Chapter 2
Virtual Worlds:
Corporate Early Adopters Pave the Way

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ABSTRACT

Multi-user virtual environments (MUVEs), the most popular of which is Second Life, have great potential to provide engaging, interactive content to today's students using both synchronous and asynchronous delivery. Educators, as well as several forward-thinking corporations and military organizations, have proven to be early adopters of MUVEs as a training delivery medium, paving the way to begin evaluating the medium for use in professional development. The use of MUVEs for education will definitely grow. Corporations considering venturing into this arena would do well to consider the lessons learned by the early adopters, paying particular attention to the barriers that need to be overcome for successful implementation.

VIRTUAL WORLDS: CORPORATE EARLY ADOPTERS PAVE THE WAY

In the continuing quest for effective delivery methods for distance education, multi-user virtual environments (MUVEs), also known as virtual worlds (VWs), have become popular at the university and secondary school levels and, to some extent, in corporate training. While use is still varied, both in quantity and quality, early adopters—educators and several corporate learning officers—provide ample evidence of the value of MUVEs as an instructional delivery medium. Although VWs are being used successfully for professional development and training, efforts to evaluate their effectiveness are still in early stages. Corporations that are considering venturing into MUVEs should consider the lessons learned by these early adopters, particularly in terms of the barriers that need to be overcome for successful implementation.

The evolution of multi-user virtual environments spans a long, logical, and progressive past. Although there are many in existence today, serv-

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ing a variety of age groups and demographics, the best known is probably *Second Life*™ (SL). Launched in 2003 by Linden Lab Technologies, SL is a finite "grid" that currently accommodates millions of users around the world (WebProNews, 2009), although the number of "residents" logged in and actively using the service on a daily basis is estimated at closer to 60,000[1] (SL website, 2009).

Researchers suggest that the development of virtual worlds is based on a merging of gaming and social networking (Messinger, Stroulia & Lyons, 2008). Gaming began as interactive arcade games with tactical and strategic goals and has undergone a series of evolutionary changes. Early single-player, off-line games became multi-player, off-line games and then progressed to single- and multi-player networked games including those played via internet connectivity. The next step was unstructured games, which developed into those in which the player generates the content; the current stage features multiplayer online role-playing environments.

Evolving separately, social networking has increased in popularity as it meets a variety of social and networking goals manifested in products such as *Twitter, LinkedIN, Facebook, YouTube, My Space,* and *Skype*. These environments support members pursuing their own objectives of socializing and sharing information (Messinger, Stroulia & Lyons, 2008).

While SL is often thought of as a game it is, in fact, anything but. Kalning (2007) notes that typically games include both structured and unstructured goals as well as objectives for completion. Games have limits and theoretically, persistence and skill will allow the participant to win by reaching the outer limits of the established environment. However, in SL there is no inherent conflict or goals set by the programmer (Kalning, 2007). The goals and objectives are set by the users according to their individual needs. The only limit is one's imagination, since SL users create their own content and their own ever-changing objectives. Simultaneously, many "residents" are drawn to the environment by the opportunities for social networking and personalized goal achievement.

REAL LIFE USES FOR SECOND LIFE

Many organizations are seeking to establish a presence in virtual worlds. Although several initially envisioned SL as a commercial environment, that narrow vision only skims the surface. Educators have proven to be active, early adopters and have built a strong presence in SL, using the environment to conduct classes, collaborate with peers, and participate in conferences that they might otherwise be unable to attend. Several universities have established a presence using SL to conduct classes synchronously (Lagorio, 2007). Government agencies, including the military, as well as corporations, use it for teleconferencing, role-play, and simulation (New England Business Bulletin, 2009). Many of these organizations also use SL for recruitment (TMP, 2007).

The collaborative and active nature of a MUVE is being shown to offer creative possibilities for delivering learner-centered, engaging educational content with practical application and interaction at several levels:

- **Person-person.** Learners interact with other learners, instructors, or "the general public."
- **Person-object.** Learners interact with discrete objects or a particular environment.
- **Person-self.** Both instructors and learners find the MUVE setting engenders new roles and encourages self-reflection.

PERSON-PERSON INTERACTION

A MUVE is, by definition, a collaborative environment which provides engagement and a strong "sense of presence," fostering socialization among learners considered critical to success in distance

education (Irwin & Berge, 2006). Minocha and Tingle (2008) provided a comprehensive list of socialization activities to help build community among learners, including tours, treasure hunts, and collaborative projects. Those new to the environment will need this kind of gentle, guided introduction, while more experienced students can become engaged more quickly (p. 220).

Strongly image-based, immersive environments foster "the death of distance" while creating "the power of presence" and a "sense of space" (Montoya, Massey, & Ketter, 2009) in a way that can be very powerful for learners. One educator stated,

What has attracted me to Second Life is what I've found lacking for quite some time in online classes—no sense of place and a strained sense of presence. . . . The sense of presence created by screens of text . . . [is] difficult for many students to hold onto. . . . The sense of community arises more quickly when we see images of others before us, behind us, to the sides and so on. . . .[As for sense of place, t]here's no "where" . . . with screens of text in Blackboard, Moodle or Angel. But there is a where in Second Life, an up, down, left, right, mountains, buildings, sky (SLED/Holt, 2009).

