

# General Track (GEN)

<b>TITLE</b>	<b>VIRTUAL WORLDS AND PEOPLE WITH LIFELONG DISABILITY: EXPLORING THE RELATIONSHIP WITH VIRTUAL SELF AND OTHERS</b>
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## Abstract

*An increasing number of people with lifelong disability are active members of virtual worlds. Through their avatars, people with disability are able to participate in social, work related and educational activities in the virtual world. The aim for this paper was to explore how people with lifelong disability experienced the relationship with their virtual self and others, applying the lens of Embodied Social Presence Theory. Based on data collected through participant observation and interviews with novice and experienced users of Second Life, our findings indicate that the relationship between humans and their avatar is strong. Further, the findings indicate that the relationship with a person's own avatar and others in the virtual world requires time to develop and be meaningful for people with lifelong disability. The ability to create an avatar with no visible disability and to choose what to disclose about a disability, is important affordances offered by the virtual world to people with disability. This study contributes to an understanding of the potential for virtual worlds to support people with lifelong disability in engaging in leisure activities and social interactions.*

*Keywords: Virtual Worlds, Second Life, disability, Embodied Social Presence Theory.*

## 1 Introduction

Presence in computer-mediated environments typically consists of two interrelated phenomena, the sense of being there and the sense of being together (Schultze and Leahy, 2009). These two phenomena are evident in virtual worlds, where humans are represented by an avatar, which in many cases resembles the human it represents. Avatars are technological artifacts that offer a virtual body for communication and provide the affordance of embodiment for people in virtual worlds (Schultze and Leahy, 2009). Embodied Social Presence (ESP) theory is a framework for understanding interactions and communicative activities in virtual worlds (Mennecke et al., 2010). Researchers applying this theory have emphasized the situated and dynamic nature of this form of presence (Schultze and Leahy, 2009) and demonstrated that avatar users experience a greater sense of engagement, encouragement and task performance when they experience ESP (Mennecke et al., 2011).

People with disability are active users of virtual worlds (Babiss, 2009). According to the UN Convention, “Persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others” (Leonardi et al., 2006). People with disability experience a range of challenges in their day to day life, including difficulties with communication, mobility and access to the community (Ballin and Balandin, 2007; Greenwood, 1987). Communication is intrinsic to being connected and feeling part of a community or society, consequently communication impairments can give rise to feelings of exclusion from being an active citizen (Jackson, 2006). Access to computers and the internet has shown to be a positive influence for people with disability helping to empower them in their life, be independent and be part of the community (Davies et al., 2001; Gardelli, 2008). The experience of being treated as different, not being seen as equal to their non-disabled peers is a challenge that is common to most people with disability (Hammel et al., 2008).

To date researchers have pointed to the educational (Smedley and Higgins, 2005) and rehabilitation capabilities (Standen and Brown, 2005) offered by virtual worlds for people with disability. How people with lifelong disability are experiencing and using virtual worlds for leisure activities is an under-researched area that requires more attention (Stendal et al., 2011; Stewart et al., 2010). Motivated by the positive effect of ESP on engagement in virtual worlds documented in previous studies and the theory’s attempt to explain the importance of embodiment in mediated communication (Mennecke et al., 2010), the aim of the present study was to understand how people with lifelong disability experience the relationship with their virtual self and others in virtual worlds. The research question was:

*How do people with lifelong disability relate to their virtual self and experience interactions with others in the virtual world?*

In this paper we present the results of a study that included both novice and experienced users of the virtual world Second Life. Using ESP theory as the lens, we analyzed the different stages of development of virtual self relationship and the affordance of embodiment participants experienced when communicating with others. This study is part of a larger project supported by the Norwegian Research Council that explored how Virtual Worlds can assist people with lifelong disability to engage in meaningful activities and social interactions. Ansello and O’Neill (2010) defined lifelong disability as: “Developmental disabilities, as federally defined, are chronic impairments that occur before age 22 that may affect functional abilities in matters of self-care, learning, mobility, language, economic self-sufficiency, capacity for independent living, and other everyday skills. The impact of the impairment is life-long while the causes are many, including chromosomal anomalies, birth trauma, mother’s lifestyle during pregnancy, adverse drug reactions, and accidents such as automobile and diving that produce traumatic brain or physical injury. Thus, developmental disabilities, being functionally not categorically defined, are heterogeneous and might include individuals with Down syndrome, autism, deafness, epilepsy, polio, cerebral palsy, and the survivors of any number of untoward events that occur during life’s developmental (under age 22) stage” (p. 106-107).

