Virtual Worlds and Avatars as the New Frontier of Telehealth Care

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Abstract: We are entering a new age where people routinely visit, inhabit, play in and learn within virtual worlds (VWs). One in eight people worldwide are VW participants, according to the latest 2011 figures from KZERO [1]. VWs are also emerging as a new and advanced form of telehealth care delivery. In addition to existing telehealth care advantages, VWs feature three powerful affordances that can benefit a wide range of physical and psychological issues. First, the highly social nature of VWs encourages social networking and the formation of essential support groups. Secondly, the type of spaces that have been proven in the physical world to promote psychological health and well-being can be virtually recreated. Finally, research suggests that embodied avatar representation within VWs can affect users psychologically and physically. These three aspects of VWs can be leveraged for enhanced patient-client interactions, spaces that promote healing and positive responses, and avatar activities that transfer real benefits from the virtual to the physical world. This paper explains the mounting evidence behind these claims and provides examples of VWs as an innovative and compelling form of telehealth care destined to become commonplace in the future.

Keywords: telehealth, health care, virtual worlds, avatars, social networking, support groups

1. Introduction

In this past decade, the use of virtual worlds (VWs) – those socially connected, persistent, online spaces one inhabits by means of a personal avatar – has been rapidly increasing. According to British social media research company, KZero Worldswide, 56% of worldwide VW users, or 1 billion people, are in the 5-15 year old demographic in the first quarter of 2012 [1]. This figure for youth alone actually surpasses the number of people using Twitter or Facebook, but goes largely unnoticed by the general public. This heavy usage suggests that the upcoming generation will be finely attuned to receiving social connections and services through the medium of virtual worlds.

2. A Case for Virtual Worlds as an Advanced Form of Telehealth care

Virtual Reality (VR) technology came to popularity in the last decade of the 20th Century, and preceded the recent rise of virtual worlds by at least a decade. VR utilized as a therapeutic tool has been shown to be clinically effective at helping with some

persistent mental health issues, such as phobias and PTSD [2; 3; 4]. Virtual Reality, however, is not easily accessible outside a clinician's office, nor is it built with social connectivity in mind. In addition, most Virtual Reality environments do not provide the user with any sort of embodied, personal avatar; most often the user is given a "first person, through the eyes" camera view into the virtual environment. If an avatar representation is used, it tends to be a generic "one type fits all."

VWs, by contrast with established VR, provide much easier accessibility, as all a user needs is a computer and an Internet connection. VWs are connected social spaces, so that many hundreds or thousands of users can be concurrently online. VWs also allow for highly focused forms of environments that can be specially built and targeted to assist in any health care process that is delivered by them. Finally, almost all VWs provide the means for a participant to create and customize their avatar with which they will navigate the world and interact with others.

These characteristics have allowed Virtual Worlds to make inroads to the health care field as an emerging type of "telehealth care." Traditional telehealth care provides several proven advantages that complement traditional, face-to-face health care, including 1) accessibility from rural locations, 2) remote patient monitoring, 3) reduction in need for travel, 4) fostering a positive client-patient relationship, 5) providing enhanced continuity of care, 6) reduction of hospitalization, and 7) overall savings in cost of care, even with increased contact [5; 6]. We believe that Virtual worlds can provide these same benefits, but exceed them in three important ways mentioned above: their social networking functions, their support of customizable environments that can be created to complement and enhance healing functions, and finally the use of a personal avatar. We will look at each of these in more detail.

3. The Unique Affordances of Virtual Worlds for Telehealth care

First and perhaps most importantly, virtual worlds provide powerful means for social connectivity. People in virtual worlds can converse with each other, share experiences, visit in social situations, and work collaboratively toward goals. This social functionality allows for networking to health care providers and others with similar issues. Such Internet-connected social support groups have been shown to facilitate improved healing and maintenance of higher levels of recovery [7; 8; 9].

Secondly, since virtual worlds are malleable, environments within them used for health care can be made to resemble those that research has found over the last half century to be most beneficial to psychological health. No longer is someone relegated to a stark bedroom or clinical setting, but can continue their care in simulated natural settings, such as woodlands, water areas, or mountains, which are more soothing and accessible from their own home no matter where the patient lives [10; 11; 12]. The importance of this was shown to our ICT team when we started working with U. S. military veterans in the virtual world Second Life (SL). We found that they were unable to deal with an Iraqi Village environment we had set up for a previous project, and in fact, one of them could not even remain in the desert overlooking the gates to the village, but had to teleport away immediately, saying "it was just calling back too many bad memories." This led us to create a veterans' environment that was based on a woodland setting with water features and a warm, comfortable lodge for social gatherings. Much of the design work was done with reference to 6o years of research

that looks at how environments can contribute to psychological well-being.