The synchronicity of the environment is another factor in building community and strengthening collaboration (Minocha & Tingle, 2008). Students may have difficulty connecting with each other in asynchronous learning and find it easier to collaborate with the more immediate feedback of a synchronous setting.

MUVEs provide exceptional training in the form of role-plays and simulations, even approximating apprenticeship-type experiences. In a "no-harm" practice environment, students interact to gain practical experience with soft skills such as language learning, decision-making, and leadership roles. A virtual world can portray a simulated environment that might require an "elaborate or expensive" set in the real world. It is fairly easy to make a few changes to the "set" and produce a completely new environment:

Textures can be rapidly changed to completely alter the appearance of the space, allowing the same holodeck to be used as a set for many different role-plays. . . .[T]he appearance of a particular space can be altered around the group rather than the group being moved to another location. (Addison & O'Hare, 2008, p. 13)

In a military context, "live training exercises can be expensive, not to mention dangerous, to soldiers, as well as to the environment" (Stackpole, 2008).

Furthermore, "actors" in the role-play can be played by robots or scripts, reducing the need for large numbers of participants. In fact, "[s]tudents felt that role-play within the virtual setting was more likely to interest them and hold their attention as compared to face-to-face role play" (Gao, Noh,& Koehler, 2008 cited in Addison & O'Hare, p. 11). Such role-playing also allows the student to "gain authentic experience under the guidance of real world experts not available in a traditional campus setting" (Arreguin, 2007, p. 2).

A wide range of projects supports this notion, with some outstanding examples including the following:

- Students carry out an inspection of a food factory to determine if it meets regulatory requirements—a situation potentially dangerous in real life (Addison & O'Hare, 2000).
- Members of an emergency department team practice preparedness for multiple-victim disasters (trauma and nerve toxin exposure) (Heinrichs, Youngblood, Harter, & Dev, 2008).
- Trainees learn how to staff a Canadian border crossing, examining documentation and interviewing potential visitors into the country (Werner, 2008a/2008b).

- Students practice "assessing and remediating disability issues" in houses designed for this purpose (Gerald & Antonacci, 2009).
- A homeland security simulation "train[s] first responders to a dirty bomb or chemical weapons attack" (O'Brien, 2005).
- In an operating room simulation, nurse anesthetist students learn "complex medical procedures"; the students' actions are recorded and emailed to the instructor for assessment (Gerald & Antonacci, 2009).
- In a virtual early childhood education classroom, scripted "children" respond to teachers-in-training, or teachers-in-training role play the children and teacher, while an instructor observes and critiques (SLED/Freese, 2009).
- Soldiers operate on a virtual battlefield in an extremely realistic depiction of combat conditions, being trained for the "unconventional, unpredictable guerilla warfare the military didn't … envision in Iraq," as well as "learn[ing] cultural skills needed to operate in a hostile and foreign land" (O'Brien, 2005).

PERSON-OBJECT/ ENVIRONMENT INTERACTION

The 3D nature of virtual worlds allows learners to explore objects in ways that may be impossible in real life, transcending both distance and size (both macro and micro). For example, students can get inside a star in another galaxy, or a micron. The same is true for environments: in SL, students can transcend space and time, visiting recreated locations or time periods that are far away or no longer exist. The social interaction possible in these worlds also allows learners to experience and interact with real-world scenarios. For instance, SL's flourishing economy permits learners to examine business practices, marketing, and market trends.

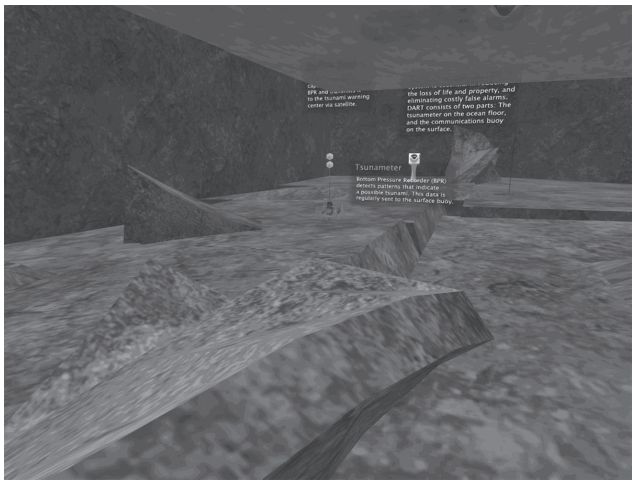
For many students, simply inspecting and relating to objects or environments provides valuable learning experience. Others gain deeper understanding by creating content using programming, 3D rendering, scripting, and animation skills. The virtual world then also serves the function of displaying student work (Ryan, 2008).

