

Embodied Social Presence Theory

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Abstract

We discuss and reflect on the importance of embodiment, context, and spatial proximity as they pertain to the sense of presence obtained by individuals in virtual environments. We propose Embodied Social Presence (ESP) Theory, a theoretical framework that focuses on the embodied virtual representation (i.e., the avatar) as the nexus of activity in social interaction within virtual worlds. We review the literature on place and space, presence and embodiment and draw on theories of embodiment, feminism, and Activity Theory to frame our model. We propose that a social actor in a virtual environment derives meaning during interactions with his or her environment through actions, context, and tools and that the virtual body is a tool for mediating communication.

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

1. Introduction

What does it mean to have that feeling of "being there" and why would an individual using a multi-user virtual environment (MUVE) have such a powerful and salient experience of presence? Researchers studying information and communications technologies (ICT) have for years looked into the questions of why and how people develop feelings and perceptions related to a sense of presence. Although the literature in this area is rich [8, 16, 29, 41], much still needs to be learned about why, how, and where ICT enables users of mediated communication tools to perceive that they are present in some place with others [8, 17]. The user's comment also highlights a few of the characteristics of multi-user virtual environments that are unique compared to many other ICTs; for example, the presence of avatars, a shared space, and shared activities. In this paper, we set out to investigate the features and affordances that foster a sense of

embodied social presence in many users of virtual environments. To do so we discuss Embodied Social Presence Theory (ESP Theory), a theoretical framework for understanding interactions and communication activities in MUVES.

Virtual environments create relatively unique 3-D spaces that can be used for collaboration, entertainment, social engagement, and other forms of communication. Although MUVES share some features with other *traditional* communication tools (e.g., email, videoconferencing, etc.), MUVES are unique realms where users can leverage many of the spatial aspects of communication that we are accustomed to when we share physical proximity. Proximity is important for enhancing communication because social actors often rely not only on words, but also gestures, objects, actions, tools and other stimuli embedded in the spatial context and that incorporate affordances derivative of our species' long history of communicating face-to-face (FTF) or, put another way, body-to-body (BtB). This points to the importance of the spatial nature of virtual environments and the role an embodied virtual presence on communication. Most importantly, what is unique about the way we interact in virtual spaces and how does an embodied virtual presence influence attitudes, perceptions, and behaviors? To answer this question, we build on the existing literature and suggest that ESP Theory describes the process by which MUVE users achieve a high level of cognitive engagement through interactions between virtual bodies in a digitally-generated space.

Media theories such as Media Richness Theory [16] and Social Presence Theory [41] primarily focus on examining the degree to which a communication medium compares to a proximate, BtB setting [29]. In other words, media are generally designed to provide communication experiences that draw on one or more stimuli used when communicating BtB. This is necessary because the stimuli transmitted via communication technologies must be encoded by the sender and decoded by the receiver using one or more of the five bodily senses (i.e., auditory, visual, olfactory, haptic, gustatory). Thus, an understanding of user experiences is best developed when the nature of BtB communication is incorporated into the

analysis because communication media are ultimately designed to reproduce, to one degree or another, some facet of the FTF experience. Lombard and Ditton [29] put this more succinctly; that is, the perception of presence occurs when the users has “the perceptual illusion of nonmediation” (p. 11).

Although several authors have discussed the nature of embodiment and perceptions about the avatar body in the virtual environment [6, 7, 10, 22, 40, 44], the role of the virtual body has not been fully explicated. The purpose of this paper is to fill this gap by bringing together several theoretical perspectives [10, 28, 29] that help to identify and define the role of the user’s physical body, virtual embodiment, and perceptions about the body and space in the development of attitudes, perceptions, and behaviors.

