is worth noting that it is not necessary for all of the social actors whose avatars are in a shared space to experience perceptions of embodied copresence for embodied copresence to occur. For example, my avatar might venture into a virtual locale and be present with another avatar that is being controlled by a person who is also watching the television in their physical proximity (i.e., engaged in watching TV but simultaneously logged into the virtual environment). It is possible in such a scenario for me to perceive that avatar's presence, thus developing a sense of embodied copresence; yet, the social actor controlling the other avatar is distracted and unaware of my presence.[15] This is one of the limitations of the current literature on presence and

[15] This highlights an important characteristic of most existing virtual environments; that is, the fidelity of the embodied representations filter significant cues coming from the user of an avatar thus creating the potential for misrepresentations, misinterpretation, and deception. This is not as pronounced a problem when social actors are engaged in communication in a proximate BtB context because they generally have the opportunity to observe gestures and other cues with relatively high fidelity (i.e., the observer can see the other social actor's non-verbals directly, without mediation). While misrepresentation and misinterpretation can certainly take place in BtB interactions, the mediation offered through virtual environments affords these opportunities for miscommunication (e.g., body suits and other haptic and high fidelity controls that allow users' movements to be

copresence; that is, the notion of copresence does not take into account the role that interaction has in creating a high sense of interactive copresence. The concept of ESP addresses this shortcoming by identifying the factors that are fundamentally associated with rich, BtB interactions that exist in the real world and applying these to interactions in virtual environments. Key to this interactive potential are the shared contexts, shared spaces, shared objects, shared activities, and the tools for interaction that exist within the milieu of artifacts that define the shared virtual experience. We call this higher level of interaction ESP, which we define and explicate in the next section.

Embodied Social Presence Explicated

Activity Theory is focused on identifying how people derive meaning during interactions with their environment through words, actions, context, and tools. The primary focus of Activity Theory is on activity in context; that is, how do context, tools and symbols allow us to understand how people develop an understanding of their world in a given activity-based context (e.g., Nardi, 1995, notes that "...the unit of analysis is an activity", p. 72). In other words, how do people learn in a given context? As such, the focus is on the individual and how he or she learns about his or her environment, including others in the environment with whom the learner interacts. One of the important tenets of Activity Theory is the notion that reality is a mix of objective and subjective interpretation by the learner. As such, it focuses on how we interpret our context; in doing so Activity Theory tells us that we do not necessary know what is objectively in the environment.

Activity Theory is in contrast with much of the presence literature, which has focused on the objective content of communication with a goal of identifying whether and how technology

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accurately represented in the virtual environment would address some of these issues).

does or can accurately transmit information. However, when people communicate, both objective and subjective content is embedded in communiqués. Ultimately, one important stated goal associated with the notion of social presence is to understand what the reality is behind the mask presented by the communicator. The Theory of the Mind focuses on this notion and is, in our opinion, at the heart of Social Presence Theory. Here lies the problem. Activity Theory argues that we can only develop our understanding of others through our own subjective lenses that are framed both by objective and interpretive influences. In other words, we cannot really know reality in an objective sense; we cannot read the mind of the other person we are communicating with.

A conclusion one might draw from Activity Theory is that there is no point in trying to decipher the intent of the communicator since one cannot read his or her mind. Of course, this is not the purpose of Activity Theory; rather, it is to highlight that understanding one's environment is, in part, a subjective process and that understanding it is internalized through the stimuli available to the observer. The stimuli in question when considering communication activities are the actions taken by other social actors in the environment of the observer (i.e., the learner). Activities consist of verbal and non-verbal actions. Actors engage in these actions using tools that are symbols in a context. In the context of communication, all of these actions are initiated by the mind of the actor through the quintessent medium, the actor's body. So, while actors have intent and goals, those intentions are instantiated through actions that are exhibited through the body. In other words, the body is used as a tool for impression management, communication, and symbolic interactions. For example, in describing how social actors manage impressions during social interactions, Goffman (1959) offers a theory of impression management that is analogous to the use of the term as it is used in a theatrical performance.

Goffman further asserts that an individual will create an impression that has two components: "the expression that he gives, and the expression that he gives off" (Goffman 1959, p. 2). The expression *given* by the social actors is purposely made up of his verbal language plus the actions he performs through his body (Goffman, 1959). Of course, the message *given off* is the subjective impression received by the observer and derived through the interpretation of actions and language. This highlights the fact that it is the body that is the focal point for understanding communication; the body is the nexus where activity is initiated by communicating actors (i.e., the actor taking action) or where actions might have an effect (i.e., the actor as the recipient of action). Let us say for now that this bodily nexus is the focus point in virtual worlds where the avatar's body (both for the observer and the observed) is a focal point of the visual field; however, as we will discuss later this is the case in other media as well.

Actions emanate from the body and have effects on bodies. Actions can be classified as either verbal or non-verbal. Verbalizations can be highly symbolic with embedded semantics. The body codes (Andersen, 1999) of nonverbal communication include physical appearance (e.g. clothing, sex, race, age, stature), kinesics (e.g. facial expressions, gestures, interactional synchrony), oculesics (e.g. eye contact, pupil dilation, eye movements), proxemics (e.g. territoriality, crowding and density, personal space), and haptics (e.g. types of touch, touch avoidance, touch taboos). The contextual codes (Andersen, 1999) of nonverbal communication include macroenvironments (e.g. large geographic regions, climates), microenvironments (e.g. small sociopetal/sociofugal spaces, seating, temperature, color, lighting, sound), chronemics (e.g. waiting time, spending time, talk time, body speed), olfactics (e.g. scent and smell), and vocalics (e.g. voice quality, pitch, rhythm, tempo, resonance, control, accent). All of these forms of communication are relevant in virtual worlds as well as the real world. Each of these is a cue

that can be interpreted by an observer in the total context of the observer's frame.

The tenets of ESP are that bodies are the nexus of communication and that communication cues, either verbal or non-verbal, are filtered through the body. The mind of the actor cannot be read by an observer, the best that the observer can do is read the language of the body. This is not a new concept. For instance, feminist literature has dealt extensively with issues of embodiment (De Beauvoir 1953; Wittig 1976; Irigaray 1981; Butler 1988; Braidotti 1990; Haraway 1985). Since Margaret Mead (1928) and Simone de Beauvoir (1953) launched ideas that dislocated the subjugated position of women by separating the biologically determined genitalia identified as sex from the social construct of gender, feminists have underlined the importance of issues of embodiment. More recently, feminist studies of cyberspace have addressed the question of embodiment in studies of identity in virtual space. For instance, Nakamura (2002) argues that the practice where users experience different virtual bodies forms part of a "'postbody'" ideology, an era where the body no longer grounds our sense of identity (p. 5). Nakamura's (2002) contentions are comparable to Butler's theory on the performance of gender when she states that "the Internet is a theater of sorts, a theater of performed identities" (p. 31). Blending Butler's theory on the performance of gender with Haraway's prediction of the feminist cyborg as feminist emblem, Nakamura (2002) interprets "visual avatars as theatrical prostheses in cyberspace" (p. 33). Thus, in the context of feminist theory the virtual body acts as a display and provides a platform for exhibiting meaningful signs and symbols that are intended to be read by other social actors.

Our purpose in proposing ESP is to highlight the need to frame all communication in the context of an embodied sense of self interacting with the context, symbols, and tools of the space it populates. Of course, we do not argue that ESP negates the Theory of the Mind or that

observers cannot infer purpose and meaning in actions, but it does turn our focus of attention where it should be; that is, the actions instantiated through the body. This focus on the body is particularly important for virtual worlds because these environments are designed with affordances that support a variety of body-centered actions. This includes both verbal and non-verbal actions. Additionally, non-verbal actions are more pronounced in virtual worlds because of the broader context in which those actions are placed; that is, the virtual environment and space in which the virtual body, the avatar resides.