SL also lends itself to blended learning, which is on the rise (Young, 2002). Blended learning is traditionally defined as "the combination of instruction from two historically separate models of teaching and learning: traditional [face-to-face] learning systems and distributed learning systems. . . [emphasizing] the central role of computer-based technologies" (Graham, 2006, p. 3). However, it can also be seen as a mélange of delivery methods supporting a combination of synchronous and asynchronous delivery. There are a number of examples of such asynchronous, or non-facilitated, training in SL:

- At the National Oceanic and Atmospheric Agency's island in SL, visitors can experience a virtual tsunami, observing tectonic plate movement under the ocean and the devastation that occurs to land-based structures.
- Visitors to Vassar University can sit in a virtual flying machine which provides a guided tour of the features of the island.
- The International Society for Technology in Education is one of many locations where users can follow a self-guided marked trail leading to "posters" providing directions for basic SL activities such as walking, using different camera views, and taking pictures.

Virtual worlds transcend the definition of blended learning by combining separate delivery models into one: they deliver both virtual "face-

Figure 1. Standing underwater at the NOAA tsunami simulation, read about and observe changes underwater



to-face" learning and asynchronous but interactive learning. Thus, we begin to see the potential for this technology as it evolves into what educators and trainers often demand: a "one-stop shop" for instruction.

PERSON-SELF INTERACTION

The mere idea of teaching this way can be difficult to envision; some educators see new technology as a threat to established ways of doing things (Haymes, 2008). The learning curve is steep, so that "[r]ather than feeling proficient in the teaching environment, instructors are often thrust into the learner role as they acquire new skills themselves" (Arreguin, 2007, p.8). Having accepted the challenge, educators and instructional designers may find that it is not easy to create content (Werner, 2008a) or even just to deliver content in a MUVE. Carr, Oliver, and Burn (2008) found the investment in instructor time was high, both for preparation

Figure 2. The virtual flying machine at Vassar University Island

and for delivery. Their training was labor intensive to run, requiring several instructors to be on hand; they characterized the experience as "intense and draining" (pp. 90-91).

Given the cost and effort of using a MUVE, the challenge may be to capitalize on its capabilities. Educators must take care that they "learn to use the benefits of virtual worlds to their best advantage and not merely recreate 'old ways' of teaching" (Arreguin, 2007, p. 11). A recent extensive discussion on the SLED list focused on the use of various tools to enhance pedagogy in SL. As is common with such debates, there were those at extreme ends of the argument. One group believed that instructors should *never* use lecture, Powerpoint slides, or other "transplanted Real Life" tools in SL. Or, to put it succinctly, "People can fly and you want them to look at slides" (SLED/Hunsinger, 2009). Others approached the issue from more of a design standpoint and argued that, as in any educational situation, the tool must be appropriate to the content, the delivery system, and the audience, and no tool should be ruled out. Partridge (SLED, 2009a) pointed out that using familiar tools can help people make the leap to teaching in SL. "Most teachers aren't ready for rapidly building 3D interactive landscapes and worlds."

Many newcomers to MUVEs find the learning curve—referred to as the "pain barrier" by Carr et al. (2008) —troublesome. Simple navigation tasks—moving around, getting from one location to another, or surveying the current location—can be frustrating. In addition, a principal means of communication, text chat, is not comfortable for everyone. "Some of the students struggled with following text discussions, and it became clear that participating in discussions in SL with confidence is an acquired skill, . . . We had not fully appreciated the problems associated with text-chat for beginners" (Carr et al., 2008, p. 90). A 2007 Pew study found that American use and understanding of technology is fairly shallow: only 8% of Americans are "deep users of the participatory web" (Horrigan, 2007 cited in Haymes, 2008, p. 67).

For the technologically literate, part of the appeal of a MUVE is the challenge of building and scripting objects and environments. But for those who are not comfortable with technology, the learning curve is very steep and requires significant and often sustained training and effort. Kemp, Livingstone, and Bloomfield (2009) cite the New Media Consortium (2008) as noting that "Faculty and staff are usually unprepared to support students in these 3D spaces" and "building capacities sufficient to teach may take between 6 months and 12 months" (p. 551).

Interestingly, some educators are more eager than their students: "If I show SL to students who had been playing WOW [*World of* Warcraft] for example [and that is the majority of them] they hate it and laugh at it as old people's ridiculous attempt at being cool" (SLED/Tadros, 2009). However, constituents of younger generations may be very comfortable in this type of environment. "With the current generation of soldiers raised in an era of video games and the Internet, most are just as comfortable, if not more so, learning from a digital experience as they would be participating in real-world training scenarios" (Stackpole, 2008). Badger notes that the use of virtual worlds for training can be a recruiting advantage for companies, stating that "millenials want this technology" (2009, p. 4).

Clearly, in these vibrant learning environments, the characteristics of a simulation in a learning situation promote active learning and students are required to take an energetic role in directing and discovering their own learning content. As Antonacci and Modaress (2005) note, "you cannot be passive in a game or simulation"; "lurkers" will have to join in or take responsibility for failing to meet the goals and objectives.