2. Literature Review

2.1. Place Theories

Two characteristics stand out in differentiating MUVes from other media: (1) the availability of a shared virtual space in which objects, avatars, actions, and higher level associations (e.g., meanings associated with place) can be established and (2) selective temporal persistence. Space is important because it has the potential to influence how people respond to MUVes [11]. Place-based features in MUVes are similar to the features we associate with real-world places; thus, space creates a context where the milieu of place-based features, associations, and accoutrements provide a richer mix of perceptual and attitudinal influences than the concept of place as a physical location alone represents.

Scholars studying presence in immersive and virtual environments have explored concepts associated with place drawing on fields such as neurology, environmental psychology, geography, and others [13, 14, 24, 39, 45]. An important perspective on place is the concept of place identity [39]. Place identity relates to an individual’s sense of association with a place. Relph suggests that individuals develop a place identity by associating physical settings with activities and meanings that occur and are historically associated with those settings [39]. The first component, physical settings, is associated with the objects in the space. Thus, identification by an individual with a place implies that the individual associates the other two components of place identity—activity and meaning—with a place. Place identity is useful in considering presence because it highlights that, from a user’s perspective, a place one senses a presence in

represents more than a mere space; rather, it is objects and space in context.

Gustafson [24] builds on Relph [39] by defining how meaning is associated with place. Gustafson identified three factors that influence how place becomes meaningful: environment, self, and others. This model is a synthesis of work done by earlier authors [1, 14, 30, 31] and is an important framework for understanding how and why place is relevant to more than just physical (or virtual) proximity. People assign meaning to places, objects, historical and contextual characteristics, and others in the space[9]. Thus, to understand presence, we must develop an understanding of the various factors that cause users of virtual worlds to sense and comprehend place.

2.2. Presence

In their review of the presence literature, Lombard and Ditton [29] provide a useful synopsis of the presence literature. They note that presence has been used in different fields to connote slightly different concepts that coalesce under the notion that the user of the communication medium is captured by an illusion that there is no mediation in the communication channel. This illusion can be manifest in multiple ways, for various reasons, via a number of media, and influenced by a number of contextual factors. Further, the illusion of presence is not a dichotomous state; rather users experience various “levels” of presence perceptions.

Lombard and Ditton offer six presence types or factors. First, in communications studies the presence construct focuses on the media’s conveyance of social cues; that is, to what degree does a medium have the capacity to transmit information that is perceived by a user and used to interpret the message? Media Richness Theory [16] and Social Presence Theory [41] represent this perspective. Second, is the degree to which a medium creates sensory input that has high fidelity relative to the target person, place, or thing that is the focus of communication (i.e., is it a realistic representation?). Third, a medium can function as a transport mechanism [29] by giving a user the sense that they are transported elsewhere (i.e., “you are there”), by bringing a place or objects to the user’s location (i.e., “it is here”), or by bringing one user to a “place” with another user (i.e., co-presence). Fourth, a medium can *immerse* the user within the space represented through the channel. Immersion can refer to either physical immersion (i.e., immersing sensory organs into physical devices) or psychological (i.e., creating a sense that one is inside the space). Fifth, a user may treat a character in a medium as a social actor regardless of whether

that actor can respond or is controlled by a human actor (i.e., actors in a movie). 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 (see CASA Theory [33]).

Presence is a concept that is multidimensional and spans various literatures. Our focus will be primarily on the body, objects, and actions that enable the psychological perceptions of presence. It is important to note that these definitions of presence do not require that a user engage in activities with other human or computer-agent entities. When one enters a virtual space, interacts with objects in that space, and develops perceptions of being there, the user has developed a sense of presence. Thus, regardless of the source of the presence perception, it is the observer who assigns these associations and meanings to their experience. An obvious question is, what is it about a shared place that is important in developing a sense of presence and what happens when other social actors arrive?

2.3. Co-Presence

Co-presence is a natural extension of the concepts associated with presence because media are often used for communication. In fact, many of the concepts associated with presence relate to defining how people perceive presence in the context of others (e.g., consider the fifth presence concept [29]). Nevertheless, presence and copresence are distinct constructs and have been examined as such in the literature [3, 7, 15, 18, 22, 36, 38, 40, 42, 43, 48].

