

Communications of the Association for Information Systems

Volume 22

Article 19

3-2008

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Recommended Citation

Schultze, Ulrike; Hiltz, Starr R.; Nardi, Bonnie; Rennecker, Julie; and Stucky, Susan (2008) "Using Synthetic Worlds for Work and Learning," *Communications of the Association for Information Systems*: Vol. 22 , Article 19.

DOI: 10.17705/1CAIS.02219

Available at: <https://aisel.aisnet.org/cais/vol22/iss1/19>

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Communications of the Association for Information Systems

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Using Synthetic Worlds for Work and Learning

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Abstract:

Synthetic worlds [Castronova 2005] are graphically-rich, three-dimensional (3D), electronic environments where members assume an embodied persona (i.e., avatars) and engage in socializing, competitive quests, and economic transactions with globally distributed others. Frequently categorized as technologies of play, synthetic worlds range from massively multiplayer online games (MMOGs) such as *World of Warcraft*, to virtual reality environments such as *Second Life*. Increasingly, educators, researchers and corporations are recognizing these 3D online spaces as legitimate communication media, thereby blurring the lines between work and play, and between reality and virtuality. In this panel, presented at the 2007 International Conference on Information Systems, we explore how the fluid work-play and reality-virtuality boundaries are negotiated and managed in practice. The panelists will rely on their research, conducted in educational, corporate and game environments, to address questions about learning, working and playing in these new media spaces.

Keywords: games, online games, virtual reality, three-dimensional, communication media, *Second Life*, *World of Warcraft*

Volume 22. Article 19. pp. 351-370. March 2008

I. SYNTHETIC WORLDS¹

Synthetic worlds [Castronova 2005] are graphically-rich, three-dimensional (3D), electronic environments. Figure 1 illustrates Schultze and Rennecker's [2007] framework for classifying synthetic worlds. It differentiates these worlds along two dimensions: the game's rule structure (x-axis) and its correspondence to material reality (y-axis). The rules dimension represents the degree of structure built into the synthetic world by its designers through both implicit and explicit rules of the game and/or interaction. Juul [2005] differentiates between two approaches to structuring game rules: progression and emergence. The progression structure is characterized by a highly scripted, typically quest-driven narrative. Players have a specific goal that they seek to achieve through the game. In contrast, the emergence structure is typically devoid of predetermined goals. Instead, worlds with emergent structures specify a small number of rules that, when enacted, yield a large number of behaviors and play variations. Thus, the horizontal axis sets up the distinction between "games" and "virtual worlds." The more game-like synthetic worlds are more conducive to players interested in "acting," i.e., taking action to achieve a goal, while the emergent worlds are more conducive to "interacting," i.e., developing relationships with and in the synthetic world [Bartle 1996].

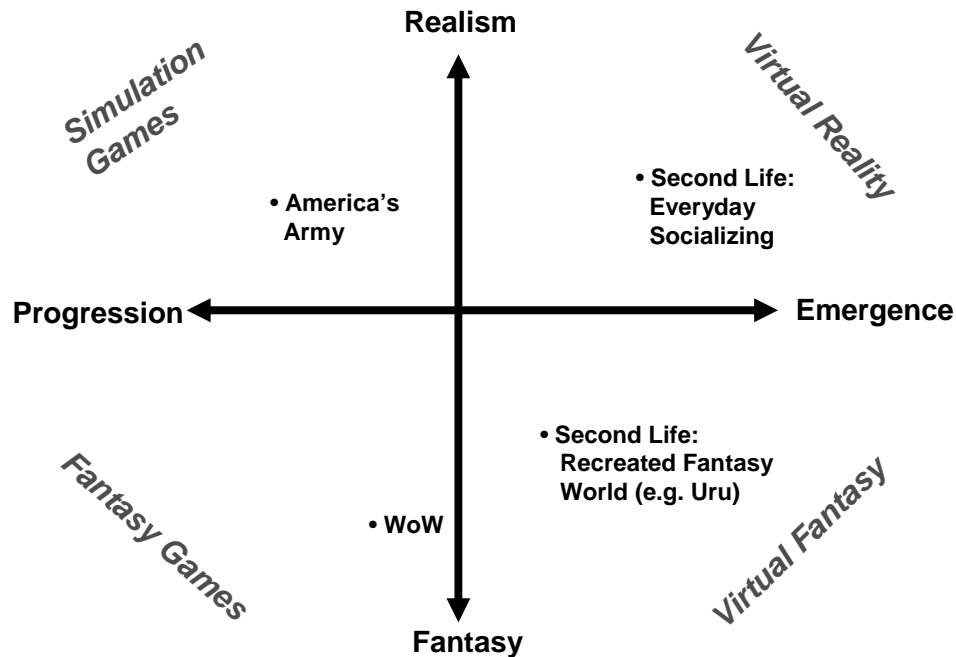


Figure 1. Synthetic Worlds Classification Scheme [Schultze and Rennecker 2007]

