Virtual Worlds for Learning and Training

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ABOUT THIS REPORT

A record number of students are taking online courses today, and the number is rising steadily. Technology-based learning is also seeing growing use in companies. Still, significant improvements in learners' online learning experience are necessary if online learning is to see continued growth and success. We have long known that learning is a social activity, so greater opportunities for social networking, communication, and collaboration are likely to make online learning more appealing and effective. The dramatic growth of video gaming in recent years has also made educators and learning designers consider the possibilities of applying game and simulation principles in online learning to make online learning more engaging and interesting.

The growing popularity of virtual worlds in recent years—including the dramatic success of the massively multiplayer online game World of Warcraft as well as the rapid growth of Second Life, a visually rich, avatar-mediated three-dimensional virtual environment—is making available new online platforms and technologies that could take online learning and training to the next level, where new and different forms of socialization, communication, and collaboration can take place. Although efforts to incorporate these virtual worlds in more "serious" applications beyond entertainment are in their infancy, a growing number of enterprises are now exploring ways to use virtual worlds, especially Second Life, for a variety of business applications, including learning and training.

This report explores how virtual worlds, and Second Life in particular, may find use in learning and training. It describes early-adopter organizations' current activities and plans on this front and presents some plausible scenarios of future uses of virtual worlds for learning. Organizations that like to innovate and be among early adopters of technologies, perhaps partly to send a signal to their employees and customers, should consider initiating pilot projects to learn and gain new insights—especially because they can do so at low cost. Even organizations that are unlikely to embrace the use of virtual worlds for learning or other business applications in the next few years are wise at least to monitor and become familiar with virtual-world developments in light of the opportunities and threats that these advances are likely to present.

EXECUTIVE SUMMARY

The Emergence of Virtual Worlds

Innovation has become a top priority in many organizations in recent years because it offers a path to top-line growth and profit margins. Virtual worlds are potential innovation platforms or environments because they enable organizations to test new product and process concepts cost-effectively. Longer term, these virtual environments may also represent transformative technologies that enable dramatically new ways of social interaction and of conducting business—especially as future computing-network infrastructures improve significantly (a very likely scenario). Learning and training will likely piggyback on these developments.

Virtual worlds have existed for more than ten years but have seen dramatic growth and attracted the attention of users and the popular media in the past year or two. Tens of millions of people around the world are now regular users or members of virtual worlds. This growth has been possible because of improved game design and improved platforms and tools. The impact of these advances is clear in the strong appeal of World of Warcraft in different parts of the world and in Second Life residents' ability to build and sell their own virtual creations in their virtual world. Advances in computer software and hardware—better graphics cards, better microprocessors, and higher-quality and lower-cost computer monitors—have also made the virtual-world experience more satisfactory. Virtual experiences have also improved because of higher-speed (and lower-cost) Internet connections around the world.

Many of today's virtual worlds focus on gaming and entertainment, but others are three-dimensional virtual environments in which users can socialize and interact within environments that they build or customize, taking advantage of relatively easy-to-use tools and technologies. This report focuses mostly on a particular virtual world, Second Life by Linden Lab, which has attracted the strong interest of a wide range of organizations in the past year or so, including education institutions and enterprises that see potential for a variety of business operations in the Second Life environment.

The Innovator and Early-Adoption Stage

Since version 1.0 of Second Life's software client launched in June 2003—the company opened its doors in 1999—almost all enterprise use of the platform has been at the innovator and early-adoption stage. And, in general, large corporations have started to explore the use of Second Life only in the past year or so.

IBM is one of the most prominent early adopters of Second Life. This early participation should perhaps not be surprising, given the company's focus on innovation and services and its interest in how new technology can find use in its internal operations and how its clients can gain competitive advantage

through technology. Sun Microsystems and a number of other large corporations from different industries, including manufacturing and advertising and media companies, are also becoming active in Second Life.

Learning and training is still at a nascent stage in Second Life, but a number of educational institutions have built operations to test the possibilities, and NETg (a part of Thomson that will soon be part of SkillSoft) has also built learning and training operations in Second Life. Others, including Apple Computer, are now in the planning stage, exploring how to take advantage of Second Life's innovative platform and assessing the tools and technologies available for designing and building learning and training facilities and operations.

The Future of Virtual-World Learning and Training

A number of academic institutions and enterprises have already established operations in Second Life, and others plan to launch pilots to explore ways to use the Second Life environment (although some organizations will prefer Active Worlds, ProtonMedia, Forterra Systems, Caspian Learning, or one of the other virtual-world environments). We expect to see a growing number of organizations following these leaders' example by launching pilots or at least looking at ways in which they might take advantage of virtual worlds.

The tools in today's virtual worlds that enable users to design and build a wide range of artifacts will likely give users increasing functionality and the ability to do new and innovative tasks. We also expect to see growing integration of external tools and technologies into virtual-world environments, giving greater capabilities to individuals or enterprises that provide design and construction services. This development will allow the creation of increasingly sophisticated equipment as well as realistic simulations for use by learning and training operations.

The popular press's growing interest in Second Life, especially in the second half of 2006, has caused the number of users to increase exponentially, but reports that Second Life professional designers and builders are making six-figure incomes—along with the low barrier to entry—will likely attract a growing number of creative individuals to Second Life. As a result, the range of service offerings in Second Life will expand, and the rate of innovation will accelerate. This expansion will benefit enterprises that plan to create Second Life operations or to expand their current operations.

Recommendations and Action Steps

As enterprise adopters decide to test the waters of Second Life or other virtual worlds, the following action steps should be on their list:

- Align enterprise learning and training needs and learners' needs and preferences with virtual worlds' potential to facilitate learning.

- Prepare the technology infrastructure for virtual-world learning.
- Set up a virtual-world monitoring group and recruit a small number of "virtual-world explorers."
- Build low-cost game-based simulations for learning in virtual worlds.

Even vendors of learning products and services that don't plan to enter directly into virtual worlds in the near term cannot afford to ignore these developments. Vendors should consider taking the following action steps:

- Become knowledgeable about and conversant with virtual worlds.
- Examine virtual worlds as threats and opportunities.
- Use virtual worlds as a laboratory for innovation.
- Team up with clients to cocreate virtual-world learning operations.

THE EMERGENCE OF VIRTUAL WORLDS

No universally accepted terminology exists for so-called virtual worlds (see the box on page 6). Indiana University–based economist and researcher Edward Castronova, one of the most respected researchers in the field, prefers the term *synthetic worlds* and uses it in the title of his book *Synthetic Worlds: The Business and Culture of Online Games.* Interestingly, Castronova's book title implies that virtual or synthetic worlds are about gaming, even though one of the virtual worlds that has gained a great deal of publicity in the past year or so, Linden Lab's Second Life, has relatively little to do with gaming, at least so far. Today, gaming that includes the typical structural elements of games (especially video games)—rules, goals and objectives, outcomes and feedback, conflict and competition, challenge and opposition, interaction, and representation or story—is only a small part of Second Life's "residents'" activities in this three-dimensional (3-D) immersive virtual environment. According to Byron Reeves, a professor and media researcher at Stanford University, other important aspects of massive multiplayer online role-playing games include player self-representation, reputations, immediate feedback, ranks and levels, and marketplace and time pressure. Second Life does involve extensive role playing, but this form of play is, at least at present, quite different from the type of playing that takes place in most video games.

Virtual worlds are not a new phenomenon: Some worlds, such as Ultima Online, go back ten years or more, although they were much more primitive than most of today's virtual worlds. In recent years, however, the popularity and use of virtual worlds has exploded, and feature articles about virtual worlds—focusing increasingly on the business issues and commercial development that have emerged in virtual worlds—have appeared in *BusinessWeek,* the *Economist,* and other business, media, and technical magazines and journals. As a result, new attention is focusing on the kinds of environments in which many of us will likely spend a great deal of time working, socializing, collaborating, and playing in the not-too-distant future.

Meanwhile, people in technology circles (including respected technologists and researchers from large computer and media companies) are discussing a range of questions: Will virtual worlds—or specific virtual-world platforms (such as Second Life, which could be a platform for a range of applications)—become a next-generation operating system? (Robert Scoble, the well-known Microsoft blogger who is now with the start-up Podtech, is among those who see Second Life as an operating system.) Do virtual worlds represent truly disruptive and transformative technology platforms? (Mitch Kapor—creator of the Lotus 1-2-3 spreadsheet application, founder of the Electronic Frontier Foundation, and chairman of the Mozilla Foundation—thinks Second Life is indeed a disruptive platform, but he admits that he is not a neutral observer of this virtual world.) And even if most observers believe that the answer to these questions is no, virtual worlds may still have significant implications for online social and business activities and for the future of learning and training.