Zhao [48] suggests that co-presence has been used by researchers to refer to two distinct interactive contexts. First, co-presence can refer to being together in physical proximity in the physical environment [43]. Alternatively, copresence can refer to being together with another person in a technology-mediated environment along with the sense of togetherness perceived in that context [18, 40, 43]. Based on this, he defines a typology of copresence that is based on the degree to which the actors are physically collocated (i.e., the mode of copresence) and the degree to which they perceive one another (i.e., sense of copresence).

As with the construct of presence, an important question about copresence is why does it occur? In considering presence, researchers have suggested that users suspend disbelief while using computers to interact with virtual objects [33]; Nass et al., 1996 [35, 37]). Humans appear to be predisposed to accept stimuli as true unless there is evidence suggesting that the stimuli is false. Reeves and Nass [37] referred to these behaviors as “The Media Equation”

(TME), and suggest that media are believed to be real because of this tendency. Lee [27] categorizes TME into two different groupings, folk physics and folk psychology (p. 499). Folk physics involves the process of automatically accepting stimuli associated with virtual objects and spaces and folk psychology involves the automatic acceptance of virtual social actors. Perceptions of copresence exist when the user experiences presence in the environment (i.e., folk physics is enacted) and the user also senses the presence of the “person behind the mask” (i.e., folk psychology is enacted). Similarly, the “Theory of the Mind” (ToM) [23] suggests that a social actor's objective when interacting with others is to decode the other actor's behaviors, feelings, and motivations.

The literature suggests that the perceptions of both presence and copresence will vary depending on a number of factors. For example, the user's readiness to suspend disbelief, the degree of physical immersion, the quality and fidelity of the media, the appearance and realism of the virtual objects and actors, the user's physical surroundings, and others. One such factor, the embodiment provided by an avatar, seems patently important in furthering a sense of presence in MUVes.

2.4. Embodiment

Embodiment has been dealt with in numerous literatures. For example, Merleau-Ponty, in his “The Phenomenology of Perception” notes that, “I regard my body, which is my point of view upon the world, as one of the objects of that world” [4, p. 83]. In his discussion of extracorporeality, he highlights the dialectic between cognition and physicality which has come to the fore in virtual spaces. More recently, Ehrsson [19] found that participants having out-of-body experiences had the 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” (p. 1048). This understanding of bodies as objects has been tied to a sort of consciousness associated with people's sense of “being there” as related to media.

Nevertheless, while the notion of virtual bodies and embodiment has been touched on to some degree in the literature addressing virtual environments, the literature related to embodiment in the context of presence is limited. Ziemke [49] first identified and defined six types of embodiment challenging the traditional cognition of the body in response to technology (see [49] for a description of his taxonomy). His article serves to launch a discussion of embodiment in response to the state of mediation and it frames our discussion as it pertains to

embodiment in a virtual space by posing embodiment as a multi-tiered construct.

For Biocca [7], presence is motivated by the desire to transcend the body “to move beyond the limits of the body and the sensory channels” (p. 13) and calling attention to what he calls the cyborg’s dilemma: the extension of the human senses through technology. Biocca suggests that the body offers opportunities to foster a sense of presence in three forms: being there, being with another body, and having a feeling of self presence (i.e., does the avatar represent me?). The first two forms of presence are equivalent, respectively, to the notions of presence and copresence reviewed above; the third conceptualization is dealt with less directly in the presence literature. However, before moving into a discussion of Biocca’s third form of presence, it is worth noting that he ties perceptions of the body to the development of a sense of presence in a useful way when he observes that users will experience oscillations in their sense of presence because the illusion of presence is unstable. A user’s sense of presence will straddle three “places;” the physical environment, the virtual environment, and the imaginal environment. This last conceptualization of how the user perceives space and, by extension, the body, when not attuned to the physical and virtual stimuli is important in considering how users respond to others. For example, the embodiment not only of one’s self but also of someone with whom one is communicating will take place in the imaginal realm when using mediated communication technology that does not include high fidelity representations of the social actors (e.g., telephone communication, email, virtual worlds with stylistic avatars, etc).

