

# The Relationship Between Social Interaction and User Immersion in a Virtual Experience

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## ABSTRACT

A virtual experience is defined as the psychological and emotional state in which users undergo while interacting with products in a 3D environment. It is a relative newcomer to the range of user experience and traditionally, user experience can vary from indirect to direct. This all depends on the depth of possible interactions with the experience. Virtual experiences are similar to indirect experiences in a sense that they are both mediated, however virtual experiences also contain characteristics of direct experiences (Dobrowolski, Pochwatko, Skorko, Bielecki, 2013).

The availability and implementation of virtual reality interfaces has seen a rapid growth in recent years. However, less is known about what aspects of a virtual setting can help create an immersive experience. Despite the emergence of virtual reality, specifically in video games, as entertainment platforms, there have been very few studies that have explored the capabilities for virtual experiences as a whole. Thus, limiting our research data in analyzing social interaction in an immersive virtual environment. These findings, along with other previous research, suggests that social nature is a key component to successfully achieving a full sense of immersion in a virtual setting. Moreover, it is suggested that focusing on the realism of the virtual interactions is potentially more important for heightening a user's sense of immersion in the world than focusing on the realism of the virtual environment.

## Keywords

Virtual reality, augmented reality, social interaction, immersive environments, user interface, user experience

## 1. INTRODUCTION

In the last decade, vast technological advances in computing and Internet speeds have been made and thus, increasing interest in socially based virtual worlds such as Second Life and World of Warcraft. 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 other professional fields such as education, medicine, marketing, business, and psychology (Yee and Ducheneaut, 2011).

There is a growing interest in the relative utility of social virtual worlds in these professional fields that are viewed as an unobtrusive methodological tool to study the various attributes of users. This is due to the exceptional ability of researchers being able to control aspects of the experimental paradigm that were previously unattainable in real life settings (Blascovich, Loomis,

Beall, Swinth & Hoyt 2009, Bayraktar & Amca 2013). If a virtual experience can influence social interaction, then by providing a virtual experience in which evaluations can be made, researchers can expect to find data correlating to changes in attitudes explicitly before and after a virtual experience. By assessing a user's social interaction and spatial exploratory behavior within a socially driven environment, we can begin to assess what behaviors were most associated with users' sense of immersion in a controlled virtual space. Knowing more about behavioral indicators in immersive virtual worlds can inform programmers and researchers about what components of a user's experience create the highest levels of immersion (Takatalo, Nyman & Laaksonen 2008).

There are multiple definitions of what constitutes as an immersive experience. Merienne (2010) 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" (p.). Weibel and Wissmath (2011) describe the concept of flow as being made up of feeling concentrated and focus, feeling control over the activity, feeling full involvement, and a distorted sense of time. Other researchers 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" (p.). It's easy to see the overlap in the definitions and how the aspects of presence and flow are captured in the definition of immersion and vice versa. In these findings, the utilization of feeling immersed in a virtual environment and the technology in which this phenomenon is implemented is discussed. Additional findings include observations regarding social engagement and behavioral change in an immersive virtual environment.

## 2. IMMERSION IN THE VIRTUAL WORLD

In video game and virtual reality companies, there are multiple definitions of what constitutes as an immersive experience. The feeling of immersion in virtual worlds is an important phenomenon to investigate because it predicts motivation, engagement, and re-engagement in a virtual environment (Yee et al., 2011). 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. 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 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 vital space (Coulter, Saland, Caudell, et. al, 2007).

Another component of the immersive experience that is exported in social virtual worlds is the user's sense of social presence. 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). Additional survey data also suggest that users prefer to be in virtual worlds with other humans rather than computer controlled characters. Moreover, users choose online social worlds for features that allowed them to choose who to play and chat with other users (Dalgarno & Lee, 2010). Another recent study also found that 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 (Dawley & Dede, 2014).

Using factor analytic methods, Weibel and Wissmath (2011) found that although presence, flow, and immersion are distinct, they are also moderately correlated. In the same study, immersion, presence, and flow were assessed using primarily single user video games rather than social virtual worlds. It may be the case that social virtual worlds are seen as a dimension to the user experience that is 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 a user's experience of immersion within social virtual worlds (Gorini, Capideville, Leo, Mantovani & Riva 2011). In other words, researchers should examine which aspects of the key variables are the ones that foster a positive user experience.

### **3. IMMERSIVE VIRTUAL ENVIRONMENT TECHNOLOGY**

The technology that is used to build these virtual environments are essentially a collection of computer hardware and software designed to immerse users in artificially created virtual environments such that users perceive themselves to be included in and interacting in real time with the environment and its contents. This gives users the sensation that they are on the inside, existing within an environment or simulation, as opposed to being on the outside watching it on a screen (Blascovich et. al, 2009).

There are several major benefits that are particularly applicable in the study of immersive virtual environments. This technology allows us to conduct experiments and simulations in very realistic, true to life environments where every element is tightly controlled. Research in this area shows that there is an inherent tradeoff between how much an experimental situation is like reality. The more realistic an experimental situation becomes, then the control factors that can have an effect over the environment decreases (Schonbrodt and Asendorpf 2011).

Another major benefit of immersive virtual technology is the ability to present and manipulate characteristics and objects that are otherwise unachievable in the physical world. In an immersive virtual environment, it is easy to change any person's physical characteristics such as gender, race, and age or physical behavior such as personality (Schonbrodt and Asendorpf 2011).

Additionally, there is a great benefit in the expansion of implicit and covert behavioral measures that this technology can bring to

social and behavioral experimentation. Behavioral measures are clearly the primary goal in behavioral research, but they are also difficult to design and administer. In these virtual settings, physical behavior serves the fundamental root of system operation. It is these types of experimental measures that could potentially hold information about how an individual can respond to a certain experimental context (Depledge, Stone & Bird 2011).

