ABSTRACT

The authors developed an immersive diabetes community to provide diabetes self-management education and support for adults with type 2 diabetes. In this article the authors describe the procedures used to develop this virtual environment (VE). Second Life Impacts Diabetes Education & Self-Management (SLIDES), the VE for our diabetes community was built in Second Life. Social Cognitive Theory, behavioral principles and key aspects of virtual environments related to usability were applied in the development in this VE. Collaboration between researchers, clinicians and information technology (IT) specialists occurred throughout the development process. An interactive community was successfully built and utilized to provide diabetes self-management education and support. VEs for health applications may be innovative and enticing, yet it must be kept in mind that there are substantial effort, expertise, and usability factors that must be considered in the development of these environments for health care consumers.

Keywords: Diabetes, Diabetes Education, Self-Management, Technical Architecture, Virtual Environment

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INTRODUCTION

Many forces have been driving the need for new media to assist patients in diabetes self-management, including the need to: (1) eliminate barriers to healthcare; (2) accommodate limited health literacy; (3) provide sustainable, accessible patient education and support; and (4) move beyond non-interactive behavioral interventions. Advances in technology such as the Web 2.0 provide a means to bridge the gap between consumer needs and current chronic disease management approaches (Committee on Quality of Health Care in America, 2004; Funnell & Anderson, 2003). Initial studies suggest that virtual environments (VEs), which promote social and educational interaction via repetition, practice, feedback, and application, lead to a “significant learning gain” (Okita, Bailenson, & Schwartz, 2008). With the Federal Communications Commission (FCC) plan to disperse affordable high-speed Internet nationally, it is only a matter of time before access to the Internet, and VEs, will become pervasive (Federal Communication Commission, 2011). We therefore developed and pilot tested a theoretically grounded, technologically based, bio-behavioral intervention within Second Life (Linden Lab, San Francisco, CA) (SL) to facilitate diabetes self-management among adults. Our pilot study aims were to develop an immersive diabetes community called Second Life Impacts Diabetes Education & Self-Management (SLIDES) and assess its feasibility and acceptability. In this article we describe completion of the first aim, the methods and approach to building SLIDES.

VEs are real time computer-generated 3D representations of a contrived or natural environment running over the Internet. Through digital technology, spaces such as buildings are created that contain objects, e.g., chairs (Guadagno, Blascovich, Bailenson, & McCall, 2007), and avatars (digital representations of humans) or bots (scripted avatars) (Bailenson, Swinth, Hoyt, Persky, Dimov, & Blascovich, 2005). Instead of passively observing computer images, users actively participate in VEs. Avatars interact with other avatars or bots through voice or text chat via a headset with a microphone, and navigate by walking, running, swimming, flying, or teleporting from one location to another. VEs allow users to learn, socialize, and behave in ways that resemble real world behavior. Second Life (Linden Labs, Inc.) is one of the largest 3-D virtual worlds, with 21.3 million users or residents (“Current user metrics for Second Life”, 2010). VEs are complex information spaces with the potential to provide opportunities for users to practice new behaviors in real-life scenarios without the disadvantages of making mistakes in real life.

The healthcare community has developed and used 3D environments to deliver healthcare (Gorini, Gaggioli, Vigna, & Riva, 2008), health information (Boulos, Hetherington, & Wheeler, 2007), education (Ohio University, 2009), social support and social networking, yet there is a significant gap in health related research being conducted in these environments (Beard, Wilson, Morra, & Keelan, 2009). These environments are being used to treat post-traumatic stress disorder, simulate the effects of stroke, treat phobias, and provide virtual psychiatric treatment (Gorini, et al., 2008; Hodges, Anderson, & Burdea, 2001; Hoffman, 2004; Rothbaum, Anderson, Zimand, Hodges, Lang & Wilson, 2006; Yellowlees & Cook, 2006). SL currently includes a number of health education projects; for example The Nutrition Game (Ohio University) informs users about the health impact of their choices in various restaurants, HealthInfo Island (National Library of Medicine) provides consumer health services, and CDC Island (Weinrich, 2006) also disseminates health and disease-related information to name but a few.

The Internet has allowed people with similar disabilities and diseases to exchange information (www.patientslikeme.com) and social support through online chat rooms and in VEs. Yahoo!Groups lists over 20,000 online health-related support groups, SL has approximately 14 healthcare-related support groups (Beard et al., 2009), and online patient communities such as “PatientsLikeMe” are widely used. Most of
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