

The Healing Potential of Online Virtual Worlds

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Abstract. This chapter describes the research being done to create a healing center for veterans of recent conflicts in the online virtual world Second Life. This work, started in 2008 and funded by the US Army's Research Office, is building a dedicated online virtual world space to provide not only social connectivity for widely dispersed veterans, but also to offer stress-reducing health care and activities, especially in the area of Complementary and Alternative Medicine. The social space is populated by several intelligent agent-avatars that serve various functions. For example, there is a knowledgeable guide that can show people the various activities and spaces the site has to offer, find out and store a list of the visitors' interests, and keep a record of what they have seen and done. Additionally, this guide can offer to connect veterans with others from their units without revealing the real life identity of the Second Life resident (who is known in-world only by a pseudonym), based on information the veteran shares with the guide. It can also recognize trigger words that might indicate that a veteran is in a potentially dangerous psychological state, and alert a real world therapist. There are also intelligent agents who can provide guidance for certain activities such as walking a labyrinth, and a story activity called "The Warriors' Journey."

Working with experts in Mindfulness-Based Stress Reduction (MBSR), we are implementing MBSR therapy in Second Life for veterans. These experts will run the initial group sessions, utilizing an avatar for this purpose. We will record all the activities of the group leader over several such sessions and use that information to create an intelligent agent that can perform some of the facilitator's functions. This will not take the place of the expert session leader, but will serve much the same function as the practice CDs usually given out for MBSR "homework," with the advantage of providing an interactive experience rather than being simple recitation. The agent will also allow the therapist to track users' at-home participation. Experiments with returning veterans are planned for 2010 that will test the efficacy of such therapies deployed in the virtual world. We expect the use of virtual worlds for both group and individual therapies to increase in the future and this project is a first step in determining their viability.

Disclaimer

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1 Introduction: Social Networks and Virtual Worlds

The beginning of the 21st Century has fast become the age of web-based social networking. Internet applications such as Facebook, MySpace, Twitter, forums, blogs and simple-to-set-up community websites are used daily by tens of millions of participants across the globe.

In addition to the countless social networking applications on the Internet, online virtual worlds (VWs) have also seen a huge rise in popularity. As contrasted to other online offerings, VWs are the most graphic, immersive, and in some ways the most personal, of all applications. Virtual worlds are not new, with text-based examples dating back to the 1970s in the form of MOOs and MUDs. Since the mid-1980s, however, such environments have advanced from early 2D to fully 3D forms, with rich graphical capabilities. Today's virtual worlds have unique properties in addition to being three-dimensional graphical spaces: they have persistence (the world continues to exist and change even when you are not there), they require representation by an avatar (usually of one's choosing or design), and they feature highly immersive and interactive experiences (you can fully explore the 3D space).

In 2003, a small team at Linden Lab in San Francisco built a new virtual world for consumers. This one was a bit different than those that had gone before (e. g. Alpha World, Active World, Lucas Films' Habitat World). The Linden Lab world, called "Second Life," was made in a way that allowed the participants themselves to design, create, and even own elements of the world.

To use the Second Life virtual world, a person must download a software program called a "client" to their computer. Running this client connects the user to a network of server machines run by Linden Lab. Each server in the huge network grid (several thousand at the end of 2009) contains a piece of the virtual world expanse, and communicates to all the other servers to maintain a consistent state across the entirety of the world.

1.1 Creating, Existing and Participating in the Virtual World

Second Life contains in-world tools that allow players to build content, while certain assets such as textures, sounds and animations can be uploaded from other content creation programs, such as PhotoShop, Maya, or 3D StudioMax. This content reflects the ways in which Second Life residents mold the world to their own goals and purposes.