Our inquiry into ESP began with the observation that the use of virtual worlds, and particularly Second Life, created in us, the researchers, and our students a greater sense of engagement with the environment (i.e., presence) and others in the environment. When we communicated with someone in Second Life we observed that in spite of the fact we knew that the avatar was not real, the perception remained that our interactions with him or her were more engaging, more dynamic, and more satisfying. Why would this be so? The answer lies in the space we, the two avatars, shared and the interactions our avatars engaged in. It is the sharing of space that provided context and it is the interaction of bodies being used as tools that created richness. But the question might be posed, isn't this just copresence? While copresence implies that there is a perception of presence associated with the other social actor, the concept of copresence does not capture the depth of the interaction that exists when two or more avatars are engaged in substantive activity-based interactions. It is at this rich level of interaction that deeper meanings can be laid upon actions and, thus, information encoded and conveyed. This resembles the concepts associated with the Theory of the Mind, but there is an important difference between what we are saying and the implications of TOM. We, of course, cannot read another social actor's mind; the best we can do is read (and sometimes misread) bodies. Perhaps instead of the

theory of the mind, we should consider ESP the theory of the body's mind expressed and, in turn, interpreted in action.[16]

While space does not allow a full discussion of each of the factors that define that antecedents of ESP, Table 1 lists the major factors suggested by Activity Theory in the context of multi-user virtual environments. Each of the factors listed in Table 1 represent elements that define and influence whether, when, and how social actors derive meaning and understanding from their environment and ultimately make interpretations about interactions with other social actors. As such, each represents a category of variables that can be examined to identify the role of context, tools, and symbols in shaping a social actor's sense of ESP. It should be noted that ESP, as it currently stands, is primarily a descriptive theory that frames the context in which the phenomenon of ESP occurs. Nevertheless, as has been the case with Activity Theory we expect that as the model is developed and the factors further investigated, we will be able to develop a predictive frame for examining this phenomenon. In fact, we rely on the prior research on media theories and presence as a starting point for this model. For example, to achieve ESP we assume the channel offers sufficient bandwidth to allow users to experience embodied presence, copresence, and ESP. Additionally, we should also note that several factors are present in multiple columns and that this is purposeful. For example, space is present in all three categories. This is because space has context and also provides context and thus defines how a social actor will interpret his or her surroundings. In addition, place theories suggest that space has significant meaning associated with its history and features (e.g., Gustafson, 2001). Thus, space can also be used as a tool when combined with its symbolism. Politicians, monarchs, and dictators have, for example, used space and, in some cases, created new architectural spaces to

[16] We recognize that there is an irony associated with the use of the term ESP in juxtaposition with reading a mind, but this, in our opinion, is an appealing feature of this theory..

bestow meaning on an act such as a change of power or the enactment of a new government program (e.g. see Blockmans, 2003). Thus, space provides context but it also can be used as a tool in symbolic activities associated with social interactions.

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Table 1 about here

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In closing this explication of ESP, an important point of departure is to identify the path by which ESP is achieved and explain how we see this high-level of engagement in activity-based social interactions develop (this summary represents a synopsis of our analysis and interpretation of subject reflections, which we discuss in detail in the next section). Embodied social presence takes place in a multi-step and cyclical process of cognitive engagement similar to the process described in several studies examining presence. We summarize this process in Figure 3. In summary, the ultimate observed state of ESP occurs when a social actor engages in goal-directed interactions with another social actor through the mediation of their avatars' bodies. The process of perceptual focus we see in our data starts with the *Recognition of the Other*, which involves the individual observing the digital representation of the other avatar engaged in activities in the shared space. This is followed by a *Recognition of the Digital Self*, which involves the actor also developing a perception of the digital self embodied in his or her own avatar. The social actor will at some point participate in *Collaborative Engagement*, where the actor's cognitive attention (conscious and subconscious) turns to interacting with the real other through the avatar and the avatar's actions. The result of this interaction is an *Appraisal of the "Real" Other*, which involves the development of some level of assessment and understanding of the other as an individual. This is interwoven with a *Reflection on and*

Appraisal of the Self, which occurs with the development of an actor's perceptions of his or her own digital self engaged in activities with the other actor's avatar. Thus, the social actor considers his or her *real* self within the context of interaction and action. This loop of attentive focus, shifting focus, and refocus is fundamental to the interactive, activity-based nature of high levels of engagement within the virtual environment.

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Figure 3 about here

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In this context we see that the perception of ESP is dynamic, ever-changing and oscillating as the attention of the social actor turns towards and away from the task to be performed, inward and outside of the interaction, much like in the conversation in which the actor becomes disengaged when distracted by a demanding call coming from his or her cell phone. The social actor's gaze is first introverted and concentrated on the lived experiences of his or her real body. Since the physical body is all he or she knows in real life, the actor then readily recognizes the digital body of the other in the virtual environment and gets to know the other through the other's avatar as both engage in collaborative activities. Next the gaze becomes inverted, as the actor recognizes the role of his or her real body through knowing the real other.

We detail the way these factors are observed in interaction in the next section where our qualitative analysis of user interactions in virtual worlds is presented. While space does not permit an expanded discussion of the measurement of this phenomenon, suffice it to say that perceptions of ESP will follow and be dependent on a sense of presence and copresence, which are constructs that others have attempted to address in previous research (e.g., Biocca et al., 2003; IJsselsteijn, 2000; Witmer & Singer, 1998). Furthermore, ESP will be achieved when the

actors engage in shared activities that are performed in a context (e.g., involving specific tasks, in a particular space, etc.), using tools (e.g., virtual objects, the body of the avatar, etc.), within a symbolic frame (e.g., a space with historical meaning, clothing with symbolism, etc.). Thus, these are factors that can be measured and varied to understand where, when, and how ESP is achieved. Finally, perceptions of ESP will be associated with a recognition made by the social actor of observations of and reflections upon the other digital and real social actor, the shared actions, and the digital and real self. Thus, a scale for the measurement of perceptions of ESP, while beyond the scope of this paper, will focus on these three constructs and phenomena. As this discussion suggests, the development of perceptions of ESP is achieved through a complex process that begins with a perception of embodied presence and co-presence and culminates with a perception of self and others engaged in interactive, task-focused activity. We summarize the process through which these perceptions are developed and the factors influencing their development in the research framework represented in Figure 4. In the next section we present a content analysis of Second Life user reflections that is designed to offer support for the ESP Theory and this research model.

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Figure 4 about here

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QUALITATIVE DATA ANALYSIS

We have thus far offered a description of ESP at a theoretical level. While the model as presented is primarily descriptive, we expect that the factors that define and create ESP in a virtual environment can be defined and used for predictions and testing. Furthermore, we think

the model stands on its own and provides a useful framework for understanding how high levels of cognitive engagement are achieved in virtual environments. Nevertheless, it is important to provide support for ESP by describing the data that we, at least in part, used in our development of ESP. This section provided a brief description of the qualitative analysis we performed as we developed the model.

Data Collection Procedures

Data were collected from two offerings of one graduate course, E-Commerce, that was taught during the summer of 2007 and spring of 2008. The objective of the course was to help students develop an understanding of the nature of the consumer purchasing process, the characteristics of products and services, and the role of human behavior. The students were to participate in business activities, socialization, and collaboration, which involved using the virtual environment of Second Life to hold team meetings, engage in social and task-related activities, and participate in class lectures and discourse (see anonymous, 2008).