KEY CHARACTERISTICS OF VIRTUAL WORLDS

According to Betsy Book (in her presentation at the October 2004 State of Play 2 Conference), *Virtual Worlds Review*, and Wikipedia, the following are some of the commonly accepted main features of virtual worlds:

- *Shared space.* The worlds allow many users to participate at once.
- *Graphical user interface.* The worlds depict space visually, in styles ranging from two-dimensional "cartoon" imagery to more realistic three-dimensional environments.
- *Immediacy.* Interaction takes place in real time.
- *Interactivity.* The worlds allow users to alter, develop, build, or submit customized content.
- *Persistence.* The worlds continue to exist regardless of whether individual users are logged in and active.
- *Socialization or community.* The worlds allow and encourage the formation of in-world social groups like guilds, clubs, cliques, housemates, and neighborhoods.

We in the Learning-on-Demand program see Second Life as an immersive environment, although we admit that it is not as immersive as most forms of virtual reality—such as enclosed airplane simulators—which position users more fully inside the virtual environment. Second Life is immersive in a psychological sense: Some participants are consumed with their participation and perceive the activities of their avatars in Second Life as more "real" than their own physical lives. But Second Life is not, in its current instantiation—which offers two-dimensional representation of a three-dimensional world—as immersive as CAVEs (Cave Automatic virtual environment; see http://en.wikipedia.org/wiki/CAVE), virtual environments with stereoscopic-display goggles, or state-of-the-art flight simulators.

Several factors are driving the sudden and dramatic growth in popularity and interest in virtual worlds:

- *The combination of spreading broadband networks and improved computer hardware.* High-speed Internet connection, a key requirement for a great user experience in many massively multiplayer online games (MMOGs), such as World of Warcraft (see Table 1), has been especially important, but even other virtual worlds like Second Life yield much better user experiences with high-speed Internet connection. PCs with faster processing speeds, higher-quality graphic cards, and better audio systems have also helped make virtual worlds more appealing to users, and new improvements are on the way.
- *Improved game or world designs.* Great technology and high-speed networks will do little good unless the games or virtual worlds are well designed (and new academic game-design programs are emerging in universities around the world, including in China). The sharp contrast between the disappointing response to the Sims Online (which most analysts had expected to do very well, by leveraging the success of Sim City) and the dramatic success of World of Warcraft clearly demonstrates the power of design to create engagement

and appeal and to attract millions of users. But other factors, such as business models, also determine the degree of success. Runescape's offer of free memberships to users (see Table 1) no doubt helped boost its popularity, especially because most of its users are teenagers, who may be more price sensitive than young adults playing other MMOGs.

- *Growing interest in serious games.* Educators and researchers have shown growing interest in the potential of games, especially video games and online games, to create more engaging, interactive, and effective learning experiences. Annual serious-games conferences take place, and games for health have emerged as a popular genre within the serious-games movement. John Seely Brown (former chief scientist at Xerox PARC and now associated with the Annenberg Center for Communications at the University of Southern California), Edward Castronova (who in October 2006 funded the first phase of a new center for the study of synthetic worlds at Indiana University), Constance Steinkuehler and James Gee (researchers at ADL Colab at the University of Wisconsin–Madison), and others are among the leaders of a growing number of researchers examining the connections between gaming or virtual worlds and learning. They are helping to generate interest in and attention to the more serious side of these worlds.

The growing popularity of virtual worlds in recent years is also evident in the growing use of 3-D modeling and simulations as well as in improvement in virtual-reality technology. These technologies have been evolving for many years but are now reaching a high level of sophistication. For instance, increasingly advanced technologies of these types are finding use in medical training at the Stanford Medical School among other institutions. But these technologies are finding use in a growing number of applications and industries, and the U.S. government is an important customer for many of the companies building 3-D simulations. DigitalSpaces (DSS), a small Santa Cruz, California–based company, for instance, has for years built shared, 3-D virtual spaces on the Internet and has for years created sophisticated 3-D real-time simulation models for NASA to test lunar and other vehicles and technologies. The DSS platform takes advantage of open-design engines, which are available as open source (see the Learning-on-Demand [LoD] program report *Open-Source and Open-Access Learning*).

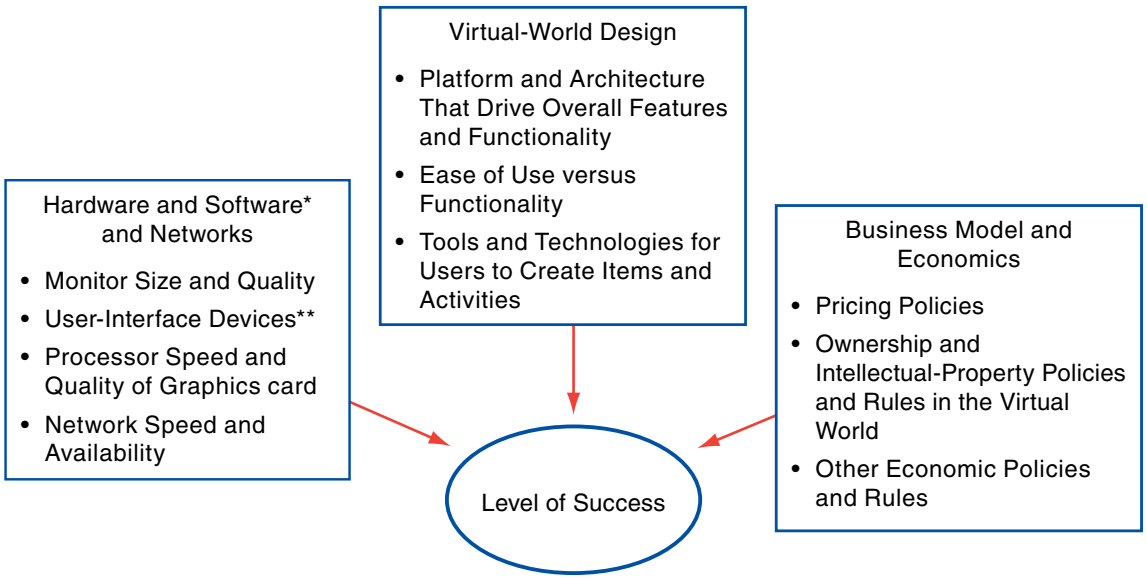
Table 1
SELECTED VIRTUAL WORLDS

World	Comments
Second Life	This imaginative and creative online environment has seen rapid growth since its launch. Its more than 1 million "residents" socialize, collaborate, and conduct commercial transactions with items that they have designed and built. Ownership of virtual goods is a key part of this virtual environment and its growth.
Cyworld (South Korea)	Some 15 million people—some one-third of South Korea's population—are registered users, and Cyworld has some 20 million daily unique visitors.
World of Warcraft	World of Warcraft is one of the most popular online games, with more than 6.5 million subscribers worldwide and some 500 000 simultaneous players. Analysts see this massively multiplayer online game (MMOG) as the first one with strong global appeal, including appeal in Asia.
Runescape (United Kingdom)	Basic membership in this world is free, and this strategy has helped build a user base of more than 5 million people. The environment combines social networking and entertainment.
Sims Online	Analysts expected this MMOG to do very well because of its lineage to the Sims video games, but so far it has not come close to meeting early expectations and lags far behind the most popular MMOGs.
Active Worlds (AW)	This platform is popular with many educational institutions that have built virtual worlds using it. One program at Cornell University has more than 80 AWs that focus on science education. More than 1000 unique AWs exist.
There	This virtual world launched in late 2003 and has free basic membership. According to *Virtual World Review,* "There has 'PG-13' standards and is a very social world, with chatting and making friends as the main focus. Members are encouraged to explore There with buggies and 'hoverboards' that carry avatars safely and swiftly around virtual terrain."
Forterra Systems	The company, which began operation in 1998, has an online, interactive, virtual-environment platform that allows customers to generate three-dimensional (3-D) virtual environments. The platform includes a set of tools and interfaces that allow nonprogrammers to create application-specific content and scenarios. One of the company's projects—working with Stanford University Medical Media and Information Technology Center—has received U.S. government Small Business Innovation Research funding.
ProtonMedia	The company touts its "experiential communications platform," which combines elements of simulations, games, authoring tools, and online meetings in an immersive 3-D world. The platform fosters collaboration, using chat and sharable white boards, for example. The company has a number of pharmaceutical and health-care clients—including GlaxoSmithKline, Johnson & Johnson, Merck, and AstraZeneca—but it also has clients from the technology and media industries.