In addition, an aspect of learning that is often neglected in both in-place and distance education classrooms is the opportunity for self-reflection

and change. Having an alternate "self"—an avatar—in the learning space provides this opportunity.

I have dared to do MANY things in SL that would never have occurred to me in RL [real lifel]. Some involve trying new skills, some involve working alongside people that I never paid close enough attention to in my professional life, and some involve trying out behaviors that my RL mind says are MUCH too risky for someone of my years and reputation (SLED/Loon, 2009b).

Salmon (2009) echoes this thought, noting that having individuals engage in experiences outside their normal comfort zones can be a powerful learning tool. "If such an experience can be made purposeful and designed for learning, it seems to me that we have tools at our disposal … the likes of which no educators have ever had before" (2009, p. 533).

BARRIERS TO CORPORATE ADOPTION OF SECOND LIFE

While the use of MUVEs is thriving in some quarters, there are still many barriers to full acceptance in the corporate training world. Chief among these is lack of management buy-in due to concerns that may not be well grounded in fact, such as the validity and cost of MUVEs.

There is considerable skepticism in the corporate world about allowing, much less encouraging, employees to "play games," and concern about verifying digital identities (Badger, 2008, p. 6). There is also apprehension that in the public areas, corporations are unable to protect their employees from exposure to unknown and undesirable factors. The fact that SL contains much "adult," even pornographic, content heightens the concern. The welcome islands are not well policed, giving newcomers a bad impression, and the potentially highly visible nature of inappropriate content, coupled with occasional avatars who choose to act in very disruptive ways (known as "griefers"), are among the factors that lead many corporate executives to perceive a lack of seriousness or integrity (and therefore value) to activities in SL. Linden Lab is implementing changes that indicate the developers recognize that future revenue for SL will stem from legitimate business such as education, military, government, and corporate use. Gambling is one example of the type of undesirable content Linden Lab eliminated from SL in 2007. In 2009, Linden Lab launched an effort to isolate the adult content to a specific area of the grid, allowing educators and corporate entities to move about more freely in the virtual environment.

Corporations are interested in the bottom line, of course, and participation in a MUVE may require considerable investment. While casual use of SL is free and public space on a public server is available for purchase for a one-time cost of less than $2,000, such a venue does not bode well for workplace privacy. Additionally, a "fully customized, fully private virtual world with capacity for thousands of users" may run up to $1 million (*"What Does It Cost,"* 2008, p. 88). Although the spirit of collaboration prevails and many educators are willing to share their resources,[2] ultimately the creation of such items is costly and time-consuming, whether developed by an in-house team or purchased from vendors. In addition, supplying the appropriate technology for users is costly in and of itself. Hardware and software must both be high-end and in some cases customized. Thus, access to the required technology constitutes another common barrier.

Complicating the issue of cost is the unlikely notion that current training materials created for a different delivery method can be re-purposed for use in online format. Corporations must give careful consideration to the need for (and expense of) quality instructional design created by experienced individuals who have successfully designed and implemented other online training programs.

MANAGEMENT/EVALUATION OF USING SECOND LIFE

Since a virtual world is one alternative delivery method for distance education, many practices surrounding the management and evaluation of effectiveness in distance education—indeed, of effectiveness in any kind of education—have already been outlined and explored by experts and thus apply to this delivery medium. Moore and Kearsley (2005) suggest that management of a distance education initiative should include the following strategies: 1) strategic planning to define a mission; 2) goals and objectives; 3) prioritizing the goals; 4) continuous assessment including trends; and 5) noting emerging technological options that might increase efficiency when projecting future needs and determining how to meet them. As with any distance education initiative, the overall program mission must be driven by a strong commitment on the part of corporate management, at all levels, to ensure the program's potential for success.

Another key element to any successfully managed program is the need for entities to determine in advance how the chosen tool will provide the "best bang for the buck". To determine that, it is initially critical for each entity to define, relative to their own organizational mission and goals, what the bang is. If the bang is to reach a maximum number of people, SL may not be the answer. As of December 2008, *Facebook* had over 200,000,000 separate visitors worldwide, giving it the distinction of being one of the largest social networking sites in the United States. In contrast, SL reported just over 700,000 unique residents as of March 2009. Thus, it would seem counterintuitive to use SL for a "maximum coverage" marketing tactic. However, if the bang is to conduct synchronous meetings and conferences or provide a limited and targeted audience with the ability to collaborate on projects as a team, SL just might be the best option. Spend some time honestly outlining desired expectations before choosing the tool with which to deliver it. A different tool may be more appropriate for the designated needs (joeeisner, 2009).

One caution, from Miner and Hofman (2009), is that it is important to focus on student success rather than on technology. To do that organizations must: 1) ensure the technology works before implementing it; 2) work with smaller courses and evaluate their effectiveness; 3) include interactivity; 4) require self-directed commitment with consequences if the student does not comply; and 5) review objectives carefully and ensure the chosen technology is the most appropriate delivery method. This was reflected recently by an educator who noted: "We are *way* too focused on asking 'How can SL enhance my teaching?' instead of asking first 'How can I teach better?'" (SLED/Loon, 2009a).