A distinctive characteristic of virtual worlds is that people inhabit them by taking the form of an avatar, a 3D representation of one's "self." Thus, communication in the world is primarily via avatar-to-avatar interactions, which brings a rich social component that goes beyond other web-based social networking programs. A new virtual world "resident," as they are called, can choose an avatar from a default starting set, but customization tools allow for modifying that avatar to a form more compatible with a person's self image. The tools available in Second Life are extremely flexible. Users can change not only clothing, but also the shape of body parts, and can add attachments and animations as they desire. People have created avatars that

range from tiny furry creatures to fantastical forms such as dragons, fairies, genies and even a prehistoric mammoth. It is also possible to map an actual photograph of one's face onto a human avatar, thus creating a virtual look-a-like with which to inhabit the world.

With this avatar, a resident can participate in hundreds of activities. In the early days of Second Life, people built houses, cars, tourist destinations and entertainment spots. A popular activity was to dance in a nightclub, with special dance animations controlling one's avatar. Another early pursuit was virtual gambling – playing slot machines by paying them with an in-world currency called Linden Dollars (L\$). The odds were with the house, as they would be in a standard casino, but it was a good way to socialize and you could actually win a few L\$ once in a while. (In-world gambling has since been disallowed due to legal issues.) Besides the nightclubs and gambling, there was shopping (for virtual goods to wear and use), parties, musical performances, role-playing and casual games, and creating new forms of virtual art.

Residents also formed groups as a means to define their use of the virtual world and find others with shared interests. These groups range in size from a few people to literally thousands of members. Some are for role-playing (Kingdom of Sand and Gorean medieval role-playing groups), some are to bring attention to certain activities (Virtual Artists Alliance, Merchant Theft Protection Group), some just for fun (Star Trek Aliens, SL Pirate Crew), and several are reflections of real world groups (Virtual Nurse Educators, Breast Cancer Awareness, Relay for Life, NASA). In addition, more than 400 universities and colleges have some form of Second Life representation, with interests ranging from doing research to holding classes in-world.

In recent years, groups in this last category have grown as academics began to see the potential of the virtual world. Businesses tried to take advantage of its popularity, as well as entrepreneurs hoping to make some real money from those virtual dollars (L\$ can actually be exchanged for real cash). A very few succeeded, but most capitalists found it disappointing. Second Life was a world looking for its purpose, and money-making ventures were not that purpose, for the most part.

In 2007, the USC Annenberg School for Communication's Network Culture Project issued a challenge to residents: What can you do in the virtual world for the public good? [1] The group offered three L\$300,000 prizes for development (in Linden Dollars) to the projects deemed to have the best potential for a SL experience to do real world good.

One of the three winners was the Ability Commons group, whose stated purpose is to make:

A virtual space dedicated to providing support for those living with disabilities. The purpose of the project is to provide a space for educating people about a wide range of disabilities, and to provide a common safe space for discussion and socialization. [2]

The roadmap for the Second Life virtual world was beginning to take a real world positive turn. In 2008 Linden Lab itself initiated the Linden Prize, specifically to award an innovative in-world application that meets the following criteria:

- Work in Second Life that also achieves tangible, compelling results outside of Second Life.
- Distinctive, original work using Second Life that clearly demonstrates high quality, execution, function, aesthetics and technical sophistication.
- Work that has the capacity for inspiring and influencing future development, knowledge, creativity, and collaboration both inside and outside of Second Life. [3]

The first year awardees, chosen from 230 entries, were Studio Wikitecture (a distributed architecture and urban planning team collaborating through SL) and the Virtual Ability group that had previously won the Annenberg prize. [4]

A small team at the USC Institute for Creative Technologies (ICT) had been using the Second Life platform since 2005 as a freely accessible, powerful test bed to demonstrate possibilities for sensor-driven feedback in a simulation environment. This was possible because Second Life provides a custom scripting language that permits a range of expansions to the SL software client. We at the ICT have built a simple Iraqi Village as a background environment for players to walk through. If the participant's arousal threshold, as measured by heart rate and skin conductance sensors, fell below a certain level indicating inattentiveness or boredom, some action would be triggered in the virtual world. This could be a car explosion, or other arousal event. A reverse connection was also possible: being too aroused could set off other consequences.

1.2 An Idea to Support a Need

This project engendered a great deal of discussion within the team about other functional designs that could be implemented in the virtual world, for example: making people relax, or helping them deal with stress, or giving them access to activities that they might not be able to do in real life.