The vertical axis represents the degree to which these worlds correspond with material reality, i.e., their realisticness and verisimilitude to real life. Whereas some synthetic worlds rely on representations and narrative structures that are obviously fantastical (e.g., WoW, EverQuest), others seek a close correspondence to reality (e.g., America's Army, Madden NFL). This dimension thus sets up the distinction between "realistic" and "fantasy" worlds. A synthetic world's realisticness depends not only on the fidelity of its graphics and the correspondence of its landscapes and characters with real places and people, but also on the credibility of its narrative structure and game rules.

¹ The title of the ICIS 2007 panel was "Using Multi-Member Online Worlds (MMOW) for Work and Education." Due to the unwieldiness of MMOW as a label to represent both online games such as *World of Warcraft*, which are frequently referred to as MMORPGs or MMOGs, and virtual worlds such as *Second Life* and *Eve Online*, we have replaced it with "synthetic worlds" in this paper. Our challenge with identifying the most suitable label is indicative of the diversity of perspectives and classification schemes prevalent in this space. Among our panelists, some prefer the terms virtual worlds and MUVE (multi-user virtual environments) to synthetic worlds, and the respective write-ups reflect each panelists' preferences.

In synthetic worlds that are supposed to be representative of reality, or near the top of the y-axis, congruence between the in-world representations and the player's real-world experiences must be achieved in order for the synthetic world to serve as a sufficient extension of the player's world. This is especially important if the knowledge gained in-world is intended to be directly transferred to real-world situations, i.e., learning by analogy [Thomas and Brown 2007]. Realisticness must be achieved if the skills and lessons learned in the synthetic worlds are to be transferred to the real world.

In contrast, synthetic worlds on the fantasy end of the realisticness continuum need to create coherent, possible worlds that the player can imagine, cognitively inhabit, and complete. Only then does the world support the knowledge transfer through metaphorical reasoning, imaginative projections and critical reflection that fantasy worlds promise to provide [Thomas and Brown 2007].

Combining these two dimensions orthogonally, Schultze and Rennecker [2007] identify four broad classes of synthetic worlds: simulation games, fantasy games, virtual fantasy, and virtual reality. Examples of each can be gleaned from Figure 1.

Formerly the purview of a relatively small, technically-savvy minority, these worlds are now a popular source of entertainment for millions of people with widely ranging technical skills, ages, and professional backgrounds. Not surprisingly, they have now also attracted the attention of both educators and business executives as a new medium for learning and work.

While media and film scholars have long recognized MMOGs as a new class of media [e.g., Galloway 2006; Kline, Dyer-Witthford, and De Peuter 2003], numerous games researchers [Castronova 2005; Malaby 2007] note that business researchers have been dismissive of online games, characterizing them as technologies of play and, therefore, outside the bounds of legitimate arenas of inquiry, namely, technologies of work. These common notions of play and work, as well as of virtuality and reality, as mutually exclusive social arenas, have held back our exploration of synthetic worlds as legitimate media for productive activities.

However, the strict separation between technologies of work and play appears to be relaxing. A variety of organizations are experimenting with synthetic worlds or have incorporated them into their day-to-day practices [Cane 2007]. For example, educators are integrating online game environments into the classroom (e.g., ECON 201 at the University of North Carolina Greensboro), researchers are designing and using games to test social theory [e.g., Castronova 2005; Bainbridge 2007], and corporations are leveraging synthetic worlds like *Second Life (SL)* for marketing, recruiting, and more. Many of the corporate appropriations of these 3D online worlds focus on communicating with customers and partners (e.g., IBM's press conferences in *SL*) and creating collaborative workspaces for distributed teams (e.g., Sun Microsystems virtual workplace project²). Indeed, Cane [2007] highlights that corporations are increasingly recognizing virtual worlds as a next generation of communication media. Rather than just being faster, providing greater bandwidth, or extending a users' information access, features that have distinguished other new media, synthetic worlds are distinct for the "psychological immersion" [Castronova 2005] they promote. Participants' representation of themselves in a bodily form whose appearance they can control reintroduces embodiment [Taylor 2006] into mediated communication. Through their avatars, participants regain access to the expressive capacities of the body, including positioning themselves with respect to others, making gestures, and interacting with objects in the space, making the interactions feel more like "real" face-to-face interactions. In fact, Taylor [2006] found that some participants experienced their in-world representation and experience as "more real" than their corporeal, off-line life.