When discussing the conceptualizations of the body, the focus of Biocca’s discussion is primarily on the perceptions that the user has of his or her own representation in the virtual world. Biocca notes that two things are happening when one is immersed in a virtual environment. First, “the mental model of the user’s body (body schema or body image) may be influenced by the mapping of the physical to the geometry and topology of the virtual body” (p. 23). Second, “The virtual body may have a different social meaning (i.e., social role) than the user’s body” (p. 23). Thus, the avatar body creates perceptions in the user of that avatar and of the user himself. Furthermore, the manifestation of the avatar has a social meaning for other users who see that image and interpret it in the context in which it is manifest.

In summary, when users experience embodiment in a virtual world there are three bodies involved in the interaction: the objective physical body of the user, the virtual body, and the body schema that is

part of the user’s mental model and aids in managing the interaction between the real and the virtual. We would add that a fourth body is sometimes part of a user’s interaction with a virtual environment; that is, the body schema of the user created in the mind(s) of an observer (or set of observers). Thus, there is both an objective component to embodiment (i.e., how one’s body is represented) and a subjective component (i.e., how one’s body is perceived).

2.5. Activity Theory

The literature review thus far illustrates that theories of presence, including co-presence and social presence, are insufficient to provide a full description of the factors explaining the effects of virtual environments. While the literature on presence has proven useful for describing a variety of factors influencing the establishment of a sense of presence, it fails to demonstrate the richness, depth and multidimensional character of interactions associated with embodied presence and co-presence. Biocca and colleagues [8] noted this when they observed that limitations of the social presence construct include “...defining the limited scope of psychological phenomena that constitute social presence”, “...defining the scope of social behavior that elicits social presence,” and “...setting criteria for measurement...” (p. 471). In other words, what are the antecedents, the psychological phenomena, and the outcomes of presence in all its forms? We suggest that Activity Theory offers a useful framework for beginning to address these open questions, particularly related to understanding embodiment and the use of the virtual representation of the body as a tool in the virtual environment [8].

Activity Theory understands living as engagement in collective outcome-driven and socially determined activity that is mediated through context, tools and symbols. The theory developed from the historical and cultural perspective on individual mental processes to encompass communities of practice and their complex interaction within and with the environment [19]. The link between the individual and social is central to this theory: it is only within the context of the community and by participation in mediated activity that individuals come to realize themselves. In Vygotskian terms, individuals engage in deliberate thinking and performing, both of which nurture the development of conscious awareness, whereby one examines one’s own thinking. It is through this process that we become cognizant of the reality that presents itself as both objective (i.e., existing without individuals) and socially constructed (i.e., within

individuals). Awareness is achieved by participation in activity and mastery of tools and symbols, where the latter two are created to reflect the experiences of others, accumulate and preserve social knowledge and enhance the activity system of a community.

By using tools and symbols, individuals not only modify both their mental process and external behavior, but also exercise their agency. Engeström's [19] work emphasized the role of human agency in shifting the focus from the individual to the social in that individuals negotiate their practices within social contexts by defining rules and labor divisions. Regardless of the medium used, we encode messages with information that is framed by our own internal and contextual understanding of reality. Furthermore, the recipients of the message engage in cognitive acts that attempt to derive meaning through lenses that mediate their interpretation in the context of culture, tools and symbols. The process of deriving meaning happens within each individual during comprehension and is shaped by the external cues that are present in a social context.