Companies that are just getting started exploring virtual worlds can learn from the best practices and standards that have been established by the early adopters of this technology. For example, a few forward-thinking corporations have demonstrated that it is advisable to regulate and standardize their employees' use of virtual worlds to maximize the corporate performance improvement goals. IBM's established rules of engagement set out expectations for frequency, type, and amount of interaction expected from users (IBM Virtual World Guidelines, n.d.). IBM provides advice on how to handle inappropriate behavior, appearance, digital personas (reputation), and proper usage of IBM resources "on the clock." Ultimately, IBM employees are considered responsible for conducting themselves in-world in much the same way they do in real life and are encouraged to use good judgment and follow IBM's values and Business Conduct Guidelines while in the public grid.

As for evaluating the success of a virtual world, most experts seem to agree that measuring the effectiveness of virtual worlds is challenging and represents a stumbling block for overall acceptance. Lockee, Moore and Burton (2002) suggest that management of student progress and evaluation are critical and that programs lacking

a strong component of each are likely to fail. However, measuring the success of virtual worlds in distance education is still in its infancy. Evaluation of virtual worlds seems to generate mostly research focused on satisfaction, and particularly satisfaction levels comparing virtual worlds and other distance education delivery methods to "face-to-face" learning.

Massey, Montoya and O'Driscoll (2005) outline how important it is to align objectives with HPT (Human Performance Technology), which provides a logical evaluation framework for training initiatives. They suggest focusing on business issues and performance problems by linking the technology to performance outcomes. Although Massey and Montoya (Science Daily, 2008) have blazed the trail and developed a measurement tool called the PVP (Perceived Virtual Presence), to measure one's involvement or "perceived reality" within virtual worlds, currently experts seem to be unable to agree on any widely accepted measurement technique or tool. To date, the PVP is the newest and most promising tool available for researching the effectiveness of corporate training in a virtual world. Montoya and Massey (Science Daily, 2008) suggest that the more "real" the virtual experience is for employees, the more likely they are to find the community engaging and to collaborate, which leads to an enhanced virtual training experience and increased employee productivity.

PROFESSIONAL DEVELOPMENT IN SECOND LIFE

Individuals engage in professional development for many reasons: to achieve personal growth, to realize innovation through networking and collaboration, to maintain or enhance current skill levels, or to fulfill professional regulatory requirements. Mertens and Flowers (2004) highlight the fact that professional development contributes to employee retention and performance improvement. Depending on the organization, performance improvement can be manifested in different ways. In the educational realm, teachers who regularly engage in quality professional development are directly linked to an increase in student achievement (Mertens & Flowers, 2004). For the military, there is a major shift in the way in which troops prepare for war with the goal being the same for everyone: simply to survive (Vargas, 2006). In the corporate realm, innovation is linked to collaboration (Neal, 2006), innovation, and job performance, which are critical to business success.

Educators were early adopters of virtual worlds for professional development delivery, with such organizations as the International Society for Technology in Education (ISTE) quickly establishing a presence in SL. Training organizations such as the American Society for Training and Development (ASTD) also have active roles in SL. Conducting regular meetings, conferences, and training events, they seek to attract educators to the environment to provide networking opportunities for collaboration on both a national and an international level. Mertens and Flowers (2004) suggest that to be effective, teachers need to participate regularly in a variety of formal and informal professional development events. Formal events include workshops or classes, conferences, and visits to other schools. Informal events include collaboration with other teachers, lesson planning as a group, coaching peers, and reviewing students' work collaboratively. These professional development opportunities are important enough that they should already be in place for educators who teach in a face-to-face format. As an added benefit, teachers who experience the same events virtually, expand the pool of educators with whom they can interact.

Lighthouse Learning Island is one example of a community committed to the professional development of educators. Lighthouse, which is a collaborative effort of four school districts in Massachusetts, has purchased their own virtual

island and is training their teachers how to use SL through professional development workshops in-world. The team's longer-term goal is to bring students into the SL Teen Grid (reserved for those under 18) and teach them the curriculum virtually (Schrock, n.d.). This collaborative tool will be an excellent case study regarding how much more effective the learning experience will be for everyone concerned if the teachers meet the students on their terms, using technology and online learning objectives that motivate the students to achieve and excel.

For the military also, well noted as being early adopters of virtual worlds for training and professional development, there are many opportunities to leverage the background of technology-savvy individuals. For example, today's soldiers are digital natives (Cabanero-Johnson & Berge, 2009) who are very comfortable with multi-tasking, social networking, and gaming tools. Soldiers who play games like *Full Spectrum Warrior*, *Call of Duty*, *Medal of Honor*, or *Halo 2*, are already experienced with first-person shooter games and immersive gaming experiences and will continue to achieve performance improvement through training using digital simulations. In fact, they see using virtual worlds to accomplish military training as a natural and necessary progression (Vargas, 2006).