We talked about which population might be best served by these ideas. ICT has received funding from the US Army and has developed many training simulations for them. Therefore, we thought military personnel would be a group that could benefit greatly, especially soldiers returning from deployment. We decided that we could harness the virtual world to create a place for veterans to get together and also access activities that would be beneficial to them. This project was proposed to our Army sponsors as the Transitional Online Post-deployment Soldier Support in Virtual Worlds (TOPSS-VW), but is more colloquially known as *Coming Home*. As the project proposal began to take shape over the summer of 2008, there was increasing media coverage and research about the needs of returning soldiers and the issues involved with obtaining that help.

A 2008 study by the Rand organization called *Invisible Wounds of War* [5] found that there were approximately 300,000 soldiers who had either psychological issues or some form of Traumatic Brain Injury (TBI) as a direct result of their military service. The Rand study noted that several gaps existed in the effort to get returning veterans health care for deployment-related psychological or brain injuries. These include a lack of accessibility, shortages of therapists trained to understand the military

mindset, and the sometimes difficult process of getting the priority needed to qualify for care through the Veterans' Administration services. Rand's recommendations included expanding treatment options beyond the VA system through private insurers and the government TRICARE system [6] while noting that the availability of mental health specialists varies considerably by region.

In addition, recent studies by the Walter Reed Army Medical Center and the Army Research Institute (ARI) using the Post-Deployment Health Assessment and Reassessment instruments (PDHA and PDHRA, respectively) found that soldiers often take six months or more after they return home to self-report mental health concerns. This signals that even if soldiers do not think they need help they may come to require treatment at a later stage. From a long-term longitudinal study published in the Journal of the American Medical Association:

Soldiers indicated more mental health distress on the PDHRA than on the PDHA and were referred at higher rates [...] mental health concerns also increased substantially, including PTSD (active, 11.8% to 16.7%; reserve, 12.7% to 24.5%), depression (active, 4.7% to 10.3%; reserve, 3.8% to 13.0%), and overall mental health risk (active, 17.0% to 27.1%; reserve, 17.5% to 35.5%). [7]

Perhaps the most challenging obstacles to minimize are the "considerable" military cultural barriers that stigmatize admitting one needs such help. For many in the military, stigma is the single biggest deterrent to getting necessary treatment. Soldiers are inculcated with the need to be strong as an essential component of the warrior's ethos. The 2008 Rand study notes that mental health disorders are often looked upon as a sign of weakness, not only throughout the military but in the civilian world as well. Admitting the need for help is often perceived as failure, and it may also cause considerable damage to one's military career.

1.3 Benefits of the Virtual World

We realized that key aspects of the virtual world could be very beneficial to address some of these issues, such as stigma, difficulty in getting to or sticking with treatments, and finding others with similar interests despite being in remote or rural regions of the country.

Accessibility. Today's returning soldiers are most likely geographically dispersed, which may make it difficult to get to centers where medical help is typically aggregated. In addition, a social support structure may be lacking, leaving veterans unable to socialize with comrades in person on a regular basis. Psychological, physical or social factors can also prevent soldiers from attending live meetings, subsequently missing beneficial interactions with others. Online shared virtual worlds, however, are easily accessed from any personal computer, and can support the formation of social networks, facilitate access to care, and provide social activities between soldiers where geography is no barrier. It should be noted that soldiers are of the generation that is quite comfortable playing video games and using social networks, and they are therefore likely and willing to join online communities.

Awareness. We believe that a social space where soldiers can access treatment information, resources, activities, and socialize with other post-deployment soldiers, may create an awareness of symptoms that are typical of stress and encourage them to access appropriate traditional therapies. Specific resource areas can be made available within the virtual space dedicated to self-assessment and information about potential therapies soldiers can obtain. Such information might encourage them to seek out real-world treatment if and when they determine they need it.