Key affordances associated with the re-embodiment enabled by synthetic worlds include:

- Presence: Being present implies personal identity, agency and performance capabilities.
- Placement (with respect to others and objects): Proximity to others communicates meaning (e.g., relationship), as do practices of the body (e.g. sitting, lying down). Furthermore, the proportions of objects to the player's/member's representation are likely to have implications for communicative practices. For instance, books and presentation screens are typically much larger than in real life, sometimes towering over the avatar.
- Perspective: Viewing a situation from the same perspective as others promotes understanding. In addition, a player's/member's ability to observe him/herself in a social situation creates a heightened sense of self-reflection as the player/member is able to see her/himself the way others do.

² <http://research.sun.com/projects/dashboard.php?id=85>

- Place: Places situate members/players in geographies and social situations, which are deeply implicated in sense making.

An additional affordance of particular interest to corporate participants in *SL* (i.e., Sun Microsystems, IBM, Reuters) is the ability to stream real-world, real-time information sources—i.e., radio, television, video—into what would otherwise be a fantasy-scape. For instance, Sun Microsystems recently demonstrated the ability to run word processing and other common office applications inside a virtual world similar to *SL*. They envision workers sitting at their respective material-world desks working on documents that will be visible in real time both on their own desktop screens and on their “in-world” simulated screens, making them visible to distributed teammates logged into the world.

This blurring of the boundaries between reality and virtuality raises some interesting and important questions. While anthropology, film and game studies scholars have argued that work and play, and virtuality and reality, are better understood as dualities, i.e., mutually constitutive social phenomena [for a review, see Schultze and Rennecker, 2007], it is unclear how these dynamic work-play and reality-virtuality boundaries are negotiated, communicated and managed in practice. Figure 2 highlights some of the false dichotomies that need to be managed as dualities.

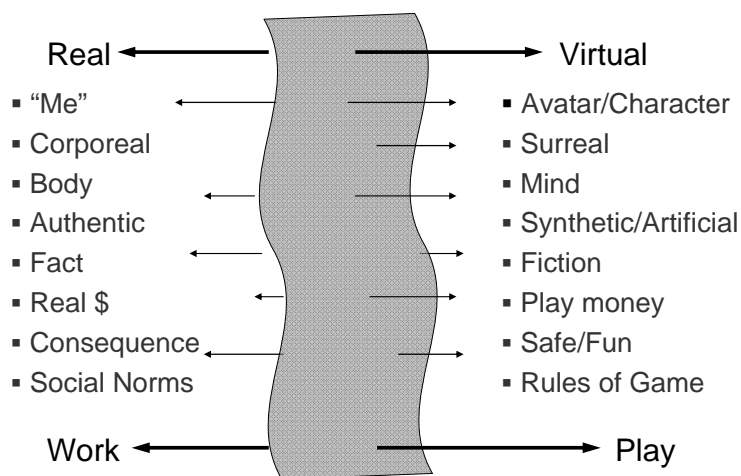


Figure 2. False Dichotomies in Synthetic Worlds

In this summary of a panel presented at the 2007 International Conference on Information Systems, we explore the negotiation and management of the work-play and reality-virtuality boundaries that characterize the adoption of synthetic worlds as legitimate media for learning and work. Based on their empirical research, each panelist describes how the participants’ communicative practices in the virtual worlds of their respective studies constitute the boundaries between work and play and between reality and virtuality at the individual, group or societal level. The summary ends with a transcript of the question and answer session from the end of the panel presentation.

Our panelists are:

- Ulrike Schultze, an IS researcher, served as panel chair and introduced the panel by providing: (a) an overview and a taxonomy of synthetic worlds; and (b) an outline of the focal questions of the panel (i.e., the negotiation and management of play-work and reality-virtuality boundaries).
- Julie Rennecker, a research scientist at Perceptive Sciences, focused on the emergence of social order in *SL* and the implications for business uses of synthetic worlds.
- Roxanne Hiltz, a Distinguished Professor of IS, who has been studying the acceptance, use and impacts of computer-mediated communication in all its forms since the 1970s, focused her discussion on the use of *SL* in the educational setting.
- Susan Stucky, a manager in Service Design at IBM, focused on the application of synthetic worlds as technologies of learning in corporate settings.

- Bonnie Nardi, an anthropologist, drew on her two year study of *World of Warcraft* to identify the boundaries that need to be overcome to replicate the knowledge sharing successes of MMOGs in educational and business settings.