Source: Wikipedia; Edward Castronova, *Synthetic Worlds: The Business and Culture of Online Games*; *Virtual World Review*; SRI Consulting Business Intelligence (SRIC-BI)

Thanks to significant progress on these fronts, high-fidelity 3-D simulations with a high degree of realism are increasingly common. In the gaming world, physics and other types of increasingly sophisticated engines are now available to produce unequaled 3-D realism in games. Immersive, 3-D virtual worlds are a logical and natural extension of these developments into the online environment. In combination with improvements in the other elements in Figure 1, these various technology-related developments have produced a much more satisfying user experience. Virtual worlds are likely to become much more widespread and a common part of everyday life for many people. Therefore, learning—alongside socializing, entertainment, and commerce—will be one of the activities that people do in virtual worlds. Learning has an opportunity to piggyback on this important technology development.

Figure 1
VIRTUAL-WORLD SUCCESS FACTORS



* Hardware and software that may affect the user experience in virtual worlds include PCs, televisions (especially large, digital, high-definition TVs), and other platforms (including a growing range of mobile devices). Three-dimensional sound will also become a factor affecting user experience in the not-too-distant future.

** In 2006, Nintendo introduced a radically new user-interface device—the Wii Remote, with motion-sensing capability—that enables players to interact in more intuitive ways with the video game.

Source: SRI Consulting Business Intelligence (SRIC-BI)

THE INNOVATOR AND EARLY-ADOPTER PHASE

Although gaming capabilities have emerged over a number of years, the application of virtual worlds to business and learning is very recent. Today use of these technologies and virtual worlds for learning is at the innovator and early-adopter stage. But we are seeing the early signs of interesting opportunities to use these virtual worlds both for "serious games" (or "hard fun," as some game-based learning designers refer to these applications) and for non-game-based learning and training activities. A growing number of educational institutions and companies are now giving serious consideration to using virtual worlds for learning and training, and a small number of well-known players have already taken actions and are actively building, or conducting advanced planning for, virtual-world activities. We may be today at the tipping point for the use of virtual worlds for learning (and business). Sufficiently compelling reasons exist both on the demand side (including the need to create more engaging learning environments for the so-called Gen Y or Millennials workers who will enter the workforce) and on the supply side (with the technology sufficiently mature to enable 3-D immersive virtual user experiences that were not possible before).

A wide range of platforms—mostly proprietary and commercial but some, like Croquet, open source—find use today for virtual worlds. But one platform, Second Life, has particularly attracted the interest of organizations from a wide range of industries and sectors, perhaps because it does not aim to be a "gaming environment" like many of the other virtual worlds in Table 1. For this reason, the rest of the report focuses mostly on this platform.

Second Life: Virtual World for Business and Learning

Second Life has garnered recognition in a wide range of well-regarded publications in the past year, especially in the past six months, and has generated an impressive amount of buzz, along with the inevitable hype. Some of this attention—and Second Life's success in bringing corporations, universities, government agencies, and other institutions into its virtual environment to establish a presence—stems from organizations' desire to experiment with the Second Life platform to determine what types of activities and operations are worth pursuing and investing in.

The media and public-relations (PR) effect of becoming active in Second Life—for example, by sponsoring a musical concert (which BBC has done), launching a new car model (Toyota), selling PCs (Dell), or holding a Second Life press conference to announce the launch of a Second Life presence and game-technology research (Sun Microsystems)—has no doubt helped justify participation in this virtual world. But beyond the PR buzz and short-term attention that these Second Life activities generate, most organizations see the potential for more significant, longer-term benefits. This potential drives companies like IBM, Apple, NETg, and others, whose Second Life operations

and plans I discuss below. The reasons for this belief are many, but companies largely respond to Second Life's features and characteristics (see Table 2) and the opportunities they present for taking certain actions, building facilities, and organizing and testing processes on this new platform.

Table 2
SECOND LIFE: A PLATFORM FOR LEARNING AND TRAINING?

Features and Characteristics	Description
Platform with creative freedom	Linden Lab has built a set of tools and technologies that enable individuals or companies to build a wide range of artifacts, from intricate buildings (and campuses) to clothing, and, of course, avatars. (Avatars are Internet users' representations of themselves, often in the form of 3-D models that find use in computer games.) Many individuals have established businesses to create and sell their constructs, and many design and development firms—such as Millions of Us and Electric Sheep Company—are now operating in Second Life. New tools are emerging as technology innovators create mashups of—combinations of content or applications from—other existing technologies.
Real time 3-D simulation and collaboration	Individuals—"residents"—can engage, through their avatars, in real-time simulation of various activities. For example, they can enter replicas of space rockets in the aerospace museum and fly them. Residents can also collaborate with others in building creations or in undertaking other activities.
Rapid, cost-effective prototyping	The Second Life scripting language and existing tools and technologies enable residents—or the entrepreneurs or "design and construction" firms in Second Life—to build intricate prototypes of a wide range of devices or structures. Architects can build and examine the quality of their designs and see how well they work by observing how residents use and interact with the structures.
Community building	Social groups can form, creating advanced versions of simpler social-networking spaces on the Web (like Face Book or MySpace). The 3-D immersive environment enables social interactions that are more like the types of true, face-to-face interactions that take place outside Second Life.
Nontraditional, engaging experiences	Residents can quickly move from one place in Second Life to another one by teleporting. Individuals from around the world can meet virtually in a conference room and work and socialize in ways that are difficult to replicate without spending considerable money and time to meet physically or to meet via expensive videoconferencing equipment. However, videoconferencing technology cannot replicate the Second Life experience.
Low-cost R&D lab—or virtual "petri dish"	Organizations can create social R&D labs and use Second Life as a virtual petri dish—for example, to experiment with ways to integrate learning into business processes and work flows.

Source: Linden Lab; SRIC-BI

The features and functionality available in Second Life have attracted organizations that are intrigued by the possibilities for this virtual world and that want to start experimenting and testing. In addition to the technological capabilities, the economics of Second Life operations are attractive because most activities are relatively low cost, for several reasons:

- *Low entry cost*. Participants of Second Life who want to be a member without owning virtual land have to pay nothing. Organizations that want to establish a presence in Second Life, however, have to buy land—some buy a private island—and pay an up-front and monthly rental fee to Linden Lab.
- *Competitive service market*. Thousands of members have learned to build artifacts in Second Life, and hundreds of participants now operate as commercial designers and contractors in Second Life, as do many design and construction firms that have built large and intricate campuses for organizations like the New Media Consortium.
- *Relative ease of building artifacts*. Building Second Life artifacts from the so-called primitives is not for everyone, but thousands have learned to do so. (Linden Lab reports that about 15% of residents engage in scripting—an impressive statistic because scripting is by no means trivial.) A trainer at Thomson NETg, Doug Bassett, learned enough (mostly in his spare time) to build an impressive Second Life facility for his company (see discussion below).

Second Life has existed for only some three years, so the company and its technology platform are at an early stage in their life and evolution. As **Construction of a Learning and Training Operation in Second Life** discusses, some issues still plague the Second Life platform and need resolution. This situation is not unusual for new technology platforms, and the Linden Lab staff is busily addressing the challenges. New technology capabilities may also emerge as innovators come up with new tools and technologies that can complement and enhance the virtual world that Linden Lab has built. The company also has an impressive board of directors, including some well-known veterans who can help guide the company as it tackles emerging challenges (see the box on page 13).

MITCH KAPOR: SECOND LIFE INVESTOR, CHAIRMAN OF THE BOARD, AND EVANGELIST

Mitch Kapor—creator of the Lotus 1-2-3 spreadsheet application, founder of the Electronic Frontier Foundation, and chairman of the Mozilla Foundation—spoke at the August 2006 Second Life Community Convention. Below are some key excerpts from his speech to the convention.

- "I am an enthusiast and fan and supporter and believer and advocate. I think there is something extraordinarily important going on here, and it's not just about the company, it's what is being created: the community and the innovation and the ways this will be transformative."
- "Second Life is a disruptive technology on the level of the personal computer or the Internet. Everything we can imagine and things we can't imagine from the real world will have their in-world counterparts, and it's a wonderful thing because there are many fewer constraints in Second Life than in real life, and it is, potentially at least, extraordinarily empowering."
- "Philip [Rosedate; the CEO of Linden Lab] had this radical idea that hadn't been done before about having an infinitely scalable virtual world by centralizing the back-end storage of the objects and terrain, and then streaming the geometry down to clients. It had not been done that way. Technical people said this was not going to work. But that hurdle was overcome, and the existence proof was built in six months."
- "There is an enormous explosion of new stuff going on in Second Life. The number of possibilities becoming real on a daily basis is exploding and expanding, and the kind of knowledge and understanding people have of it is also growing dramatically."
- "In the short term, right now there is still a chasm between the power users and the clueless newbies. Those are Second Life's slightly provocative terms, they are not the best, it's just a fact, there is still a significant number of people who come in, try it and leave. It's not ready for prime time. I don't believe it's going to change overnight. It's going to change in stages. It's hard to know how long it's going to take, and how long before it is mainstream. It's not tomorrow, it's not next year, but it's coming."

