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Development and Evaluation of Health and Wellness Exhibits at the Jefferson Occupational Therapy Education Center in Second Life

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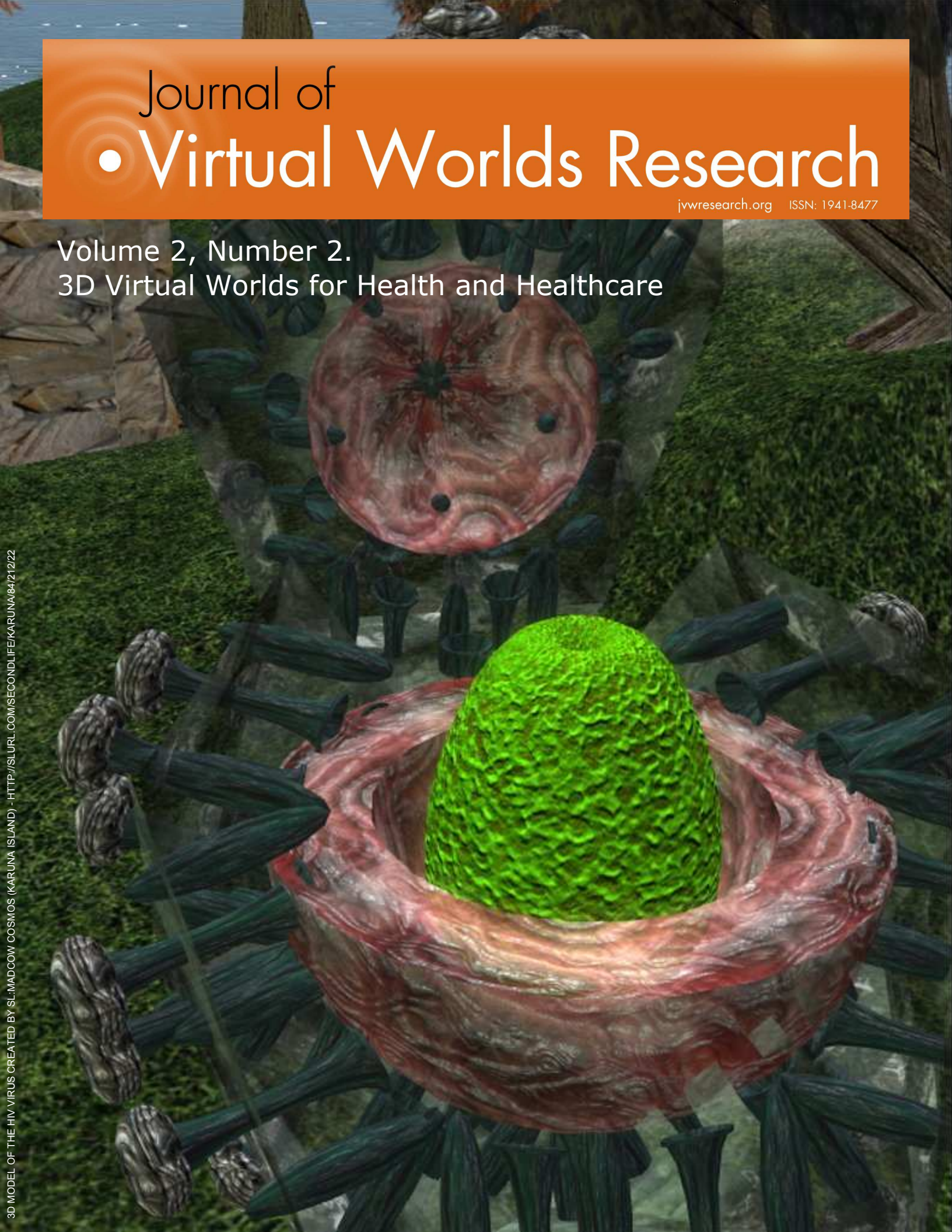