The class assignments included several team projects. For example, in one section of the course the students developed a consulting report and presented a final project that consisted of an analysis of a Second Life initiative for a local non-profit organization. The purpose of the group activity was to explore the role of avatars in fostering or hindering communication between team members. Student teams were to examine and document two cases of communication, one using Second Life chat and a second using a traditional chat tool (e.g., Google Chat, AOL IM, etc.).

After engaging in this group activity, the students were asked to individually reflect on these tools for communication. The students were asked to draw comparisons, to report on the

benefits or the drawbacks of using the tools for communication, to think about the usefulness and helpfulness of the tools' features, and to discuss team interaction when engaged in three-dimensional chat versus two-dimensional chat.

Data Analysis

The student reflection exercise was collected from 59 students, 31 from the summer 2007 course and 28 from the spring 2008 course. The reflections were combined into one document which consisted of 149 pages of text (Times New Roman 12-point font, double-space, 1-inch margins). We used content analysis to examine the text. Content analysis has been defined as a research technique for *making replicable and valid inferences from data to their context* (Berelson, 1952; Holsti; 1969; Krippendorff, 1980; Weber, 1990). The multipurpose technique has been used to discover the psychological, attitudinal and behavioral states of individuals and groups (Krippendorff, 1980; Weber, 1990). Through system of coding, content analysis transforms words into numbers by examining the frequency and magnitude of a phenomenon as it is represented in a text (Bailey, 1978; Franzosi, 2004).

Initial Analysis

Initial analysis examined the concept of embodiment by enumerating references to the body (i.e. physical and digital), senses, and feelings. The top five embodiment words returned from a frequency counting search were “see” (68), “feel” (65), “avatar” (57), “person” (50), and “real” (28). From this initial analysis, we can begin to understand the qualities of the virtual communication include visual and emotional stimuli experienced by the individual represented by the avatar.

Also explored was the concept of body in action. The spatial aspect of virtual environments enabled participants to leverage more codes for communication. In addition to language, virtual participants identified and used four of the five body codes – physical appearance, kinesics, oculesics, proxemics, and haptics (Andersen 1999).

Focused Analysis

Focused analysis began with the development of a start list of codes (Miles and Huberman, 1994) based on *a priori* concepts outlined in Lombard and Ditton (1997). Line by line coding was framed by the causes of presence (e.g. number of senses involved, visual quality, and aural characteristics), effects of presence (e.g. user arousal, enjoyment, and task performance), technology content variables (e.g. conventions and fidelity), and user content variables (e.g. personality type, mood, age, gender). The initial start list contained eight causes of presence, eleven effects of presence, three content variables, and three user variables.

As line by line coding progressed, several themes emerged which were not contained in the start list. The student reflection data included additional causes (e.g. place, self, and nonverbal communication) and effects (e.g. the feeling of having and using a digital body). The start list was refined to include these concepts and the data were recoded.

We calculated intercoder reliability where reliability is the ratio of twice the number of coding decisions on which two coders agree divided by the total number of coding decisions made by the first and second coders (Wimmer, 1994). When a 25 percent random sample of the data was reanalyzed the overall intercoder reliability coefficient was .86.

Theme Development

The coded data were then organized into a clustered matrix (Miles and Huberman, 1994). Each row represented one of the 59 student respondents. Each column detailed the coding associated with the causes and effects of presence, the user and content variables, and the written text describing the event. The raw data were narrowed to 248 statements (10,058 words) describing the phenomenon of embodied social presence. Statements were one to three sentences that described a complete thought or action.

When reflecting on the virtual communication assignment, most students wrote about their teammates (52), the visual stimulation they received (44), the nonverbal body codes they transmitted or received (36), the interaction within the virtual place (44), and the feedback that the shared activity provided them (44). The effects of presence most often written about were increased arousal (33) and task performance (30). Of the 59 students, 39 wrote about a mediated body experience. A feeling of using a digital body and interacting with others who also possessed a digital body. A frequency table summarizes the causes and effects of presence experienced by the students.

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Table 2 about here

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Operationalizing ESP

The next stage of content analysis was the development of a step process model (Meyer and Conrad 1957; Smelser 1962; Lofland and Stark 1965). A step process model examines the conditions necessary in order to progress through a process. Lofland (2006) wrote, "the model

is akin, analogically, to the assembly line production process in which each stage shapes further the character of the product, such that there is a progressive narrowing of the range of possible outcomes." The spring 2008 student reflection data were used in an attempt to identify the possible steps or conditions associated with ESP. There were 76 statements from 28 student reflections (14 male, 14 female) which described the assignment to discuss their team project using Second Life and traditional chat.

Three categories were operationalized to measure the possibility and range of ESP:

ESP Achieved:	Author writes of the avatar in the first person. Author uses possessive form to refer to digital self and digital others (e.g. *my* avatar, *our* avatars, or *her* avatar). The author describes the feeling of using a digital body to interact with digital others (i.e., *actions* in the context of *activity*).
ESP Neutral:	Author switches between using first person and possessive forms to using articles and adjectives to refer to digital self, digital others, and avatars.
ESP Not Achieved:	Author uses an article (e.g. *an* avatar or *the* avatar) or an adjective (e.g. *that* avatar) to refer to the Second Life experience. The author also describes psychological and/or technological barriers which prevented them from moving into the next stages of presence, co-presence and then to embodied social presence.

Based on these definitions, we found that 68 percent of the students experienced ESP. In this sample, both males and females were approximately equally divided in experiencing ESP.

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Table 3 about here

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The step process model also focused in on the conditions necessary to achieve ESP. Students who experienced ESP did so by expressing visual, emotional, and nonverbal stimulation when engaging in the shared activity with their teammates in the virtual environment. A sample of

the categorized process model is show in Table 4.

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Table 4 about here

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It is important to note that the students writing these reflection pieces were first time users of Second Life. Even so, these novice users experienced a complex feedback loop. For example, the statement, "Others around me can see my expressions and mood much easier than in two dimensional chat," seemed simple. However, a closer analysis uncovers its density. The word "others" refers to digital others who are "around me" the author's digital self in the virtual place. The phrase "can see" refers to the real others and "my expressions" refers to the actions of the author's avatar. Lastly, the word "mood" refers to the emotional state of the author's real self. The realization of embodied social presence experienced by this individual went from digital others, to digital self, to real others, back to digital self, and finally concluded with the real self.

The students who did not achieve embodied social presence clearly indicated that there were motivational, technological and psychological barriers preventing them from taking the next steps into presence, co-presence and then to embodied social presence.

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Table 5 about here

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Students also identified some of the affordances of having and using a digital body. This group reported that they were better able to express themselves and to get to know their teammates when facilitated by the virtual environment.

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Table 6 about here

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ESP Research Framework: Factors Influencing Presence, Co-Presence, and ESP

The ESP research framework (Figure 4) includes six factors influencing presence, co-presence and embodied social presence: 1) technological readiness, 2) psychological readiness, 3) virtual embodiment, 4) virtual space, 5) proximity of other social actors, and 6) activity-based interactions.

