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

Brian E. Mennecke† and Janea L. Triplett
Supply Chain and Information Systems, College of Business, Iowa State University, Ames, IA 50011, e-mail: mennecke@iastate.edu, rdtrip@iastate.edu

Lesya M. Hassall
Center for Excellence in Learning and Teaching, Iowa State University, Ames, IA 50011, e-mail: lesya@iastate.edu

Zayira Jordán Conde
Department of Electrical and Computer Engineering and Computer Science, Polytechnic University of Puerto Rico, San Juan, PR 00919, e-mail: ZJordan@pupr.edu

Rex Heer
Center for Excellence in Learning and Teaching, Iowa State University, Ames, IA 50011, e-mail: rex@iastate.edu

ABSTRACT

In this article, we discuss and empirically examine the importance of embodiment, context, and spatial proximity as they pertain to collaborative interaction and task completion in virtual environments. Specifically, we introduce the embodied social presence (ESP) theory as a framework to account for a higher level of perceptual engagement that users experience as they engage in activity-based social interaction in virtual environments. The ESP theory builds on the analysis of reflection data from Second Life users to explain the process by which perceptions of ESP are realized. We proceed to describe implications of ESP for collaboration and other organizational functions.


INTRODUCTION

What does it mean to feel as though you are present in a place as you collaborate with another person? This is a question that has interested scholars studying information and communication technologies (ICT) for more than three decades as they

---

*We acknowledge and thank the Engineering Online Education (EOL) program at Iowa State University for supporting this research through the purchase and maintenance of the Second Life Island on which these data were collected. Our gratitude also extends to the Center for Excellence in Learning and Teaching at Iowa State University, an academic unit that provided pedagogical support for the courses taught by the first author. Finally, we are grateful to Andy Luse and Jon Kelly and the anonymous reviewers and editors for their input and recommendations on earlier versions of this paper.

†Corresponding author.
try to determine how best to align communication technologies with organizational needs. Fundamentally, communication is a joint activity that requires interaction and a sense of presence between two or more social actors. To succeed, the actors must possess an acute awareness of self, others, verbal and nonverbal cues, the place, and the context (Krauss & Chiu, 1998).

A rich body of literature has been developed to account for the collective nature of communication, importance of presence and copresence, and effective alignment of ICT with organizational needs (e.g., Biocca, 1997; Lombard & Ditton, 1997). Investigations of presence and copresence have centered on the nature and role of technology in shaping perceptions of social actors as they engage in communication activities (Short, Williams, & Christie, 1976; Daft & Lengel, 1986; Lombard & Ditton, 1997).

Despite prolific scientific inquiry, there is much urgency to understand how perceptions of presence and copresence are mediated and impacted by new media and communication tools (Biocca, Harms, & Burgoon, 2003; Davis, Murphy, Owens, Khazanchi, & Zigurs, 2009), including three-dimensional (3D) massively multiplayer online role-playing games (MMORPGs) and virtual environments, like Second Life, and their unique affordances (avatars, shared spaces, and activities).

In this article, we discuss the embodied social presence (ESP) theory as a means to explicate how and why perceptions of presence and copresence are defined by and through shared spaces, activities, and embodiment in multiuser virtual environments and other ICTs (Mennecke, Triplett, Hassall, & Jordan-Conde, 2010). Practical applications of the ESP theory have the potential to enhance the design and management of collaborative virtual environments by giving us a better understanding of how presence, copresence, and ESP are evoked and nurtured for productive collaborative functions.

We define virtual environments as computer-generated 3D spaces with unique affordances for communication activities. The spatial characteristics of such environments realistically simulate physical proximity, which enhances propinquity and fosters rich interaction by allowing users to perform activities collectively via the mediation of their virtual bodies. Through interactions with other social actors in a virtual environment, individuals perceive their own actions as more engaging, dynamic, and satisfying (Csikszentmihalyi, 1998). Although theories related to copresence hint at these higher levels of engagement, they pay little attention to the role of activity-based interaction and embodiment and thus miss the deeper sense of engagement that is developed through joint interactions that are substantive and goal directed. ESP theory posits that when social actors experience this higher level of embodied interaction, they more effectively encode, convey, and decode individual and collective communicative acts. A central tenet of the ESP theory is that an avatar, as an embodied representation of the social actor, is the nexus of communication. Within virtual environments all verbal and nonverbal communication acts and cues are filtered through this embodied representation of the user. The ESP theory suggests that a communicative act in a virtual environment builds on the embodied sense of self and is realized through coparticipation in a particular context that is defined, in part, by the symbolic meaning associated with the space that is shared and tools that are used. Thus, shifting the focus on these bodily representations (the avatar of self and the other) and their uses as
tools for communication we can expose the value of virtual worlds for achieving organizational objectives.

Most forms of communication aim to exchange information through either verbal or nonverbal acts that are mediated by the bodies of the social actors. ICT is commonly designed to support communicative acts that are derivative of and based on stimuli present in proximate, face-to-face (FtF) or, body-to-body (BtB) communication. For example, to define the concept of presence, Lombard and Ditton (1997) reference “the perceptual illusion of nonmediation,” a nonmediated form of communication that implies a FtF interaction with verbal and nonverbal acts carried out and interpreted through the bodies of communicating social actors. ESP acknowledges the role of the body in communication activities and answers, at least in part, the call for a richer communication theory made by Biocca et al. (2003). Specifically, they observed that, “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” (Biocca et al., 2003, p. 472). The ESP theory provides a framework that is useful in extending theories of presence by focusing on embodied interactions and engagement with other social actors as driving forces that shape our perceptions of presence and copresence (Benford, Bowers, Fahlén, Greenhalgh, & Snowdon, 1995; Bowers, Pycock, & O’Brien, 1995; Biocca, 1997; Gerhard, Moore, & Hobbs, 2004; Schroeder, 2006).

Furthermore, the theory builds on the written reflections of Second Life users who engaged in a variety of goal-oriented collaborative activities (discussions, lectures, and team design exercises) to dissect how perceptions of ESP are achieved in virtual environments. Analysis of such reflections offer a rich window into the experiences of and perceptions held by these users, and insights garnered from these data were used, in part, to guide the development of the ESP theory and to discuss the ramifications of the ESP phenomenon for organizational functions.

This article is structured to first present a review of the presence, place, and embodiment literature to position ESP within the rich landscape of communication theories. Next, the analysis of Second Life user reflections on embodiment, collaboration, and engagement serves as an introduction to the tenets of the ESP theory. We conclude with a discussion of the results and implications.

**LITERATURE REVIEW**

The concept of presence has been examined in a number of disciplines and in a variety of contexts associated with interpersonal and organizational communication as well as in group and organizational studies of collaboration and decision making (e.g., media richness theory, social presence theory, media synchronicity theory, hyperpersonalization theory). Research as far back as the early 1980s examining group decision support systems, for example, applied these and similar theories to frame predictions about how social actors would behave and perceive one another when collaborating using various forms of communication technologies. Much of this research examined perceptions related to the nearness, propinquity, and sense of social presence associated with team interactions. Thus, the role of presence
Examination of a Theory of Embodied Social Presence

and related concepts associated with perceptions about being there with others have been an important component of research examining group and organizational communications. This literature review is important in framing an analysis of the broader presence literature and for defining a context in which a more robust theory of ESP can be articulated. The next section reviews the presence literature as well as literature related to location and place, which are constructs that are important to consider together when examining the broader literature associated with ESP.