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3D MODEL OF THE HIV VIRUS CREATED BY SL:MADCOW COSMOS (KARUNA ISLAND) - HTTP://SLURL.COM/SECONDLIFE/KARUNA/84/212/22

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Development and Evaluation of Health and Wellness Exhibits *at the Jefferson Occupational Therapy Education Center in Second Life*

by Susan Toth-Cohen, Thomas Jefferson University and Therese Gallagher

Abstract

Virtual worlds such as Second Life are increasingly used for consumer health and higher education. The present paper describes the development and evaluation of public exhibits on health and wellness at the Jefferson occupational therapy education center in Second Life.

Keywords: occupational therapy; home adaptation; healthy aging; program evaluation.

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Virtual worlds such as Second Life are increasingly used for educational endeavors ranging from consumer health education to graduate education (Skiba, 2007), and many universities incorporate virtual worlds into their curricula and research (Stott, 2007; Yellowlees & Cook, 2006). Virtual worlds also are employed to educate the public about health and health conditions; for example, organizations such as the American Cancer Society and the US Centers for Disease Control presently utilize Second Life to encourage health promotion and education to the public (Boulos, Ramloll, Jones, & Toth-Cohen, 2008; Woodford, 2007).

Delivery of health educational programs within virtual worlds may be conceptualized as a type of interactive health communication (IHC) extended into social web media. IHC consists of interactions between people and healthcare information that are mediated through electronic devices or communication technology (Office of Disease Prevention and Health Promotion, 1999). In studies focused on the flat internet, IHC has shown promising results in providing information on health and health conditions, promoting healthy behaviors, and providing information exchange and support (Murray, Burns, See, Lai, & Nazareth, 2005).

IHC projects within virtual worlds can be customized to fit the needs of various users—a factor cited as critical to the success of IHCs (Ahern, 2007). One example of customization is HealthInfo Island, a project funded by the National Library of Medicine that provides consumers with individualized support and health information resources (Boulos, Hetherington, & Wheeler, 2007). IHC is just now entering Web 2.0 tools via virtual worlds such as Second Life, with a number of additional benefits related to their characteristics as virtual worlds. Specific benefits of the 3-D environment include features such as an enhanced sense of place and co-presence with others within the virtual environment (Jarmon, 2009). Further development of IHC within these virtual worlds is expected to capitalize on the increasing capacity to integrate virtual world and real-world experiences (Gorini, Gaggioli, Vigna, & Riva, 2008).

This paper describes the development and evaluation of exhibits on health and wellness at the Jefferson occupational therapy education center within the virtual world of Second Life. The occupational therapy center (OTC) consisted of 4 main areas: 1) an adaptation home that displayed strategies for modifying the home environment to improve capabilities of persons facing challenges from decreased mobility, impaired cognitive functioning (memory), and low vision; 2) backpack safety awareness, which explored the dangers of improper backpack use; 3) carpal tunnel syndrome (CTS), which consisted of exhibits demonstrating the anatomy of the carpal tunnel, strategies for prevention, experiences of persons who had CTS, and current research about CTS; and 4) healthy aging, which provided education on ways to maintain cognitive and physical functioning through the lifespan. The OTC is shown in Figure 1.

Figure 1: Occupational Therapy Center

The overall aims of the OTC were to:

- Provide interactive exhibits on health and wellness for residents of the virtual world and conduct ongoing evaluation and improvement of these exhibits
- Collaborate with health professionals and consumers/residents to create the content and format of the exhibits, and
- Provide a means by which graduate students in occupational therapy can learn to deliver health information for consumers that is engaging, accurate, and benefits everyday life.

The present paper reports results of the development and evaluation of the OTC exhibits, which were informed by an interactive process built into the development and evaluation of the exhibits. Exhibits were created by the faculty director of the OTC and graduate students in occupational therapy, and then modified in response to feedback from Second Life residents.