Additionally, for the military, an inevitable outcome of war is the undeniable need to provide for war veterans. Groups such as the Disabled American Veterans have established support groups in SL (Au, 2009). In addition, in an effort to respond to the presence of very real post-service adjustment challenges, military organizations are establishing a private world within SL to provide a "healing space" for veterans. This space is designed to meet a variety of accessibility challenges such as being geographically dispersed, perhaps physically disabled, and to circumvent the stigma associated with seeking mental health assistance. Morie (2009) notes that recent studies indicate soldiers take six months or more to report mental health issues post-deployment. The limited-access "healing space" in SL provides veterans access to a Complementary and Alternative Medicine area (meditation, breathing exercises, positive visualization, etc), a Resource area (links to outside services and additional information, guidance for

Figure 3. The lighthouse is a central focal point on Lighthouse Learning Island, which is divided into six areas: one for each of the four Massachusetts school districts, a sand box for development, and a common area for meetings and collaboration.

recommended therapies based on need, etc), and a Social Center for game-playing and group social gatherings. The most ringing endorsement of all for this application of SL is the fact that motivation for success stems from the desire to help vets. The technology is not the highlight, the results are.

For corporate use, virtual worlds expand the possibilities well beyond what corporate training was able to provide prior to the existence of VWs (New England Business Bulletin, 2009). Because private conversations and group conversations can occur simultaneously, communication is enhanced and matches the desired pace of both the individual participants and the group. Documents can be shared and collaboration is further encouraged to foster innovation and creativity. Additionally, Companies such as IBM are starting to provide case study statistics indicating that virtual meetings and conferences are being conducted at a significant savings over the same event held in the physical world (Virtual World News, 2009b). Virtual worlds are becoming increasingly integrated into the workplace and based on our research, we can only expect that trend to grow in the future.

THE GROWTH OF SECOND LIFE

A discussion about the future of emerging technologies should include a trend analysis. Tom Werner (2009), a Brandon Hall researcher, recently presented a graphical representation of an Acceptance Curve, the process by which new technological ideas are accepted into the mainstream.

Emerging technologies are generally subject to a curve of acceptance that begins with the introduction of the new technology, creative brainstorming by early adopters leading into inflated hype about what the product can do, the leveling off of the hype as the technology is adopted into the mainstream, evaluating and altering the adoptive techniques as needed, and finally the arrival of benchmarking and industry standards for the use of the technology.

According to Werner, SL and the use of virtual worlds in the workplace is just coming down from the hype bubble and entering into the early adoption phase (see Figure 4). Thus, some early adopters have moved further along in the curve and are developing and expanding virtual worlds with appropriate functions, while others have abandoned SL believing that they were victims of the hype and that the product did not deliver. Stevens and Pettey (2008) quote Gartner indicating "90 percent of corporate virtual world projects fail within 18 months" (p. 1). It is important to note that there are many possible explanations why a SL project may have failed. Focusing on the technology rather than on the users and the necessary content to make it a meaningful learning experience is one common error; another is the lack of a strategic plan outlining appropriate goals. Driven to match what competitors are doing, it is all too easy to implement a project without clear goals or objectives and a limited understanding of the composition and demands of virtual world communities and their residents.

The hype around digital virtuality over the past decade has been more about myth and less about cyberspace… Symptoms of virtualism include exaggerated expectations of anything described as 'virtual', and unrealistic expectations that digital technologies will solve social problems. (Shields, 2003)

Companies with interest in the field say that "virtual worlds [are] on the cusp of a major expansion" and are something to which people should be paying very close attention (Thomas, 2008, p. 1). Corporate experts have suggested that "virtual worlds provide a clean slate for organizational renewal, a transition from the rigid structures and boundaries of the industrial (physical) world to the flexibility and innovation of the knowledge (intangible) world" (Cross, O'Driscoll, & Trondsen, 2007, p. 1). These experts also suggest that SL, which is not the only virtual world in existence,

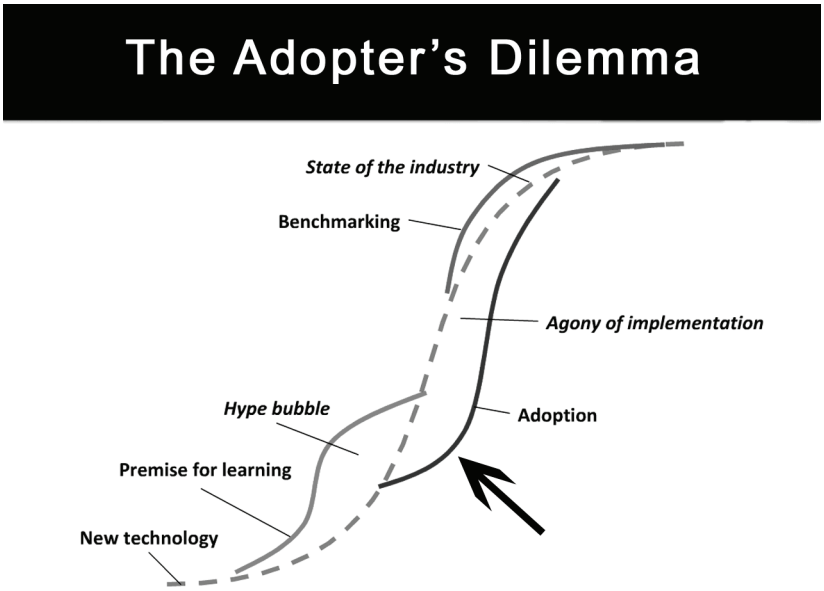
may not be the proper fit for a particular organization; careful research is needed to choose the option which will adequately meet the corporation's needs.