Presence and Place

One of the earliest theories describing perceptions of the presence of other social actors is social presence theory (Short et al., 1976), which suggests that different media have varying capacities for conveying cues that create in a user an awareness of other social actors. This theory, along with media theories such as media richness theory, has been used by organizational researchers to study teams, media choices, and organizational adoption of communication technologies (Daft & Lengel, 1986). One of the common themes associated with presence and copresence is the idea that the user is present with someone else in a place; therefore place is relevant to the concept of presence and to understanding how we respond to virtual environments (Bowman & McMahan, 2008). In fact, a deconstruction of virtual world environments highlights two unique characteristics relative to other media: (i) the availability of a shared virtual space in which avatars, objects, actions, and higher-level associations (e.g., meaning associated with a place) can be created and manipulated, and (ii) selective temporal persistence (i.e., places and objects remain when the user departs from a virtual locale).

In this context, we see that place is important in framing a context for shared activity in a virtual environment. This is because place-based features in virtual environments are similar to those features we associate with real-world places. As such, the concept of place creates a structure where the milieu of place-based features and accoutrements creates a richer mix of perceptual associations than one would expect if one simply considered a virtual space as a virtual geographical location. To examine place in the context of virtual environments, 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. 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), which is consistent with much of the presence literature as well as literature from the information systems (IS) field that has often considered ICT from the first-person perspective.

When considering places in virtual environments, it is useful to recognize that these virtual spaces have meaning just as do real-world places. The attachment of meaning with a place was described by Relph (1976) as place identity. Place identity suggests that place represents more than merely objects in space; rather, place associates objects and places as contexts where activity and events happen. For example, we might associate home with comfort, sleep, family, and other elements identifying a particular place with the feelings and things that are located there.
Relph (1976) suggests that individuals often develop a place identity by associating physical locations with meanings and activities that are historically associated with those settings. Gustafson (2001) expanded this concept by identifying three factors associated with place identity: environment, self, and others (Figure 1). In this context where self and others are considered together with environment, we see how place identity offers an important framework for understanding how and why place is relevant in more than just the geographical sense of being a physical (or virtual) space. Specifically, people assign meaning to places, even places they have not previously visited, and this provides an important context for their understanding of themselves, others, and the shared actions they undertake. To understand presence, and particularly ESP, one must develop an understanding of those factors that influence users of virtual worlds as they develop a sense of place and comprehend its meaning within a context. We will expand on this contextual role of place as we elaborate on ESP below.

**Presence and Copresence**

Two primary perspectives related to presence have been offered by researchers examining ICTs: presence and copresence. We first review concepts associated with presence and follow this with a review of the concept of copresence.

In their thorough review of the presence literature, Lombard and Ditton (1997) provide a useful summary of the literature on presence, including the six types of presence defined in the literature (Table 1), 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
Table 1: The types of presence (adapted from Lombard & Ditton, 1997).

<table>
<thead>
<tr>
<th>Type of Presence</th>
<th>Description of Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveyance of social cues</td>
<td>The degree to which any given medium has the capacity to transmit information that is perceived by a participant and used in the interpretation of the message</td>
</tr>
<tr>
<td>Fidelity of representation</td>
<td>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</td>
</tr>
<tr>
<td>A transport mechanism</td>
<td>The degree to which a medium can give a user a sense that they are transported elsewhere (i.e., “you are there”) or bring a place or objects to the user’s location (i.e., “it is here”)</td>
</tr>
<tr>
<td>Immersion in a space</td>
<td>Either physical immersion (i.e., immersing sensory organs into physical devices like head mount displays and headphones) or psychological immersion (i.e., creating a sense that one is inside the space)</td>
</tr>
<tr>
<td>Social actor in a medium</td>
<td>When an observer treats a character in a medium as a social actor regardless of whether that actor can respond or is controlled by a human actor (e.g., watching and talking back to a TV anchor)</td>
</tr>
<tr>
<td>Computers as social actors</td>
<td>When people treat inanimate objects that do not resemble human actors (e.g., computers) in a socially sound manner</td>
</tr>
</tbody>
</table>

Different concepts that have in common the idea 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, via various media, for different reasons, and is dependent on how one frames the task context. Because several of these diverse concepts associated with presence are relevant to our discussion of ESP, we summarize these six forms of presence below.

**Conveyance of social cues**

First, Lombard and Ditton suggest that presence has been used in communications studies, such as those examining ICT in the IS field, as a construct that focuses on the media’s conveyance of social cues (the degree to which any given medium has the capacity to transmit information 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 a 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 & Lengel, 1986) and social presence theory (Short et al., 1976). The notion that much of communication is centered on, at least in part, the social acts and cues is important for virtual worlds and the concept of ESP. Furthermore, although controversial
(Dennis, Fuller, & Valacich, 2008), 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.

**Fidelity of representation**

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 that is the focus of communication. In other words, is the medium producing a realistic representation? Although this concept of presence is quite pertinent to the electronics industry, 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 refers to the plausibility of the communication content whereas perceptual realism refers to the degree to which the imagery possesses an accurate representation of the content of the communications.

**Transport mechanism**

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 & Ditton, 1997). 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, it can bring a place or objects to the user’s location, 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, high-definition television 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 nonvisual forms of communication (e.g., surround sound) can take the observer 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 (VR) 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; Waller, Hunt, & Knapp, 1998; Benyon, Smyth, O’Neill, McCall, & Carroll, 2006; Conroy, 2001; Lee, 2004; Lathrop & Kaiser, 2005; Sandamas & Foreman, 2007). Although a high degree of realism (i.e., via visual, auditory, and other channels) is not necessary for ESP to be manifest, an important criterion 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 is present in a space (Turner & Turner, 2006).
Examination of a Theory of Embodied Social Presence

Immersion in a space
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 headphones) or psychological immersion (i.e., creating a sense that one is inside the space). Of course, psychological immersion is generally the objective of creating VR environments (e.g., caves and head mounted displays), virtual worlds, and 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 physical immersion can be problematic when it leads to disorientation, motion sickness, dizziness, and other problems (Biocca, 1993; Azar, 1996; Biocca & Rolland, 1998); however, a minimum level of physiological immersion is thought to be needed to achieve a perception of immersion (Isgro, Trucco, Kauff, & Schreer, 2004). The concept of psychological immersion is important in virtual worlds because a user must develop minimal perception of psychological immersion to develop a sense of copresence and ESP.

Social actor in a medium
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 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.

Computers as social actors
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.

As this review highlights, presence is a concept that is multidimensional and encompasses 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. These definitions of presence do not require that a user be with or 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 a user visits a virtual space, interacts with objects, and perceives that he is there, the user has developed a sense of presence. This raises a question, what features of a shared place are important in fostering a sense of presence and how do other avatars influence these perceptions?

Copresence extends the concept of presence because most ICTs where presence has been studied are also designed to enable social communication. Therefore, although these concepts are related, they are unique constructs and most of the literature has treated them as unique phenomena (e.g., Biocca, 1997; Durlach & Slater, 2000; Slater, Sadagic, Usoh, & Schroeder, 2000; Regenbrecht & Schubert, 2002; Nowak & Biocca, 2003; Slater, 2003; Zhao, 2003; Gerhard et al., 2004; Chen & Börner, 2005; Bailenson, Yee, Merget, & Schroeder, 2006; Schroeder, 2006). Zhao (2003) notes that copresence has been used by researchers to refer to two distinct interactive contexts. First, copresence can mean being together in physical proximity in a physical environment (Slater et al., 2000). Alternatively, copresence can include the act of “being together” with someone in a technology-mediated environment along with the feeling of togetherness (Durlach & Slater, 2000; Slater et al., 2000; Schroeder, 2006). From this, Zhao proposes a typology of copresence defining the degree to which actors are physically collocated (i.e., the mode of copresence) and the degree to which users perceive being with another social actor (i.e., sense of copresence).

An important question about copresence is why and how does it occur in virtual environments? For both presence and copresence to occur, scholars have suggested that users suspend disbelief while engaging in activities mediated by 3D technologies (e.g., Moon & Nass, 1996; Nass, Fogg, & Moon, 1996; Reeves & Nass, 1996; Nass & Moon, 2000). Gilbert (1991) suggests that humans are predisposed to accept a stimulus as true unless there is a strong contravening reason suggesting the contrary, and that it is easier to believe than to reject when presented with realistic or near realistic stimuli. Reeves and Nass (1996) define these behaviors as “the media equation” and suggest that this is the reason people perceive media to be real.