Program Development

The OTC began in summer of 2007 with general exhibits about occupational therapy and the university sponsoring the OTC. Graduate student involvement began in September of 2007 with one student exploring a potential final Master's project and two students serving as paid graduate assistants (GAs). The present paper reports the evaluation of the OTC in fall of 2008, when two students were completing their final Masters projects and five were serving as GAs. All seven students contributed to exhibit development. One student (the second author) took primary responsibility for the program evaluation as her final MS project. The other student completed her final project by developing and conducting a formative evaluation of the new Healthy Aging exhibit. A graduate student and a faculty member from Kent State University's speech pathology and audiology provided feedback on initial development of the adapted home.

Several key areas of exhibit development were emphasized with graduate students involved in their creation. In particular, students were instructed to focus on providing exhibits that were as interactive as possible, while including other types of education such as in-world video and web resources. Another important focus was to ensure that all text-based materials had a reading level of either grade or lower and did not include professional jargon or terms likely to be unfamiliar to those not in the health professions. While beyond the scope of this evaluation, interviews with graduate students involved in the exhibit development indicated that these students found the process beneficial to understanding current course topics and providing a perspective on healthcare and disability (Toth-Cohen, 2009).

The backpack safety and carpal tunnel exhibits were fully completed before initiation of the evaluation. The adaptation home exhibit was revised and expanded just prior to the evaluation, to enhance existing content to include more displays and explanations as to how to adapt one's home for various challenges.

In order to develop the new healthy aging and neuroplasticity exhibit, the MSOT (Master of Science in Occupational Therapy) student researched current literature and assisted in designing the specific exhibits. In doing so, she utilized guidelines for development that were established by the TechVirtual (http://slurl.com/secondlife/The%20Tech/197/159/38), a museum within Second Life that also has a physical museum in San Jose, CA, the Tech Museum of Innovation (http://www.thetech.org/about/).

The Tech Virtual guidelines for exhibit development consist of identifying the main idea behind the exhibit, specific interactive aspects, determining the look and feel of the exhibit, making the design intuitive, ensuring access, creating "wow" or "aha" factors that attract visitors, ensuring responsiveness, providing a context or story, and giving a reward and opportunity to revisit or reset their experience. Based on these guidelines, the MSOT student developing the Healthy Aging exhibit created displays and interactive experiences that included the benefits of learning a new language, dancing and playing musical instruments, yoga, and contrasting the effects of passive activity such as watching TV with active pursuits such as exercising.

All exhibits at the OTC included quizzes, videos about the specific topics accessed in-world, and evidence based resources in the form of notecards and a wiki designed for this purpose. The adaptation home illustrated selected universal design elements and types of adapted equipment that may be used to assist functioning of persons with disabilities. Three main types of disabilities were addressed: low vision, memory/cognitive issues, and limited mobility. The kitchen of the adapted home is shown in Figure 2.

Figure 2: Kitchen of Adapted Home

The adaptation home was set up as a small house within Second Life consisting of an entry way, living room, bathroom, kitchen, and bedroom. Each component of the home exhibit was labeled with a station number (see Figure 2) that provided information about the specific adaptation in local text chat when clicked by the visitor. The home also had objects corresponding to real-life adaptive equipment that visitors could try out, such as a tub seat.

Research Design and Methods

The research design was a case study used to evaluate and provide descriptive detail about the OTC exhibits within the context of the virtual environment (Yin, 2003). Both quantitative and qualitative measures were used to collect program data. These data sources included an online survey, focus group, and interviews, which have been described previously as methods for determining impact of virtual world programs (Kamel Boulos & Toth-Cohen, 2009).

Institutional Review Board approval was obtained from the principal investigator's university prior to commencement of the study. All participants were residents of Second Life who agreed to take part in the program evaluation at the OTC. Participants were recruited through announcements made to education groups in Second Life and from lists of visitors to the OTC. Potential participants contacted the principal investigator by instant message while logged into Second Life or by touching a signup box outside the OTC. After the participants indicated their initial consent through this contact, they were given a notecard with information about the program evaluation.