One of the first factors of ESP is technological readiness. If a user's hardware is not adequate to support the virtual world application, then the user may experience a technological barrier which hampers their activity and prevents them from progressing through the ESP research framework. In our sample of Second Life users from the spring 2008 course (n=28), several students noted that deficiencies in their hardware caused them to feel frustrated or distracted and prevented them from experiencing the full benefits of the virtual world experience:

> " I don't know if it's simply because of the speed of the connection, but moving about in Second Life is slow and staggered. Sometimes I can move around quite freely and others, I can't move at all. This adds the frustration when trying to have a conversation with someone." [Male 03]
>
> "I think I would enjoy Second Life more if I had the most recent up to date technology to have a speedy connection." [Female 05]

> "I found that the use of Second Life was cumbersome, distracting and difficult as the application did not play nicely with my system." [Female 12]
>
> "During our Second Life chat session, I was kicked out a few times…I was constantly experiencing lag." [Male 08]

In addition to the readiness of the user's hardware, the nature of the Second Life application could also be a barrier to progression through the ESP model. Users may feel that the characteristics of the virtual world do not meet the needs of their activity. In the student reflections, some wrote that Second Life was too game-like or that it was not real enough:

> "It is easier to stay on task [using traditional IM] than in the more gamelike environment in Second Life." [Female 12]
>
> "After a few minutes of this I began to multitask and treat the Second Life chat as a traditional MSN-type chatting application because there was no value in watching the avatar. Perhaps if the avatars were more lifelike, or if there were some other communication value in the facial expressions, I would have continued to watch the avatar to gain more information." [Male 07]

However, if the user's technology is ready and the virtual world application meets the needs of the activity, then progression to the next step in the ESP model is likely. One example of passing through the first step of technological readiness was expressed by a student who compared the assembly of a team in Second Life to that of real life.

> "The SL chat was easier to assemble, all team members simply agreed to show up in the large class room. 15 minutes late?...no problem, just show up when you can…very similar to being late for a 1st Life meeting." [Male 09]

A second factor in the ESP model is psychological readiness. This factor is expressed when the user is willing to believe the virtual stimuli and is motivated to participate in an activity. Examples from our sample indicated that some students had preexisting negative attitudes toward the virtual environment. These students were unwilling to suspend disbelieve in the virtual meeting and expressed a preference for face-to-face encounters:

> "I prefer face-to-face meetings and building personal relationships that really have something to do with me as a person, not my avatar. I prescribe to the idea that studies show you personality changes when you're hiding behind a mask." [Female 13]

> "The simulation provides a closer proximity to the face-to-face interaction, but cannot completely reproduce it." [Female 10]

> "So while the sensation [as a face-to-face meeting] is similar, it is different enough to keep me from having any sense of 'closeness' due to the environment." [Male 01]

Psychological readiness also includes the motivation to participate in a virtual activity. If there is little reason to engage in a task such as virtual team building, then it is unlikely that the user will find value in the interaction and thus not progress through the ESP model. As one student reflected, she had previously met her teammates and found little value in holding a virtual team meeting.

> "Since I have already met most of my team, it was not important to see them face to face [in Second Life] because I have built a relationship with them previously." [Female 5]

When a user is psychologically ready to participate in a virtual experience, then that individual may be likely to progress through the ESP model. As two students expressed, they liked the convenience of a virtual meeting and felt a closeness to their group even though they knew that a real physical distance separated them from their team members.

> "I like the idea of feeling like I'm 'meeting' with my group without having to travel or try to find a time to meet." [Female 11]

> "There is a 'closeness' that develops when you're working Second Life. It comes from seeing an image of a person's avatar there. My group described this feeling as 'tricking your mind' into being in the environment. It is an odd experience at first until you get used to it." [Female 13]

Once the factors of technological and psychological readiness were met, then the students began to delve into what it meant to have and use a virtual body. Virtual embodiment has been characterized as an opportunity to create and extend one's identity through an avatar. The first time users of Second Life wrote that virtual embodiment helped them to better express

themselves and to better interact with their team members.

> "I feel it is much easier to be myself without worrying if I am stating something wrong. Others around me can see my expressions and mood much easier than in two dimensional chat." [Female 01]
>
> "Three –dimensional chat applications allow individuals to act more freely and realistically because they are not able to hide as much behind their computer screen [as in two – dimensional chat applications]." [Female 02]
>
> "Being represented by an avatar can be liberating, thus encouraging individuals to be more willing to share thoughts and ideas." [Female 14]
>
> "You can relate to other team members more because you see a human form in front of you." [Female 09]
>
> "I feel the chat mechanism [in Second Life] actually helps members expressing true feelings / opinions; more so than face-to-face meetings. For me, it is easier to give praise and easier to disagree in the chat room." [Male 09]

Parallel to virtual embodiment is the feeling of being immersed in a virtual space. The space or place serves as a context for the activity and is a precursor to ESP. Many students who participated in a Second Life chat session felt they were in the same room with their teammates.

> "In Second Life it seemed like we were in the same room." [Female 06]
>
> "Having an avatar also aids in building the relationship and feeling as if you are in the same physical space with another person." [Female 07]
>
> "One may be very close to another individual in Second Life and you may actually feel as though your space is being invaded." [Female 02]
>
> "You feel as if you are in a real face to face meeting. Especially if you have taken the time to set up the appearance of your avatar and all others have done the same." [Female 09]

A next major step in the ESP model is the perception of presence. When a technology facilitates a communication act and the mediation becomes invisible to the users, then presence is said to be realized. The students in our sample wrote how the Second Life chat sessions helped to improve communication by increasing feelings of excitement, participation, and engagement. The students also wrote that the use of an avatar body created opportunities for the expression of nonverbal acts which added to the value of the communication.

> "When my classmate originally sent me a message through gmail chat, she seemed busy, distracted, and a little short because of multi-tasking. However, minutes later in Second Life, she seemed excited, focused, and eager to discuss." [Female 01]
>
> "I like meeting in SL because it makes me feel like I am more of a participant, but I do not like the fact that we do not have any tools to work with other than the chat." [Female 09]
>
> "The feature that I like the absolute most about Second Life is how after a short period of inactivity, the avatar will 'go-to-sleep' which lets everyone else know that you've 'drifted off' as a signal of disengagement." [Male 05]
>
> "Being able to see limited body language and proximity did give me an added sense of nonverbal communication." [Male 13]
>
> "It is also advantageous to see the avatar acting out the typing of the message prior to a message being transmitted-this allows for a more realistic communication pattern and is at least one signal as to when it is your 'turn' to talk" [Male 14]

The impression of virtual space is extended by the concept of proximity to others. Virtual space can be experienced as one walks solo through a place. However, when one is joined by digital others, then the cultural rules of nonverbal communication are added to the encounter. Students wrote that seeing the avatar aided in their communication exchanges. They also wrote that proximity conventions applied to the interaction between digital bodies.

> "You can tell when someone is going to add a chat message because their avatar looks like it is typing." [Female 06]
>
> "Being able to see what the avatar is doing also give greater insight into what the other person may be interested in or what they are looking for." [Female 07]
>
> "Second Life on the other hand did provide a sense of proximity. We didn't start typing until we all had moved our avatars around so we were facing each other. Even though this wasn't necessary for us, because we were close enough to each other that we could have chatted without facing each other, we all chose to do so." [Male 08]
>
> "I think that personal space is relevant in SL. I wouldn't think of standing closely, or sitting on a colleague in SL. All of our SL sessions were at arm's length. Even when building the SL project, my cohort and I excused ourselves, when we bumped into each other unwittingly." [Male 10]

While presence is realized by the disappearance of the technology mediation, the perception of co-presence is experienced when one becomes aware that they are not alone in the virtual space. Students experiencing co-presence wrote that they felt comforted by seeing their teammates in

Second Life.

> "There is something about seeing your team's avatar. When we were separated, I did not like being 'alone'." [Female 03]
>
> "Other people come to recognize a person by their avatar, or even as their avatar, and there is a comfort in having that familiarity." [Male 14]

Activity based interactions serve as building blocks to creating and extending a user's perception of the virtual experience. Virtual embodiment and virtual space influence the perceptions of presence. The proximity of other social actors influences the perception of co-presence. The final precursor and key to embodied social presence is the activity based interaction. Students coming together to discuss their team projects, noted that their team became stronger because of the sense of fun and closeness that they experienced.