Stigma. Another powerful aspect of virtual worlds is that they can provide anonymity, safekeeping one's real identity. When a player creates an account with their avatar in Second Life, the system is set up so that they choose a fictitious name for that character. While Linden Lab allows freedom in choosing the first name, the last name is selected from a provided list of sometimes colorful choices (e.g. Cupcake, Puddlegum, Calamity). This system encourages a "new" name for the person while they inhabit the virtual world. No one can know your real name unless you disclose it because the full details of account ownership are known only to Linden Lab.

Groups. Another feature of SL is the ability to form groups themed around a particular idea, cause, or interest. As the Coming Home Project idea was taking shape, the team did a search on SL groups to determine if there was anyone already providing care to veterans in the world. We did not find any at that time, with most keywords turning up military-like role-playing groups. We did discover one existing social group – the U. S. Military Veterans in Second Life. This group comprises veterans from all conflicts and branches of the service, and was started by two real life veterans named (in Second Life) Cowboy Wayne and Gwill Brickworks. This group had 300 members in the summer of 2008 and grew rapidly to more than 1000 members by late 2009.

The group serves a strong social function, uniting veterans so they can feel confident that the people they are connecting to in the virtual world share the same worldview, and understand the types of experiences they have encountered in their military service. It also screens those who want to join the group to be sure they are veterans by having fellow members from their specific branch of the service interview them.

2 Virtual Solutions to Health Care

There has been increasing focus on innovative uses of technology to assist with treatment methods, with many specifically targeted at military personnel. For example, Virtual Reality Environments¹ that recreate the area of conflict with real time computer graphics are being used to aid in imaginal therapy approaches. This Virtual Reality Exposure (VRE) Therapy has been shown to be more effective than the standard approach of simply asking the patient to try to imagine the situation (something that their coping mechanisms tend to fight against). VRE ensures a graduated therapeutic approach by giving the therapist control over the timing and intensity of distressing triggers. [8, 9, 10, 11, 12]

2.1 Designing the Veterans' Healing Center

The Coming Home Project was funded by the Army's Research, Development, and Engineering Command (RDECOM) in the Fall of 2008. Considering the myriad social affordances of SL, such as nightclubs and public gathering spots, we decided instead to create a calm, quiet, welcoming place for the veterans to gather. We used the vacation destination of a Western lodge as inspiration for the design of the main building, and called it "Chicoma Lodge" after a mountain in the Southwestern United States known as a place of spiritual centering to the native populations. Within the Lodge, a central "great hall" was built in a circular shape with comfortable seating around several fireplaces where avatars could sit while users converse or simply enjoy the space. Two wings of the lodge were filled with interactive games such as pool, darts, arm wrestling and air hockey. There is also music provided by a jukebox that streams radio stations, and a grand piano where one can sit and play music like a well-trained music lover.

The Chicoma Lodge is but one part of a complex of offerings in our space. A primary focus for our veterans' center is to make information available about disorders and their associated symptoms, and ways to try various types of therapies. Rather than recreate the entire range of possibilities for therapy, we chose to include ones that were part of the Complementary and Alternative Medical (CAM) arena that focus on a holistic mind-body approach. We chose this route for several reasons. First of

¹ Virtual Reality Environments (VREs) differ from Virtual Worlds (VWs) in several ways. VREs are usually built for single purpose use and are not designed for social interaction. They are also not persistent, but do allow events and other arousal triggers to be consistently controlled by the therapist utilizing them in a clinical setting. VWs, by contrast, are more open-ended, persistent and notably social in nature.

all, the military is open to CAM approaches in the real world, and have been offering activities such as Yoga Nidra (a practice that leads to deep relaxation and better sleep) at Walter Reed Army Hospital, and other military medical facilities. [15] Secondly, these approaches may be easier for the veterans to try, as they do not involve medications, or revealing information to a doctor. And finally, CAM activities are often considered pleasant and relaxing to those who participate in them.²



Figure 1: The great hall of Chicoma Lodge, built as the social hub of the veterans healing center in Second Life

2.2 Focus Therapies

What exactly are CAM therapies and how can they be implemented in Second Life? These techniques are designed to promote an integrated approach to treating illness. They focus on providing intervention strategies that promote a person's health through various relaxation techniques, self-reflection, and cognitive behavioral therapy, as well as through body movement and alternative medical practices such as acupuncture.