In explaining perceptions of presence and copresence, Lee (2004) suggests that folk physics and folk psychology, which are cognitive processes that are used by social actors to infer causation from observed phenomena based on innate or quickly developed assumptions about the functioning of the system underlying the phenomenon (McCloskey, 1983), are applied by social actors to interpret stimuli
from the virtual world. Specifically, folk physics is applied when we automatically accept virtual objects and spaces as real whereas folk psychology is enacted when we automatically accept the reality of virtual social actors. Therefore, perceptions of copresence exist when folk physics is enacted (i.e., presence) and the user also enacts folk psychology (i.e., he or she perceives the “person behind the mask”). The literature also suggests that perceptions of presence and copresence are affected by various factors, including the embodied form of the user in the virtual environment (Biocca, 1997; Biocca et al., 2003).

Embodiment
Numerous literatures have considered embodiment (Biocca, 1997; Lakoff & Johnson, 1999; Biocca et al., 2003; Baldwin, 2004; Ehrsson, 2007). For example, Merleau-Ponty observed the following, “I regard my body, which is my point of view upon the world, as one of the objects of that world” (Baldwin, 2004, p. 83). Similarly, in writing about “the embodied mind,” Lakoff highlights the role of the body in mediating all stimuli and, by extension, cognition and thus emphasizes the importance of embodiment in framing perceptions and understanding (Lakoff & Johnson, 1999). Furthermore, Ehrsson observed that people who had out-of-body experiences had an illusion that “their center of awareness, or ‘self,’ [was] located outside their physical bodies and that they look[ed] at their bodies from the perspective of another person” (Ehrsson, 2007, p.1048). This perspective on bodies as objects is useful as a way to understand how people develop a sense of “being there” in media in that it highlights the dialectic between cognition and physicality in virtual spaces (Baldwin, 2004).

Although the concept of embodiment has been examined in research examining virtual environments, there is limited literature related to embodiment and presence. Biocca (1997) has dealt with various forms of embodiment in his examination of presence and immersion and his work represents a useful frame for considering the role of embodiment in virtual environments. For Biocca, presence starts with the desire to transcend the body “to move beyond the limits of the body and the sensory channels” (1997, p. 13) through the extension of the human senses via technology. Biocca suggests that the body fosters a sense of presence in three distinct ways: being there, being with another body, and having a feeling of self-presence. Biocca’s notion of being there equates to the general notion of presence while being there with another body is comparable to copresence; however, feelings of self-presence have been dealt with less directly in the literature. Self-presence addresses the perceptions that a user has of his own representation in a virtual environment. Biocca suggests that this representation, or mental model, takes on two forms. 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” (Biocca, 1997, p. 23). Second, “the virtual body may have a different social meaning (i.e., social role) than the user’s body” (Biocca, 1997, p. 23). Thus, the virtual body influences one’s own perceptions of both one’s avatar and oneself and the representation of the avatar carries a social meaning for other users who interpret its representation in context.
Biocca also notes that users experience oscillations in their sense of presence because the perception of presence is unstable. Specifically, he suggests that a user’s perceptions of presence will straddle three “places”; the physical, the virtual, and the imaginal environment. The imaginal environment is a representation in one’s mind that describes how the user perceives space and, by extension, the body, when not cognitively attending to the physical and virtual stimuli or when media filter out stimuli. For example, when using a voice-only channel such as a telephone, most callers will endeavor to imagine what a communication partner looks like, how he is positioned, and the space around him. By extension, imaginal embodiment can also occur in other contexts such as in virtual worlds where the user is represented by an avatar.

In summary, Biocca suggests that three bodies can be considered in virtual environments: the physical body, the virtual body, and the imagined body schema. Furthermore, because of the social meaning that an avatar appearance carries, a fourth body, the body schema of the user created in the mind(s) of an observer (or set of observers), is also relevant when using a virtual world. Thus, there is both an objective component to embodiment (i.e., the objective representation of one’s body) and a subjective component (i.e., the perception of the body by self and others).

Presence and Activity-Based Interaction

The literature review in the preceding sections illustrates that theories of presence, including copresence and social presence, cannot fully account for the complexity of interactions supported by virtual worlds and other ICTs. Although the presence literature describes a variety of factors influencing the establishment of presence, it fails to demonstrate the richness, depth, and multidimensional character of interactions associated with embodied presence and copresence. This point was made by Biocca and his colleagues 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” (Biocca et al., 2003, p. 471). In other words, what are the antecedents, the psychological phenomena, and the results of presence in its various forms? We propose that activity theory serves as a lens for interpreting the ambiguity noted by Biocca et al. (2003).

Activity theory suggests that humans and their actions can be best understood when the observer understands the nature of the context where the interaction occurs and when the social actors engage in shared goal-directed activities. Activity theory understands human existence as involving engagement in collective, outcome-driven, and socially determined activity mediated through context, tools, and symbols. The theory initially focused on individual mental processes (Vygotsky, 1935) but was expanded to include communities of practice and their complex interaction with their environments (Engeström, 1987). The linkage between the individual and social actors is central to understanding the major premise of this theory: it is only within the context of the community and through participation in mediated activities that individuals understand themselves and others. Although our focus is on individual perceptions of a user in a social setting within
Examination of a Theory of Embodied Social Presence

a virtual world, Vygotsky and others (e.g., Hollan, Hutchins, & Kirsh, 2000; Hutchins, 2001) have examined concepts related to the social development of meaning and understanding. For example, building on activity theory, Hutchins’ distributed cognition “seeks to understand the organization of cognitive systems” by considering cognition from a perspective beyond that of the perceptions and cognitive processes occurring at the individual level (Hollan et al., 2000, p. 175).

For social actors to achieve an outcome, individuals must work together and utilize tools and symbols that they have invented or adapted. Outcome-driven, human activity is also mediated by the rules and division of work practices embedded in the context (i.e., what is our shared understanding of how we should work together?). Being part of a community where context, tools, and practices are derived from a shared history, individuals perceive reality as both objective (i.e., existing outside of them) and subjective (i.e., residing within them). Human activity is thus directed at others as well as the environment and their activity influences and determines the environment in ways that are comparable to how the environment affects and determines each actor’s existence in the environment. Individuals realize their role in a particular shared context through involvement with others via active participation in mediated activity and mastery of tools and symbols. It is through activity-based interaction and acquisition of social knowledge that includes awareness of the functions and pragmatics of shared tools, rules, and labor divisions that individuals become cognizant of reality and begin to exercise their free agency within the context of their community and organization (Engeström, 1987). The meaningful linkage between the individual and social emphasized by activity theory helps to define how individuals perceive others and that their thinking of others revolves around their own contextual understanding of reality and is shaped by both the exercise of their free agency and manipulation of the tools, symbols, rules, and labor divisions entrenched in the shared context. The connection to the body and lived bodily experiences that ESP explicates makes sense if the body, both virtual and corporeal, is thought of as a tool to mediate communication and to aid participation in social and organizational activities. Humans are intimately familiar with their own physicality and the effects of sensory stimuli on it. They use the body to perform actions and participate in life in a social context and thus rely on their body to become knowledgeable of their environment and their role therein. One’s own body then serves as a frame of reference and is heavily used for interpretations of the actions of others (Lakoff & Johnson, 1999) and as an instrument through which learning takes place (Hanna, 1988). In virtual worlds, much like in the real world, the body is used to control the environment and bodily actions are modeled and simulated using an avatar to elicit reactions to virtual stimuli. Further, the body is part of the context, regardless of whether we reference the real or virtual world.