> "The use of Second Life for our team meetings is fun and helps our team get to know each other better." [Female 09]
>
> "I did feel a sense of closeness to the other team members. The building project in Second Life produced a real sense of camaraderie and the synchronous chats did create a greater feeling of collective togetherness." [Male 06]

Activity based interactions not only helped to improve team performance, but they also influenced the creation of cultural rules more appropriate to the context of the virtual encounter. When one team found that standard chat conventions did not meet their needs, the group created a new set of social norms.

> "We did come up with a method to allow for thinking. We just typed in 'thinking' when someone made a point or suggestion and we didn't know how to respond immediately."
> [Male 13]

Embodied social presence (ESP) is a perception based on the culmination of presence and co-presence with the antecedents of virtual embodiment, virtual space, proximity to other social actors, and activity based interactions. ESP is more than the sum of its parts because it is

formed around a shared activity. Students achieving ESP expressed a feeling of co-presence, but also noted that the social nature of the experience heightened the communication act. As a result, their communication was more relaxed, focused, and effective. Second Life was not just a replacement for face-to-face communication, but an improvement to face-to-face communication.

> "In Second Life you get the 'being there' feeling but the ability to see the other avatars makes you feel as though you are even closer than just being there. This closeness resulted in a more relaxed conversation among the group probably because of the feeling as though we were all in the same room." [Male 02]
>
> "The visual effect of being able to see the avatars of your teammates alongside your avatar created a 'feeling' that we were more unified or perhaps more focused on our discussion." [Male 05]
>
> "There was something about being able to see a representation of myself and my teammates that made it a richer and more effective chat mode for me." [Male 13]
>
> "Once a person gets used to communicating using these methods, then the argument of face-to-face lessens." [Female 04]
>
> "It is also a window into their personalities that you cannot always get in chat or in a face to face meeting for that matter." [Female 09]

Summary

In summary, graduate students compared and contrasted the communicative experience of using Second Life versus traditional two-dimensional chat for the purpose of discussing a team project. Fifty-nine students from two different courses produced nearly 150 pages of data describing this activity. Our qualitative analysis was a mix of inductive theory building and focused *a priori* coding. The analysis showed support for previously identified causes and effects of presence as well as identified new causes and effects proposed by embodied social presence (ESP) theory. An in-depth content analysis operationalized the linguistic choices that could measure the possibility and range of ESP. The step process model was then used to categorize a grouping of stimuli necessary (e.g. visual, emotional, and nonverbal) to achieve

ESP. Our analysis identified some of the barriers (e.g. motivational, psychological, and technological) that prevented students from achieving ESP as well as the affordances of having and using a digital body in team communication. The ESP research framework was also used to detail the factors indicated by our data which influenced presence, co-presence and embodied social presence.

DISCUSSION

We have presented various theories that consider the multiple factors that converge in our model for ESP. First, in reviewing the literature we noted that a sense of place identity has been demonstrated to be closely tied to peoples' understanding of space and the way in which these are interpreted and acted on and upon (Relph 1976). Then, based on Lombard and Ditton's (1997) meta analysis, we reviewed the extensive literature on presence paying special attention to Biocca and colleagues' proposals as well as those of other researchers who have dealt with different aspects of the construct of presence. As we have discussed, our model for ESP, responds to the need for filling a gap in the literature on presence which has obviated such central concerns in the analysis of communication acts such as space, place, and the mediation of the body. Our model seeks to provide an account for such meaningful elements in communication. We are interested in the explanation of the phenomenon of presence, specifically in virtual worlds, but with an eye on the implications for communications across a plethora of media. We propose a holistic model that accounts for multiple factors and are central to an understanding of the process of communication that takes place through body-mediated interactions.

We have provided evidence and reflected on the centrality of embodiment in virtual worlds as it

pertains to interaction and task completion. In this respect, Activity Theory has been employed as a framework which is useful in contextualizing and understanding the process leading to the attainment of ESP. The impact of embodiment in the interpretation of an objective reality has been visited in the past by scholars in disciplines such as feminism; however, a contribution of ESP is that it provides a framework for understanding how the language of the body influences perceptions of engagement and, by extension, meaning.

Human beings are inherently social. The social nature encoded in our primeval survival instincts drives us to define ourselves by relating to others. The self does not occur in isolation or a vacuum, "when a self does appear it always involves an experience of another" (Goffman 1959 p. 195). In the case of avatars, the digital body the user wears for his online performance has the power, in much the same way the actor's physical body does, to influence the perceptions developed by other social actors. Studies of presence have shown that the perception of presence of another sentient being is cause enough to impress change on an individual's performance (Bailenson et al. 2003, Zanbaka 2007). Nevertheless, co-present avatars share space but not intention. Just as Boyd (2007) has claimed that the profiles afforded by online social networks are digital bodies, public displays of identity where people can explore impression management (p. 13), the mediated body of the avatar should stand as a more wholesome representation of the self with affordances that allow the user to re-enact existing social scripts while interacting with others. In the new social scenario provided by the virtual world, the social conventions associated with FtF (i.e., BtB) interactions seem to prevail. The sense of presence seems to drive a re-enactment of RL social conventions. We see then that the user goes back to the body. The virtual representation of an embodied self stands as the

materialization of the self online, in a spatial context where digital objects and digital others help frame actions. We have discussed the usefulness of Activity Theory in providing a framework for developing an understanding of the communication process mediated through bodies, be these digital or in the flesh, without obviating the effects of contextual elements, tools, and symbols.

The ESP model explicates the elements in a process of communication. Central elements of the process, some of which have been previously brushed over, are accounted for in this model. Our data indicates that a user's embodied representation of self interacting with others in a virtual space with a place identity provides a higher sense of involvement and satisfaction, in many cases, incomparable to that provided by other media. In fact, these results suggest to us that virtual worlds are the most proximate re-creation of BtB interaction currently in existence which is available to the general public; i.e., the re-presentation that more closely resembles the real life scenarios that have been the pervading focus of communication technology design and research. Ultimately, ESP provides a comprehensive framework for understanding the role of the body in interactive social communications. The most important contribution to the IS literature and, for that matter, to other literatures examining presence is framing the discussion of communication in the context of the user's actions as presented by the body and as understood and interpreted by a social actor in the context of his or her own experiences, intentions, and motivations thereby adhering to a user-centric paradigm.

IMPLICATIONS AND CONCLUSION

ESP will be relevant to research in the IS field in a number of domains. The most obvious application for this theory will be on continued research on virtual environments and the 3-D

Internet. The popularity of environments such as Webkinz, Habbo Hotel, the Sims, and the Wii among pre-teens (and, for some games, adults) and World of WarCraft, Star Wars Galaxies, and similar MMORPGs for teens all suggest that virtual worlds like Second Life will continue to be important and likely explode in popularity during the next decade. Furthermore, while several false starts have been seen with business ventures in virtual worlds, it is likely that business applications such as marketing, customer support, modeling and product develop will also grow at a fast pace (e.g., see Ganis et al., 2008). As we saw with the development of the Internet and ecommerce during the '90's, so too we will likely see an explosion in "3De-commerce" during the next few years. Just as it was important for IS researchers to examine issues related to designing, building, managing, and using ecommerce applications, so too will it be important for IS researchers to apply theories from the IS field to studying virtual environments. Of course, the avatar, space, objects, context, and related issues are fundamental features of virtual worlds and therefore understanding how the user reacts to and perceives other actors in virtual environments will be key to identifying how to build effective virtual platforms for commerce, collaboration, and education. ESP suggests for researchers a robust set of factors and variables that can be examined to better understand whether and how users will react to these environments.