The role of the human body is fundamental to communication in that it serves to mediate and aid participation in activity. Intimately acquainted with our own bodies and the way sensory stimuli work within bodies, we use bodily movements to perform actions and employ bodily senses to interpret the bodily actions of others. Thus, the human body is an instrument [25] through which learning occurs. It is through the physical body that we represent ourselves to others and our own selves. The body tells a story as in the example of a dance, whose reports and patterns reproduce the life of an individual as a social being [25]. Learning thus involves doing motor reproduction of attitudes, acts and emotions of others [5], where the body is used to model and replicate ourselves, others, and social interactions.

The physical body also serves as a basic frame of reference in the interpretation of digital spaces. Most often, MUVes are constructed so that movement of the virtual body is modeled after the real world sensations. Virtual environments act as social contexts within which individuals and communities participate in joined activity, interact with the context, internalize tools and symbols embedded in the culture. During this process, we master virtual tools via deliberate acts of generalization and systematization. Thus, as with any medium, people learn to appropriate the cadre of tools in context through both generalizing and systematizing acts, which is consistent with how Activity Theory suggests that actors learn and understand. One of the primary tools used in virtual environments, both to interact in the space and represent the user in social

interaction, is the virtual body. Thus, Activity Theory posits a mix of factors that are useful for defining those features of MUVes that are important in communication.

2.6. Summary of the Literature

We suggest that perceptions of presence and copresence are inexorably tied to concepts such as place, embodiment, environments in and around the physical and virtual space, and the presence of others. An important question is whether and how the sense of presence is created and the effect it has on the user's perceptions, actions, and attitudes. Biocca and colleagues [8] discuss the issue in their review of the presence and social presence literature. They note that, "*A central concern of social presence theory has to be whether technologically mediated social interaction is or is not different from unmediated interaction. If mediated interaction is different than unmediated interaction, in what way is it different and what is it about technology that causes this difference? Although mediated and unmediated social interaction may draw upon the same cognitive mechanisms, there is an assumption in all presence research that 'technology has an effect'*" (p. 473). Thus, the question is still open; that is, it is still not entirely clear how mediated communication differs in its influence on perceptions of social presence and the factors that influence the development of this perceptual state are not fully understood. While Biocca et al. [8] offer several criteria that will define the characteristics of a more robust theory of social presence, they do not offer the specifics of such a model. We suggest that a portion of the solution is hinted at in their discussion of these criteria. First, a more robust theory of social presence must be multidimensional. Second, they note, "*It may be that a full understanding of social presence may benefit from being informed by a larger theory of how we automatically interpret physical forms and nonverbal and verbal codes to simulate and infer the content of other minds. A theory of social presence may need to simultaneously address both the technology questions about media form and the psychological question about reading minds in representations*" (p. 472). We suggest that Embodied Social Presence Theory is such a theoretical lens through which we can combine the concepts of embodiment and mediation. We propose that our lived physical body is a key artifact in the evocation of embodied social presence. It is through our physical bodily movements and sensory abilities that we consciously or unconsciously model, perceive, and manipulate ours and others' embodied representations in a MUVe.

3. Embodied Social Presence Theory

Embodied Social Presence 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 - 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. In a MUVE, the virtual body is used as a tool for communication through action that is embedded in a symbolic context, which is similar to how we use physical bodies in real spaces. Activity Theory identifies how we derive meaning during interactions with our environment through words, actions, context, and tools. The primary focus of Activity Theory is on the social nature of activity in context; that is, how do we use our knowledge of context, tools and symbols to comprehend the way people develop an understanding of their world in a given activity-based context (e.g., Nardi notes that "...the unit of analysis is an activity", [34] p. 72). ESP applies these concepts to virtual environments; thus, the focus is on how the individual learns about his or her environment and others in that environment.