Finally, and perhaps most importantly, virtual worlds provide the affordance of an avatar, which is an embodied and psychological projection of a person. People are able to create and customize the avatars with which they will interact, thus engaging with them in a very personal way. Research is beginning to reveal the power that one's avatar representation can have on behaviors, perceptions, and psychological health [13; 14; 15]. One of the first studies to show the effect using an avatar could have on people was done by Nick Yee as part of his dissertation work at Stanford University in 2007 [16]. Two of his studies dealt with manipulation of avatar characteristics to relate them with behaviors. In the first study, people provided with a more attractive avatar tended to confide more in a confederate of the opposite gender than those given a less attractive representation. In a second study, Yee manipulated the height of the avatar, and showed that people assigned a taller avatar in the virtual world tended to negotiate with more confidence in a known negotiating task than those with a shorter avatar. A later extension to this last study revealed that the effects noted in the virtual world tended to carry over to the actual world. Yee termed these virtual characteristics that affected physical world behavior "The Proteus Effect," concluding that our digital self-representations may, in fact, have potentially profound actual world impact.

4. Examples of Virtual Worlds as Telehealth care

Because of these affordance provided by virtual worlds, and the increasing number of global users, their use as an advanced form of telehealth care is expected to grow in the coming years. While more studies are needed to prove the efficacy of the virtual world approach for specific uses, a few key groups are piloting programs that suggest virtual worlds can be effective as a telehealth care mechanism:

VW enthusiast Dick Dillon expanded Preferred Family Health Care's substance abuse treatment program for teens, in Kirksville, Missouri, to include sessions in SL. Dillon found that the teens spent considerably more time in the virtual world than those in a clinical setting. More importantly, the rate of those completing the program jumped from the usual 30% for in-person care to an astonishing 90% for VW groups [17].

Club One™ Fitness Center followed a similar model, launching a virtual Club One Island™ (COI) in SL. Results of their Virtual World-based weight loss intervention were compared with traditional face-to-face interventions, and the results showed both groups were able to reduce overall weight and their Body Mass Index. The COI group had increased confidence in their ability to continue healthy habits such as frequent exercise and avoiding unhealthy food [9].

Other notable developments have grown from research aimed at supplementing support for military veterans. The authors of this paper are involved in one such endeavor taking place at the University of Southern California's Institute for Creative Technologies (ICT), who have partnered with the National Intrepid Center of Excellence (NICoE)- the DoD's premier research institute for traumatic brain injury and psychological health conditions. Working together, ICT and NICoE have built a virtual version of the Bethesda MD facility, where each department will place educational materials, activities and ongoing connectivity for their patients to utilize while they are in their 4 week program at the NICoE and after they leave [18]. YEAR 1 (2011-2012) focused on building a version of NICoE for use in the virtual world, and on working

with the NICoE leadership to determine appropriate content to be included in the project, and also on training the staff in the use of Virtual Worlds. Year 2 will allow stakeholders to test and enhance the functionality of the Virtual NICoE platform to ensure maximum functionality. Year 3 will involve focused studies on effectiveness with a patient cohort using the virtual world.

ICT has also explored leveraging activities for stress relief that have substantial evidence-based support for their efficacy, such as Mindfulness-Based Stress Reduction (MBSR). MBSR has over twenty-five years of studies that show it can relieve chronic pain, improve sleep, and reduce stress [19; 20]. Working with MBSR experts from the University of San Diego Mindfulness Center, we adapted the 8-week program to be deployed in Second Life and did a pilot study to inform improvements to the virtual MBSR classes in preparation for a longitudinal study comparing traditional versus virtual results from two groups of military personnel.

Another study at ICT involved an engaging virtual world activity that resulted in physical world benefits to the participants. Inspired by a request from a military social worker, we devised a means for the running to be controlled by a person's even, relaxed breathing rather than a keyboard. When the user matches the sound of their breath (recorded by a microphone) to a rhythm indicated on screen, the avatar will run without being controlled by keys. A small study done with the jogging activity showed that it was effective in reducing stress markers in users [21].

Other developments associated with expanding military care include work by Alice Krueger and Virtual Ability, Inc. [22]. With funding from the Army's Telemedicine and Advanced Technology Research Center (TATRC), Krueger's team built a specially designed space in Second Life expressly for military amputees to find camaraderie and participate in fun activities and challenges. Hoping to expand the initial promise of this space, TATRC called for contributions that would enhance the virtual space or the lives of amputees overall. Many unique ideas were proposed and ultimately developed for a Phase 1 Small Business Innovation Research grant (SBIR) in 2011 [23]. Phase 2 of the TATRC work is soon to be awarded and should expand the therapeutic potential of these VW activities to many more of these military veterans.

5. Conclusion

These are exciting times for technological solutions that provide improved, more accessible and more personalized health care for people, regardless of their geographical proximity to such care. Virtual Worlds are a part of the promise that technology can deliver advanced forms of telehealth care that provide better environments, more peer support, and an embodied avatar to help motivate and modify behaviors. While there remains much research to be done, especially in the how of why avatars affect their users, we believe there will be many studies completed in the near future that inform this area. Understanding the full potential of both virtual worlds and avatars to deliver and improve health care, especially for upcoming generations who feel at home with these technologies, will inspire new ideas and provide innovative personal incentives, making virtual world healthcare options very real indeed.

6. References

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