After interacting with all exhibits at the OTC, participants were given the url address in which to complete the online survey, which had been created at http://www.surveymonkey.com/ The online survey was anonymous with only the participant's avatar name recorded in the survey. Thirty-three surveys were completed. Participants were paid 100 Linden dollars (fifty cents) for finishing the survey. Upon completion of the survey, some participants elected to be interviewed by the researchers within Second Life. Those who participated in the interview received an additional 100 Linden dollars.

The survey questions included: 1) demographics (gender, age, employment status); 2) responses to the OTC exhibits overall; and 3) specific responses related to the more recently developed healthy aging exhibit. Interviews were performed in Second Life through face to face virtual chats with one of the researchers. Twenty-five of the 33 respondents agreed to participate in the follow-up interviews. Open-ended questions were utilized to elicit responses about the overall impressions of the exhibits at the OTC. Prompts were added as needed to extract greater detail from the respondents. Interviews ranged from approximately 15 minutes to one hour, with the average length of interview 20-30 minutes. The interview text was recorded verbatim on the chat logs in Second Life and transferred to Word documents for analysis. Each transcribed interview was coded for categories, and the common themes across transcripts were identified.

Results

Demographics of the 33 survey participants are shown below in Table 1. Participant views of the exhibit features (application to real life, clarity of information, and preference for three-dimensional learning) are shown in Figure 3.

Table 1. Demographics

Gender	Male	Female	Declined to say			
	11	20	2			
Education	High school	Some college	Bachelor's	Graduate		
	5	8	5	15		
Employment	Unemployed or retired	Full-time worker	Part-time worker	Full-time student	Part-time student	
	6	17	6	3	3	
Age	18-25	26-35	36-45	46-55	56-65	> 65
	4	8	8	9	3	1

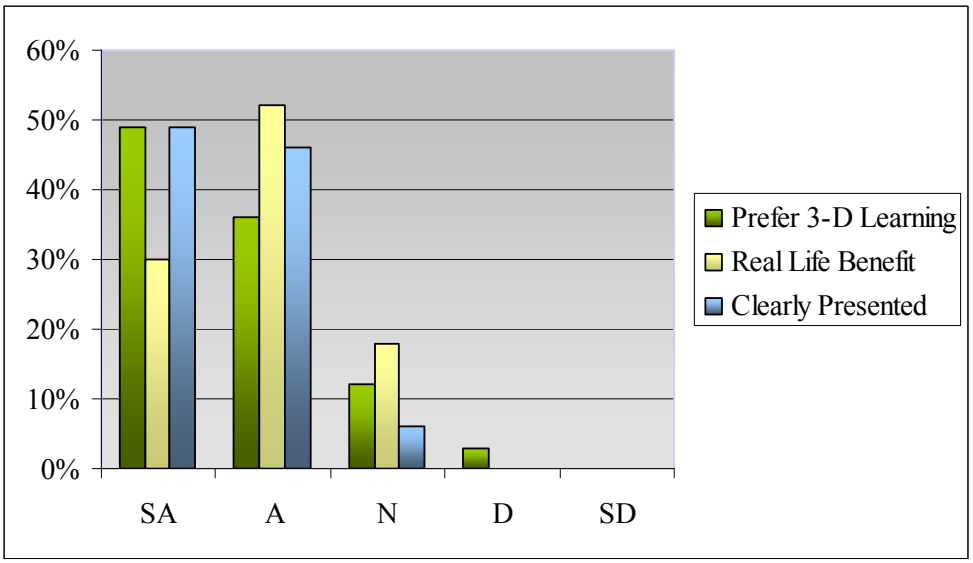

Figure 3. Participant response to exhibit features

Participants were also asked to identify the exhibit they considered most useful and why. The largest number of participants (12) identified the home adaptations as most useful; the healthy aging exhibit was identified as most useful by 11 of the 33 participants. Sample responses for their choices are shown in Table 2.