In summary, virtual worlds not only call for the physicality of the human body, but also act as a social context where individuals and communities participate in joined activity, interact with the context, internalize and use tools and symbols embedded in the digital culture, and regard and transform social rules and divisions of labor. During such processing of virtual worlds, users master virtual tools via acts of generalization and systematization and open a gateway to conscious thinking, which appreciates the complex matrix of virtual worlds. Thus, people learn to
appropriate avatars, spaces, and objects in context through both generalizing and systematizing acts, which is consistent with how activity theory suggests that actors learn about their environment.

The Development of Embodied Social Presence

This literature defines an important context that should be considered in examining the specific features of the ESP theory. 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 ESP, the actor must first achieve and perceive sufficient levels of embodied presence and copresence. To summarize the literature, we present a process model in Figure 2 that outlines the actions, requirements, and constraints that the presence literature has previously identified and that define a context for the development of perceptions of ESP. This is not a model of ESP, but rather a summary of what the presence literature suggests happens when users enter virtual worlds, experience presence and copresence, and engage in substantive, task-focused interaction.

The process begins with the user 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 (i.e., user variables). To enter the virtual world, the user must use physical communication channels (i.e., causes of presence), although it is not necessary for all of these channels to be present for the user to develop perceptions of presence. Assuming that the user’s physical context provides adequate mediation, the user will be presented with the stimuli representing the virtual space (i.e., virtual space content variables). This does not guarantee that the user will experience a sense of presence, but it does afford the user that opportunity. As the literature points out, factors such as realism, spatial characteristics of the environment, and numerous other characteristics will influence whether the user obtains a sense of presence and the degree to which that occurs (Lombard & Ditton, 1997). In a virtual environment the user is presented with stimuli representing the virtual environment, the objects in that environment, and their own avatar’s representation (i.e., virtual space variables as well as embodiment content variables). If the user engages with these stimuli he or she 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, that representation will have an influence on perceptions of self, identity, and the user’s actions associated with that representation. Thus, embodied presence creates an opportunity for the user to develop and extend his or her identity in the virtual environment in a way that is not present in most other communication environments.

Once a user develops a sense of presence in a virtual environment, the opportunity exists for that user to share that space with others. When 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
**Figure 2:** The process and context of ESP.

- **Causes of Presence**
  - Technological Readiness
    - Interface Characteristics
    - Nature of Experiential Mediation
    - Fidelity of Stimuli
    - Degree of Interactivity
    - Synchronicity
    - Nature of Sensory Stimuli

- **User Variables**
  - Psychological Readiness
    - Motivation
    - Arousal
    - Self Efficacy
    - Experience with Virtual World
    - Perceptual, Cognitive, Spatial Abilities
    - Mental State (e.g., suspend disbelief)
    - Involvement

- **Content Variables**
  - Virtual Embodiment
    - Avatar Characteristics
    - Body Visualizations
    - Movement and Gesture
  - Virtual Space
    - Realism
    - Configuration of Shared Spaces
    - In-space Distractions/Impediments
    - Virtual World Characteristics
  - Proximity of Other Social Actors
    - Spatial Proximity of Avatars
    - Auditory Cues
    - Spatial and Instant Messages

- **Perceptions of Embodied Presence**
- **Perceptions of Embodied Copresence**

- **Effects**
  - Physiological Effects
    - Arousal
    - Motion or Movement
    - Brainwave Activity
  - Psychological Effects
    - Enjoyment
    - Involvement
    - Task and Role Engagement
    - Desensitization
    - Memory and Skills
    - Social and Parasocial
entity is present and, in virtual environments, this is accomplished at a rudimentary level through visual, auditory, and other action-oriented stimuli manifested by the other user’s avatar. 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 not necessary for all of the social actors whose avatars are in a shared space to experience perceptions of embodied copresence for this to be perceived by some users. One of the limitations of the current literature on presence and copresence is that the notion of copresence does not take into account the role of interaction in creating a high sense of copresence. The concept of ESP addresses this shortcoming by identifying the factors that are fundamentally associated with rich, B2B interactions in the real world and applying these to interactions in virtual environments. As we will describe below, key to this interactive potential are the shared contexts, spaces, objects, activities, and tools for interaction that exist within the milieu of artifacts that define the context of the development of a sense of ESP.

This review highlights the role and importance of place, presence, embodiment, and shared activities in defining a context where social actors achieve what we have termed ESP. This phenomenon encompasses a set of perceptions that users of virtual worlds experience when they engage in shared activities with other actors. We elaborate on the tenets of the theory and its importance for understanding how virtual worlds influence user perceptions in a later section. In the next section we discuss the qualitative data that informed our development of ESP theory.

QUALITATIVE DATA ANALYSIS

This section provides a description of a qualitative analysis of factors associated with ESP theory to identify the process(es) by which perceptions of ESP are derived and examine the results of this phenomenon on social engagement, collaboration, and interactions. The development of ESP theory followed a traditional grounded theory method, which began with research questions, was followed by data collection, theme and code construction, and finally theory development (Glaser & Strauss, 1967; Glaser, 1978, 1992; Charmaz, 2003).

Opening Research Questions

We began with a series of questions to study a phenomenon that the researchers had observed over time through direct observations and interactions within a 3D world. As participants in the Second Life environment, the researchers experienced a depth of immersion that seemed to warrant further investigation. What were the features and affordances of the 3D environment that fostered a sense of presence and copresence? Did the avatar play any role in the perception of engagement? Did the shared tasks play any role in the immersive experience? And finally, did the combination of the 3D environment, the avatar, and the shared activities affect the experience of the participants?

Data-Collection Procedures

Data were collected from two offerings of one graduate course in 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.

Data Analysis
A student reflection exercise was collected from 57 students; 29 from the summer 2007 course and 28 from the spring 2008 course. The reflection exercise was a class-related activity that, for pedagogical purposes, asked students to reflect on and describe their experiences in Second Life. Names and other identifiers were removed from the reflections prior to analysis and combined into one document that consisted of 149 pages of text. The students’ narratives were analyzed in the tradition of linguistic anthropology (Sapir, 1949; Whorf, 1956; Volosinov, 1973), which asserts that the physical and social environment of a community can be understood through an examination of the vocabulary used by members of that community. Content analysis was used to analyze the text, as it has been described as a multipurpose technique for studying communication artifacts (Berelson, 1952; Holsti, 1969; Krippendorff, 1980; Weber, 1990) and has been used to discover the psychological, attitudinal, and behavioral states of individuals and groups (Krippendorff, 1980; Weber, 1990).

Focused analysis
Focused analysis began with the development of a start list of codes (Miles & 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. From the start list, a seven page code book was developed and used to train two coders. As line by line coding progressed, several themes emerged that 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 (Table 2) to include these new concepts, which are concepts that were not part of the original Lombard and Ditton (1997) list of concepts and represent the important variables relevant to ESP.

The code book contained detailed descriptions of the 25 codes used for the text analysis (i.e., 11 causes of presence, 12 effects of presence, 3 content variables, and 3 user variables). The code book also provided a definition of each code, an example from the text, and general researcher notes. The full text was coded and a 29% random sample of 248 statements was re-analyzed to report intercoder reliability measures for two coders (Table 3). Variables with less than 95% agreement were re-examined. Disagreements were resolved by the principal
### Table 2: Start list of codes used for text analysis with additional causes and effects.

