Virtual Worlds: A Next Generation for Instruction Delivery

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Abstract

Businesses, universities, K-12 schools, and various consortia are exploring the possibilities of using virtual worlds (VWs) for communication, collaboration, and instruction delivery. This review is written from the perspective of an educator new to Second Life (SL). The nature of VWs and SL, and resources to join and acquire survival skills in SL are presented. The potential for learning and collaboration in VWs is discussed in light of representative projects and initiatives across business and educational organizations. Concerns about SL and hurdles that educators might face when they attempt to be effective in a virtual environment are explored. Cognitive mapping is suggested as a research methodology for examining the potential of VWs for learning.

Keywords: virtual worlds, Second Life, virtual world consortiums, online learning, instruction delivery

Businesses, universities, K-12 schools, and various consortia are exploring the possibilities of using virtual worlds (VWs) for communication, collaboration, and instruction delivery. One of the hottest and widely discussed is Second Life (SL), created by Linden Lab in 2003 primarily for those over 18. An on-going personal investigation of SL reveals that reading about this VW and actually experiencing it are a world apart (Deubel, 2007a). There is a steep learning curve filled with frustrations brought about by lack of a clear learning process. However, those who persist might find real opportunities in a "second life" that actually become an integral part of the first. In this review, the nature of VWs and SL, and resources to join and acquire survival skills in SL are presented. The potential for learning and collaboration in VWs is discussed in light of representative projects and initiatives. Finally, concerns about SL and hurdles that educators might face when they attempt to be effective in a virtual environment are explored.

The Nature of Virtual Worlds

According to Trondsen (2007), VWs are characterized by a shared space allowing many users to participate at one time; a graphical user interface depicted in styles ranging from 2-D cartoon-like imagery to 3-D more realistic environments; interactions that take place in real time; interactivity allowing users to build, develop, alter, and submit customized content; persistence (VWs continue whether or not users are logged in and active); and socialization or community-building groups (p. 4). As holistic learning spaces, VWs offer opportunities for instructor-led or self-directed formal learning, social networking and informal learning, virtual prototyping and demonstrations, role-playing and simulations, storytelling and coaching/mentoring by more knowledgeable experts. They can offer areas for entertainment. Podcasts, wikis, blogs, and video are among tools that can be used to enhance the learning experience (p. 16).

The theoretical foundation for learning in VWs includes situated learning (Hayes, 2006; Purbrick, 2007) and constructivism. Cross, O'Driscoll, and Trondsen (2007) call a VW a *Learnscape*, which is a learning/working ecosystem that features flow (i.e., a balance between inactivity and challenge), repetition and practice by doing, experimentation, experience, observing others, and baked-in motivation. It presents learners with several sensibilities that might not be found in their current learning portfolio: an alternative sense of self; the death of distance; the power of presence, sense of space, and capacity to co-create; the pervasiveness of practice, and the enrichment of experience (sec: What do people do in VWs?).

Second Life

At first glance SL might appear to be a 3-D massive multiplayer online role-playing game. Purbrick's (2007) presentation, *Learning in Second Life*, will dispel that notion. SL has opportunities for entertainment, business, and education, and a full working economy with transactions carried out in Linden dollars. Everything in SL is created by its residents, who have near unlimited freedom to create and experience whatever they want as long as they agree to Linden Lab's terms of use and community standards. SL comes with its own graphic tools, a programming language, and a developer directory to assist those who do not wish to create their own content. Developers retain intellectual property rights over their creations.

SL users need a high-end computer and graphics card and a broadband Internet connection. *How to Live in Second Life,* which is among the *Top 10 Second Life Tutorial Videos on YouTube* (http://www.associatedcontent.com/article/215721/top_10_second_life_tutorial_videos.html), will help individuals join, select a virtual name, and an avatar (your virtual self) from those provided. After downloading the SL software, new members might experience frustration with seeing their avatar, as master to survive in SL, including camera and movement controls, chat out loud, instant messaging, using the Friends menu, opening the World map and teleporting, flying, using the mini-map, taking and storing snapshots, searching, and opening and searching the member's inventory. Foolish Frost's *Complete Fool's Guide to Second Life* (http://www.sldrama.com/), SL video tutorials (http://wiki.secondlife.com/wiki/Video_Tutorials), and the aforementioned YouTube tutorials are all helpful to learn about SL skills.

Fig. 1: Amareal Jewell looks for classes in Campus: Second Life

it might not appear as expected the first few times logging-in. There are downloadable templates and virtual items in-world, some of which must be purchased, to help residents customize their avatars. In SL, this author is known as Amareal Jewell.