Table 2. Reasons for choice of most useful exhibit

Home Adaptations	Healthy Aging
I am dealing with aging parents at present and found the suggestions very helpful. We are thinking about re-modeling the bathroom, so it it was timely as well.	The whole ordeal of aging I hate it. But, we must go through it.
My dad has ALS and gave me insight on things to make it easier on him.	Because... I know how it is for older people to have to adjust their lifestyles as they age
Just fascinating... plus we are renovating our house and thinking of these things as we grow older...	Being a student doctor, I already know much of the science, the aging exhibition was the most fun and engaging though
Some things that I could actually do at home. Having to walk through the house made it more 'real' and helped with context.	I am in that age group, and knowing that certain things I do, like SL participation, are actually part of a healthy aging lifestyle - and other points - will keep me focused on pro-active strategies
So many of the suggestions were so good for either myself, or my mom, who suffers from macular degeneration (eyesight is almost gone).	Maybe it is just that the topic is most on my mind. I'll follow some of the resources.
I love the interactivity, and a great deal of information was provided that would be useful to someone trying to make adaptations for people with a disability.	Useful in the sense of experiences how others are structuring an interactive environment... it is useful to know about the Healthy Aging processes, because I think this could be a future field of activity in Second Life concerning every content.
I'll be retiring in a few years. It makes me think more about how to plan my retirement home for when I get much older.	

After completion of the online survey, 25 follow-up interviews were conducted and analyzed. The following three common themes emerged: 1) the ways in which exhibits applied to everyday life; 2) recommendations for improving the exhibits; and 3) perspectives on the exhibits overall. The recommendations category was further divided into the subtopics of content and format. The content subtopic comprised suggestions for enhancements or new ideas as they related to the different exhibits. The format subtopic was further divided in terms of suggestions for resources, setup, or technical aspects for specific displays or the exhibits in general. The third category, perspectives/impressions of the exhibits, was separated into the subtopics of content and format. Examples of specific quotes for these themes are included in Table 3.

Table 3. Sample Interview Responses

Real Life Applications	Recommendations	Perspectives/Impressions of Exhibits
"I thought the content was immediately applicable and practical…I think it is a great resource for the OT's in the state…" "I am a cake decorator in real life (retired cake decorator) I should say, and its due to extreme carpal tunnel in my right hand." "I never realized how hard it is for someone in a wheelchair to do basic tasks like get things out of the cabinet in the kitchen!" "…I am in education, and always intrigued by the latest brain research…" "the backpack display really helped me out because I carry a lot of weight in my backpack with all my books."	*Content*	
	"…suggestions about physical fitness…" "maybe a computer with some adaptive technology…" "…show child being off-balanced depending on where weight in backpack is placed…" "…go into seating, monitor positioning, posture, etc"	"pretty good – you have a lot of content and interactivity…" "…I thought both the aging and home area were quite good…I learned some things and it kept my interest"
	Format	
	"maybe a path to follow [*in the garden*]…" "the text was a bit long and presented visual clutter…" "…a more consistent style in terms of colours and fonts…" "here's a trick for slideshows…" "for inspiration try and visit some of [second life's] really good content creators…"	"at first I didn't think it would be all that interesting but the whole design work[ed] well and kept me interested…" "I liked the presence of the little quizzes to reinforce the exhibits…" "very informative and being interactive helps you to think about the answers…"

Follow-up to Evaluation Feedback

The evaluation team reviewed participants' recommendations and approved changes to the exhibit as shown in Table 4. Decision to approve changes was based on relevance and congruence with the overall content and format and feasibility.