<table>
<thead>
<tr>
<th>Causes of Presence (Lombard &amp; Ditton, 1997)</th>
<th>Additional Causes (ESP Theory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-No No. of senses involved</td>
<td>C-Place Sense of location</td>
</tr>
<tr>
<td>C-Vis Visual quality</td>
<td>C-NV Awareness of nonverbal commu-</td>
</tr>
<tr>
<td>C-Aur Realistic sound</td>
<td>nication</td>
</tr>
<tr>
<td>C-Othr Smell tactile movement</td>
<td>C-Self Awareness of self and</td>
</tr>
<tr>
<td>C-Intra Interactive</td>
<td>digital body</td>
</tr>
<tr>
<td>C-Oibr Glitches</td>
<td></td>
</tr>
<tr>
<td>C-Live Real-time</td>
<td></td>
</tr>
<tr>
<td>C-Ppl No. of people</td>
<td></td>
</tr>
</tbody>
</table>

### Effects of Presence (Lombard & Ditton, 1997)

<table>
<thead>
<tr>
<th>Physiological Effects</th>
<th>Psychological Effects</th>
<th>Additional Effects (ESP Theory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPy-V Motion or vection</td>
<td>EPs-I Involved</td>
<td>An expressed feeling of having and using a digital body</td>
</tr>
<tr>
<td>EPy-O Flinching or ducking</td>
<td>EPs-T Task</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPs-P Persuasion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPs-M Memory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPs-R Parasocial</td>
<td></td>
</tr>
</tbody>
</table>

### Content Variables (Lombard & Ditton, 1997)

<table>
<thead>
<tr>
<th>User Variables (Lombard &amp; Ditton, 1997)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV-Real Lifelike</td>
</tr>
<tr>
<td>CV-Cnv Follow conventions</td>
</tr>
<tr>
<td>CV-Task Task match fidelity</td>
</tr>
<tr>
<td>UV-Susp Willing to suspend disbelief</td>
</tr>
<tr>
<td>UV-Expr Prior experience</td>
</tr>
<tr>
<td>UV-Other Personality, mood, age, gender</td>
</tr>
</tbody>
</table>
Table 3: Intercoder reliability report.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
<th>Percent Agreement</th>
<th>Scott’s Pi</th>
<th>Cohen’s Kappa</th>
<th>Krippendorff’s Alpha</th>
<th>N Agreements</th>
<th>N Disagree</th>
<th>N Cases</th>
<th>N Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>C-No</td>
<td>96%</td>
<td>-0.02</td>
<td>-0</td>
<td>0</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>02</td>
<td>C-Vis</td>
<td>92%</td>
<td>0.702</td>
<td>0.706</td>
<td>0.708</td>
<td>23</td>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>03</td>
<td>C-Aur</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>04</td>
<td>C-Othr</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>05</td>
<td>C-Intra</td>
<td>92%</td>
<td>0.802</td>
<td>0.802</td>
<td>0.806</td>
<td>23</td>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>06</td>
<td>C-Obr</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>07</td>
<td>C-Live</td>
<td>92%</td>
<td>0.826</td>
<td>8.826</td>
<td>0.83</td>
<td>23</td>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>08</td>
<td>C-Ppl</td>
<td>96%</td>
<td>0.911</td>
<td>0.911</td>
<td>0.913</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>09</td>
<td>C-Plc</td>
<td>96%</td>
<td>0.918</td>
<td>0.918</td>
<td>0.92</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>C-NV</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>C-Self</td>
<td>100%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>0</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>12</td>
<td>EPy-A</td>
<td>96%</td>
<td>0.905</td>
<td>0.905</td>
<td>0.907</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>13</td>
<td>EPy-V</td>
<td>96%</td>
<td>0.905</td>
<td>0.905</td>
<td>0.907</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>14</td>
<td>EPy-O</td>
<td>96%</td>
<td>0.905</td>
<td>0.905</td>
<td>0.907</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>15</td>
<td>EPs-E</td>
<td>92%</td>
<td>0.826</td>
<td>0.828</td>
<td>0.83</td>
<td>23</td>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>16</td>
<td>EPs-I</td>
<td>88%</td>
<td>0.502</td>
<td>0.516</td>
<td>0.512</td>
<td>22</td>
<td>3</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>17</td>
<td>EPs-T</td>
<td>96%</td>
<td>0.883</td>
<td>0.884</td>
<td>0.886</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>18</td>
<td>EPs-S</td>
<td>96%</td>
<td>0.883</td>
<td>0.884</td>
<td>0.886</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>19</td>
<td>EPs-D</td>
<td>96%</td>
<td>0.883</td>
<td>0.884</td>
<td>0.886</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>20</td>
<td>EPs-P</td>
<td>96%</td>
<td>0.883</td>
<td>0.884</td>
<td>0.886</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>21</td>
<td>EPs-M</td>
<td>96%</td>
<td>0.883</td>
<td>0.884</td>
<td>0.886</td>
<td>24</td>
<td>1</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>22</td>
<td>EPs-R</td>
<td>88%</td>
<td>0.733</td>
<td>0.737</td>
<td>0.738</td>
<td>22</td>
<td>3</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>23</td>
<td>MB</td>
<td>92%</td>
<td>0.833</td>
<td>0.834</td>
<td>0.837</td>
<td>23</td>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

Note: Report is based on a subsample of 25% of the statements in our sample of 248.
Table 4: Causes and effects of presence experienced by students.

<table>
<thead>
<tr>
<th>Causes (ESP theory)</th>
<th>Number of Students Mentoring Causes (N = 57)</th>
<th>Effects (ESP theory)</th>
<th>Number of Students Mentoring Effects (N = 57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>52</td>
<td>Aroused</td>
<td>33</td>
</tr>
<tr>
<td>Visual</td>
<td>44</td>
<td>Task performance</td>
<td>30</td>
</tr>
<tr>
<td>Movement</td>
<td>27</td>
<td>Involved</td>
<td>24</td>
</tr>
<tr>
<td>Interactive</td>
<td>23</td>
<td>Enjoyment</td>
<td>23</td>
</tr>
<tr>
<td>Real-time/live</td>
<td>20</td>
<td>Motion</td>
<td>4</td>
</tr>
<tr>
<td>Aural</td>
<td>8</td>
<td>Memory</td>
<td>3</td>
</tr>
<tr>
<td>Causes (ESP theory)</td>
<td></td>
<td>Effects (ESP theory)</td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>44</td>
<td>Digital self</td>
<td>39</td>
</tr>
<tr>
<td>Real self</td>
<td>44</td>
<td>Digital other</td>
<td>39</td>
</tr>
<tr>
<td>Nonverbal</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

research coder. The code book was refined to reduce future miscoding and those data in question were recoded.

**Theme development**

The coded data were then organized into a clustered matrix (Miles & Huberman, 1994). Each row represented one of the 57 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 we have termed ESP. 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 (91%), the visual stimulation they received (77%), the nonverbal body codes they transmitted or received (63%), the interaction within the virtual place (77%), and the feedback that the shared activity provided their real self (77%). The effects of presence most often written about were increased arousal (58%) and improved task performance (53%). Of the 57 students, 39 wrote about a mediated body experience (68%). We define a mediated body experience as 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 (Table 4).

**Operationalizing ESP**

The next stage of content analysis was the development of a step process model (Meyer & Conrad, 1957; Smelser, 1962; Lofland & Stark, 1965). In addition to coding the data for the causes and effects of presence, the step process model examined the conditions necessary to progress through the process of ESP. Lofland, Snow, Anderson, and Lofland (2006, p. 161) wrote that a step process 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 student reflection data were
used to identify the possible steps or conditions associated with achieving the state
of ESP.

Three categories were operationalized to measure the possibility and range
of ESP, which were based on the distinction between the narrative mode of first-
person, and third-person. Drawing from cognitive linguistics, a first-person per-
spective has been defined as one “experienced either as physical forces or as
emotional or social pressures that make you move in a particular direction” and
a third-person perspective is one that “sees forces acting upon an object from the
outside” (Gärdenfors, 2007, p. 188). Thus, Gärdenfors (2007, p. 189) concluded
that “from the first-person perspective, powers act directly on you, while from
the third-person perspective forces act at a distance.” Grammatically, the English
language utilizes a set of categories to express first- and third-person perspectives.
Using the distinction between the grammatical modes of first person and third
person, the ESP process was operationalized as:

<table>
<thead>
<tr>
<th>ESP achieved:</th>
<th>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).</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESP neutral:</td>
<td>Author switches between using first person and possessive forms to using articles and adjectives to refer to digital self, digital others, and avatars.</td>
</tr>
<tr>
<td>ESP not achieved:</td>
<td>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, copresence and then to ESP.</td>
</tr>
</tbody>
</table>

Based on these definitions, we found that 68% of the students experienced
ESP at some point during the exercise (Table 5). Although these students experi-
enced ESP at some point and reflected upon this experience, we are not arguing
that this is a persistent perception; rather, much like “flow,” ESP is achieved when
the conditions support its development. In this sample, males and females were
approximately equally divided in experiencing ESP.