## 2 Embodied Social Presence Theory

Social presence has been defined as the degree of awareness of other individuals in an interaction, and also the appreciation of an interpersonal relationship through such interaction (Short et al., 1976; Tu and Mclsaac, 2002). The degree of social presence is a subjective measure, where it is combined by the characteristics of the medium used and the user's perception (Tu and Mclsaac, 2002). It is widely agreed on that social presence should be viewed as an experience, which varies from moment to moment, and differently between individuals (Shen and Khalifa, 2008; Tu, 2000). Building on previous research (Schultze and Leahy, 2009), we focus on presence as being of a situated and dynamic nature. Social presence is not a set measurement, and will differ between individuals and situations (Biocca and Harms, 2002; IJsselsteijn et al., 2003; Tu, 2000; Tu and Mclsaac, 2002). With the introduction of virtual worlds, social presence theory has gone through another development and in this context referred to as Embodied Social Presence (ESP) Theory.

Embodied social presence is used to discuss social presence in virtual environments (Durlach and Slater, 2000; Mennecke et al., 2010). The sense of social presence with others is important, as is the relationship and sense of social presence between the human and the avatar. In a physical environment social presence begins with acknowledging the presence of others, equally, in a virtual environment the acknowledgement of the avatar as a representation of self is crucial (Durlach and Slater, 2000; Schultze and Leahy, 2009).

Mennecke et al. (2010) presented a framework (Table 1) for embodied social presence with five stages which describe the social presence in a virtual environment, extending a model by Biocca and Harms (2002). The framework includes recognition of the digital self and the virtual environment being engaged. It also focuses on the appropriation of the avatar as being a tool in the social interaction and therefore an important factor in the social presence. Mennecke et al. (2010) suggest the perception of ESP is achieved through a complex process in five stages beginning with the perception of embodied presence and co-presence and ending with the perception of self and others engaged in interactive and task-focused activity. The first stage, recognition of the other, involves observing other avatars participating in activities. Mediated embodiments such as pictures and other representations of others may automatically trigger a sense of social presence (Biocca and Harms, 2002). In a 3D virtual world, unlike text-based virtual worlds, presence is rearticulated to others and self by adding an avatar (Taylor, 2002). The second stage includes recognition of the digital self, where the user creates a perception of the digital self embodied in his or her own avatar. Schultze and Leahy (2009) stated there are various ways of viewing an individual's own avatar, such as avatar as 3D cursor or avatar as possible self. The strength of an individual's relationship to his or her own avatar is perceived differently by individuals and may be related to time (Bailenson et al., 2001; Wolfendale, 2007). In the third stage, collaborative engagement, the users starts interacting with others using avatars and through the avatars' actions. Schultze and Leahy (2009) presented the avatar as an object of play and as a tool. Avatars are tools for interaction and communication, as well as a tool for collaborative activities with other avatars. The fourth stage, appraisal of the "real" other, involves an individual having some understanding of the others as individuals. Virtual worlds offer a representation of self and others. Such representations may be misunderstood as not real (Schultze, 2010). It is important to remember and understand there are real people behind each avatar. Schulze (2010) noted that the encounters in the physical world and the virtual world are similar. The fifth and final stage, reflection on and appraisal of the self, occurs with the development of the users' perceptions of their own digital self, engaged in activities with other avatars. Mennecke et al. (2011) stated this represented a shift in focus on the virtual and real self, as the user perceives him- or herself as a component of the environment manifested in his or her avatar. Table 1 shows the stages in the model by Mennecke et al. (2010) and the implications at each stage.

<b>Stage</b>	<b>Perceptual Focus</b>	<b>Context</b>	<b>Instrumental Tools</b>	<b>Outcome</b>
Recognition of Other	The other social actor's avatar	Other social actor's virtual body engaged in goal-oriented activities in a virtual space	-Avatar Body -Virtual Space -Virtual objects -Verbal Communication -Non-verbal Communication	- Perception of other avatar - Perception of Space