Academia: Leading the Way

As the recent LoD report *Open-Source and Open-Access Learning* makes clear, considerable research and innovation in learning technology are taking place on university campuses around the world. Therefore, the fact that a growing number of educators and academic researchers are now making their way into Second Life is not surprising. Although the view of the dean of Wharton School, Patrick Harker—"I think that the next big teaching innovation will come from the area of virtual worlds. Think Sim City and The Sims in a business environment."—has few adherents among his peers in university or business-school administration, a number of academics are at least open and willing to examine the possibilities that Second Life brings.

Professors, administrators, and researchers in academia have taken steps to use, or are planning activities around, Second Life in one or more of the following three ways:

- *As an innovative and virtual teaching platform and meeting place.* In a September 2006 announcement, Harvard Law School announced that Harvard Law School Professor Charles Nesson would coteach a course on argument

with his daughter, Harvard Extension School Instructor Rebecca Nesson, in the Second Life environment. The Harvard course will teach students how to use blogs, wikis, podcasts, and other electronic tools to make effective arguments. According to the announcement, the class will be open to the public through Harvard's extension school. Rebecca Nesson will hold virtual office hours in Second Life; Charles Nesson's office hours will be in his actual office.

The New Media Consortium (NMC)—consisting of nearly 200 leading colleges, universities, and museums dedicated to exploring and using new media and new technologies—has had a Second Life campus since early 2006. The consortium reportedly paid the Second Life design and development firm Electric Sheep Company $20 000 to build an impressive campus to use for lectures, meetings, and areas where NMC members can test how best to use this virtual environment for learning-related activities (For pictures and descriptions of Electric Sheep's creations for Second Life, see www.electricsheepcompany.com/portfolio.php; for a similar view of the output of another large Second Life service firm, Millions of Us, see www.millionsofus.com/portfolio/.)

- *As a place for interactive and experiential learning.* So far, most learning-related activities in Second Life have replicated traditional formats and forums for teaching in a virtual environment—for example, by constructing buildings, lecture halls, and auditoriums in which virtual lectures and presentations can take place. Although students appear in the form of avatars and can meet and interact through other student avatars, and thus can meet students from other parts of the world if they make prior arrangements, apparently few innovative, formal types of learning in Second Life have so far taken place. However, as the well-respected professor and researcher John Bransford pointed out in a discussion in Second Life in October 2006 (see the box on page 15), academics see advantages in the interactive and experiential learning possible in Second Life, including in ways and forms that may not be possible in the real world.
- *As a research lab for experimenting and innovating.* Dr. Bransford and other academics expect and hope to undertake experiments in Second Life because the virtual environment may enable educators and researchers to create new forms of learning environments quickly and easily. For Dr. Bransford's Second Life presentation, for instance, his students built a mazelike structure that attendees could enter and make their way through. Dr. Bransford integrated the activity into his discussion to illustrate the type of activities possible in such an environment. Architecture students from various schools—including from the School of Architecture in Stockholm, Sweden, and the School of Architecture at the University of Texas, Austin—have been able to test physical structures in Second Life, for example. Dr. Bransford and other social scientists plan to offer social activities for students to determine how effectively students learn and how they behave in different (virtual) environments.

JOHN BRANSFORD ON LEARNING IN SECOND LIFE

John D. Bransford is professor of education and psychology at the University of Washington in Seattle. He is also principal investigator and director of the Center for Learning in Informal and Formal Environments (LIFE), a program recently funded by the National Science Foundation (NSF). In the fall of 2004, the University of Washington, Stanford University, and SRI International received funding from the NSF for a five-year research center on the science of learning. The LIFE Center seeks to understand and advance human learning through a holistic focus on implicit, informal, and formal learning and thus to cultivate generalizable interdisciplinary theories that can guide the design of effective new technologies and learning environments.

On 2 October 2006, Dr. Bransford gave a presentation in Second Life on learning in this virtual world. The following are excerpts from his presentation (recorded by Jeremy Kemp of Simteach, Information and Community for Educators using Multi-User Virtual Environments):

- "Multi-user virtual environments (MUVEs) can support 'rigorous learning' if they have the right, effective designs. Environments like Second Life provide us with a way to learn from one another by collaborating in new ways that ultimately can restructure the nature of educational possibilities."
- "Second Life activities and learning experiences can be recorded and learning can come from combining the Second Life experience (via avatars) with discussion following review of the recording—discussions that can take place in real life if desired. Discussion can explore how people as a group—perhaps in the form of a number of avatars—frequently come to believe in a way of doing something."
- "MUVEs, such as Second Life, represent spaces for collective inquiry and action—going beyond situations where students are simply being told about concepts, and thus combining experience and description (as most learning is today, through lectures and books)."
- "Imagine an 'innovation island' where we collaborate to create and test environments to enhance learning. So I imagine an innovation in Second Life and on Second Life where we all collaborate. Anyone can use it. Make it better; do studies with it, and report them."
- "The big thing I see is the creativity out there and how much we could do together. We need a way to have a focused way to build on one another's work, however. All of us in Second Life are far from having a clear idea of how to establish this kind of innovation environment. But we are convinced that Second Life offers a great possibility for doing this."
- "We need a mechanism to reward distributed expertise. If we could help teams form—some builders, some educators, some researchers—and have them all get credit for their particular work, it would be great."

Industry: Testing the Waters

Discussions with LoD clients and other organizations have revealed strong curiosity about and interest in Second Life and in ways to use this virtual environment for learning and training. This interest comes despite realistic recognition that formal learning and training operations are unlikely to make significant use of Second Life in the short term. Yet, though most observers—and even Mitch Kapor—recognize that Second Life is not yet ready for prime time, many organizations believe that they need to start exploring and testing the platform, and climbing the Second Life learning curve, so that they can be ready when the time is right and even gain a running start. The three companies below certainly hold this view.

In view of educators' and researchers' growing interest in the potential use of Second Life for learning, and the increasing range of companies' commercial activities in Second Life, we should not be surprised that corporate thought leaders in learning and training have started to build the foundation for their future activities in this arena that some people believe may be the next-generation learning platform. Below are details on three important early adopters (see Table 3).

Table 3
SECOND LIFE LEARNING-RELATED ACTIVITIES BY SELECTED COMPANIES

Company	Activities
IBM	• The company is conducting a wide-ranging examination of Second Life and its potential longer-term business impacts. • More than 400 employees are currently active in a range of Second Life activities. • Globally distributed teams are using Second Life for meetings. • The company has undertaken no specific training activities so far but has begun planning for such activities. • A number of research projects are under way to improve the company's understanding of how it—and its partners and customers—might use Second Life.
NETg	• Thompson NETg is committed to exploring how it can use Second Life for formal learning/training. • One dedicated employee (Doug Bassett) built the NETg facility in Second Life. • The company hopes to leverage and create synergy between its online training classes and its Second Life operations.
Apple Computer	• The largest training group at Apple—under Lucy Carter, director of World Wide Sales and Communications—is making plans for its Second Life presence. • Carter's group wants to explore ways it could use Second Life to train and engage young retail-sales associates. • Apple hopes that Second Life will be a useful laboratory in which creative and technology and design-savvy talented employees can experiment with ideas.

Source: SRIC-BI

- *IBM: leading in technology and service to prepare for next-generation innovation.* IBM is one of a very few *Fortune* 100, or even *Fortune* 500, companies whose senior executives have strong familiarity with, and also talk publicly about, Second Life and its potential role in business and learning. (IBM's CEO and chairman, Sam Palmisano, even has his own Second Life avatar and has committed millions of dollars in investment in the company's virtual-world projects for 2007). The company already has built a strong

presence in Second Life, and it has its own private island with facilities for current and future activities. Many IBM employees, often part of global teams, meet regularly in conference rooms in Second Life, and they report that being present at such meetings through their avatars brings a new dimension to virtual meetings. Participants report that the ability to face colleagues one-on-one and to make gestures and body movements makes these meetings different and more interesting. The experiment is too new to determine—either from these team meetings among IBM employees or from research projects that IBM is conducting in Second Life—how much more effectively employees work, communicate, and learn through the greater social interaction possible in Second Life's 3-D, immersive environment. But even if the company gains some short-term benefits by making team meetings more interesting and perhaps effective, IBM sees its Second Life operations mostly as a long-term R&D investment to gain new insights into the potential social, business, and technology impacts of virtual worlds, whether they find use for business or for entertainment. But senior executives at IBM—including Ted Hoff, IBM vice president, Learning—see the important role of virtual worlds and video games as they add a new dimension to corporate training because "people don't perceive game play as learning—which makes them more willing to take risks, more flexible in their thinking, and faster at connecting with others to help solve complex problems." If Mitch Kapor and others are right in thinking that Second Life may become a common, next-generation operating system for a 3-D Web, IBM's wide-ranging involvement in Second Life will give it a central position to participate in, and perhaps influence, the evolution of this operating system.