SL has unique vocabulary and commands. For example, inventory is anything a resident collects to put on an avatar, to build, or give away. A SLURL is a URL, used to teleport (think Star-Trek) to an island or region in SL. Residents who visit Angel Learning Island (http://slurl.com/secondlife/ANGEL%20Learning%20Isle/128/128/0) will observe 10 essential skills (Figure 1) they need to

Blogs, such as *MUVE Forward* (http://muveforward.blogspot.com/search/label/classroomuse), contain ideas for applying SL to learning environments, issues and experiences with implementation, news, and resources for facilitating education using SL. Educators will also benefit from the work of experienced SL educators. DeVry University's John Jamison is the creator and owner of imagiLEARNING island (http://slurl.com/secondlife/imagiLEARNING/23/22/23), which he uses to introduce traditional educators and businesspeople to SL (Deubel, 2007a). His professional development module, *Digital Immersion for Educators* (http://www.imagiLEARNING.com), can be viewed without

entering SL. Conklin (2007) of Elon University shares her personal experience using the software in her classes, including how to get started with learners. Her handout has an extensive list of readings and ideas for how a variety of academic disciplines might use SL. Among her resources are *Simteach* (http://www.simteach.com/), recommended as a first stop for interested educators, and the *New World Notes* (http://nwn.blogs.com/), a blog for learning quickly about the culture within SL.

Potential for Learning and Collaboration

Residents who randomly explore many locations in SL might find them rather devoid of others at any time (Hayes, 2006; Rose, 2007). It can be a negative for those trying to learn about the environment and how to do things by questioning others. However, Antonacci, Modaress, and Gerald (2007) illustrated that the interactions possible in SL enable learning to occur in three ways: person-person, person-object, and object-object. At SL Medical Center of the University of Kansas, students use role-playing to gain perspectives of patients and medical staff in a doctor's office; students in an urban planning class interact with objects to build a park; a simulation of satellite orbiting illustrates learning procedural and physical processes using only objects.

Developers of objects themselves within SL learn technical and collaborative skills transferable to the real-world. Everything is created using *prims*, which are basic geometric solids that are put together and stretched to form a new object. Color, textures, audio, animation, and scripting are then applied, resulting in a virtual object that mirrors appearance and actions in the real world. Developers might also learn economic principles, if they decide to brand their creations and develop an in-world business to sell them, and promote the same with press releases, and planning and hosting events (Purbrick, 2007).

Various projects and initiatives demonstrate the potential of VWs for learning and collaboration in education, business, industry, and research, and not just in SL. Representative VWs for K-12 youth include Whyville, Quest Atlantis, and River City.

University projects during Spring 2007 (Figure 2), posted in-world at Campus: Second Life (http://secondlife.com/csl), deal with such topics as artificial intelligence, linguistics, product design, web publishing, motion arts, creative and technical writing, life in the universe, contemporary performance, business studies, and more. For a more permanent presence, educational institutions and nonprofit organizations buy private islands to set up secure intranets for only their students and faculty, or opt to make accessible spaces for all SL residents.

Fig. 2: Amareal Jewell finds SL survival skills on Angel Learning Island

In Whyville (http://www.whyville.net/smmk/nice), members design a face to represent themselves, rather than a full-bodied avatar. While social networking is a feature among its over 1.5 million citizens, there is real learning involved as youth, ages 8-16, might explore a virtual economy by starting a business, write for the town's newspaper, or run for Whyville's Senate. Neulight, Kafai, Kao, Foley, and Galas (2006) used Whyville to test the integration of a multi-user virtual environment (MUVE) within grade 6 science curriculum in their investigation of students' understanding of virtual versus natural infectious diseases.

Indiana University's Quest Atlantis (http://atlantis.crlt.indiana.edu/) uses a 3-D MUVE built around strategies found in online role-playing games. Activities engage youth, ages 9-12, in learning about social commitments and are completed in the virtual space or real world. According to Barab (2005), quests are based on academic content standards. Learners might find themselves "conducting environmental studies, researching other cultures, calculating frequency distributions, analyzing newspaper articles, interviewing community members, and developing action plans" (para. 3).

River City (http://muve.gse.harvard.edu/rivercityproject/index.html), a VW project of Harvard University, is designed as a 19th century town for middle and high school learners, via their avatars, to develop collaboration and science skills as they investigate health problems in the town. Educators who want to use River City must request to become part of the research, after they determine if the River City curriculum meets their learning goals and objectives and that they have the required technology infrastructure to run the simulation.

For the business sector, MIT (Mollman, 2007) builds realistic training simulators within SL. "Clients include a company interested in training workers for its power plants, a manufacturer of medical devices, and pest-control firm Orkin" (para. 3). As another VW option, Proton Media's ProtoSphere (http://www.protonmedia.com/) might be used for communication, marketing, simulation-based training initiatives, social networking, and informal learning within organizations. Along with avatars, this MUVE features blogs, wikis, VoIP, and text chat.