Recognition of Digital Self	Digital self embodied in one's own avatar	Actor's avatar present in the virtual space in proximity to the other social actor's avatar	-Avatar Body -Virtual Space	- Perception of one's own avatar - Perception of Space
Collaborative Engagement	Joint activities	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	-Avatar Body -Virtual Space -Virtual objects -Verbal Communication -Non-verbal Communication	- Perception of other avatar in action - Perception of one's own avatar in action
Appraisal of the "Real" Other	Actions (verbal and non-verbal) of virtual other	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	-Avatar Body -Virtual Space -Virtual objects -Verbal Communication -Non-verbal Communication	- Perception of the social actor "behind" the other avatar
Reflection on and Appraisal of Self	Digital self-embodied in one's own avatar	Actor's avatar engaged in goal-directed collaborative activities with the other social actor's avatar	-Avatar Body -Virtual Space -Virtual objects -Verbal Communication -Non-verbal Communication	- Perception of one's own actions as manifested in avatar-based social interaction

Table 1 The Stages of ESP (Mennecke et al. 2010, p.7)

In research based on photo-diary interviews with 14 participants, Schultze and Leahy (2009) identified four social presence categories in the virtual world; Virtual Me, The Avatar as Possible Self, The Avatar as a Character, and Scripted Character. In these categories, Virtual Me represented an integrated avatar-self relationship where the participants never perceived themselves as separate from their avatar. Scripted Character represented a totally segmented avatar-self relationship where the avatars did not represent the participants in any way, but were used as a tool to engage activities, for example, in role-plays. In the two middle categories, The Avatar as Possible Self and The Avatar as a Character, there was a more dynamic avatar-self relationship. The Avatar as Possible Self allowed participants to explore an alternative self or the real self which is not possible in real life. The Avatar as a Character, implied a sense of connection between the avatar and self, where participants referred to their avatar as 'her' or 'him', yet the participants had control and made the decisions.

Mennecke et al. (2010) stated that the embodiment of self in the virtual environment may be seen as a tool for communication and symbolic interactions. They viewed the virtual body as a tool for mediating communication; therefore the actions of the virtual body have embedded perceptions. Embodied Social Presence theory not only attempts to explain the communication between users in the virtual environment, but also takes into account the relationship and communication between avatar and human being.

Embodied Social Presence theory is a new theory that has been used as a framework in empirical research to account for the higher levels of perceptual engagement that users experience as they engage in activity-based social interaction in virtual environments (Mennecke et al., 2011). These researchers examined proposed ESP theory in a qualitative study, where data was collected from two graduate courses in e-commerce. The data consisted of reflections from the students involved in the courses on their experiences in Second Life. They stated that users experience a greater sense of engagement, encouragement and task performance when they experience ESP. Furthermore, they indicated the sense of embodied social presence will evolve over time. Biocca and Harms (2002) stated that social presence is suitable for self-reporting by individuals, such as in the study by Mennecke et al. (2011).

### 3 Research Method

This study was conducted in the virtual world Second Life (SL). Aligned with previous research, Second Life was chosen due to (1) the large number of users, (2) the range of activities available and (3) the wide range of opportunities (e.g. business and education) (Schultze and Leahy, 2009). Because of these features, SL presents a suitable platform for both novice and experienced users to explore and prosper in the virtual world. Furthermore, the ability to create an avatar and play with identity gives this platform an advantage when exploring embodied social presence and the avatar-self relationship for people with lifelong disability. Due to the limited research conducted in this area, this was an exploratory qualitative study. This study included two groups of participants, novice users and experienced users of SL. All participants were over the age of 18, diagnosed with a lifelong disability, able give informed consent, and able to use and access to a computer with broadband. All participation understood that they could withdraw from the project at any time without giving a reason or incurring penalty. Ethical approval for the study was obtained from the Norwegian Social Science Data Services (NSD).

With the first group we aimed to explore how novice users with lifelong disability experienced virtual self and the social presence of others in the virtual world. This group consisted of five participants, all located in Norway, and recruited through organizations in their local community (e.g. teaching services). One participant has Cerebral Palsy (CP), the remaining four have mild to moderate intellectual disability. During a period of eight weeks in 2011, the five participants met with the first author (hereafter referred to as 'the researcher') in weekly sessions of one and a half hours, to engage in various activities in Second Life. During these sessions, the researcher guided the participants in their exploration of the virtual world. The participants engaged in activities such as visiting amusement parks, playing miniature golf and playing soccer. Online in the virtual world, but located in a different area in Norway, the researcher was available to help and guide the participants and act as a participatory observer in the activities in SL. Communication between the researcher and participants in SL was mainly through the voice feature offered by SL. However, when the voice feature was unavailable, communication was conducted in text-chat. In the fourth and eighth week of the study, all novice users participated in individual in-depth interviews about their experiences in the virtual world. Interviews were conducted by phone; as it was decided to devote the SL sessions solely to activities and interactions in the virtual world. The researcher did not meet any of the participants in the physical world. This protected the anonymity of the participants and the researcher. Consequently, the participants had the opportunity to choose what to disclose about themselves and their disability and maintained control over their own identities, when interacting with the researcher.