SL remains the "virtual world of choice" for academia, particularly in the UK, where it is being used "in a very wide range of teaching and learning activities"[3] (Kirriemuir, 2009, p. 2). In fact, Kirriemuir (2009) notes that there has been a significant increase in SL use in the last two years. Factors contributing to this trend include that it has become "more academically acceptable" at the same time that improved technology makes it easier to access and funding has become easier to obtain. In May 2009, Texas State Technical College granted a certificate in digital media to the first-known student ever to graduate from an institution of higher learning based on classes taken entirely in a virtual environment (TSTC, 2009).

There are very good business reasons to explore and use more than one delivery platform simultaneously. Corporate use of public grid areas on SL servers are best used to provide outreach to a general audience, as in the case of NOAA noted earlier. People who might not otherwise know who NOAA is can now take a few self-directed minutes and gain insight into the mission and objectives of an organization they previously knew nothing about. Corporate use of public grids with private access on SL servers is traditionally used for employee training, collaboration between employees and perhaps even interfacing with clients and customers. Xerox provides an area in SL for their Research and Development team as does Intel who also provides advertising and market-testing of digital replicas of products. Closed grids not accessible to the general public are very much in vogue. Linden Lab is developing a proprietary stand-alone version of SL, which corporations can implement on their own corporate servers. This version is still being tested by several corporations, including IBM, who wish to reap the benefits of a virtual environment from behind their own firewall.

Another creative and cost effective use for a private grid is virtual prototype testing. Rather than building several physical prototypes representative of the product (at a cost) and making

Figure 4. The Adopter's Dilemma: the arrow indicates that SL is just entering the early adoption phase



evolutionary changes along the way that require a rebuild of each version of the prototype, corporations can create a virtual prototype, allow it to evolve electronically, and then produce a better physical prototype later in the development cycle (Stackpole, 2008). Deere & Co. is using this process to develop a cotton picker that handles an increased volume of cotton without increasing horsepower.

Even SL is getting into the act: in May 2009, Case Western University announced a new venture as it became the first to "host a private, stand-alone version of SL behind its firewall" (Parry, 2009).

BEYOND SECOND LIFE

SL is, however, far from the only MUVE in town. Project Wonderland, developed by Sun Microsystems Laboratories in conjunction with the open-source community, is a completely extensible toolkit, based on Java, for creating collaborative 3D virtual worlds; it is "robust enough in terms of security, scalability, reliability, and functionality that organizations can rely on it as a place to conduct real business" (Project Wonderland, n.d.). Sun has used Project Wonderland to create MPK20, a virtual recreation of Sun's Menlo Park campus, which allows employees to "accomplish their real work, share documents, and meet with colleagues" in a virtual environment (MPK20, n.d.).

Another promising new technology is Caspian Learning's Serious Games authoring platform, Thinking Worlds, which provides a "drag and drop" capability to create simulations with custom assets, people, models, etc. "This thing was so easy to use, that in the UK tens of thousands of school children (8+) started using it virally to make their own games" (SLED/Partridge, 2009b).

IBM recently announced a new "3D conferencing product," Virtual Collaboration for Lotus Sametime. Universities as well as the aerospace and defense industries are pilot users (Virtual World News, 2009a). The U.S. military is using virtual worlds for training not only on the internet but also on a classified network known as SIPRnet (Wilson, 2008). In fact, O'Brien (2005) points out that "Many [virtual world design] contractors have so much work from the Army and the Marines, they have to turn new clients away". The Army is currently creating a new organization which will develop a simulation toolkit, scheduled for deployment between 2010 and 2015, that "allows end users to build and customized [sic] their own training scenarios without needing a contractor to do it for them" (Wilson, 2008, p. 5).

As mentioned earlier, closed grids on private servers are being examined with increasing interest because they can be built behind firewalls for greater privacy and security. In such cases, it becomes possible to utilize real names to facilitate identity verification, further enhancing security. Universities, for example, envision such systems as providing more control over which students are engaging in learning activities (and ensuring that only registered, paid students are doing so) (IBM, 2009). Case Western University, for example, intends to mix adults and children on its closed grid, something not easily possible in the commercial SL; with this tool, the campus Hispanic club will be able to provide mentors to Cleveland public-school students (Parry, 2009). On the other hand, corporations may shy away from SL in search of something more, well, corporate: a participant in a pilot using Forterra's Online Interactive Virtual Environment (OLIVE) noted that "A lot of what I've seen with SL feels very 'out there.' … [OLIVE] was business-oriented and real for people" (Badger, 2008, p. 14).