VW Initiatives

Aaron Walsh, Director of Media Grid, believes that educators need spaces that do not have some of the adults-only content found in SL. Hence, he and Media Grid initiated the software project *Immersive Education* (http://immersiveeducation.org/), which will take advantage of the now open-source SL software (A Virtual World for Education, 2007). The New Media Consortium of over 250 learning-focused organizations worldwide joined this endeavor to develop best practices and standards for virtual learning and game-based learning platforms (Media Grid, 2007).

The New Media Consortium (n.d.) has its own *NMC Virtual Worlds* initiative (http://virtualworlds.nmc.org/). The NMC Campus in SL offers "a wide range of educational tools, services, and meeting spaces, as well as a functioning museum and library, a planetarium, and much more" at no cost to educators (sec: About Us, para. 4). The short video, *NMC Campus: Seriously Engaging*, is valuable to learn more about this campus and SL (Levine, 2006).

The Croquet Consortium (2007) promotes its open source software to create virtual environments for research, education, and industry. The software enables "live discussion among worldwide collaborators who come together in "real time" within a 3-D virtual space. They may view, manipulate and revise documents, dynamic visualizations, or large amounts of data from sources such as laboratories or supercomputing centers" (para. 5). Croquet envisions its virtual environments being used by public health officials and epidemiologists tracking the spread of an infectious disease, architects and engineers collaborating on a building design, chemists and biologists prototyping different chemical compositions for a new drug, and so on (para. 7).

Sloodle (http://sloodle.com/) is an open source initiative to join SL and Moodle, the latter of which is an open source online learning course management system. According to Kemp and Livingstone (2006), the hybrid is made possible because SL's scripting tools also enable "connectivity with external web-pages and internet resources" (p. 13). By combining the strengths of each, this initiative might have greater appeal to educators and future online learners, who might be skeptical of teaching or learning using only one or the other.

Also of significance is the new SRI Virtual Worlds Consortium (http://www.sric-bi.com/vwc/), which SRI Consulting Business Intelligence just launched (E. Trondsen, personal communication, July 28, 2007). "The consortium will monitor and examine ongoing virtual-worlds trends and developments, including innovative business applications of virtual worlds and new technologies that enable new virtual-worlds capabilities. It will also analyze specific application areas such as innovation and collaboration (in context of virtual teams, for instance), as well as learning for sales professionals and customer learning." Virtual meetings will be held within SL (SRI, 2007, para. 2).

Concerns and Hurdles

Serious money is involved in developing and using VWs. Colleges might spend several thousands of dollars just to establish a presence in SL (Groveman, 2007). Beyond financial concerns, however,

there are technical, legal, societal, and pedagogical concerns about using VWs, and hurdles that educators need to overcome to be effective.

The technology for VWs is still in its early forms of development and makes great demand on hardware. Linden Lab has software and scaling issues. This author found, as did Conklin (2007), Hayes (2006), and Rose (2007), that SL users sometimes experience a lag due to lower bandwidth, or extremely high SL use at the time. Processing speed is slow. Sometimes logging-in is not possible. Software updates might need to be downloaded frequently.

According to Rose (2007), the SL physics engine is years out of date. Most of SL is made up of thousands of disconnected regions, most of which must be searched for by name and then teleported into. The problem lies with the processor associated with each region, as "each processor on Linden Lab's servers can handle a maximum of only 70 avatars at a time; more than that and the service slows to a crawl, some avatars disappear, or the island simply vanishes" (p. 2). This means that adopters must be aware of the technology limitations and work around those for large group meetings, and also determine what SL is planning to do to advance its software, and when those enhancements might become available.

Certain areas in SL are marked as "mature." Teen Second Life (http://teen.secondlife.com/) is supposed to be restricted to teens 13-17 and Linden employees. Thus, it is understandable that educators (e.g., Groveman, 2007; Kemp & Livingstone, 2006) have noted concerns about the liabilities of schools and universities if their students find their way into areas not appropriate for their age level or if students engage in inappropriate, disruptive behaviors while in a VW. Developers of VWs, however, share concerns for safety. Educators and anyone wishing to work in Teen SL must undergo a background check for security. Linden Lab (2007) is beta testing an age and identification verification system to control users from entering spaces where they do not belong. SL also has an abuse reporting system and disciplinary actions for violations of community standards, including warnings and suspensions, which are made public within SL Police Blotter (http://secondlife.com/community/blotter.php). Whyville uses a language filter and its city workers frequently, but not 24/7, monitor what goes on. They will review chat logs and will mute, ban, or fine offensive citizens (Whyville Watch Call Box, n.d.).