- *Apple: designing leading-edge, engaging, and effective sales training for the future.* Lucy Carter, the director of Apple's World Wide Sales and Communications group, has seen how her own kids interact with and learn from video and online games and has experienced the challenges of training young retail sales associates at Apple's retail partners of Circuit City, Best Buy, and others. As a result, when she and members of her team attended a demonstration of Second Life by Joe Miller, vice president of Platform and Technology Development at Linden Lab, at the September 2006 meeting of the eLearning Forum at Apple Computer, Carter decided that Second Life represents a potentially important opportunity for her team and for Apple as a whole, and she began plans to launch a Second Life initiative the first quarter of 2007. Because of Apple's unique and strong emphasis on internally created design and on details of "look and feel," as well as the user interface, Carter says that Apple is unlikely to use external resources to design and build its Second Life operations. In fact, Apple's employees will most likely embrace the opportunity to leverage their design creativity, and their understanding of the needs of the company's learning and training operations will reinforce the case for using internal staff to build Apple's Second Life operations. Although the corporate cultures of Apple's retail partners vary, Carter is confident that

most or all of the partners will be enthusiastic about the plans to experiment and test Second Life as a training-delivery platform. The goal of these operations is for retail sales associates to be able to learn while they do their work (in the virtual environment), rather than attend training classes that are separate from work. Finally, Carter thinks that a well-designed system, perhaps with gaming elements, may motivate sales associates to access the Second Life environment even in their spare time.

- *NETg: leveraging online training classes to test a next-generation delivery platform.* One reason that NETg is a leader and early adopter of Second Life is that its parent organization, Thomson, is a large publishing and media company with a commitment to R&D to explore "next-generation learning." (In October 2006, however, Thomson announced that it will sell NETg to SkillSoft, a large eLearning-content company. The move raises questions about the future of NETg's Second Life operations.) NETg's Second Life initiative has had senior executive support. In addition, NETg offers a large number of online courses as part of its core business, so its Second Life operation needs only to complement and leverage its current operations and, in the process, build additional traffic and buzz for the company. In a short time, one of NETg's online instructors, Doug Bassett, who has taken a strong personal interest in the Second Life initiative, taught himself to design and build the NETg facilities in Second Life. These facilities include classrooms and auditoriums with computers and large screens that can display streaming video during presentations and lectures. The seats contain audio, so students can listen to podcasts or audio files that relate to video or class lectures. Chairs in lounge facilities inside or outside also have built-in audio connections to allow students to listen to music or podcasts. According to NETg, live classes are available on its Second Life island, and these operations are profitable. The company is primarily interested in marketing its Second Life initiative and believes that its presence in Second Life enables it to extend its reach (beyond its traditional audience) and to develop new relationships through its Second Life class offerings.

A number of other companies are launching projects and initiatives in Second Life, many of which have, or may have, at least indirect learning implications. Many of these companies want to observe and monitor how consumers react to existing and new products or media campaigns that they launch in Second Life. For example, Toyota has introduced new car models in Second Life to see consumer reactions, Sony BMG test-markets new music or bands, Starwood Hotels has tested reactions to new concepts for hotel architecture, and Sun, whose Sun Pavillion in Second Life focuses on its Java technology, presents and invites feedback for new technology products. Such activities offer easy and cost-effective ways to gauge consumer reactions and to learn what adjustments a company should make in a product or service before launching it outside Second Life.

Reuters announced another intriguing use of Second Life in early October 2006. This global information company—which has become a leading user and developer of software applications in the online news and information business—revealed its plans to open a news bureau in Second Life. Not only will its journalists report the outside world's news in Second Life, but they will also report to the outside world on news and developments taking place in Second Life. As Castronova pointed out in his book on synthetic worlds, Second Life is a rich environment with financial, economic, social, and cultural developments that are becoming increasingly interesting to companies and individuals as virtual worlds become a larger part of our digital work, entertainment, and communications.

A number of possibilities exist for integrating Reuters' Second Life news operations and services directly or indirectly with learning and training operations in Second Life. NMC, NETg, or Apple could easily enable the mobile devices that users carry in Second Life to access Reuters news stories from inside or outside the virtual world into learning events and activities. Learners could then meet in the Reuters News Center in Second Life to discuss the latest developments, perhaps exploring how certain news stories and events could affect the sales of Apple products in certain parts of the world, for example. In short, Reuters has brought another element of the real world (news and information reporting) into Second Life to expand this virtual world's features and characteristics and bridge the real and virtual worlds.

Construction of a Learning and Training Operation in Second Life

Because of the novelty of using virtual worlds for applications beyond gaming for entertainment, most learning operations, whether those of educational institutions or those of the training company NETg, have not yet gone beyond replicating the activities and processes they use in their real-life operations. This patter is common with new technologies: Users of the new technology are often risk averse and don't know how to innovate, push the envelope, or use the new technology to do what they could not do with the old technology. Thus, many observers—especially the early adopters whom I describe above—will be watching the experiments by organizations in Second Life—especially efforts to create innovative learning activities and processes in Second Life in the next year or two and beyond.

Organizations that establish operations in Second Life typically go through the following three phases:

- *Planning.* Companies ask themselves several questions when they start planning for their Second Life operations. What are the main reasons for creating a presence in Second Life? What do we want to achieve, and what type of operation and presence do we want? Whom do we want to serve with these operations? Technology and service companies like IBM and Sun need to be in the middle of new technology developments, especially those that may have

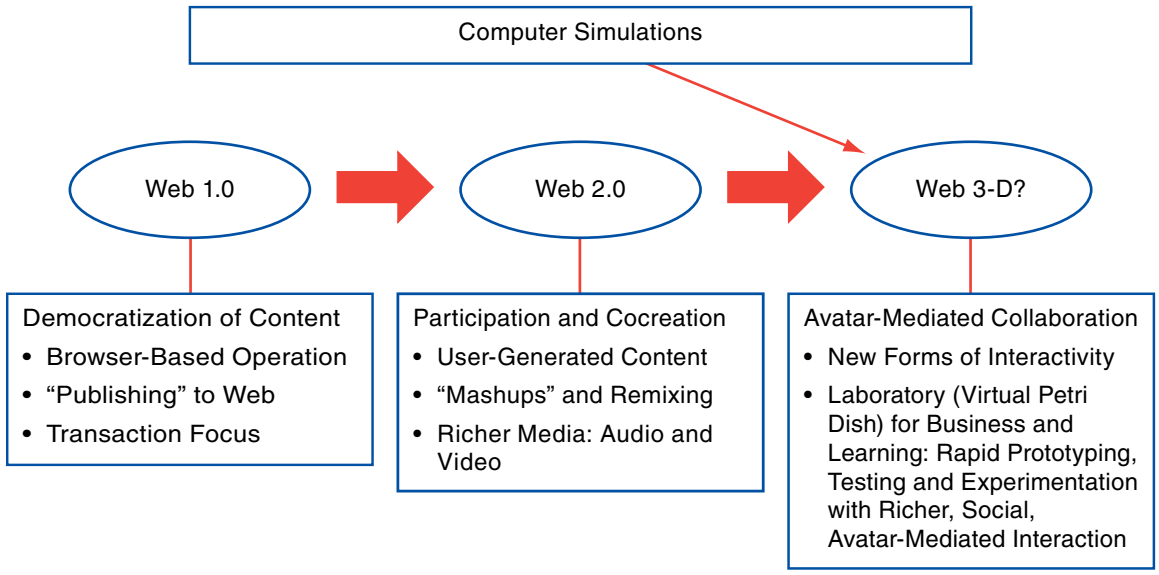
dramatic longer-term implications (as Mitch Kapor and others think Second Life may have), but others may want to be part of Second Life to show that they are on the leading edge of new technology and social developments. IBM also sees a need to do research about, and in, Second Life, and many other companies are likely to participate in Second Life for the same reason. Reuters and Apple also see a strong imperative to interact with and meet the needs of Generation Y, or even younger cohorts, and want to improve their understanding of how to serve them news, information, and learning. The planning phase should include a realistic assessment of potential obstacles and challenges that the organization may face in building and operating a Second Life facility (see the box on page 29), because the Second Life environment is not yet ready for prime time, as most operators in Second Life have seen.