The second group that participated in this study consisted of six experienced users. These users were recruited with the help of Virtual Ability Inc. (see [virtualability.org](http://virtualability.org)), which operate an island in SL that supports people with disability entering into the virtual world. During two in-world presentations of the project by the researcher, people attending the presentation were invited to participate in this study. Within this group three participants have a physical disability, two have a hearing impairment and one participant has Autism Spectrum Disorder (ASD). Five of the participants are from the US and one is from Finland, but is located in South Africa. The experienced users participated in a longer in-depth interview of approximately two hours, exploring their experiences with the virtual world, their relationship to their avatars, and to others in the virtual world. With the exception of one interview, the interviews were conducted using text chat in the SL setting. Because of a physical disability, one participant had difficulties communicating through text and preferred the voice feature in SL for communication and interaction. The remaining five participants said they were more comfortable using text chat when communicating with people with whom they do not have a close relationship. The experience level of being active in SL of the participants in this group ranged from one to seven years. The experienced users reported using the virtual world for a range of activities such as meeting friends, engaging in activities with friends, participating in classes, helping others to master SL, building and designing objects, and work.

To ensure the anonymity of the participants, all the avatar names mentioned in this paper are pseudonyms. Table 2 contains a summary of the characteristics of the participants in the two groups

Participant	Type of user	Disability	Location	Primary language
Pevit Torana	Novice	Intellectual	Norway	Norwegian
Mix Mofat	Novice	Intellectual	Norway	Bulgarian/Norwegian



Solvita Silka	Novice	CP	Norway	Norwegian
Trinaka Lika	Novice	Intellectual	Norway	Norwegian
Rolatina Endora	Novice	Intellectual	Norway	Norwegian
Agonra Sircka	Experienced	Physical	USA	English
Kalnika Gublic	Experienced	Physical	USA	English
Sunger Alista	Experienced	Hearing impairment	USA	English
Ahroun Wolf	Experienced	ASD	USA	English
Maria Butterfly	Experienced	Physical	USA	English
Kirana Merkini	Experienced	Hearing impairment	South Africa	Finnish/English

Table 2 A summary of the characteristics of participants

The focus of the data collection was to understand how the participants experienced their use of Second Life. We collected data about communication, experience with activities and how the participants experienced Second Life's interface and technical challenges. Data collection and data analysis were guided by ESP theory, with interview statements and observations categorized and compared across participants according to the different stages of ESP (Mennecke et al. 2010).

## 4 Findings

The findings presented here are structured according to the five stages described in the Mennecke et al. (2010) framework for Embodied Social Presence theory. Observations and interviews conducted with the novice users of SL were conducted in Norwegian, and any quotes from these participants have been translated. The interviews with the experienced users of SL were conducted in English and direct quotes are used here.



Figure 1 Novice participants playing miniature golf and Interview with Ahroun Wolf

### 4.1 Recognition of the Other

During the sessions with the novice users of SL we visited multiple locations as a group. The participants expressed excitement with being able to visit diverse locations. They soon referred to each other's avatars as "him", "her" and "you". The recognition of being together with others in the virtual environment was also displayed when they tried to speak to other avatars in some of the locations they visited, or when they spoke about other avatars among themselves. They showed the recognition of space, through vocalizations and laughter, when avatars crashed into each other in the virtual environment. Also, in the individual interviews participants found it amusing when another avatar who was not part of their group tried to mimic their Norwegian language. One participant spoke of another avatar seen in one session: *"She was all alone there. I felt a little sorry for her, being all alone, while all of us were in a group"* (Pevit Torana).