The National Institutes of Health (NIH) sponsors the National Center for Complementary and Alternative Medicine Research (NCCAM) to research the effectiveness of CAM treatments through evidence-based studies. The main categories of CAM include whole body approaches, mind-body medicine, biologically based substances such as herbs and vitamins, body work such as massage, and energy therapies such as eastern movement activities. [14] The aim of CAM treatments is not to replace tradi-

² It should be noted that the efficacy of any therapies presented within a virtual world space, whether traditional or CAM-based, have yet to be studied and verified. Because of this we chose to start with CAM techniques that have a body of real world evidence-based research supporting them.

tional clinical treatments, but instead to provide positive adjustments in a person's life that may work in addition to any clinical intervention. The use of CAM techniques has been recognized by the Department of Defense (DoD), which through the Defense Center of Excellence (DCoE) for Psychological Health (PH) and Traumatic Brain Injury (TBI) is currently studying the use of CAM in helping soldiers recover from the war. [15]

The Second Life Coming Home center provides basic information about many CAM therapies and encourages soldiers to try them out, focusing on the mind-body and movement areas of CAM. The first therapy we are implementing is Mindfulness-Based Stress Reduction (MBSR). This therapy was pioneered by John Kabat-Zinn and is a form of cognitive therapy that trains the mind to eschew judgmental thoughts and to accept each moment "as is". [16] It has been proven effective in stress reduction, chronic pain alleviation, and even remission of some physical diseases. [17, 18, 19, 20, 21]

Working with experts Dr. Steve Hickman and his colleague Rochelle Voth from the San Diego Mindfulness Center, we have begun to adapt this CAM technique to the virtual world. We first held a real world workshop to bring all members of the team up to speed on the methodology of the technique. Initial in-world sessions for veterans are planned for the near future that will be run by Drs. Hickman and Voth, each using an avatar through which they will lead the virtual world sessions, with veterans also represented by avatars.

A typical MBSR routine involves an eight-week commitment. The group meets once a week with the facilitators in person, and participants are then required to do MBSR exercises at home during the rest of the week. In our case, the participants will be given space in the Second Life Coming Home center to both meet and to do their exercises. Data logs will be collected from these group and individual sessions for several purposes. They will be initially used to track how much time a veteran spends on the "homework" for the class. The long-term goal is to use the data logs as the basis for a virtual human who can eventually run these homework sessions more interactively than the standard CD that is provided for this purpose.

Once the initial sessions have been run in SL with a pilot group of veterans, we will run controlled evaluation studies to determine the level of efficacy this therapy provides. These studies are being developed with Dr. Valerie Rice Chief, ARL-HRED AMEDD Field Office with the Wounded Warriors Program at Ft. Sam Houston, Texas.

Any CAM activity implemented in the virtual world must be evaluated to assess its effectiveness in a controlled study. Until this is done, we cannot be sure whether or not the activities are beneficial when delivered within the virtual world. However, as noted, Mindfulness-Based Stress Reduction has a large body of evidence-based research to show its effectiveness. As it has been shown to be a valuable real world therapy, we can then judge its effectiveness in the virtual world with some degree of confidence.

As we are able to show the effectiveness of the MBSR stress reduction techniques in the virtual world, we will explore other therapies that seem especially suited to this platform. One promising technique is behavioral activation, which focuses on reducing avoidance-behavior activities by reinforcing activities the veteran finds pleasurable.

able or rewarding. [22, 23] Others include movement-based activities such as Tai Chi and Yoga.