- *Building.* Just as Apple will most likely build its own operation in Second Life, NETg has used internal resources, but many other organizations, including NMC, have taken advantage of the services available from individuals or firms in Second Life. The number of "designers and contractors" in Second Life is increasing steadily, creating considerable competition on the Second Life supply side. However, as the number of organizations that want to have a Second Life presence goes up—partly driven by a me-too phenomenon as some executives try to avoid falling behind their competitors—no one knows which way prices for Second Life design and building services will go. A unique aspect of Second Life, and virtual worlds in general, is the ease of reusing digital copies of past work, which enables developers to leverage and customize Second Life primitives that they have built up, for instance. Owners of Second Life structures can therefore make part or all of their digital models available to others. Copying digital objects has also emerged in 2006 as a very controversial development in Second Life as so-called CopyBots—computer programs, or bots, that allow users to make replicas of objects (that others have created)—have gained more common use in Second Life. One result is that some virtual entrepreneurs worry that their livelihoods are at stake.
- *Operating.* NETg envisions having (avatar) coaches and mentors available within its Second Life learning and training facilities, but most of its operations will leverage its online classes and the resources in use in these classes. Thus, it should incur little additional cost once it builds its basic facilities—beyond the rental fees it pays to Linden Lab. Reuters will have one or more in-world reporters, but the company will also leverage real-life news stories into Second Life at no significant marginal cost. IBM incurred a cost in buying its Second Life island and building its facilities, but the company has no significant recurring costs from its use of these facilities. Companies that have launched media campaigns in Second Life and hired media firms to help plan and execute these plans—which companies like Swivel Media and others do (Swivel worked with Wells Fargo's Second Life plans in 2005)—can spend several hundred thousand dollars or more, depending on the scope of their campaigns.

THE FUTURE OF VIRTUAL-WORLD LEARNING AND TRAINING

Rapid progress in design and technology has spurred dramatic growth in MMOGs and virtual worlds, which now open up new visions for transforming education and learning. (The box on page 23, on improvements in graphics-processing technologies, illustrates how virtual worlds can benefit from continuing technology advancement.) Excitement about virtual worlds goes far beyond education. Many technologists see a future like the one in Figure 2—in which the Web evolves into a 3-D Web.

Figure 2
VIRTUAL WORLDS: NEXT-GENERATION WEB?



Source: IBM; SRIC-BI

The type of change that Figure 2 shows will emerge very slowly—if at all, and many other changes are likely to take place to affect virtual worlds' operations, and Second Life in particular. Many of the changes in the next year or two will likely address many or all of the problems that users face today. But some of the changes will also result from Linden Lab's business and policy decisions, as the company searches for the best ways to serve consumers, residents, and the growing number of companies establishing themselves in Second Life. Another possibility is that a much larger player than Linden Lab—Microsoft, Sony, Apple, or Google, to mention just a few candidates—will either acquire Linden Lab or come up with the next version of Second Life.

Opportunities for Business

The opportunities available to companies in Second Life today, which are likely to become even more compelling in the future—especially if Linden Lab irons out lingering problems—fall into the following two categories:

- *Building and conducting operations on a private island in Second Life.* When Apple builds its learning and training operations for its sales associates in collaboration with its business partners, it is not likely to place these operations in open and public places (with a few possible exceptions). Some of these operations could also be partner specific, aiming to meet the unique needs of one or more of its retail partners. Conceivably, a partner could even prefer to have its own private island in Second Life and to build unique and proprietary sales operations. If so, it would build the island in collaboration with Apple, drawing on the expertise that Apple has gained in running its other Second Life operations. Other companies that want to protect their own operations and business processes in Second Life would also likely build them on their own private island. Some of these operations might conduct R&D activities that the companies do not want to be publicly accessible. Oil companies building training operations for offshore oil platforms, for example (see the use scenario below), are unlikely to open their facilities to anyone in Second Life because they will want to prevent disruption of and interference in the learning and training processes that they conduct on these facilities.
- *Interacting with Second Life residents in public spaces.* If the popularity of Second Life continues to grow, with millions of residents participating in a growing range of activities, the environment will become an attractive virtual laboratory in which companies can test new product and service concepts. Interacting with residents will therefore become one of the main objectives of companies' participation. Some organizations will conduct R&D projects to observe and analyze avatar behavior in situations that would be too difficult or too costly to replicate in real life. A significant share of Second Life's residents are from regions other than North America, and companies have an opportunity to test the reactions of consumers from different regions of the world to specific product and service concepts, which companies will be able to convey in 3-D virtual spaces to determine the best localization strategies. They will be able to design and build situations and processes that leverage the particular advantages of both the 3-D, immersive virtual environment and the diversity of consumers who come into this environment. Companies are already hosting special events to which they invite specific groups of consumers. Such by-invitation-only events will no doubt become common in Second Life.

Today, companies can import Hypertext Markup Language images from the Web into Second Life and use them to create objects like a Cisco router or an oil pump. Or they can bring audio and video files into Second Life, as NETg and

others have done, to provide educational or entertainment content. Interactivity in Second Life will undoubtedly become richer as companies blend applications and technologies and bridge in-world and out-of-world environments. YouTube, Flicker, and other applications may therefore become common elements in Second Life, and some analysts speculate that payment mechanisms like PayPal may also soon find their way into Second Life. Although Second Life is a proprietary platform, Linden Lab cannot afford to be very restrictive in the types of technology innovations that it allows residents to come up with. Even if Active World, Croquet (an open-source virtual-world technology that is in early development), and other virtual worlds don't today have the buzz and growth that Second Life is now experiencing, fortunes change quickly in today's fickle world of digital media, and Linden Lab does not want to alienate its resident individuals and companies by imposing policies that are very restrictive.

IMPROVEMENTS IN GRAPHICS-PROCESSING TECHNOLOGIES

Several improvements on the near horizon for graphics processing will enable improved experiences for users and residents of virtual three-dimensional (3-D) worlds such as Second Life (although the improvements may be driven more by computer vendors' desire to improve the experience of 3-D games by extreme gamers). One of the key additional technological components will be the general deployment of Microsoft's Vista operating system (OS; now available for corporations and presumably to consumers in January 2007). Vista will require a high-end computer for successful operation, including a recent microprocessor (faster than 1 gigahertz), substantial memory, and a very capable graphics-processing unit (GPU; typically a top-of-the line—or close to top-of-the line—graphics unit from NVIDIA, ATI, or their direct competitors), to keep up with the graphics inherent in Vista. In the past, the deployment of a new OS by Microsoft has generated additional computer sales, and in this case, Vista-capable computers will have to have high-performance GPUs. Vista will also further enable improved graphics by the use of its graphics-processing management and get additional capabilities from already powerful graphics-processing chips and cards from NVIDIA and ATI, the leading vendors.

The graphics component in Vista is more sophisticated than that of previous Windows versions—the operating system will manage and share GPU capabilities, enabling features such as graphics-memory management, including virtualized memory, GPU command scheduling, and multitasking. Vista, for example, will control video memory—which previous operating systems have not done—and determine when to move data to the graphics card and will also be able to extend GPU memory limits using system or virtual memory. Multitasking and resource sharing will also improve under Vista, enabling application program developers to write code to Vista's DirectX 10 application programming interface for graphics and reducing the need to for programmers to define physical interfaces for each individual computer. Vista will be aware of individual computers' graphics capabilities, and ideally, apportion resources optimally for graphics tasks. Consumers will not have to update their computer's configurations for graphics, letting Vista do so for them.

In addition to finding improvements in specialized graphics processing, computer users will also benefit from the deployment of multiple "cores" (multiple individual processing units) within general-purpose microprocessor chips. Intel and AMD already sell dual-core microprocessors; Intel recently began selling its "quad-core" chips (four-core microprocessors), though in limited amounts, at a high premium. AMD will sell its competing versions of quad-core chips early in 2007, and in so doing, reduce prices and increase supply.

Challenges and Risk

The rise of Second Life has been dramatic, and no guarantee exists that the recent growth and buzz will continue. The prospects for continued growth and success look good today, and the current momentum is strong. But some observers believe that Linden Lab will need not only to make significant progress in solving current challenges, but also to offer more diversified activities in Second Life to keep existing residents and to sustain the current growth rate of new members and visitors.