The experienced users of SL stated that they were aware of others present in their environment when they were in-world. For example, during one interview, which took place in the context of a bar in SL, using Instant Messaging (IM), the participant gave as an example of how others are present in the environment, the chat going on in the open environment. *"lol someone asking how old are you in RL [real life]. Usually only newbies ask personal [questions]? In open chat"* (Kalnika Gublic). Ahroun Wolf noted that initially other's avatars are mental models to



him when communicating or are present in the shared space in SL. The recognition of others is clear from these experiences reported by the experienced users of SL. They perceive others as communication partners and see also the social attributes of the virtual environment.

#### 4.2 Recognition of Digital Self

The novice users did not express a clear feeling of connection to their virtual self. The novice participants recognized the avatar as a representation of themselves, a virtual body that they controlled through their keyboard or mouse commands. The novice participants made few changes to their avatars over the eight weeks of the project. The changes they made required extensive assistance from the researcher. In the interviews, all expressed contentment with the appearance of their avatars, noted that their avatars did not resemble them in RL, and stated that this was a positive feature. However, they were unable to elaborate on why this was a positive feature. They did not choose to depict or discuss their disability using their avatars at any point in time. One of the novice participants noted that using the pseudonym names of the avatars was a good way of being who she wanted to be rather than having to say who she really was.

The interviews with the experienced users revealed a closer connection between virtual self and the individual participant. Maria Butterfly expressed: *"She is an extension of me. Maria has the qualities I have in RL, she is similar to me."* Ahroun Wolf is represented by a wolf in SL, and when asked why he had a wolf as an avatar answered: *"I suppose to some extent... because it just feels right. I've never known myself by any other symbol. Remove the wolf I wear on the outside here and wear on the inside in real life... and there'd be nothing of me left."*

On the other hand, the experienced users did sometimes depict their disability. Agonra Sircka explained he designed his avatar to display his own characteristics, including using a wheelchair: *"This avatar is designed to visually represent me pretty close to my real self. I use a sports chair in RL. I'm African American in RL. I'm a male in RL."* He explained that his avatar's use of a wheelchair was partly because he spends much time on the Virtual Ability Island: *"When I hang around Virtual Ability places, I think it also opens up conversations a bit"*. Sunger Alista chose to state in her profile in SL that she is deaf and can only communicate through text chat, to avoid misunderstandings with other people she encounters in SL.

#### 4.3 Collaborative Engagement

The interviews and observations demonstrated how both groups experienced collaborative engagement in SL. The novice participants did not always express this in words, but in actions. The way they communicated and interacted with each other and with the researcher during the sessions showed that they recognized others as being there and that they could interact with others. This was demonstrated through their engagement in activities together, and in their comments commenting on each other's dancing or diving abilities in SL or talking about things they saw and experienced together. One of the participants explained he felt "at home" with the group, and enjoyed being together with the others in his group. However, the same participant said about others outside of the group: *"I like others, but it may make things a little harder. It is hard to understand when there are others around"* (Pevit Torana). In other words, he was afraid he would not understand what others said or be able to communicate with them in the way that he felt comfortable.

The experienced participants all expressed that one of their main goals in using SL is the social aspect of the virtual world. They are able to meet people across geographical boundaries and interact with people they would not otherwise meet. *"Great. There is no other platform you can have access to so many personas."* (Maria Butterfly). The experienced users clearly described interactions with others and how it feels is dependent on the situation they are in at the time. Maria Butterfly, because of her disability finds it difficult to type on the keyboard, said: *"Depends on the situation, I can expand more with voice than with text. It depends on the lag, and how many people are around."* For Maria Butterfly writing a conversation in text chat can take too long, whereas the voice feature allows her to express herself in a shorter time.

#### 4.4 Appraisal of the “Real” Other

Since all novice participants were co-located during the sessions, the researcher, through SL, heard them discussing what happened on their screen during the SL sessions. They were aware that the other avatars in their group represented each person in the room with them. However, when the researcher talked to the novice users of SL about the people behind the avatars they were interacting with, these participants did not express ideas of other avatars outside their group being other people. They talked about the avatars only as a virtual object that was in their computer. During the eight sessions they were rarely exposed to any locations where there were large groups of avatars. When they were in this type of environment, the participants, with few exceptions, “became quiet” and did not engage in conversations with others. Pevit Torana and Mix Mofat attempted to initiate some interaction with people outside their group at times, but the attempts were not pursued. Although English presented a language barrier for the novice users, when visiting an environment where others were speaking Norwegian, the group became observers of the other avatars present. In this particular virtual context there was a live DJ, therefore communication was only text based, and they were asked to turn off the voice feature. Nevertheless, they did not express any wish to communicate with the others they met in this environment. When asked about making friends during their time in SL, the participants indicated each other and the researcher as new friends. Solvita Silka stated that she did not make any friends during her time in SL.