Besides determining the perception of ESP, the step process model also fo-
cused on the conditions needed to achieve ESP. Students who experienced ESP did

<table>
<thead>
<tr>
<th>Table 5: Distribution of students experiencing ESP.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
so by expressing visual, emotional, and nonverbal stimulation when engaging in a shared activity with their teammates in the virtual environment. It is important to note that the students writing these reflection pieces had only used Second Life for several months. Even so, these novice users experienced a complex feedback loop. For example, one of the students made the following statement; “Others around me can see my expressions and mood much easier than in two-dimensional chat.” On the surface, this statement seems quite 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 ESP experienced by this individual went from digital others, to digital self, to real others, back to digital self, and finally ended with the real self. The students who did not achieve ESP clearly indicated that there were motivational, technological, and psychological barriers preventing them from taking the next steps into presence, copresence and then to ESP. Students also identified the affordances of having and using a digital body. An affordance has been described as the properties allowed by an object (Gibson, 1979; Norman, 1990; Gärdenfors, 2007). A classic example (Gibson, 1979) is that a chair affords sitting. Those experiencing ESP reported that the affordances of virtual communication included such things as emotional and realistic communication that enabled improved interaction with their teammates.

Analysis 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-seven 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 and identified new causes and effects proposed by ESP theory. An in-depth content analysis operationalized the linguistic choices that could measure the possibility and range of ESP.

This analysis provides a context for the ESP theory. The next section details the components and tenets that we propose in this theory. The theory is derivative of the researchers’ own experience in virtual worlds, the presence literature, and this content analysis of these data.

Theory of Embodied Social Presence

We suggest that ESP is experienced through participation in shared collaborative activities occurring in virtual worlds and mediated via embodied representations of social actors. Or in other words, ESP theory posits that the body is the nexus of communication, and that an embodied representation—whether virtual, physical, imaginal, or some combination, combined with goal-directed shared activity—including body-mediated gestures and verbalizations that are used as tools and symbols, in a shared virtual or real space, affects the perceptions of users by
drawing them into a higher level of cognitive engagement in their shared activities and communication acts. As noted, the user reflection data linguistically suggests that third-person inanimate pronouns describing the use of an avatar (e.g., it, its) are replaced by personal and possessive pronouns (e.g., I, me, my, his, hers), which suggests that at some point the user’s embodied perceptions mesh with their avatar so that as they flow through these stages of ESP they experience a higher sense of engagement and immersion in not only the space and activity but also in the actions and persona of their virtual embodied representation.

In this light, the virtual body is a tool for communication through action embedded in a symbolic context, which is how we use physical bodies in physical spaces. Like activity theory, ESP recognizes the social and contextual nature of activity, but shifts attention from activity as the unit for analysis to an individual, or rather his or her embodied representation that in the context of the virtual environment becomes a recipient of and actor in a social activity-based and shared structure. In contrast to most of the presence literature, ESP does not rely on the objective content of communication with the goal of accurate transmission of information by means of particular technology. Rather, ESP emphasizes the processes by which the users of a virtual environment jointly strive to accomplish a purpose that is unattainable individually, to achieve a consensus, and a mutual commitment to a shared meaning that drives their activity within a context. Such a commitment is not dormant; it is constantly modified by further interactions that bear on objective, subjective, and mutually agreed upon content.

Ultimately, one important goal associated with social presence is to understand what the reality is “behind the mask.” The theory of the mind addresses this and is at the core of ESP theory. However, activity theory argues that we can only develop our understanding of others through subjective lenses that are influenced both by objective stimuli and subjective interpretation. A conclusion one might errantly draw from activity theory is that there is no point in trying to decipher the intent of the communicator because one cannot read his 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 important stimuli when communicating are the actions taken by other social actors along with contextual factors (media, objects, and symbols). Activities consist of verbal and nonverbal actions that involve tools, such as the body and language, which are symbols in a context. In the context of communication, all actions are initiated by the mind but carried out through the quintessential medium, the actor’s body. Although actors have intent and goals, intentions are instantiated through actions that are manifest through the body. In virtual worlds the avatar is used as a tool for impression management, communication, and symbolic interactions just as one’s real body is used in the real world.

Our inquiry into ESP began with the observation that the use of virtual worlds created in us and our students a greater engagement with the environment and with others in the environment. We observed that even though we knew the avatars being used by other social actors were not real bodies, the perception remained that interactions with the avatar were engaging, dynamic, and satisfying and this led us to ask why this was true. The answer is found in the space the
avatars share and the interactions the users engage in through their virtual bodies. Sharing of space provides context and the interaction of virtual bodies used as tools creates richness. But the question might be posed, is this just copresence? Although copresence addresses the perception of the presence of another social actor, it does not capture the deeper interaction that occurs when the users of avatars are engaged in substantive activity-based, body-centered interactions. It is at this rich level of interaction that deeper meanings can be encoded and conveyed through actions. Therefore, although virtual bodies cannot replace real-world bodies, a virtual body can be used as a tool for conveying concepts, meaning, and symbolism in a way that mirrors how social actors use their physical bodies in real world social activities.

We conjecture that for ESP to occur, social actors must participate in goal-directed, shared activity mediated through embodied representations in a context (e.g., a shared space, a place with meaning, on a task with purpose, etc.). This occurs as a multistage process that begins with the antecedents of the phenomenon (e.g., the process of attaining presence and the context in which that occurs) and culminates with the manifestation of the phenomenon (i.e., development of perceptions of ESP).

We have already outlined in general terms the process by which perceptions of presence and copresence are achieved in Figure 2. The presence literature has identified many variables that influence this process; however, to provide a richer framework for defining the factors that influence this process, we reference the contextual elements suggested by activity theory. Specifically, activity theory suggests that understanding and meaning are developed in a context mediated by tools and symbols (Table 6 contains a list of some of these contextual factors). Each of these factors represents 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 broader frame for a category of variables that can be examined to identify the role of context, tools, and symbols in shaping a social actor’s development and perception of ESP. Further, this also suggests the research framework presented in Figure 3, which summarizes and categorizes these antecedents within the context of the presence literature and the factors suggested by ESP theory.

**Table 6: SP antecedents.**

<table>
<thead>
<tr>
<th>Context</th>
<th>Tools</th>
<th>Symbols (Semiotics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>Body</td>
<td>Bodies</td>
</tr>
<tr>
<td>Experience</td>
<td>Objects</td>
<td>Objects</td>
</tr>
<tr>
<td>Goals and tasks</td>
<td>Space</td>
<td>Semantics, pragmatics, and syntactics</td>
</tr>
<tr>
<td>History</td>
<td>Technology and medium</td>
<td>Space</td>
</tr>
<tr>
<td>Needs and wants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology and medium</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Several antecedent factors are present in multiple columns, which is purposeful.*
Figure 3: The ESP research framework: factors influencing presence, copresence, and ESP.
The second stage in the development of ESP occurs when the phenomenon itself is manifest. Our analysis of the student reflection data suggests that perceptions of ESP are achieved through a complex process that begins with a perception of embodied presence and copresence and culminates with a perception of embodied self and others engaged in interactive, task-focused activity. ESP is manifest in a process that is multistepped and cyclical and involves multiple levels of cognitive engagement in the virtual space and its context (Figure 4). This process starts with recognition of the other social actor as manifest by his avatar, which is engaged in activities in the shared space. Recognition of one’s own digital self...
follows as the observer develops a perception of his embodied representation as an avatar. Collaborative engagement in the shared task activity follows when the social actor’s cognitive attention becomes focused on interactions with the social actors, his or her avatar, and the avatar’s embodied actions. The social actor will appraise the other social actor (i.e., the person behind the avatar) by assessing and perceiving that individual through his actions and appearance. As this process evolves, the social actor will reflect on and appraise himself as he observes his own avatar interacting with the other actor’s digital body. The result is a reflection on and consideration of his or her real self, including motivations, additional actions, and attitudes in the context of action and interaction. This represents a loop of shifting attentional focus on the virtual and real self, on the other social actor’s virtual and real self, and on the context of interactions. It is this loop of attentional focus that ultimately results in the user perceiving himself as a component of the environment manifest in his avatar (i.e., I rather than it) that defines the core of the ESP phenomenon.