### **4. SOCIAL ENGAGEMENT AND BEHAVIOR CHANGE**

There is only a limited amount of research that exists in which a user's social presence and behavioral pattern are investigated. However, immersive virtual environments could be implemented as role playing or decision making tools (Guadagno, Muscanell, Okdie, Burk & Ward 2011). They can even be utilized as a way to research and identify possible social identities. By using immersive virtual technology to engage in realistic role playing experiences, a unique opportunity to examine how human variables can influence decision making can potentially be created. Moreover, users might utilize these virtual realistic experiences as a decision aid to mentally reinforce their thoughts. Furthermore, the unique structures of role playing in virtual environments can also provide users the opportunity to experience alternative forms of self (Depledge, Stone & Bird 2011).

Although there has been limited amounts of research on the importance of social presence in a user's sense of immersion, there have in fact been generalized studies conducted about social virtual worlds. What we know about social virtual worlds is that social presence is a vital component of an immersive experience. Given the potential utility of social virtual worlds as a medium for multiple disciplines, programmers and researchers should consider incorporating social engagement into their virtual spaces. Several sources state that users feel more immersed in a virtual environment if the interactions they have with each other are realistic (Riva et al. 2007).

### **5. PERSPECTIVE ON USER IMMERSION**

Online computer games are actively enjoyed by millions of people around the world. World of Warcraft alone attracted approximately 10 million users annually over the past few years (Yee, Ducheneaut, Nelson, & Likarish 2011). The secret to success in this genre of games all have one unique thing in common: the ability to captivate and manipulate human senses known as immersion. The three distinct levels of immersion are engagement, engrossment and total immersion (Reiners, Taras, Chang & Wood, 2014).

The concept of immersion is nothing new in the world of video gaming. According to Graham and Gosling (2013), virtual game worlds are creating a new context in which young people are socialized to group norms by learning intellectual skills and expressing their individuality. For example, students who completed a course in Second Life were more engaged in the immersive interface and learned as much as with a similar, paper based curriculum that included laboratory experiences. Additionally, other research found that immersive digital settings enhance participants' engagement and learning (Visch, Tan & Molenaar 2010).

## 6. TARGETING OTHER PROFESSIONAL PURPOSES

Strengths of virtual learning environments, such as active engagement in content, have been identified as key elements in strategic planning for other educational content areas. 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 from individuals who reported higher levels of immersion. Immersion is also assumed to be a key moderator of the efficacy of virtually based treatments for mental disorders (Dalgarno & Lee 2010). In fact, immersive virtual technology holds several major advantages for the development of teaching tools and platforms for educational research. The first and most obvious advantage is the immersive nature of this technology, wherein users are enveloped by the environment allowing for focused and naturalistic interaction with educational materials. Since virtual learning environments are digitally constructed, they can allow for presentations of certain visuals and objects that are unachievable in real world scenarios (Reiner, Teras, Chang & Wood 2014).

Moreover, this technology will soon provide ways of exploring previously unimagined and unexplored areas of research that were previously impossible to execute. For example, the possibility of exploring the inside of a human body in real time and experiencing the action three-dimensionally from whatever angle we might choose can be groundbreaking for the medical industry. Even educational lessons in virtual learning environments can be implemented, formulating breakthrough learning processes (Li, Daugherty & Biocca 2003). Though very little work that evaluates behavioral measures as a tool for educational purposes have been published, a small amount of related educational studies suggests that immersive virtual environments have purpose in this aspect of society (Slater, et. al 2013).

## 7. CONCLUSION

Immersive virtual technology is continually evolving and many disciplines are beginning to tap into the potential utility of virtual worlds. By assessing a user's social interaction and spatial exploratory behavior within a socially driven environment, we can begin to assess what behaviors were most associated with users' sense of immersion in a controlled virtual space. By synthesizing this research, engineers and innovators can utilize this data to think intuitively about what is next in the realm of virtual reality. In psychological research, there continues to be an interest in social virtual worlds from both a social and clinical perspective. From a social perspective, virtual worlds offer researchers a highly controllable and unobtrusive tool to study human interaction and behavior in manner unobtainable in a real world setting (Ahn, Seo, Kim, Kwon, Jung, Ahn & Lee 2014). From a clinical perspective, social virtual worlds are a potential medium to deliver therapeutic interventions in a cost effective and highly accessible manner (Charles, Charles, McNeill, Bustard & Black 2011).

The year of 2015 could historically be known as the first year where effective augmented virtual reality can have a profound effect on consumer behavior and human nature. The most highly anticipated device to utilize this technology is the Oculus Rift headset system where users can view three-dimensional computer generated images. Often times, users are often free to move naturally within a defined area while their location and orientation information is tracked used to control movement in the virtually

realistic setting (Rubin 2014). The technological capabilities of virtual reality software, such as the Oculus Rift headset, is on the verge of completely redesigning user immersion as we know it. Knowing more about behavioral indicators in immersive virtual worlds can inform programmers and researchers about what components of a user's experience create the highest levels of immersion (Takatalo, Nyman & Laaksonen 2008).

If I want to use social virtual worlds for research purposes, I need to first understand how to create engaging virtual environments. For future research projects, I should take into account this relative importance and consider placing additional emphasis on social engagement when creating an immersive experience in a social virtual world. These findings seem to suggest that focusing on the realism of the virtual interactions is potentially more important for heightening a user's sense of immersion in the world than focusing on the realism of the virtual environment.

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