Walsh (Lamont, 2007) voiced concern about the addictive nature of virtual worlds and their impact on society, and stated, "We're already dealing with early forms of immersive illness, such as addiction, alienation, mental schisms, and more" (sec: What have been some of the challenges). While games are often embedded in VWs, the American Psychological Association (2007) does not currently list video game addiction as a mental disorder in its *Diagnostic and Statistical Manual of Mental Disorders-IV-TR*, but it will consider doing so in its next edition in 2012, "if the science warrants it" (para. 2).

Pedagogically, there is concern about the ramifications of Section 508 and the Americans with Disabilities Act as schools establish their presence in virtual spaces. In SL, using a mouse for navigation is essential; communication is in real time using chat and instant messenger; and other textual content is often displayed on note cards. These technology features can be limitations for individuals with certain disabilities. Kemp and Livingstone (2006) stated, "*MUVEs* including SL are very poor document repositories. The note cards used with SL are simple text documents which can support only very limited formatting. The documents which can be generated are essentially simple ASCII texts with embedded objects which require clicking on to view or open" (p. 14). Further, the SL software does not work with screen readers that visually impaired learners might need, nor can text color and font be adjusted to improve readability for less visually impaired (p. 15). Hence, educational organizations that use SL for learning, at least for the moment, must consider how they will provide alternative equivalents of content and interactivity for such learners. Groveman (2007) also wonders about the clear and measurable advantages of learning in virtual worlds in comparison to traditional settings, and if skills learned in the virtual world can be effectively transferred to the real world.

After working with over 3000 traditional educators, Jamison (Deubel, 2007b) stated that they have several hurdles to climb when initiated into SL. While there are exceptions to any generalizations, they might consider themselves in a wilderness, compared to digital educators and learners who have acquired skills from playing digital games, which are transferable to SL. They might look for mentors to first explain things, rather than just explore, and seek a predefined purpose for everything, rather than discovering purpose. A primary concern is that expertise is defined differently. Rather than by academic degree, position, or seniority, respect is earned by those who can perform within SL and have knowledge of the environment. While everyone might look for a social network, traditional educators will look for groups with similar backgrounds to those they have in the real world. Digital educators and learners would have diverse networks consisting of those who can help them do whatever they desire to do in SL, which also expands their cultural immersion in the digital world. Traditional educators might look to adapt current practices to teaching in SL, including the design of

the traditional classroom itself; whereas, digital educators would look to transform what they do, including meeting learners on beaches, platforms in the sky, in caves or trees, and even inside giant squids.

Conclusion

Educators should not be too quick to judge the merits or lack thereof of VWs and SL. It takes time to master basic skills, considerable exploration, and research to truly understand if a virtual environment holds promise as a next generation instruction delivery system. Salmon (2007) suggested that new approaches to imagining the future also require adding new approaches to research. In her view, a lot of the methodologies used for research in face-to-face environments are "not terribly appropriate" for these environments. As a research methodology, cognitive mapping, which combines perception, thought, and action, holds promise for capturing what goes on in the virtual environment. Hopefully, a strong element of action research supported by creative practitioners and futurists who understand how to develop models of the future will lead to "a series of shareable models of possible and preferred futures of learning and frameworks for practice in SL."

Resources Noted

Angel Learning Island: http://slurl.com/secondlife/ANGEL%20Learning%20Isle/128/128/0

Campus: Second Life: http://secondlife.com/csl

Complete Fool's Guide to Second Life: http://www.sldrama.com/

Croquet Consortium: http://www.opencroquet.org/index.php/Main_Page ImagiLEARNING.com: http://www.imagiLEARNING.com

imagiLEARNING island: http://slurl.com/secondlife/imagiLEARNING/23/22/23

Immersive Education: http: // immersiveeducation.org/

Linden Lab: http://www.lindenlab.com/

MUVE Forward: http://muveforward.blogspot.com/search/label/classroomuse

New World Notes: http://nwn.blogs.com/

New Media Consortium Virtual Worlds initiative: http://virtualworlds.nmc.org/

NMC Campus in SL: http://slurl.com/secondlife/NMC%20Campus/128/225/42/

Proton Media: http://www.protonmedia.com/

Quest Atlantis: http://atlantis.crlt.indiana.edu/

River City: http://muve.gse.harvard.edu/rivercityproject/index.html

Second Life: http://secondlife.com

SL Police Blotter: http://secondlife.com/community/blotter.php

SL video tutorials: http://wiki.secondlife.com/wiki/Video_Tutorials

Simteach: http://www.simteach.com/

Sloodle: http://sloodle.com/

SRI Virtual Worlds Consortium: http://www.sric-bi.com/vwc/

Teen Second Life: http://teen.secondlife.com/

Whyville: http://www.whyville.net/smmk/nice

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