It should be noted that ESP theory is a process theory that describes and frames the context in which 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. Although outside of the scope of this article, perceptions of ESP will follow and be dependent on both a sense of presence and copresence, which are constructs that others have addressed previously (e.g., Witner & Singer, 1998; IJsselsteijn, de Ridder, Freeman, & Avons, 2000; Biocca et al., 2003). Furthermore, perceptions of ESP will occur when the social actor engages in shared activities performed in a context (e.g., involving specific tasks, in a particular place, etc.), using tools (e.g., objects, the avatar, etc.), within a symbolic frame (e.g., a location with meaning, clothing with symbolism, etc.). These factors can be measured and manipulated to understand the development of ESP. Finally, ESP is associated with high levels of cognitive engagement, a focus on shared activities and spaces, on the actions exhibited by the virtual and real bodies of self and others, and on perceptions and interpretations of intent and content from verbal and nonverbal communication. Thus, a measurement scale for ESP will focus on these constructs and phenomena; that is, the other social actor’s virtual body and self, shared actions and communiqués, and the social actors own body and self.

DISCUSSION

We have reviewed various theories and literature that converge in our model of ESP. First, in reviewing the literature we noted that a sense of place identity has been demonstrated to be closely tied to how people understand space and the ways in which these perceptions are interpreted and acted upon (Relph, 1976). Then, 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 (e.g., Lombard & Ditton, 1997). 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 as space, place, and the mediation of both the real and the
virtual body. Our model seeks to provide an account for such meaningful elements in communication. We are interested in the explanation of presence in virtual worlds, but with an eye on the implications for communications across a variety of media in a number of communication contexts. Our model is holistic in that it accounts for multiple factors and is central to an understanding of the process of communication that takes place through interactions mediated by virtual bodies.

Embodiment’s role in framing an observer’s interpretation of reality has received considerable attention in the literature in disciplines such as feminism (De Beauvoir, 1953; Irigaray, 1981; Haraway, 1985; Butler, 1988; Braidotti, 1990); however, ESP examines how the language of the body will influence the perceptions that users of virtual environments develop and how this influences their understanding of and the meaning ascribed to their interactions with other social actors. When social actors are engaged in interaction the sense of presence they develop is derivative of and is manifest as a re-enactment of real-world social conventions and experiences. In essence, the user draws on his experiences from other contexts in real life where his body functions as the mediator of all interaction. As a tool for projecting information, a virtual body functions as a materialization of the social actor’s self online and that body is used as a tool to operate in a spatial context where virtual objects and space represent context and tools and the virtual representations of other social actors are recognized as manifestations of observers. Activity theory is useful in framing this thinking about the projection and interpretation of meaning by providing a framework for understanding the communication process when the virtual body becomes part of the mix of tools and symbols that are used and interpreted by social actors. In this context, we apply activity theory as a framework to ground our theory of communication in embodied contexts, which is a unique application of activity theory.

Our data suggest that users experience a greater sense of engagement, arousal and task performance when they experience ESP. This engagement is similar to the concept of flow as described by Csikszentmihalyi (1990, 1998), although ESP focuses not only on an individual’s development of cognitive engagement but also on how social interaction influences the development of cognitive engagement and one’s perception of embodiment. We see flow as one manifestation of ESP but there will be other components to this cognitive engagement that will focus on these other contextual elements, on embodied perceptions, and on the process that leads to these cognitions. Therefore, what ESP adds to this perspective is a mechanism by which this higher level of engagement is achieved in virtual environments and, by drawing on activity theory, embodiment, and the presence literature, ESP offers a broader framework for understanding the antecedents to the development of this phenomenon. Specifically, the focus of this activity, at least in relation to the experiences of the students involved in our research, is on the shared task and the digital bodies involved in enacting the activities associated with completing tasks.

This embodied perspective on flow is particularly relevant to virtual environments because virtual worlds are relatively accurate simulations of real life contexts (i.e., the context in which our minds are adapted to operate). Because our physical bodies are all we know in our real world experiences, in the virtual environment we can more readily recognize our digital body and that of the other social actors as we learn about them (and ourselves) by engaging in collaborative activities.
Thus, we argue that ESP theory offers a richer, more comprehensive framework for examining the role of embodiment in social communications.

People are inherently social and 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 (Goffman, 1959) and the digital body the user wears for online performances has the power to influence the perceptions developed by other social actors in a manner similar to the way a stage actor’s physical body is used in a stage performance. Research demonstrates that the presence of another sentient being is sufficient to impress change on an individual’s performance (Bailenson, Beall, & Blascovich, 2002; Zanbaka, Ulinski, Goolkasian, & Hodges, 2007). Just as boyd has suggested that online social network profiles are digital bodies (public displays of identity where people can explore impression management) (boyd, 2007), the mediated body of the avatar is a more wholesome representation of the self, complete with affordances that allow users to re-enact existing social scripts while interacting with others. In virtual worlds the social conventions associated with FtF (i.e., BtB) interactions prevail in that embodied presence drives a re-enactment of real life social conventions.

The ESP model explicates the elements in a process of communication occurring throughout this spatially defined and embodied context. Central elements of the process, some of which have been previously brushed over, are accounted for in this model. Our data indicate that a user’s embodied representation of self interacting with others in a meaningful virtual space has the potential to generate in users greater arousal and a sense of satisfaction with task completion. Ultimately, ESP provides a comprehensive framework for understanding the role of the body in interactive social and organizational communications. The most important contribution to the IS literature and to other literatures examining presence is framing the discussion of communication in collaborative contexts in light 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**

In the *Academy of Management Review*, Whetten outlined the “building blocks” of theory development (Whetten, 1989). He emphasized that it is important that the scholar addresses the what, how, and why questions associated with the phenomenon when proposing or extending a theoretical model. Specifically, Whetten suggests that the what question addresses the constructs and variables that make up the framework of the theory, the how question addresses the way these factors are related, and the why question addresses the logical justification for the construction of the model as presented (Whetten, 1989). ESP theory, as presented, addresses the question of what (i.e., multistepped and cyclical focus of cognitive attention resulting in psychological and physiological arousal), the question of how (i.e., embodied representations invoking perceptions and cognitive responses based on real-body experiences in the context of shared activity), and the question of why (i.e., higher levels of attention to the shared context, shared activities, and
embodied representations). As such, ESP is a useful theory and represents a valuable perspective for framing scholarly work in this domain.

In this context, we conclude that this theory will be relevant to research in the IS field and sister disciplines. The most obvious application for this theory will be to continued research on collaboration in virtual environments and the 3D Internet. The popularity of online 3D environments among pre-teens (i.e., Webkinz™, Habbo Hotel™) and teens and adults (i.e., the Sims™, Nintendo’s Wii™, Microsoft’s Xbox™ and Kinect™, and MMORPGs like World of Warcraft™) all suggest that virtual worlds will continue to be important and will likely increase in popularity. Understanding how users interact and react to embodied forms is important for this industry; this research offers game designers a framework for developing richer and more engaging platforms and applications for social interaction. Furthermore, although there have been several false starts with business ventures in virtual worlds, it is likely that business applications such as marketing, customer support, modeling, and product development will also grow at a fast pace (e.g., Ganis, Hall, & McNeill, 2008; Morrison, 2009).

