



Research Report

Social engagement and user immersion in a socially based virtual world



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ABSTRACT

Research into online social virtual worlds demonstrates their utility as a methodological tool for studying social behaviors and traits. Less is known about what aspects of the virtual world lead users to experience a sense of immersion (i.e., a psychological state characterized by perceiving oneself to be enveloped by a virtual environment; Witmer & Singer, 1998). The current study extends previous research by assessing the importance of social engagement with other avatars as a key component of immersion in virtual worlds. Participants navigated a virtual “hotel” in Second Life, an online social virtual world. We assessed participants’ social engagement with other avatars and the amount participants explored the virtual space e.g., spatial exploration. Positive associations between social engagement and immersion, and negative associations between spatial exploration and immersion, suggest that the users’ social experience outweighed the users’ spatial experience in creating a sense of immersion in this virtual world. This was despite the fact that the social experience was ultimately less realistic than the visual one. This finding, along with previous literature, suggests that the social nature of virtual worlds is a key component of user’s sense of immersion in the virtual environment.

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1. Introduction

In the last decade, with vast technological advances in computing and Internet speeds, an increasing interest in socially based virtual worlds such as Second Life and World of Warcraft has developed (Davis, Murphy, & Owens, 2009). Three-dimensional virtual worlds allow users to interact and collaborate in a manner that is not achievable with two-dimensional text based social networking sites and are becoming more widely used by a variety of fields such as education, medicine, marketing, business, and psychology (Minocha & Reeves, 2010). Virtual worlds like Second Life allow individuals to interact with their surroundings and other users via the creation of an avatar, a “perceptible digital representation whose behaviors reflect those executed, typically in real time, by a specific human being” (Bailenson & Blascovich, 2004). The avatar acts as an individual’s digital representation in the social virtual world. Although avatars are used in a variety of virtual environments, there exist differences between social virtual worlds and other types of virtual worlds. Social virtual worlds are differentiated from other virtual environments by the following key features: (1) shared space – multiple users can participate in the world simultaneously, (2) immediacy – users’ actions take place in real time, (3) interactivity – the world allows for users

to manipulate the environment, (4) persistence – the world continues to exist regardless if a user is logged in, and (5) socialization/community – the world allows for the formation of in-world social groups, communities, and relationships (Book, 2004).

There is a growing interest in the relative utility of social virtual worlds in the field of psychology as an unobtrusive methodological tool to study psychological attributes of users (Blascovich et al., 2002; Schönbrodt & Asendorpf, 2011; Yee & Ducheneaut, 2011), due to the ability of researchers to control aspects of the experimental paradigm previously unattainable in real-life settings. The social nature of virtual environments such as Second Life provide an ideal setting to study the dynamics of interpersonal interactions. Additionally, a growing body of evidence suggests that the manner in which users behave and present themselves in a virtual world is strongly associated with their behavior and personality in the real world (Bayraktar & Amca, 2012; Wohn & Wash, 2013; Yee & Ducheneaut, 2011; Yee, Nick, & Bailenson, 2007). The main objectives of the current study were to (a) assess users’ social engagement and spatial exploration behavior in a confined space in the social online environment Second Life and (b) determine what behaviors were most associated with users’ sense of immersion in a highly controlled virtual space. Knowing more about behavioral indicators of immersion in virtual worlds can inform programmers and researchers about what components of a user’s experience create the highest levels of immersion.

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2. Immersion in the virtual world

Immersion into virtual worlds is an important phenomenon to investigate in that it predicts motivation, engagement in, and re-engagement with the virtual space (Schultze, 2010; Yee, Nick, & Bailenson, 2007). Re-engagement in a virtual space is particularly important for a variety of users. For programmers, immersion is an important factor for user enjoyment and player experience (Ravaja et al., 2004). For researchers, engagement and re-engagement in a virtual space will likely keep experiment retention rates high. From a clinical or provider point of view, engagement in and re-engagement with a virtual space will potentially keep participants involved in the virtually based treatment as well as keep participants motivated to be active while in the virtual space. One study using virtual medical scenarios as a teaching tool for medical school students found that although most students benefitted from the training, learning was higher in individuals who reported higher levels of immersion (Coulter, Saland, Caudell, Goldsmith, & Alverson, 2007). Immersion is also assumed to be a key moderator of the efficacy of virtually based treatments for mental disorders (Eichenberg & Wolters, 2012); however, few studies have looked at immersion as a moderator of treatment success (Powers & Emmelkamp, 2008). Although immersion has demonstrated importance in the study of virtual worlds such as video games, research tools, and clinical tools, less is known about what components make up the phenomenological experience of immersion in virtually based social worlds.