The latter challenge may find at least a partial solution in the growing number of companies providing a greater variety of activities, but whether today's types of entertainment events (live concerts, for example) and commercial activities (such as product public relations and launches) will be sufficiently engaging to satisfy the growing Second Life community is unclear. Linden Lab, companies operating in Second Life, and innovative entrepreneurs may well come up with new and interesting activities that increase Second Life's appeal, such as:

- *Creating games in Second Life.* Video games and MMOGs are often addictive because they present players with challenges of increasing difficulty. Each time a player reaches a new level of the game, he or she gains a sense of accomplishment and achievement (and the bragging rights that go with it). Today, Second Life has none of these elements (or any of the other elements typical of video games)—at least in any significant way. Some participants have created games on the Second Life platform, including one that has achieved commercialization outside Second Life. But can, and will, more engaging games—along the lines of some of the most popular MMOGs or other types of games, perhaps more "serious" games—become part of Second Life to give it a new entertainment dimension?
- *Enabling more useful simulations.* For companies that want to use Second Life for more serious and business-related activities, such as learning and training, the ability to build sophisticated simulations easily—for real-time operations of equipment and machinery, for instance—would raise the appeal of the environment. This capability would enable more complete simulation of real business operations and thus allow integration of learning and training into (virtual) business processes. Today, Second Life allows the import of some applications, but many digital models built with Pro E, AutoCad, and other applications are not convertible into Second Life models—which use Second Life primitives and Second Life scripting—unless the developer is willing to put in a great deal of manual programming and effort.

Companies that are considering setting up operations and making significant investments in Second Life are wise to undertake a realistic assessment of how Second Life may evolve over time, including the possibility that the current buzz and inevitable hype will fade away. However, Linden Lab has so far proved skeptics wrong by building a successful architecture that has led to impressive growth. Linden Lab and its in-world entrepreneurs and technology innovators may well come up with tools and technologies, and new designs of in-world activities and processes, that not only sustain current growth but accelerate it. Another possibility is that other, larger players from the technology or media industries will decide to take a greater part in virtual-world developments, either by acquiring one or more of the existing players or by developing new platforms. Either way, their participation may bring more technical and financial resources into the development of new and more advanced virtual worlds.

Scenarios for Second Life Learning

The few organizations that today have learning operations in Second Life have built facilities to enable lectures and information and knowledge sharing by delivering text, audio, and video into Second Life classrooms. Although these facilities typically replicate their real-world counterparts, the Second Life virtual environment does allow for new forms of social interaction, which NETg, Apple, and others are interested in exploring. But given the nascent status of the Second Life environment, more innovative learning processes and activities are still in the planning stage. LoD analysts' discussions with companies in Silicon Valley and elsewhere indicate that a growing number of organizations will move beyond the planning phase in early 2007. Apple Computer, IBM, and Reuters may be among the leaders in more innovative uses of Second Life and thus create a foundation that others can build on to use Second Life for learning and training.

In light of what various players and researchers have told us about Second Life, we have defined three scenarios of the role that Second Life might play in selected learning and training processes in the near future (see Table 4). Some features of these scenarios may not be in place today—such as the "onboarding wiki" that is part of the first scenario—but we suggest that these and many other innovations are likely to make their way into Second Life and find use in learning and training operations.

Table 4
SECOND LIFE LEARNING AND TRAINING SCENARIOS

Categories	Orientation Training/ Onboarding	Sales-Associate Training	Offshore-Oil-Platform Training
Goals/ objectives	Give new employees an opportunity to know the company and many of their colleagues in a virtual world, and send the message that the company wants to innovate and experiment with new technologies.	Test more engaging and interesting ways for young sales associates to learn by doing and to gain insights from experiential learning activities.	Test real-time reactions and decision-making skills of employees in emergency situations on offshore platforms that closely resemble the actual platform environment.
Unique benefits of using Second Life	Meet colleagues from distant facilities and even from other countries in an informal social setting and enable social networking and learning about the company's corporate culture.	Quickly and at low cost, create alternative realistic role-playing simulations in a virtual environment that is similar to the actual work environment.	Create realistic scenarios with collaborative teams, and test alternative emergency situations to ensure that the necessary coordination, decision making, and collaboration take place on the platform.
Tools and applications that will improve future learning in Second Life	Improve integration of Web 2.0 tools to enable greater social networking and informal learning.	Provide better communication tools, including high-quality speech technology, to enable more effective and easier communication during sales interactions.	Import existing equipment simulations or models into Second Life to enable organizations to create more realistic and useful work-process situations that integrate learning.

Source: SRIC-BI

- *Orientation training or onboarding.* Most organizations use a variety of activities and processes to familiarize new employees with their new employer. Use of Second Life is unlikely to replace all or even most of these orientation activities for many years, but it could complement them and give new, and especially young, employees an opportunity to take some of their orientation in this virtual world. For example, employees could teleport to company facilities in other countries and perhaps interact with some of the employees at these facilities, deepening their understanding of how operations differ across regions and countries. Companies that manufacture large and complex products (such as turbines, airplanes, or ships) could enable new employees to enter and inspect these products from the inside, providing a much more interesting and self-directed way of learning about these products than traditional approaches allow. As more employees have their own blogs and Flicker accounts and

participate in social-networking communities, we expect to see integration of such applications into Second Life to provide richer information and social context for interactions that take place in the virtual world. Companies might also encourage new employees to contribute to an in-world (Second Life) wiki of new-employee impressions in which they can describe their orientation experience and make their learning available to future new hires. As executives gain a better understanding of the importance of informal learning, Second Life will likely be able to play a greater role in this area, especially as collaboration within and among highly distributed teams drives a greater part of new innovations and as social connections and cohesions strengthen through interactions in Second Life.

- *Sales-force training.* Second Life offers manufacturing companies and their retail partners an unprecedented opportunity to create a rich set of role-playing experiences in a wide range of sales situations—which they could design and build relatively quickly and inexpensively. These situations could also involve real customers, with companies inviting Second Life residents to participate in the sales scenarios. Because a large percentage of retail-sales associates are young and likely to have considerable Web, video-game, and even MMOG experience, this cohort is most likely to find this type of training environment interesting and engaging, so Second Life approaches could well provide more effective learning than traditional classroom-based training sessions can. The ability to replicate the real-world sales environment in Second Life, including both the physical layout and the business processes and workflows of the retail-sales operations, would enable the kind of integration of learning and business processes and work flows that most business and learning executives have long been trying to achieve. Forms of sales training other than retail sales, including business-to-business selling—in which sales professionals need to demonstrate solutions and provide consultative selling to customers with complex needs and requirements—could also use Second Life to create challenging sales scenarios (see the LoD report *The Role of Technology in Sales Learning and Training).* Avatar-mediated communication, decision making, and action steps by sales personnel could all be recorded—as many activities in Second Life are—and trainers could replay them in debriefings and in "after-action-review (AAR)" sessions. This type of experiential learning, especially in combination with coaching via AARs, could be highly effective. Some companies for which storytelling has become a powerful and popular part of sales training—Apple Computer's worldwide sales and communications group is among the adherents—could also integrate this feature into their Second Life role-playing sales scenarios. In Second Life's virtual environment, avatars could quickly change shape and outfits, and participants could quickly create digital and virtual props, potentially taking storytelling sessions to new and unprecedented levels of sophistication.

- *Offshore-oil-platform training.* Oil companies and other process-intensive industries, such as the chemical and nuclear-power industry, typically require extensive and intensive training to avoid costly, and even catastrophic, accidents. Lacking the right knowledge and skills when operating on an offshore oil platform in the North Sea, for example, could be disastrous, resulting in costly explosions, fires, oil spills, loss of life, and even loss of the whole, multi-billion-dollar platform. Given the risks in these operations, companies in these industries have a strong commitment to learning and training (although much of the training is mandatory, required by government policies regulating these industries). As Table 4 indicates, workers on offshore oil platforms could use a Second Life environment to test their knowledge and skills, as well as their ability to make good decisions in an emergency on the oil platform. The virtual environment could provide realistic situations that closely replicate the true working environment on the platforms. Today, some constraints and limitations of Second Life prevent "high-fidelity" re-creation of complex equipment and operations, but these limitations are likely to be temporary as new tools and technologies emerge to allow the import of sophisticated simulations or conversion to Second Life scripting language.