The experienced users were clear that they understood there is a human behind every avatar they interact with in SL. *“Always aware there is a RL person behind the avatar”* (Kalnika Gublic). They noted they had all types of relationships in SL, including friendships and very close personal relationships. Close relationships with others are a strong reason for this group to continue using and exploring SL. Ahroun Wolf explained: *“It takes a long time for me before a person is more than just a mental model I'm trying to build [a model] of a member of Homo sapiens to anticipate their behavior. But once I have that model and move beyond it? Yes. They are real to me even here.”*

The experienced participants were also aware that because there are humans behind every avatar in SL, the same prejudices that occur in RL can be found in SL. Agonra Sircka, noted his avatar, who uses a wheelchair, experiences similar social exclusion in SL as in RL. Even if he experiences social exclusion in SL, Agonra Sircka chooses to display his disability because it is a part of who he is. Two other experienced users, Maria Butterfly and Kalnika Gublic, both use a wheelchair in RL, but choose not to use a wheelchair with their avatars in SL. One reason for this is to avoid experiencing the prejudice they have experienced in RL. *“It goes back to the fact that the people at the keyboard are still people. The environments, be they text or graphics, are more fluid, but the social dynamic still remains.”* (Ahroun Wolf).

#### 4.5 Reflection on and Appraisal of Self

When novice users are asked if they felt they had really done the activities they engaged within SL, the answers varied. Solvita Silka stated she did not experience that she, as a physical being, had done any of the activities in SL, but pointed out the enjoyment she felt when she had been diving or playing football. Others in the same group stated clearly that they had really engaged in the activities they had pursued in SL. Pevit Torana highlighted the hikes and the beautiful scenery he had experienced. At the same time, the novice users reported that they did not feel a close connection to their avatars. The avatar is just a virtual object they control, nothing more. However, the feeling of doing activities together as a group was noted to be a positive experience for the whole group.

The experienced users of SL differed from the novice users when reflecting and appraising self. They indicated that the virtual reality is something they immerse into with heart and soul. The connection with their avatar is strong enough that they expressed fear of losing it or it being changed without their consent. Kalnika Gublic explained: *“Her face went black once, I freaked out.”* When asked if they felt present in the virtual world when in-world, their unanimous answer was yes. They explained the virtual world is very immersive and the physical world fades into the background. Sunger Alista said: *“I've had meaningful and deep conversations with folks whom I never would have met, ever, in RL.”* Sunger Alista, who is hearing impaired, uses text chat when communicating with others in the virtual world which illustrates that rich communication in SL is not dependent on voice interactions.

## 5 Discussion

Schultze (2010) noted the paradox of the relationship between technology and the physical body. She presented the notion of the physical body having an inherent limitation in that it is situated and therefore it is possible to be present at only one location at a time; however, using technology, it is possible to experience presence in multiple locations with the help of an avatar, a virtual self. The virtual body, avatar, promises the user the affordance of a “real” body in the virtual world, which may deliver the same information to our surroundings as at provided by the physical body. Through this study, using the lens of Embodied Social Presence theory, we have explored how people with lifelong disability relate to their virtual self and how they experience interactions with others in the virtual world.

When entering Second Life, the recognition of others is almost instantaneous. Almost everywhere you go there are other avatars present. The representation of other is without effort, and is perceived as a being, a mediated other in the virtual environment (Biocca and Harms, 2002). The notion of not being alone was discussed by both the experienced and novice users in this study. Although the experienced users described a stronger connection towards others than the novice users, the novice users also spoke about the presence of avatars in their surroundings.

The recognition of digital self was presented by both groups that participated in this study. However, the experienced users expressed a stronger connection to their avatar than the novice users who only accessed SL for eight weeks. This finding is similar to a results from study by Bailenson et al. (2001) who found that people who had a short relationship with their avatar did not feel any connection with the virtual representation. Wolfendale (2007) concluded that the relationship between human and avatar must be taken seriously, which was supported by the comments from the experienced participants.