Team collaboration and education are two applications for virtual worlds that are already being used in meaningful ways (e.g., Eschenbrenner et al., 2008). Activity Theory has been applied to the study of learning and social interaction (e.g., Engestrom & Middleton, 1996); therefore, ESP has relevance as a theory to apply to the application of virtual environments for teaching, learning, and team interaction. Our research and the development of ESP arose from using Second Life to conduct classes, engage students with Second Life business people, and

encourage interaction and collaboration within the virtual environment. We observed that students seemed to achieve a higher level of engagement with each other and with the projects and activities on which they were working when using Second Life. ESP helps to explain why students and instructors rate their experiences with using Second Life and other virtual worlds in a positive way. Of course, it also helps to explain why some students struggle. The application of ESP to developing better educational environments, activities, and projects would be helpful in improving the experience for students and help educators in refining and adapting their curriculum for virtual environments.

Similarly, ESP could be helpful in designing better spaces and affordances for collaboration. For example, our results show that when ESP is achieved, collaborators are more engaged in the conversation and the team's shared activities. Using ESP to design spaces for collaboration that provide, for example, adequate room for activity-based interactions is key for developing effective tools for collaboration. Furthermore, research on how affordances in virtual spaces can be applied to real world collaboration and interaction would be helpful. For example, caves and other virtual reality technologies have been used to develop and test new product designs as simulators (e.g., Choi & Cheung, 2006; Loftin, 2001; Ragusa and Bochenek, 2001). In a similar way, virtual environments can be useful as simulators in which collaboration can take place and be applied to real-world phenomena (e.g., Reeves et al., 2008). Thus, applying ESP to examine collaboration in online simulators could be useful in identifying useful interventions and environmental designs for collaboration and interaction in other contexts.

Furthermore, compared to networks of connected profiles like the popular social networking site Facebook, 3D environments go a step further in allowing a sense of embodiment through an avatar - a virtual proxy of the user. Interactions in 3D worlds are in real time and have a spatial

dimension which could be said to approximate real world face-to-face interaction better than the networks of linked profiles a majority of our college students are used to (Stutzman 2006). Arguably, the sense of presence given by the profile page is a means to "type oneself into being" (Sundén cited in boyd and Ellison 2007, p. 2) which is complemented by the "looking glass self" (Cooley 1964) represented by the friends liaisons and subsequent interactions. Virtual 3D worlds go a step further. In 3D worlds, by manipulating a graphic, which is many times a humanoid representation of the user, rather than typing, the user models himself into being. As the first generation of Facebook-college graduates start populating the ranks of the working world, at the time they grow aware of the availability of embodied social networks, it seems probable that those who will soon become the movers and shakers will demand innovations that provide, or even improve, the kind of interactions they are used to.

Additionally, with the rise of the net generation, we must be aware of the need for enabling technologies that go along with the level of expertise and worldview younger people have grown accustomed to. As Tapscott (1998) succinctly puts it, "there is no issue more important to parents, teachers, policy makers, marketers, business leaders, and social activists than understanding what this younger generation intends to do with its digital expertise" (p. 2). He further states that the culture of interaction fostered by today's technology "foreshadows the culture they will create as the leaders of tomorrow in the workplace and society " (p. 55).

ESP is consistent with the data from our sample. Nevertheless, it is important to examine the theory in different contexts and for different users. ESP is based on Activity Theory, which has begun to be used effectively in a number of areas in education, CSCW, and other fields of study. Nevertheless, it is important to examine how this theory can be used and whether it provides adequate predictive capabilities in other contexts. We suggest that Activity Theory

would be a useful theory framework for examining user interactions with other types of information technology (e.g., ecommerce, ERP, HRIS, etc.). Furthermore, while ESP is relevant for the types of tasks our subjects engaged in, it is important to examine a model like ESP in different task contexts (e.g., researchers could consider this framework in conjunction with an examination of "task-technology fit").

In closing, it should also be mentioned that ESP has been offered and framed in the context of virtual environments. An important question is whether ESP can be used in other contexts to examine communication behaviors, perceptions of social actors, and the role of context, tools, and semiotics. We suggest that, in fact, ESP is relevant for examining and explaining interactions in other contexts as well. As noted above, the body is the nexus of communication actions and as such it is the focus of activity during interactions in virtual environments. In addition, it is one of the several artifacts that can be used to mediate communication (Nardi, 1995). An important question is whether this happens in face-to-face as well as other computer mediated interactions. Of course, gestures, body language, and other non-verbal communication along with verbalizations represent the primary activity that takes place during face-to-face communication, which is consistent with ESP. In fact, as noted earlier, we would suggest that communication should actually be conceptualized as the theory of the body in action, the implication being that we can't read minds, but we can attempt to infer meaning through actions. Furthermore, Activity Theory is the basis for ESP and, as such, the application of ESP to explain communication in other than virtual contexts is useful as ESP views understanding as developing as a result of human participation in social activity that occurs through the mediation of context, tools and symbols. The body, although, not particularly visible in Activity Theory, comes to the forefront in ESP to explain that meaning-making occurs

through proximate interactions afforded and aided by body. As people come to realize themselves within their social contexts and master tools and symbols embedded in such contexts, the body is what they know and how they position themselves with regards to the others, the place and tools. Humans use their bodies, bodily movements and bodily perceptual affordances to engage in and direct activity. Body then becomes a tool (i.e., a mediating artifact), and not a mere platform for engagement in activity, whether it happens in real world or virtual settings. Thus, ESP is relevant to understanding communication and observing and making sense of interactions in real-world, proximate interactions.

But the question remains, what about other computer-mediated environments? At first it might seem unlikely that ESP would be relevant to contexts where embodied representations are not possible due to, for example, the lack of a visual channel. Environments like the telephone, instant messaging, and similar technologies would appear to have little in common with virtual environments when we try to compare them using embodiment as the criterion. In fact, we argue that ESP is relevant to these environments because, in spite of the lack of a visual channel, activity is always a component of communication mediated by the body, therefore the ESP factors are relevant for understanding how communication takes place in these environments and, most importantly, how bodily affordances are used to participate in social activity and are perceived by other social actors.

Biocca and colleagues (2003) pointed out that the imaginal body is relevant to user experiences in virtual reality systems. When, for example, you call a relative who you know well (e.g., a parent) and you talk to that person, you might often find yourself imagining what the person is doing (e.g., fidgeting with his glasses), where he is located (e.g., sitting in the kitchen in which you grew up), what is around him (e.g., his dog is sitting next to him), and other features of the

other social actor's environment. In such circumstances it is quite possible to develop a sense of ESP even though no visual channel is present.[17] Of course, not everyone who is talking on the phone will experience perceptions of ESP. As with most perceptions, the sense of ESP is not always needed nor relevant to accomplish a given task. When someone interacts with his or her father, a high level of social involvement and information exchange may be relevant to the communication. For other communication tasks, this level of interaction may not be needed and, as prior literature has suggested, is potentially counterproductive. Comments from our subjects indicated that they would select and use virtual worlds for some tasks and not others, depending on the complexity of what they are trying to achieve.