RECOMMENDATIONS AND ACTION STEPS

Virtual worlds have had a role in entertainment for years, but only in recent years have they gained extensive use and high visibility in the mass media. But using virtual worlds for learning and training is in its early-adopter stage. For this reason, IBM's announcement in November 2006 has generated considerable interest in learning circles. The company reported that it will expand its new program, IBM@Play—part of IBM's $100 million investment in new technologies—in 2007 to enable training of new employees across the company's global workforce.

Because of the nascent nature of virtual-world learning and training operations, organizations will have few ongoing operations and battle-tested models or practices to examine—beyond those that this report mentions. No established best practices yet exist. But in the second half of 2006, many organizations have established a presence, or made plans to start operations, in Second Life, and these early participants are gaining valuable experience.

Enterprise Adopters

Learning and training executives and managers should consider the following action steps:

- *Align enterprise learning and training needs and learners' needs and preferences with virtual worlds' potential to facilitate learning*. Although many companies will adopt virtual-world learning for reasons similar to those of IBM and Apple, most organizations will feel less compelled to jump into this new environment with both feet. Nevertheless, many organizations will likely have some learning and training needs, as well as employee demographics—and psychographics—that justify checking out virtual worlds and perhaps launching a small pilot. Virtual worlds are becoming another potential tool for blended learning approaches, and learning executives and managers will undoubtedly need to deal with it in the next few years.
- *Prepare technology infrastructure for virtual-world learning.* Most organizations are unlikely to have the information-technology infrastructure and support today to give their employees a great virtual-world learning experience. For many of them, virtual-world learning may be in a situation similar to that of podcasting: Very few organizations are providing all their employees with iPods for learning and training. But a growing number of companies are starting to provide iPods to at least selected employees (including salespeople) who have a strong need for mobile access to audio content. But many employees have personal iPods and are using them both during work and on their own time. Today, many employees have better computers and monitors at home than they have at work, and young workers in particular (today, the average age of a video gamer is 29 years, according to Electronic Arts) are likely to explore virtual worlds on their own time. But key groups of employees—those whom companies want to give access to virtual worlds for learning—will likely need hardware and software upgrades to ensure a satisfactory user experience.
- *Set up a virtual-world–monitoring group, and recruit a small number of "virtual-world explorers."* This step is especially important for organizations that believe that virtual worlds may offer interesting opportunities for their future learning and training or for other applications. Chances are that organizations will have no shortage of willing candidates. The press and public-relations buzz that may result from announcing a Second Life initiative, for instance—as Reuters, Leo Burnett, and other ad and media agencies have learned in recent months—can also bring benefits, demonstrating to employees and others that innovation and experimentation are high on the agenda of the organization. This step can send a positive signal at a time when organizations are competing intensely for talent.
- *Build low-cost game-based simulations for learning in virtual worlds.* Learning and training designers have become increasingly interested in games and simulations in recent years, seeing them as ways to create more engaging and effective learning and training experiences. Virtual worlds may well offer new ways to combine games and simulations. For example, organizations might build simulated learning-by-doing work processes that include competitive elements, perhaps fostering interactions between teams across the United

States or across countries in virtual spaces. Not only can companies track, tape, and review all simulation scenarios in such environments, but they can easily modify and customize the environments for different learning scenarios.

- *Join or help create a community of learning around virtual worlds.* Numerous academic user groups and communities exist in Second Life, but interestingly, none yet exist for corporate learning and training. Discussions and plans are now under way to create such communities of practice or interest, and organizations should join one or more of these communities as a way to learn from the experiences of others. Companies currently operating in Second Life may well be happy to interact with organizations that are serious about establishing a Second Life operation and want to learn from their experience—as long as they can avoid revealing secrets of competitive advantage and proprietary information.

CURRENT CHALLENGES TO SUCCESS IN SECOND LIFE

Success is a relative term, and few, if any, companies in this report have set up Second Life operations with the intention of making money or profits, at least in the near term. The technology is too new, and companies still have too little operational experience to build operational excellence in this new world. Moreover, technology kinks remain, and some of Linden Lab's operational practices cause concern. In brief, organizations that are planning Second Life operations need to take into account the following challenges:

- *Navigation in three dimensions.* Navigating within Second Life can be challenging, especially for newcomers used to two-dimensional Web and with little or no video-game background. Some analysts, including some who have spent years in virtual worlds, are skeptical about whether most consumers, perhaps excepting Gen Y or Millennials users, will embrace and become comfortable with navigating in three dimensions, unless interfaces and interface devices become easier to use in three-dimensional worlds.
- *Interface complexity.* The current user interface can be confusing and overwhelming to users. Again, this situation applies especially to users who are new to the world of video games or three-dimensional virtual worlds. Thus, these users must make a considerable investment in learning how to function in Second Life, and this learning curve will be a barrier to adoption (unless Linden Lab finds solutions).
- *Technology infrastructure.* Users' experiences in Second Life will depend on the quality of their computers and network infrastructure, because high-speed processors, high bandwidth, and a high-quality graphics card are necessary for users to enjoy Second Life fully. A large, fast, high-quality monitor can also improve the experience.
- *Platform architecture.* In real life, people can pack in tightly to allow more people into a room—especially when a larger-than-expected crowd comes to an event—but in Second Life, this approach is difficult. Latecomers thus typically cannot attend an event.
- *Linden Lab operational policies.* A number of organizations operating in Second Life complain that users often cannot access Second Life because the platform is frequently down for hours so that the staff can deal with technical issues—including on Wednesdays, when systems maintenance can make Second Life unavailable for hours. Finally, frequent upgrades of the Second Life engine make the platform unavailable.

Vendors of Learning Products and Services

The following action steps are worthy of consideration by executives in companies selling learning products and services:

- *Become knowledgeable about and conversant with virtual worlds.* As interest grows in virtual worlds and as more organizations want to explore or consider the use of virtual worlds, vendors must be ready to discuss a range of issues with clients. An organization might ask a few employees to start exploring Second Life, for instance, and to monitor organizations' activities in other virtual environments. Vendors need not expend many resources to conduct a fairly low level of monitoring, and some employees may be happy to take on this task and indeed may already be active users of Second Life or other virtual worlds.
- *Examine virtual worlds as threats or opportunities.* As the popularity of virtual worlds grows, organizations see intriguing opportunities, especially in the long term. IBM is clearly a leading player in this group. It sees a wide-ranging set of emerging opportunities that go well beyond learning and training—and that will probably create interesting synergies across the company's "opportunity spaces" of software and services in which it is focusing investments. Sun Microsystems is another technology player that sees Second Life and virtual worlds in general as an important, emerging opportunity area, mostly looking to provide the technology infrastructure to improve user experiences. At least so far, Sun has announced no internal initiatives that focus on learning and training. Other companies will also likely see opportunities to leverage their existing products or services inside virtual environments, as NETg plans for its online courses. New players, perhaps including collaborative ventures between Second Life design firms like Millions of Us or Electric Sheep and training companies with experience in designing and building training modules, could offer outsourced learning and training operations in Second Life, perhaps focusing on specific types of learning and training, such as sales training.
- *Use virtual worlds as laboratories for innovation.* Virtual worlds represent a new and emerging frontier for learning and training, and we can expect to see growing experimentation and testing of new ideas—which are possible at fairly low cost. NETg's investment in its Second Life operations was fairly modest, for example, and mostly involved one employee who took a strong interest in this virtual world and invested considerable personal time to learn to design and build Second Life facilities. Many other companies are also likely to find employees who take a strong personal interest and who can design, build, and innovate and share and showcase their creations. For example, Doug Bassett videotaped a guided tour of NETg's Second Life facilities and made it available on YouTube—which is an inexpensive and easily accessible way to showcase one's creations. Given the low cost of entry into Second Life and the wide range

of tools now available to design and build facilities in this virtual environment, many other organizations are likely to take advantage of virtual labs to experiment and innovate.

- *Team up with clients to cocreate virtual-world learning operations.* Vendors with strong design and technical expertise may see opportunities to offer existing clients ways to team up in joint learning experiences. Valuable lessons could result for both organizations, with vendors gaining experiences that they can use to help other clients and prospective clients. For small vendors, opportunities to team up with clients to address specific learning and training needs would allow them to test the waters of this new and emerging virtual environment, gaining early experience in this arena that may well play a major role in future online working and learning.

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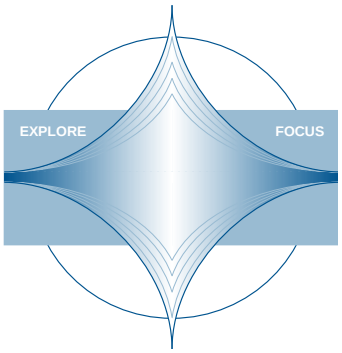

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