Although the novice participants demonstrated limited recognition of the digital self, they participated in collaborative engagement during their time in SL. When communicating with others outside the group, they were more reserved and cautious. Schultze (2010) explained co-presence as virtual togetherness, where avatars share a virtual environment and socially share experiences. The novice participants attempted to take advantage of this co-presence, but because of their limited recognition of digital self and others, were not able to utilize this opportunity to its full extent. The experienced participants however, emphasized the social and collaborative aspects of SL, which are for many, the main reason they engage in SL. They stated that connection with others is important and the opportunity to engage in collaborative activities with people from all over the world is valuable. They demonstrated that they recognized the real other behind other avatars, which did not appear to be so clear for the novice participants,

Appraisal of the “real” other was explained by Mennecke et al. (2010) as an understanding that the other is an individual. As discussed above, the novice participants did not give any indication that a real human was behind the avatars that they met outside their group. A possible explanation for this phenomenon may be that four of the novice participants have an intellectual disability and all experienced language barriers within SL. However, the experienced participants stressed the importance of being aware of the human behind the avatar when meeting both friends and strangers in SL. Furthermore, they were aware and prepared for encountering the same prejudices in the virtual world as they encounter in RL. Schultze (2010) stated that all positive and negative encounters in the RL will also be present in the virtual world because all avatars are controlled by humans. The experienced participants also noted the possibility of creating close and trusting friendships or relationships with others in SL, but emphasized that this may take time.

The final stage in the ESP framework of Mennecke et al. (2010) is Appraisal of the Self, and refers to the perception of self-engaged in interaction and activities with others in the virtual world. The novice participants were not clear when questioned about this. Some felt that they had actually engaged in the activities themselves, while others did not indicate this. However, with the previous stages of ESP in mind, when the participants do not experience the recognition of self in their digital self, it is not surprising that they did not experience being immersed in the virtual world. On the other hand, the experienced participants described how they are immersed in the virtual world and experience their activities in-world as real as any activity in RL.

Most of the participants in this study do not display their disability in SL. SL enables people with disability to disclose whatever they feel comfortable with as discussed by Stewart et al. (2010). Agonra Sircka chooses to be represented in the virtual world by an avatar using a wheelchair, because he feels this makes it easier for others with disability to initiate contact. Stewart et al. (2010) presented a different view; the possibility to create an avatar visibly able, may give the opportunity for others to get to know the person behind the disability. Whereas Agonra Sircka perceives the wheelchair to be part of his personality and an ice breaker for interaction with other users with disability in SL, others perceive the possibility to present themselves as avatars with no disability as a free haven where people get to know them, and look beyond the disability. This particular affordance offered by the virtual world, the embodiment, may prove to be an important issue for people with disability wishing to explore and express their personality.

## 6 Conclusion

Through this study we have used the lens of Embodied Social Presence theory to explore how people with lifelong disability relate to their virtual self and how they experience interactions with others in a virtual world. We have examined data collected from 11 novice and experienced users of the virtual world Second Life. The findings indicate that people with lifelong disability can develop a strong relationship with their avatar; however this relationship takes time to develop. The novice participants did not show the same strong relationship to their avatars after eight weeks in SL as the experienced participants who have been using SL for a year or more. Relationships and friendships with others may also require time to develop, and also the understanding that another human is represented by the avatar with whom it is possible to interact and communicate. The possibility of creating an avatar with no visible disability is an important affordance of the virtual world for some people with disability. Through this affordance, people with disability can present themselves so that some of the prejudices encountered in the real world are avoided. This exploratory study demonstrates how Embodied Social Presence Theory is useful for explaining the importance of embodiment and presence in a virtual world. Further, our focus on the experiences of users with lifelong disability contributes by extending the use of this theory to a different setting than reported in former research on ESP by Mennecke et al. (2011).

A limitation of this study is the number of participants in each of the two groups. However, since this is an exploratory study it is a starting point for further research in this area. It would be valuable to examine the development of Embodied Social Presence through longitudinal studies. As we have also shown, people with disability experience various levels of ESP depending on their user experience with the virtual world, but the study does not answer how much time is required to fully experience ESP. Mennecke et al. (2011) stated that individuals who experience ESP also experience greater value when engaging in activities and social contexts in virtual worlds. We observed and interviewed people with lifelong disability currently using SL during this study, yet it might be useful in future research to include people with lifelong disability who have used but no longer use SL. This might help develop an understanding about why some people with lifelong disability choose not to continue using SL. In addition, future research might examine the possibilities and challenges virtual worlds offer people with disability.

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