One could argue, that ESP in the example above is only experienced by the person on the sending end, since it is the caller who is subjected to the kind of perceptions that evoke his high engagement with the imaginal body of the other. The father could be casually looking through the newspaper during the described conversation and thus not be truly engaged, although the tone of his voice might indicate a high level of interest. This leads us to saying that, firstly, in accordance with ESP, the sender cannot infer meaning from the recipient's mind, but can only interpret the external signs produced by the body of the other (tone of the father's voice), and secondly, the sender and the recipient do not try to accomplish an important task in this phone conversation, otherwise they would have chosen a face-to-face meeting or used a different kind of technology (hence, once again the "technology-task fit" framework supported by ESP moves

[17] In Ingold's book (2000), The Perception of the Environment, he describes the way that a blind person perceives his environment and the space around him and relates this to sensing space. He quotes John Hull's (1997) description of how a blind person can perceive the environment when it rains; how the pattern of rain drops illuminates the space around the listener in a way that sighted people do not comprehend. Similarly, a movie entitled, "Blindness," which is based on the novel by José Saramago, tells a fictional account of a society inflicted with a disease that causes widespread blindness. The story includes numerous references to the way people sense the environment and the bodies (i.e., people) around them through non-visual cues.

into view).

ESP emerges as both a one and a two-way process, as in the example above where the caller experiences ESP, and the father does not, rather the father is co-present, by being "there", sharing a place where the phone conversation occurs and displaying external signs of interest, but ultimately, the father appears less engaged and is multitasking as he is listening to the caller and reading a newspaper. ESP in this case is one-way process lived by the caller. ESP can be two-way and achieved by both, the caller and the father, as both share a place and activity that is mediated through their bodies, contextual tools and symbols. Both, however, must be ultimately motivated to accomplish shared tasks. The caller and his or her father would use the sensory perceptions of their bodies, whether visual, tactile, aural or other to engage in meaningful (to both) social acts.

With this article, we intend to start the dialogue about ESP, its factors and relevance across different contexts and welcome constructive feedback that helps the academic community clarify the meaning of embodied social presence for effective communication.

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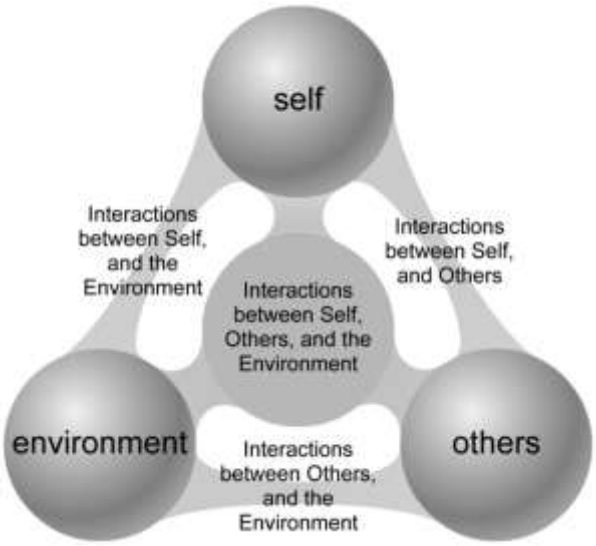

Figure 1: Factors influencing the meaning of place (adapted from Gustafson, 2001).

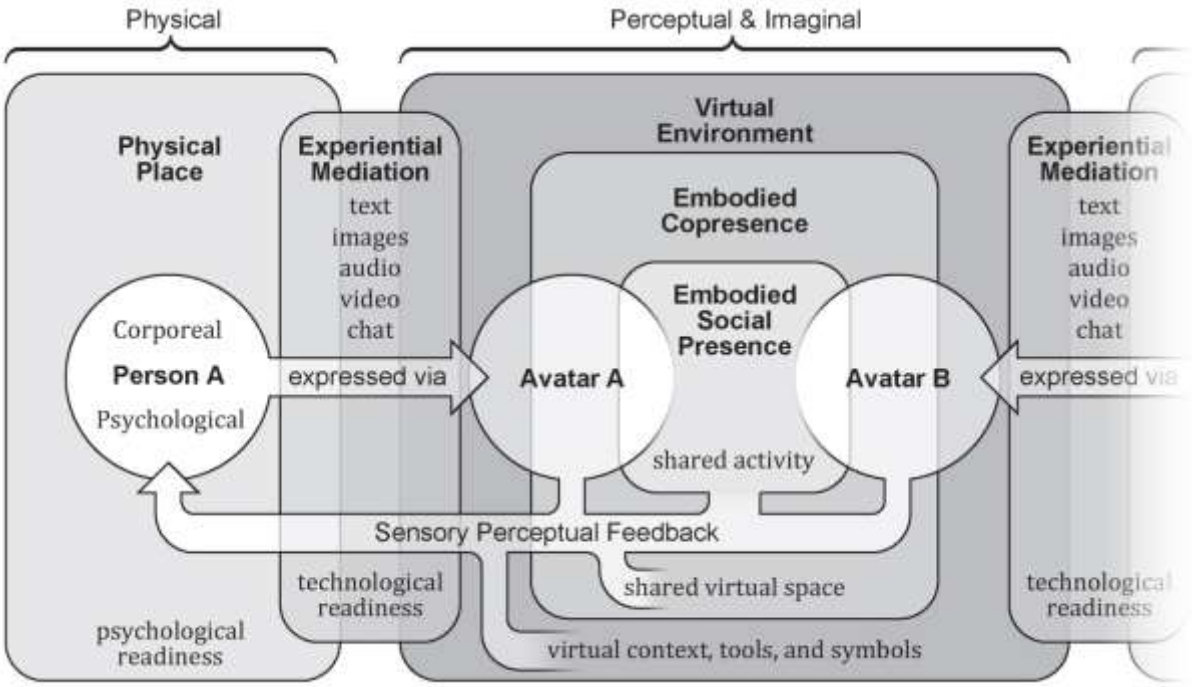

Figure 2: The Process and Context of Embodied Social Presence

Stage	Perceptual Focus	Context	Instrumental Tools	Understanding or Outcome
Recognition of the Other	The other social actor's avatar	Other social actor's virtual body (i.e., avatar) engaged in goal-oriented activities in a virtual space	• Avatar Body • Virtual Space • Virtual Objects • Verbal Communication • Non-Verbal Communication	• Perception of other avatar • Perception of Space
Recognition of Digital Self	Digital self embodied in one's own avatar	Actor's avatar present in the virtual space in proximity to the other social actor's avatar	• Avatar Body • Virtual Space	• Perception of one's own avatar • Perception of Space
Collaborative Engagement	Joint activities	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	• Avatar Body • Virtual Space • Virtual Objects • Verbal Communication • Non-Verbal Communication	• Perception of other avatar in action • Perception of one's own avatar in action
Appraisal of the "Real" Other	Actions (verbal and non-verbal) of virtual other	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	• Avatar Body • Virtual Space • Virtual Objects • Verbal Communication • Non-Verbal Communication	• Perception of the social actor "behind" the other avatar
Reflection on and Appraisal of Self	Digital self embodied in one's own avatar	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	• Avatar Body • Virtual Space • Virtual Objects • Verbal Communication • Non-Verbal Communication	• Perception of one's own actions as manifest in avatar-based social interaction