When people communicate, both objective and subjective content is embedded in communiqués. Ultimately, an important stated goal associated with the notion of social presence is to understand what the reality is behind the mask presented by the communicator. The Theory of the Mind focuses on this notion and is, in our opinion, at the heart of Social Presence Theory. Here lies the problem. Activity Theory argues that we can only develop our understanding of others through our own subjective lenses that are framed both by objective and interpretive influences. In other words, we cannot read the mind of the other person we are communicating with but we can interpret their body-mediated actions and other stimuli in that context. Thus, understanding one's environment is, in part, a subjective process and understanding it is internalized through the available stimuli. The stimuli in question when considering communication activities are the actions taken by other social actors in the environment of the observer along with the contextual factors (media, objects and symbols) that affect perception. Activities consist of verbal and non-verbal actions. Actors engage in these actions using tools, such as the body and language, which are symbols in a context. During communication all of these actions are initiated by the mind of the actor through the quintessential medium, the actor's body.

So, while actors have intent and goals, those intentions are instantiated through actions that are exhibited through the body. Therefore, the body is used as a tool for communication and symbolic interactions.

Our inquiry into ESP began with the observation that the use of virtual worlds created in us, the researchers, and our subjects a greater sense of engagement with the environment (i.e., presence) and others in the environment (these "subjects" are student users of Second Life whose reflections we have studied in other research yet to be published). This led to an obvious question; what causes these perceptions to arise? We observed that in spite of the fact we knew that the avatar body being used by other social actors were not real bodies, the perception remained that interactions were more engaging, more dynamic, and more satisfying than those experienced using other media. Why would this be so? The answer lays in the space the two avatars share and the interactions the users engage in through their virtual bodies. It is the sharing of space that provided context and it is the interaction of virtual bodies being used as tools that creates richness. But isn't this just copresence? While copresence implies that there is a perception of presence associated with the other social actor, the concept of copresence does not capture the depth of the interaction that exists when two or more social actors are engaged in substantive activity-based, virtual body-centered interactions. It is at this rich level of interaction that deeper meanings can be laid upon actions and, thus, information encoded and conveyed. So, while virtual bodies cannot replace the real-world bodies of interacting social actors, the virtual body can be used as a tool for conveying concepts, meaning, and symbolism in ways that mirror the way social actors use their physical bodies in real world social interactions (we are not saying that the "fidelity" of the avatar's actions is precise, but we suggest that "gross" actions like walking together or collaborative work on an object carries with it meaning; as the fidelity of avatars improve so too will the ability of these "bodies" to carry precise meaning).

In closing, an important point of departure is to identify the path by which ESP is achieved and explain how we see this high-level of engagement in activity-based social interactions develop. Embodied social presence takes place in a multi-step and cyclical process of cognitive engagement similar to the process described in several studies examining presence. We summarize this process in Figure 1. The ultimate observed state of ESP occurs when a social actor engages in goal-directed interactions with another social actor through the mediation of their

Stage	Perceptual Focus	Context	Instrumental Tools	Outcome
Recognition of the Other	The other social actor's avatar	Other social actor's virtual body (i.e., avatar) engaged in goal-oriented activities in a virtual space	<ul style="list-style-type: none"> Avatar Body Virtual Space Virtual Objects Verbal Communication Non-Verbal Communication 	<ul style="list-style-type: none"> Perception of other avatar Perception of Space
Recognition of Digital Self	Digital self embodied in one's own avatar	Actor's avatar present in the virtual space in proximity to the other social actor's avatar	<ul style="list-style-type: none"> Avatar Body Virtual Space 	<ul style="list-style-type: none"> Perception of one's own avatar Perception of Space
Collaborative Engagement	Joint activities	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	<ul style="list-style-type: none"> Avatar Body Virtual Space Virtual Objects Verbal Communication Non-Verbal Communication 	<ul style="list-style-type: none"> Perception of other avatar in action Perception of one's own avatar in action
Appraisal of the "Real" Other	Actions (verbal and non-verbal) of virtual other	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	<ul style="list-style-type: none"> Avatar Body Virtual Space Virtual Objects Verbal Communication Non-Verbal Communication 	<ul style="list-style-type: none"> Perception of the social actor "behind" the other avatar
Reflection on and Appraisal of Self	Digital self embodied in one's own avatar	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	<ul style="list-style-type: none"> Avatar Body Virtual Space Virtual Objects Verbal Communication Non-Verbal Communication 	<ul style="list-style-type: none"> Perception of one's own actions as manifest in avatar-based social interaction