THE FUTURE OF SL AND OTHER MUVES

That the popularity of MUVEs will continue to expand is clear; Gartner (2007, quoted in Salmon, 2009) predicted that "by the end of 2011, 80% of all active Internet users [will] have an avatar and

[will] be registered in one or more virtual worlds" (p. 528). What will those virtual worlds look like, and how will they provide more conducive spaces for learning? One trend is certainly the integration of the 3D features of virtual worlds with those of 2D applications; for example, document creation and collaboration, whether through traditional word processing software or social networking tools such as wikis and blogs.

In particular, educators, whether in academia, government, or corporate settings, are very interested in bringing the capabilities of 2D learning management systems (LMS) to bear on the 3D environment; SLOODLE is the most commonly cited application. Kemp (2009) notes that it provides features such as identity management, linking SL and Moodle for avatar registration; text chat support and integration; and archiving and retrieval of chat sessions. Other features include "blogging for reflection" (also known as taking notes) (Kemp, Livingstone, & Bloomfield, 2009, p. 553) and assessment tools such as quizzes and drop-boxes. Thinking Worlds, mentioned above, is designed with an integrated LMS and "even offers [a] SCORM compliant database" (SLED/Partridge, 2009b).

Badger (2008) points out a number of significant lessons based on a pilot project on the use of MUVEs, conducted in collaboration with the Masie Center's Learning Consortium.[4] One of the most important lessons is the necessity of securing support from a corporation's IT department. Although eight companies were initially involved in the project, six dropped out, mostly because they could not get backing from their IT departments (Badger, 2008). Badger's recipe for success in establishing a corporate training venture in MUVEs contains the following ingredients:

- Define your use case
- Consider your team members and skills as they relate to the implementation
- Use the crawl-walk-run approach
- Get tutorials and training
- Keep an open mind in creating the prototype
- Pilot with affected users
- Conduct frequent post mortems (Badger, 2008, p. 18)

CONCLUSION

To truly understand the power and opportunities inherent in virtual worlds, most experts recommend that it is necessary to get into SL and experience it to determine if the virtual environment is a good fit for organizational strategies (Thomas, 2008). Adopting an emerging trend such as this without careful consideration of the many aspects outlined in this paper is done so "at [your] own peril" (Thomas, 2008). Follow the already tested and documented best practices and guidelines for distance education. Watch what others are doing and learn from their mistakes. Only then can a determination be made regarding a MUVE's appropriateness to meet the needs of an organization and the human capital that supports it.

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KEY TERMS AND DEFINITIONS

Avatar: A computer user's electronic representation of the self; the online persona of the individual user.

Blackboard: A web-based course management system.

Closed Grid: The architecture system within Second Life that is closed to the general public and only available to those with designated access.

Java: Developed by Sun Microsystems, Java is a computer language that extends the functionality of a typically static web browser to a variety of interactive functions.

Moodle/Angel: A free and open source Learning Management System.

MUVE: Multi-User Virtual Environments (another term for virtual worlds).

Open Grid: The architecture system within Second Life that is considered open to anyone who wishes to participate.

RL: Real Life

SCORM: Shared Content Object Reference Model is a technical model that distinguishes how online learning is designed and delivered.

Second Life: A virtual world create by Linden Lab in 2003.

SLED: The Second Life Educators list

SLOODLE: A free- plug-in for Second Life that combines and integrates the benefits of Moodle and Second Life. This product links avatar performance in Second Life to a learning management system allowing trackable performance goals and objectives.

Social Networking: The grouping of individuals into a collective unit for the purposes of socializing, developing relationships and sharing common interests

WOW (World of Warcraft): A very popular online multi-player role-playing game

ENDNOTES

1 Stating how many *Second* Life users there are is not as easy as it may sound. Generally, readers will think of a "user" as a unique individual. In SL, many individuals have created more than one avatar. A "resident" is SL terminology for an avatar. Separately, while there are an average of 60,000 avatars in-world each day, it is easy to think that they may not be the same 60,000 avatars as were there the day before or the same that will be there tomorrow.

2 Some recent examples of items offered to others on the SLED list include an Audio Content Delivery System; the use of land for testing and experimenting; a "simulated discussion group to help train group leaders and members" in which fake avatars respond based on scripts (SLED/Nor
ris, 3/30/09); and various scripts and objects. Also, a number of locations for educators offer items such as free presentation tools, professional clothing, etc.

3 The list includes Open University, Edinburgh, Coventry, Lancaster, Teesside, Southamption Solent, and Glasgow Caledonian (Kirriemuir, 2009).

4 The MASIE Center, founded by Eliot Masie, is a "think-tank focused on how organizations can support learning and knowledge within the work force." The Learning Consortium is a "coalition of 240 Fortune 500 companies cooperating on the evolution of learning strategies" (Badger, 2008, p. 7).