Figure 3: The Stages of ESP

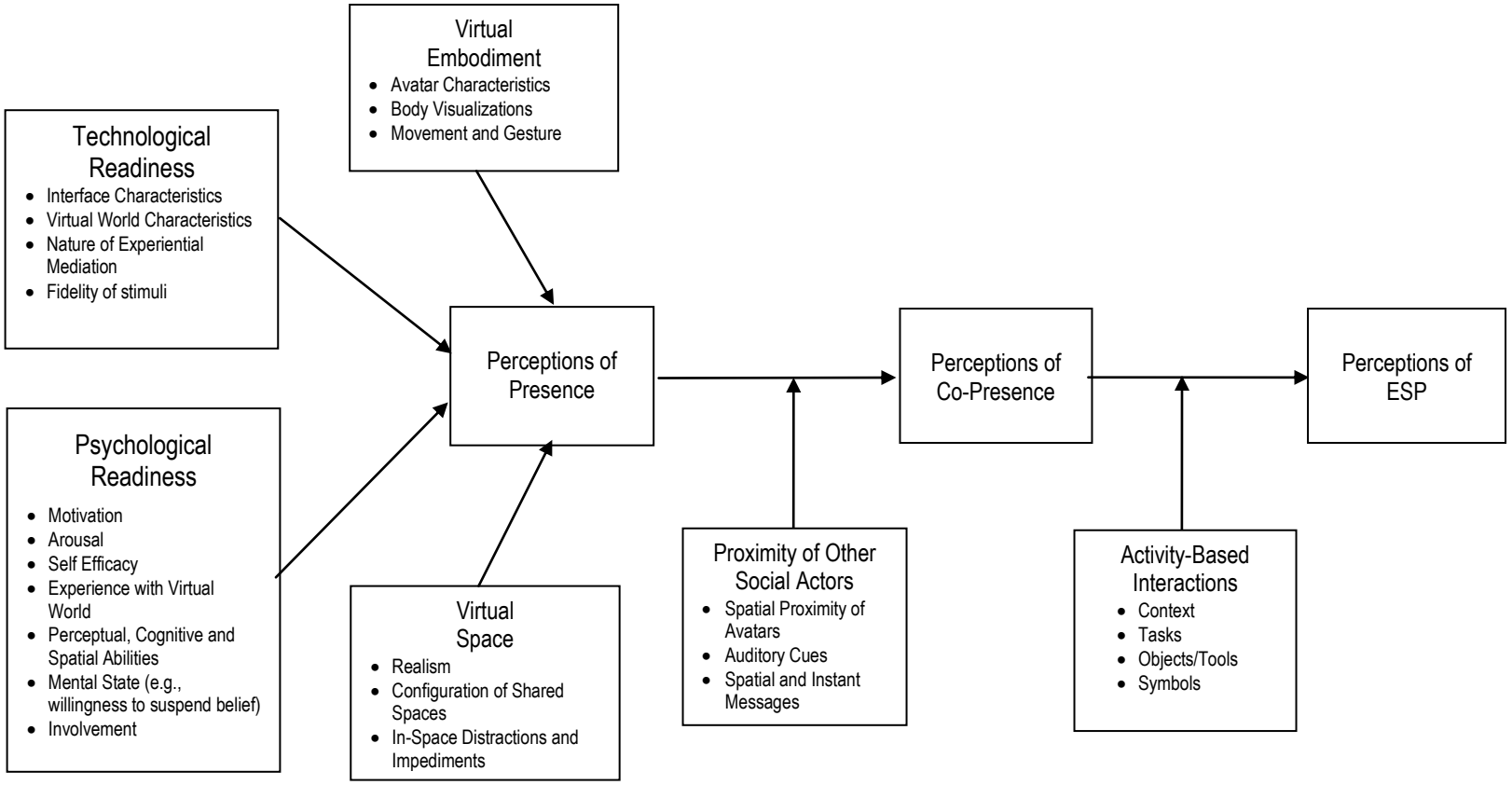

Figure 4: The ESP Research Framework: Factors Influencing Presence, Co-Presence, and ESP

Table 1: Embodied Social Presence: Model Components

Context	Tools	Symbols (Semiotics)
Culture History Space Experience Needs and Wants Goals and Tasks	Space Objects Body	Semantics, Pragmatics, and Syntactics Space Objects Bodies

Table 2: Causes and Effects of Presence Experienced by Students

Causes (Lombard & Ditton)	Number of Students Mentioning Causes (N=59)	Effects (Lombard & Ditton)	Number of Students Mentioning Effects (N=59)
People	52	Aroused	33
Visual	44	Task Performance	30
Movement	27	Involved	24
Interactive	23	Enjoyment	23
Real-time / Live	20	Motion	4
Aural	8	Memory	3
Causes (ESP Theory)		Effects (ESP Theory)	
Place	44	Digital Self	39
Real Self	44	Digital Other	39
Nonverbal	36		

Table 3: Number of Students Experiencing Embodied Social Presence

ESP Achieved	ESP Neutral	ESP Not Achieved
N = 19	N = 6	N = 3
Female 10, Male 9	Female 3, Male 3	Female 1, Male 2

Table 4: Embodied Social Presence Realized by Respondents
Categorized by Visual, Emotional, and Nonverbal Stimulation

Author	Visual stimulation from shared virtual space		Feedback from virtual shared activity
F01	Others around me can see my expressions and mood	→	much easier than in two dimensional chat.
F03	There is something about seeing your team's avatar	→	when we were separated, I did not like being 'alone'.
M05	The visual effect of being able to see the avatars of your teammates alongside your avatar	→	created a 'feeling' that we were more unified or perhaps more focused on our discussion.
M14	It was also advantageous to see the avatar acting out the typing of the messages prior to a message being transmitted	→	this allowed for a more realistic communication pattern and is at least one signal as to when it is your 'turn' to talk.
Author	Emotional arousal from shared virtual space		Feedback from virtual shared activity
F01	I feel	→	it is much easier to be myself [in Second Life] without worrying if I am stating something wrong.
F09	You feel as if	→	you are in a real face to face meeting. Especially if you have taken the time to set up the appearance of your avatar and all others have done the same.
F14	Being represented by an avatar can be liberating	→	thus encouraging individuals to be more willing to share thoughts and ideas
M09	I feel the [Second Life chat] actually helps members	→	expressing true feelings / opinions more so than face-to-face meetings.
Author	Nonverbal stimulation from shared virtual space		Feedback from virtual shared activity
F02	One may be very close to another individual in Second Life and	→	you may actually feel as though your space is being invaded.
F07	Even though you can tell your avatar to make gestures,	→	you have to be cognizant of these cues and want to communicate them.
M10	When building the SL project we bumped into each other unwittingly	→	my cohort and I excused ourselves.

M13	We did come up with a method to allow for thinking.	→	We just typed in “thinking” when someone made a point or suggestion and we didn’t know how to respond immediately.

Table 5: Barriers Preventing Respondents from Achieving Embodied Social Presence

Author	Barrier		Text Description
F05	Motivation – Reason	→	Since I have already met most of my team, it was not important to see them in Second Life because I have built a relationship with them previously.
F14	Motivation – Reason	→	For me, two-dimensional is a bit more efficient and easy to use, kind of like a phone call.
F13	Psychological Readiness	→	I prefer face-to-face meetings and building personal relationships that really have something to do with me as a person.
M01	Psychological Readiness	→	So while the sensation [of a SL meeting compared to a F2F meeting] is similar, it is different enough to keep me from having any sense of 'closeness'.
F05	Technological Readiness	→	I think I would enjoy Second Life more if I had the most recent up to date technology to have a speedy connection.
M07	Technological Readiness	→	After a few minutes I began to multitask and treat the Second Life chat as a traditional MSN-type chatting application because there was no value in watching the avatar. Perhaps if the avatars were more lifelike, or if there were some other communication value in the facial expressions, I would have continued to watch the avatar to gain more information.

Table 6: Affordances of Having and Using a Digital Body

Author	Having and Using a Digital Body		Afforded
F01	Three dimensional chat allows	→	you to better express emotions and to somewhat physically interact with another being.
F02	Three dimensional chat applications allow	→	individuals to act more freely and realistically because they are not able to hide as much behind their computer screen.
F07	Having an avatar also aids in	→	building the relationship and feeling as if you are in the same physical space with another person.
F09	It [avatar] is also a	→	window into their personalities that you cannot always get in chat or in a face to face meeting for that matter.