Figure 1: The Stages of ESP

avatars' bodies. The process of perceptual focus involved in interpreting others intentions starts with the *Recognition of the Other*, which involves the individual observing the digital representation of the other avatar engaged in activities in the shared space. This is followed by a *Recognition of the Digital Self*, which involves the actor also developing a perception of the digital self embodied in his or her own avatar. The social actor will at some point participate in *Collaborative Engagement*, where the actor's cognitive attention turns to interacting with the real other through the avatar and the avatar's actions. The result of this interaction is an *Appraisal of the "Real" Other*, which involves the development of some level of assessment and understanding of the other as an individual. This is interwoven with a *Reflection on and Appraisal of the Self*, which occurs with the development of an actor's perceptions of his or her own digital self engaged in activities with the other actor's avatar. Thus, the social actor considers his or her real self within the context of interaction and action. This loop of attentive focus, shifting focus, and refocus is fundamental to the interactive, activity-based nature of high levels of engagement within the virtual environment. The perception of ESP is dynamic, ever-changing and oscillating as the attention of the social actor turns towards and away from the task to be performed, inward and outside of the interaction.

While space does not allow a full discussion of each of the factors that define the antecedents associated with the development of perceptions of ESP, Table 1 lists the major factors suggested by

Activity Theory. Each of these 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 category of variables that can be examined to identify the role of context, tools, and symbols in shaping a social actor's sense of ESP.

Space also precludes an expanded discussion of the measurement of this phenomenon, suffice it to say that our expectation is that perceptions of ESP will follow and be dependent on a sense of presence and copresence, which are constructs that others have addressed previously [8, 26]. Furthermore, we propose that perceptions of ESP will be realized when the actor engages in shared activities that are performed in a context (e.g., involving specific tasks, in a particular space, etc.), using tools (e.g., virtual objects, the avatar body, etc.), within a symbolic frame (e.g., a space with historical meaning, symbolic clothing, etc.). As a result, these are factors that can be measured and manipulated to understand where, when, and how perceptions of ESP are likely to develop. Finally, the unique characteristics of ESP are those associated with high levels of cognitive engagement, a cognitive focus that centers on shared activities in shared space, on the actions exhibited by the virtual and real bodies of the self and other social actor, and on the perceptions and interpretation of intent and content of verbal and non-verbal communication. Thus, a scale for the measurement of perceptions of ESP will focus on these constructs and phenomena; that is, the other social actor's virtual

body and self, the shared actions and communiqués, and the social actors own body and self (e.g., see [46], for an example of a presence questionnaire). As this discussion suggests, the development of perceptions of ESP is achieved through a complex process that begins with a perception of embodied presence and co-presence and culminates with a perception of self and others engaged in interactive, task-focused activity.

Table 1: Embodied Social Presence: Model Components

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

4. Discussion

We have presented various theories and literature that consider the multiple factors that converge in our model of ESP. We are interested in the explanation of the phenomenon of presence, specifically in virtual worlds, but with an eye on the implications for communications in other media. Toward this end we propose a model that accounts for multiple factors and is central to an understanding of the process of communication that takes place through interactions mediated by the virtual body represented in an avatar. We have provided support for and reflected on the centrality of embodiment in communication as it pertains to interaction and task completion. The impact of embodiment in the interpretation of reality has been visited in the past in disciplines such as feminism; however, a contribution of ESP is that it provides a framework for understanding how the language of the virtual body influences perceptions of engagement and, by extension, meaning.