Table 4. Summary of Major Approved Changes

Exhibit Component	Changes in Content	Changes in Design or Format	Status of Change
Overall Exhibit		Use consistent style and colors throughout exhibits	Completed
Carpal Tunnel Syndrome	Add information about computer setup and work stations to optimize functioning and prevent CTS		Planned for future renovation
Adapted Home		Condense information that appears in text chat when activated	Completed
		Make it easier to see/understand specific adaptation suggestions	Redid adaptations using holodecks, with one scene per room for each type of challenge
Healthy Aging	Include more about psychosocial factors in aging	Use fewer posters, provide more interactivity	In process; exhibit undergoing major renovation
		Create a path showing how to proceed through exhibit	Completed

Discussion

The health and wellness exhibits at the OTC were positively received by evaluation participants, as shown by survey and interview responses. Participants became actively engaged with the exhibits, and many commented that what they learned would help them in their lives outside of the virtual world. This indicates that virtual worlds may provide a bridge for users that enable them to envision real-life possibilities. The evaluation also supported the choice of exhibit content, particularly the adaptation home and healthy aging exhibits that were rated "most useful." Additionally, the evaluation revealed that participants were eager to provide feedback and discuss ways to improve existing exhibits, as shown by the high level of participation (25 of the 33 participants) in follow-up interviews.

One surprising finding from the evaluation was the high level of education that characterized participants. The majority (20) had earned a bachelor's degree or higher. While the breakdown of educational level of Second Life residents is unknown, this calls into question the extent to which virtual worlds (and specifically Second Life) are able to serve health information needs of persons who have less education (and by extension, less income as the two factors are related). Are producers of this type of virtual world program serving the needs of only those fortunate enough to have access to a relatively high end computer and enough free time to explore these venues? At the present time, the answer is probably "yes." This may change as greater numbers of people gain access to computers and the cost of computers decreases. However, it is important for those involved in producing health-related programs in Second Life

and other virtual worlds to realize that they may be serving the needs of a very small proportion of persons who could potentially benefit from information on health and wellness. Nevertheless, development of such programs in virtual worlds still may enable organizations to "go where people are" and potentially reach new audiences (CDC, 2006).

It is also interesting to note that Second Life residents who participated in this evaluation consisted primarily of middle-aged to older adults, with most participants (21) over age 36 and many (13) over age 46. This may be related to several factors: the strategy used to recruit participants, the demographics of Second Life, and the specific topic areas covered in the OTC exhibits. First, participants were recruited primarily from education groups in Second Life comprising teachers, administrators, and technology specialists, who are expected to have a large proportion of members over age 36. Moreover, the greatest numbers of Second Life residents are in the middle and older adult range (46% over age 35) and account for 47% of total hours of usage (Second Life Wiki, 2008). Additionally, the most popular exhibits, home adaptation and healthy aging, may appeal to those over age 36 who are caregivers of older relatives or who might benefit personally from learning about options for adapting their homes and adopting lifestyle changes that promote healthy aging. Many of the comments listed in Table 2 support this focus for the home adaptation and healthy aging exhibits. Thus, the present evaluation, though drawing from a small sample of participants, may be viewed as a case example of Second Life content that is relevant and interesting to middle and older aged adults. This is consistent with Pearce's (2008) finding that virtual worlds, especially those providing some type of intellectual challenge, are very engaging for middle aged and older adults.

Conclusion

This paper reported a case study on the development and evaluation of exhibits on health and wellness at an occupational therapy education center in Second Life. Because of the small sample size (33 participants), results cannot be generalized to similar types of programs in Second Life or other worlds. However, findings indicate that the educational exhibits on health and wellness at the OTC were perceived as interesting and useful to participants, the majority of whom were middle aged or older and well educated. The evaluation also indicates that such exhibits may have practical applications beyond the virtual world experience and may provide resources for decision-making on home adaptation and lifestyle choices promoting healthy aging. Evaluation of health and wellness programs by users may significantly enhance the content and/or format of these programs in virtual worlds. Additionally, it may be useful to explore development of individualized interventions focused on health promotion and disease self-management for the large population of baby boomers who participate in Second Life and other virtual worlds.

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