Supporting Research for Virtual World Effectiveness. One might question whether having an avatar perform the actions rather than a person doing them physically in real life would have any benefit whatsoever. Yet there is a growing body of evidence that strongly indicates there is a beneficial effect in even simply watching one's avatar do the required movements. Several of these studies have been done in Stanford University's Virtual Humans Interaction Lab headed by Jeremy Bailenson. Early work by Bailenson and colleague Nick Yee defined what is termed "The Proteus Effect" whereby the appearance of one's avatar actually influences the behaviors a person feels that avatar must exhibit in the world. In their study, tall avatars perceived themselves to be more confident in the virtual world, and surprisingly, some of that confidence carried over into their real world demeanor. [24] A later study by Jessie Fox and Bailenson examined the real world effect incurred by simply watching one's avatar exercise in the virtual world, a form of vicarious reinforcement. [25] Participants were divided into three groups. One group watched an avatar that looked very much like their real self (accomplished by presenting an avatar with a video scan of each participant's face) exercise vigorously in the virtual world. The second group watched a generic avatar (a virtual "other") perform the same exercise. The third group watched their look-a-like avatar do no exercise. The researchers found that those in the first group were actually stimulated to exercise more in the real world over the next 24 hours (walking, climbing stairs, bicycling, aerobic exercise or sports). Simply seeing a virtual "other" do the exercise was not sufficient to incur this effect. The connection of the viewer to their avatar was key in this experiment. Considering that avatars in Second Life are designed or customized by participants and used over a long period of time, a strong connection is often formed, and therefore a similar effect can be expected from vicarious activities in the Second Life environment even if the physical resemblance is not as pronounced.

2.3 Other Activities

In addition to the CAM offerings in the Coming Home Center, we are populating the Second Life veterans' space with a variety of interactions to make it an engaging and interesting place to visit and hang out. These include musical performances and other gatherings such as themed parties and contests. We have several enrichment activities that might promote relaxation, though they are not backed up by evidence-based research in the same way that MBSR is. An example of this is a labyrinth that can be walked in the Second Life space. We have designed this to be accompanied by an agent (a conversational avatar that is controlled by an Artificial Intelligence or AI program) who can be summoned to explain how people have traditionally utilized the labyrinth. Unlike a real world labyrinth, a person walking the virtual labyrinth hears a

tone at each turn taken and upon reaching the center is rewarded with a shower of golden particles.

Storytelling. We have also built a Storytelling Tower that features classical Warriors' Journeys from throughout history. The individual warrior's story is presented in several illustrative panels adorning the interior walls of the tower. The visitor also hears ambient sounds and music and a voice-over narrating the story. At the top of the tower the visitor meets an AI storytelling agent (a fully costumed 3D avatar), who finishes narrating the story, after which the visitor is informed that the storyteller may be asked any questions about his journey. This is done via the in-world chat function, so questions are typed, and the responses come back as text messages from the storyteller agent. In this way the story of the warrior can become more relevant for the participant.



Figure 2: A visitor encounters the storyteller agent in the Warrior's Journey of the Cheyenne Dog Warrior.

Psychologists and other health care professionals often use the power of narrative to aid in dealing with troubling situations or psychological issues. [26] Judith Norman states: "The benefit of telling and retelling stories of trauma reflects the constructivist literature indicating that the human mind makes every effort to establish personal meanings regarding circumstances and events." [27: 308]

While the Warrior's Journey activity is not a formal narrative therapy, it may serve to reinforce a positive self-image in the veteran who experiences it. A current real world project, called "Real Warriors" [28], is working with veterans to find positive growth in their combat experiences, and to share that growth with family, friends and colleagues.

In year two of the Coming Home project, we plan to take the storytelling activity to a more personal level by encouraging the veterans to author their own Warriors' Journey stories. A second intelligent and more advanced story-agent will be created to work with the veterans, helping them to compose narratives from their real life experiences, based on the story-related work of Dr. Andrew Gordon at the ICT. [29] This agent will listen for language of strength, survivorship, and resilience in a way similar to that of a social worker. McMillen (1999) noted that through storytelling some patients have been able to identify "positive by-products" of traumatic experiences by identifying personal strengths in themselves and others around them. Among these he includes: "increased self-efficacy, increased compassion through a sense of vulnerability, increased optimism or faith due to interpersonal support, stress inoculation or a sense of feeling stronger than others adding a perceived heightened ability to handle future stress or trauma, and finding meaning such as increased or new-found spirituality or settling on a new cause which often focuses on helping others." [30]

The Running Path The virtual world does not have to be totally divorced from the real world. People immersed in Second Life still utilize inputs like the keyboard and mouse for navigation and interaction. Other inputs are also available, such as game controllers and more esoteric devices. Using alternative inputs to the virtual world is challenging unless these devices are widely available. For our activities, we decided to use real world inputs that could be easily accessed by most computer users, to maximize the coverage.