Human beings are inherently social. The social nature encoded in our survival instincts drives us to define ourselves by relating to others. The self does not occur in isolation or a vacuum, “when a self does appear it always involves an experience of another” [32 p. 195]. In the case of avatars, the digital body the user wears for his online performance has the power, in much the same way the actor’s physical body does, to influence the perceptions developed by other social actors. Studies of presence have shown that the perception of presence of other actors is cause enough to impress change on an individual’s performance [47]. Nevertheless, co-present avatars share space but not intention. Just as boyd [12] has

claimed that the profiles afforded by online social networks are digital bodies, public displays of identity where people can explore impression management (p. 13), the mediated body of the avatar should stand as a more wholesome representation of the self with affordances that allow the user to re-enact existing social scripts while interacting with others. In the new social scenario provided by virtual worlds, the social conventions associated with BtB interactions seem to prevail. The sense of presence achieved by users of virtual worlds seems to drive a re-enactment of RL social conventions; thus, the user returns to the body. The virtual representation of an embodied self stands as the materialization of the self online in a spatial context where digital objects and digital others help frame actions.

We have discussed the usefulness of Activity Theory in providing a framework for developing an understanding of the communication process mediated through bodies, be these digital or in the flesh, without obviating the effects of contextual elements, tools, and symbols. While Activity Theory has not generally been used to frame discussions of embodiment or presence, in virtual worlds avatars are used as tools to interact with the space, objects, and others. As a consequence, the application of Activity Theory to understanding interactions in virtual worlds represents a logical extension of the theory. Ultimately, ESP provides a comprehensive way to understand the role of the virtual body and, by extension, the real-world body in communication.

We expect that ESP will be relevant to researchers in a number of domains. The most obvious application for this theory will be on continued research on MUVes. Team collaboration and education are two applications for virtual worlds that are already being used in meaningful ways [20]. ESP has relevance as a theory in the application of virtual environments for teaching, learning, and team interaction. Our research and the development of ESP arose from using Second Life to conduct classes, engage students with Second Life business people, and encourage collaboration. The application of ESP to developing better educational environments, activities, and projects would help to improve the experience for students and assist educators in adapting curricula for virtual environments. Similarly, ESP could be helpful in designing better spaces and affordances for collaboration. Using ESP to guide the design of virtual collaboration spaces that provide, for example, adequate room for activity-based interactions, would be a logical application of this theory. Furthermore, research on how affordances in virtual spaces can be applied to real world collaboration and interaction could be aided by

considering ESP. Finally, while 2-D spaces like Facebook don't yet include 3-D content, the bodily images presented there offer another environment where the theory might aid interpretation and design.

In closing, it should also be mentioned that ESP has been offered and framed in the context of virtual environments. An important question is whether it can be used in other contexts to examine communication behaviors, perceptions of social actors, and the role of context, tools, and semiotics. We suggest that ESP is relevant for examining and explaining interactions in other contexts. As noted, the body is the nexus of communication and as such virtual bodies are the focus of activity during interactions in virtual environments. In addition, bodies are one of the several artifacts that can be used to mediate communication [34]. But, does this happen in BtB and other computer mediated interactions? Gestures, body language, and other non-verbal communication along with verbalizations represent the primary activity that takes place during BtB communication. The application of ESP to explain communication in other than virtual contexts is useful as ESP views understanding as developing as a result of human participation in social activity that occurs through the mediation of context, tools and symbols. Humans use their bodies, bodily movements and bodily perceptual affordances to engage in and direct activity. The body then becomes a tool (i.e., a mediating artifact), and not a mere platform for engagement in activity, whether it happens in real world or virtual settings. Thus, ESP is relevant to understanding communication and observing and making sense of interactions in real-world, proximate interactions.

Future research should focus on examining ESP Theory to examine the validity of the research framework. An important next step would include identifying a set of measures. Further, additional research should examine this theory in other contexts (e.g., involving different MUVES or communication media) and using various subject populations. The explication of ESP offered here is a starting point for a discussion of the role of embodiment and shared activity in virtual spaces, but we hope that ESP Theory will be useful for informing future research in virtual environments and social interaction.

5. References

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