In the video game and virtual world literature there are multiple overlapping definitions of what constitutes user immersion (Christou, 2014; Guadagno & Blascovich, 2007; Witmer & Singer, 1998). Additionally, components of the higher order immersion construct are captured in related subordinate constructs such as presence and flow (Christou, 2014; Faiola, Newlon, Pfaff, & Smyslova, 2013; Goel, Johnson, Junglas, & Ives, 2013; McCreery, Schrader, Krach, & Boone, 2013). In fact, many definitions of each construct include components of the other. For example, Witmer and Singer (1998) defined immersion as the “psychological state characterized by perceiving oneself to be enveloped by, included in, and interacting with an environment that provides a continuing stream of stimuli and experiences...”. Weibel and Wissmath (2011) describe an adapted definition of Csikszentmihályi (1975) original concept of flow as being made up of feeling concentration and focus, feeling control over the activity, feeling full involvement, and a distorted sense of time. Weibel, Wissmath, Habegger, Steiner, and Groner (2008) described presence as a subjective feeling of immersion into a virtual environment. Feldon and Kafai (2007) acknowledge the varying definitions of presence and describe it as “an experience of authenticity during interactions within a computer-based environment.” One can see the overlap in the definitions and how components of presence and flow are captured in the definition of immersion and vice versa.

Using factor analytic methods, Weibel and Wissmath (2011) found that although presence, flow, and immersion are distinct, that they are also moderately correlated. It should be noted that in the aforementioned study, immersion, presence, and flow were assessed using primarily single user video games rather than social virtual worlds¹. It may be the case that social virtual worlds add a dimension to the user experience not captured by earlier definitions of immersion. Given the utility of social virtual worlds in a variety of educational, scientific, and clinical fields, it is important to further isolate the specific components of user’s phenomenological experience of immersion within social virtual worlds. That is, researchers

should examine which aspects of the aforementioned constructs are the key observable and controllable variables that foster a positive user experience.

A component of the immersive experience reported in social virtual worlds is a user’s sense of social presence. Biocca and Harms (2002) defined the construct of social presence as a “sense of being with another in a mediated environment.” Blascovich et al. (2002) defined social presence as “the degree to which one believes that he or she is in the presence of, and interacting with other, veritable human beings” and hypothesized that environments that foster a sense of immersion and include social presence both more closely resemble in-person interactions and are a new modality in which to study human interaction. Experimentally, social presence has been found to be higher when users believe they are engaging with a human controlled avatar rather than a computer controlled agent (Guadagno & Blascovich, 2007). Additionally, survey data suggests that users prefer to be in virtual worlds with other humans (avatars) rather than computer controlled characters (agents), and users choose online social worlds for features that allow them to play with or against and to chat with other users (Griffiths, Davies, & Chappell, 2003; Heeter, 1992). It should be noted that one recent study found behavioral realism, the manner in which an avatar or agent acted in the virtual world, was more important than the belief that the user was interacting with a human controlled avatar or computer controlled agent (Von der Pütten, Krämer, Gratch, & Kang, 2010).

Limited research exists investigating the role of social presence in user’s sense of immersion in a virtual environment and behavioral predictors of immersion, particularly in a highly controlled virtual environment with limited users and space to explore (such as an environment designed for laboratory experimental manipulation of interpersonal interaction). A recent study aimed at assessing state predictors of flow found that social perception and social awareness were both significant predictors of this construct in a brief virtually based laboratory task (Goel et al., 2013). Participants interacted with one another for 15–20 minutes in a virtual “lab” within Second Life built specifically for the study and users’ navigation was limited to the “lab” space. This study is one of the first to assess predictors of immersion in a limited virtual space, one that is conducive to high levels of experimental manipulation.

The present study extends this line of research by adding spatial exploration as a potential predictor of immersion in a highly controllable social virtual world. Participants navigated a limited space in Second Life designed as a hotel lobby. We assessed their social engagement and spatial exploration during a fifteen-minute virtual experience. The goal of the current manuscript was to further investigate the role social engagement has on a user’s sense of immersion in a novel, controllable, virtual environment by incorporating measures of spatial exploration into the analyses. We hypothesize that the amount individuals explore a novel virtual environment (spatial exploration) and speak with other avatars (social engagement) will be associated with their reported sense of immersion in the virtual environment. Additionally, this relationship will be maintained above and beyond relevant covariates including experience with virtual worlds, reported extraversion, and influence of confederate avatars. Lastly, we hypothesize that spatial exploration and social engagement will mutually account for variability in reported immersion.

3. Methods

3.1. Participants

All participants ($N = 35$; 22 female, 13 male) signed up voluntarily from the University of Arizona Introduction to

¹ One of the video games used in this factor analysis study was a social virtual world *Neverwinter Nights* (BioWare Corp, 2002). However, participants were limited to specific goal oriented tasks and did not interact with other human controlled avatars.

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