In discussions with a military social work expert, we were informed that many soldiers really longed for their daily Physical Training, especially running, and were asked if we could implement this activity in Second Life. Rather than simply create a path one could make their avatar run on by clicking the "up" arrow button (i.e. move forward), we chose to implement a new and potentially more helpful method to make one's avatar run. The connection in this case is a standard microphone and a little known function of the Linden scripting language that can recognize three levels of breath. To activate the jogging activity, a veteran need only breathe into a microphone in a regular, rhythmic pattern, matching their breath to a pulsing visual graphic on screen.³ This breathing is akin to that performed by yogic practice, which can produce very relaxed and meditative states. As long as the person can maintain this type of breathing, their avatar jogs around the perimeter of the Second Life Island. This technique of requiring real world physical input to control an action in the virtual world (beyond keyboard/mouse control) is one that may provide positive physical benefits and is an area we will continue to explore.

³ To be clear, this breath is not meant to mimic the fast breathing of a runner who has been exerting himself, as this could lead to hyperventilation or dizziness if practiced by someone who is not physically exercising.



Figures 3 and 4: An avatar “jogging” in SL, showing the red and green bars that indicate proper breathing rhythms, and a person using a microphone to accomplish this running.

2.3 Expected Results

The Coming Home veterans healing center project is currently starting its second year of funding and exploration. Pilot studies are now in process for studying the efficacy and usability of both the Running Path and the Storytelling Tower containing the Warrior’s Journey activities. In addition we plan to roll out the Mindfulness Based Stress Reduction group sessions in the virtual world in the second quarter of 2010.

The results of these studies will confirm or disprove our hypothesis that activities in the virtual world can produce real world benefits including both psychological and physiological improvements (regardless of the parallel real world analog). We look forward to reporting on the results of our experiments and expect that they will present the virtual world of Second Life as a powerful, easily accessible tool that can be part of the health routine of soldiers and civilians alike. It is our goal to have the Veterans Administration include such virtual therapies as an additional possibility for healing for those with psychological injuries from their military service.

2.6 Other Health Examples from the Virtual World

To date there are only a few notable examples of therapeutic practice in virtual worlds such as Second Life. Richard Dillon, Senior Vice President of Planning and Development at Preferred Family Healthcare in Missouri (Coughran Mayo in Second Life), has been running a program to help teens combat addictions by using an open source (“OpenSim”) version of Second Life for several years now. This program provides each patient with a \$500 laptop and instructions on how to use the software. The laptops are equipped with a camera. The kids do their “home assignments” in the virtual world and know that they can be watched so they are not tempted to let someone else stand in for them.

Dillon reports: “The retention/participation rates are astounding. Our retention rate is around 90.4% with 20 clients, compared to a 10.9% retention rate for the control group. “Other measures, such as client/family satisfaction, behavior change etc. also

seem to be at or above what we are experiencing with the control group.” [31, 32, 33] In the coming year Dillon’s group plans to admit new clients, train those who have gone through the program to be mentors, and increase role playing scenarios within the virtual world.

Another group aimed at doing real world good in Second Life is the Virtual Abilities group, founded by Alice Krueger (Gentle Heron in SL) and previously mentioned as the recipient of several prizes in the Second Life community. This group provides experiences for people in Second Life that they might not be able to perform in the physical world. In November 2009 they received funding from the Telemedicine and Advanced Technology Research Center (TATRC), part of the US Army Medical Research and Materiel Command’s (USAMRMC) to provide research into best practices for virtual world support that can benefit veterans who have experienced amputations due to their service. The Amputee Virtual Environment Support Space (AVESS) looks to not only affordances of the virtual world that can provide quality of life experiences for the veterans, but also the role of peer support in these environments. [34]

Peer support cannot be underestimated as a driving force in the virtual world domain. Above all, VWs are social spaces, and the ability to reach out to a fellow veteran in the world appeals, even if subconsciously, to those who often find themselves isolated or surrounded by people who have not shared combat experiences.