As with the development of the Internet and ecommerce during the 1990s, we will likely see an increase in 3D collaboration (an example of a 3D virtual conference can be found at http://www.insidekinect.com/2011/01/avatar-kinect-first-trailer.html). Just as it was important for IS researchers to examine issues related to designing, building, and using e-commerce applications, it will soon be important for researchers to apply theories from the IS field when studying collaboration in virtual environments as these environments are applied to address business and organizational tasks. 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 important for identifying how to build effective platforms for collaboration, commerce, and education. ESP suggests a robust set of factors and variables that can be examined to better understand how users will react to these 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 theory to design spaces for collaboration that provide, for example, adequate room for activity-based interactions is key in developing effective tools for collaboration. Prior research in CAVE™ environments where collaborators engage in interactive collaborative virtual design of, for example, vehicles, demonstrates that these platforms offer advantages in terms of productivity and accuracy (e.g., Loftin, 2001; Ragusa & Bochenek, 2001). As such interactive applications are moved into the mainstream of business, it is important to identify how these applications can be used effectively lest they fail to “cross the chasm” (Moore, 1999). For example, decision room technology, an offshoot of group support systems technology, struggled to achieve widespread acceptance in the business boardroom. A framework like ESP theory offers developers an opportunity to focus on those features and affordances that generate positive outcomes for users and will likely improve the adoption of this type of technology for business applications. Conversely, 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. 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 helpful in identifying useful interventions and environmental designs for collaboration and interaction in organizational contexts where it is otherwise impractical to design real spaces or bring people together in physical proximity.

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 a moving avatar. Interactions in 3D worlds occur in real time and have a spatial dimension that can approximate real world FtF interaction better than social networking sites (Stutzman, 2006). Arguably, the sense of presence given by the profile page is a means to “type oneself into being” (Sundén cited in boyd & Ellison, 2007, p. 2), which is complemented by the “looking glass self” (Cooley, 1964) represented by the friends’ liaisons and subsequent interactions. Virtual worlds go a step further because by manipulating an avatar rather than typing, the user models himself into being. With the rise of the net generation and its entrance into the corporate world, we must be aware of the need for technologies that enable the level of expertise and worldview this generation has grown accustomed to (Tapscott, 1998).

This analysis and discussion should be considered in light of the limitations associated with this research. First, the reflection data represent reflections made by novice users of Second Life who used this tool in the context of classroom activities. Although all students were graduate students and are therefore representative of a working population of adults (most worked in full-time professional positions while enrolled in this course), the context in which they interacted was artificial in that their use of Second Life was imposed by the course requirements, interactions were made to fulfill course assignments, and exposure to Second Life lasted for several months with no requirement to continue use after the course. As such, their interactions might have been different had they used Second Life in a different context. Nevertheless, the students had considerable exposure to Second Life through course activities, assignments, and interaction events in the environment. Further, these students (MBAs who are working professionals) would likely approach this task with an eye toward identifying organizational applications for the tool and would likely be cynical in their critique of the experience. For example, one might expect that MBA students would frown upon the use of Second Life, with its game-like atmosphere, for use as a tool for organizational collaboration and interactions. In contrast to this expectation, many students reported that they found their interactions in Second Life to be productive, professional, and comparable to working in a corporate context. For example, consider the following:

Second Life with voice chat is much more practical to complete project work. A meeting feels more like a meeting. [Female]

Having a physical distance while being virtually close can allow high-level people to get out of the box and shake more hands in the crowd. With a click, they are back at their desks and can opt in or out of any conversation, as they wish there are no hard feelings. [Male]
As a technologist I’ve been using chat as a customer support tool and communication method for several years. I’ve also been able to use variety of different chat systems. For this class project I preferred the Second Life chat experience. [Male]

These students’ comments suggest that Second Life is suitable for organizational applications such as meetings, training, professional development, and socialization.

A second limitation that should be considered is the nature of the data itself. Although reflection data can be very useful for exposing respondent attitudes and feelings, they are based on memory and may include responses that are influenced by expectations about what the instructor in the course wants them to say (i.e., demand bias) or discussions with other students about experiences and attitudes. Furthermore, our model is based on reflections rather than direct observations; therefore, causes and effects we report in our model may not be as influential or important as we assert. For example, a subject might attribute a perception or feeling to an event that did not actually cause that perception or feeling to develop. Although these represent potential sources of bias, the richness and personal nature of the commentary suggest that these feelings and attitudes were salient and personal to the respondents and influenced more by their personal experience rather than by other external stimuli. Further, we received consistent reports of these experiences across multiple responses, which lead us to conclude that the causes and effects of the phenomena of ESP are accurate. Of course, further testing in controlled settings would help to clarify the exact nature of the development of ESP. Finally, although these data were coded using a commonly used and accepted methodology for content analysis, the fact that these data were coded by two experienced Second Life users should be considered when interpreting these results.

Future research should focus on examining the research model to determine its validity, particularly for organizational applications such as product sales, organizational meetings, or informational briefings (e.g., Ganis et al., 2008). An important next step would include identifying a set of measures for quantifying perceptions of ESP. Further, additional research should examine this theory in other contexts using subjects from other populations.

In closing, we return to the issue of generalizing this theory. Specifically, it is important to know 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 expect that ESP is relevant for examining and explaining interactions in other contexts because, as noted above, the body is the nexus of communicative actions and it is the focus of activity during interactions. As such, bodies are one of several artifacts that can be used to mediate communication regardless of the medium used to communicate (Nardi, 1995). Research shows that gestures, body language, and other nonverbal communication along with verbalizations represent activities that take place during FtF communication, which is consistent with our perspective of ESP. We suggest that communication should be conceptualized as the theory of the body in action, the implication being that we cannot read minds, but we can attempt to infer meaning through actions.
Furthermore, activity theory represents a component of the ESP framework and
the application of ESP to explain communication in other than virtual contexts is
useful as our theory views understanding as arising from 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
because the focus in virtual worlds is on the avatar as a bodily form used as a tool.
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 others, place, and tools. People use their
bodies, movements, and perceptual affordances to engage in activity. The body
as a tool (i.e., a mediating artifact) is not merely a platform for engagement in
activity, whether it happens in real world or virtual settings. Thus, ESP is relevant
to communication and observing and making sense of interactions in real-world
settings.

But the question remains, what about other computer-mediated environ-
ments? 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. Tools like the telephone 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,
despite the lack of a visual channel, activity is a component of communication
mediated by the body. As a result 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 VR systems. When, for example, you call a relative you
know well, you might imagine what the person is doing, where he is located, what
is around him, and other features of his environment. In such circumstances it is
possible to develop a sense of ESP even though no visual channel is present as
the social actor shifts his or her attention from the self, to the task, to the other
in both the imaginal and real-world contexts. Of course, not everyone who is
talking on the phone will experience perceptions of ESP nor is it always needed
or relevant to accomplish a given task. Comments from our subjects indicated
that they would select and use virtual worlds for some tasks and not others,
depending on the complexity of the task they are engaged in. Thus, we suggest that
although ESP occurs in a variety of contexts, it is shared activity and participation
in the task that, in part, draws participants into the higher levels of engagement
that describes this phenomenon. As such, we suggest that this theory is useful
in understanding a variety of team and organizational communication acts and
functions, understanding how communication effectiveness and efficiency can be
improved, and how this will influence the outcomes of team task and decision-
making activities.

REFERENCES
Monitor, 27(3), 25.