3 Issues and Concerns

Even though these worlds are primarily social in nature and offer great potential, there are still many challenges to successfully deploying assistive health regimens in the virtual world.

It is not clear what sorts of activities are most beneficial for the social group cohesion that keeps a virtual worlds-based group active and effective to its members. Many of the dances, musical performances, and other activities are often poorly attended. Even when wildly popular, a region in Second Life is only capable of accommodating about 40 avatars before the simulators that run the world begin to lag unacceptably. A workaround for this is to have a meeting place at the junction of four regions, such that each section can have 40 avatars, allowing for 160 total. Yet, attracting them is still more of an art than a predictable process. Most invitations are delivered via an in-world note card. If a person belongs to several groups (in SL the maximum is 25) then it is possible to get so many group invitations that they become mere noise or even an annoyance. It is up to the group managers to find the optimum balance of information to value. Especially with a group of over a thousand, information sent in this way may not be relevant to all, but subgroups are not yet supported by Linden Lab.

Kollock (1998) has examined the general features that lead to successful online communities, including 3D graphic virtual worlds. He explains, “There is no algorithm for community ... what makes for a successful online community is often poorly understood.” He goes on to note, “the tendency of those involved in building graphical virtual worlds is to create visually compelling worlds that look good, but do a poor

job of fostering social interaction.” [35, 36] Simply believing that “if you build it, they will come” does not hold for the virtual world. It takes a concerted and ongoing effort to bring people to your part of the virtual world. There are thousands of things to do and people make choices based on decisions that may have nothing to do with being able to get help. In fact, the myriad activities available in a virtual world may actually distract from exploring needed health options. Techniques still need to be developed and codified to ensure that the correct population is being served and their needs are met.

Secondly, the very thing that makes such worlds attractive – the anonymity that can mitigate stigma – may also lead to a lack of accountability for those who are in the VW. There are no real world negative consequences for interrupting or not finishing a treatment. There may also be potential ethical concerns for the relationship between a therapist and a patient operating in virtual space. Does the therapist have knowledge of the person’s true identity? If not, what are the limits on their responsibility to that patient?⁴ In addition, if in-world therapy is offered and utilized, what will it take for insurance companies, or institutions such as the Veterans Administration, to cover costs associated with such health care?

Data in the virtual world is not secure, so there is potential for anyone who tries hard enough to get hold of it for purposes other than that for which it was intended. New firewall technology has been made available in late 2009 by Linden Lab that might be able to make this less of an issue, but running behind a firewall means that the vast (unsecured) areas of the world are not available. This is another challenge, among many, for widespread use of virtual worlds for health purposes.

4 Conclusion

We see the Coming Home project for veterans, and others like it, as the beginning of validation for the virtual world as a potentially powerful mechanism for therapeutic work and behavioral change. We look forward to studies that can confirm what we hypothesize will be true: In a virtual world, we have an amazing tool that can be harnessed for good and that can provide positive results in therapies applied within its domain.

Our work with actual veterans will be a pioneering step in this validation process. We can only hope it is the start of an exceptionally pertinent approach to therapy for

⁴ In a story related to the author by veterans in the Second Life veterans group, a fellow vet had one particularly rough night when he announced in SL that he was going to commit suicide. His colleagues did not know his real name or whereabouts. The Linden Lab company, which does require this information when a person signs up for an account, was contacted. The in-world group members asked the company to alert emergency personnel near the veteran’s home address (that they had on file) without revealing any of that information to those requesting this action. Linden Lab refused, citing their policy that such information was never given out under any circumstance. To date, though, there have been no court cases that seek to clarify the responsibilities of either individuals or health care providers when it concerns life or death situations in a virtual world.

the Internet savvy, socially connected generation of both military personnel and civilians who find themselves in need of a helping hand.

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