II. A NEW MEDIUM, A NEW INTERACTION ORDER? (JULIE RENNECKER)

The use of virtual worlds for serious corporate purposes, such as recruiting, training, distributed team meetings, and public presentations, is on the rise [Economist 2007], highlighting these worlds' perceived potential as potent communication media in addition to their revenue-generating uses for entertainment and commerce. Proponents predict that avatar-mediated interactions will become the norm rather than the exception within the not-too-distant future [Castronova 2007], a position reinforced by the recent and relatively rapid moves of companies such as Cisco, IBM, and Sun Microsystems to create proprietary virtual worlds for within-company collaboration and training.

The same affordances that make a new medium attractive, however, also enable unanticipated use practices. New media are almost always both welcomed and feared [Standage 1998]. Proponents tend to focus on the new medium's capabilities while detractors highlight the potential destruction of valued aspects of the existing social order. In practice, the use of new media tends to have paradoxical social consequences [Arnold 2003]. While innovations in use will always occur in response to the near-limitless variety of use conditions [Suchman 1987], many "unanticipated" consequences of new media stem from a failure to appreciate that altering communicative boundaries simultaneously alters the social structure [Meyrowitz 1985].

Goffman [1963; 1974] coined the term "interaction order" to describe the ritualized communicative practices that regulate face-to-face interaction in conditions of co-presence and how these practices both reflect and constitute the larger social order within which they occur. Though the actual practices sometimes differed across cultures, he found that the existence of the rituals themselves were endemic to human social life. In addition, he showed that interactive structures emerge in even seemingly *unstructured* situations, such as pedestrian traffic on urban sidewalks. Of particular interest for this research is Goffman's description of the role of place and perceptual barriers in the structuring of interactive practices.

In this presentation, I draw on Goffman's notion of an interaction order to discuss preliminary findings from an ongoing ethnographic study of social practices in *Second Life*, an "emergent" virtual world with concurrent realistic and fantastic instantiations, then consider the implications of using similar worlds for work-related communication. Using the concept of "face" from Goffman's work, I draw examples from four participants to illustrate that the "interaction order" emerging in *SL* represents a hybrid of contemporary urban social customs and experimentation with (and ambivalence about) the affordances of *SL* that enable practices unavailable in material reality. In addition, I highlight indications that the boundaries between reality and virtuality and between work and play remain in flux for most participants, even those who believe they have effectively compartmentalized their participation in the game as "unreal" and "play." I close with both speculative comments and questions for corporate adopters.

Second Life

Second Life (www.Secondlife.com) is perhaps one of the most "emergent" of the currently available virtual worlds. Created by Linden Lab (www.Lindenlab.com), the content and activity within the world depend almost entirely on user contributions. Activities range from unstructured socializing to commerce in virtual objects to, most recently, political debates and interviews of presidential candidates.

The creators have adamantly resisted regulating the world, only reluctantly creating rules against behaviors perceived as egregiously antisocial in response to user complaints. CEO Philip Rosedale sees the world as "a huge social experiment," an opportunity to "see what happens" when people are freed from the many constraints (both real and perceived) of material life, also called "real life" ("RL") by *Second Life* "residents."

Goffman and the Interaction Order

Through detailed observation, Goffman illustrated how perceptual barriers, the use of "props" (the objects present in material settings), and the management of the body each contribute, singularly and in concert, to the structuring of communication under conditions of co-presence. Many of the conventions he identified transcend cultures, but even those that do not tend to represent situationally specific ways of dealing with recurring social situations that *do* transcend cultures, such as greetings and exits, situations of affinity and dislike, and the social enactment of boundaries between status groups.

Virtual worlds' affordance of co-presence in three-dimensional space with changing limits to perception (both auditory and visual) suggest Goffman's frameworks as a logical starting point for identifying whether and what ritualized interaction practices may have developed in virtual worlds. In addition, Goffman's observations provide a



baseline for identifying how virtual world rituals replicate and/or deviate from those in material life.

The concept of “face,” or the presentation of a socially-acceptable self, is central to the enactment of an interaction order [1963]. Goffman demonstrated how people almost reflexively modify their dress, posture, and facial expressions as the conditions of perception change (i.e., open versus closed drapes) in order to be positively perceived. In addition, he demonstrated *face* to be a social achievement. For instance, in the event of a gaffe, nearby others will typically collude to restore a person’s face by either ignoring the gaffe or providing assistance to restore the person’s face, perhaps by making a humorous statement dismissing the error as inconsequential and then redirecting the collective attention to another focus.

One question for the current study is whether “face” plays as central a role in the social organization of a virtual world that supports quasi-anonymous interactions between avatars, the fictitious creations of people unlikely to encounter one another face-to-face.

Participant Profiles

Four participant profiles illustrate the variety of U.S. participation in *Second Life*, though this list is far from being a fully representative user typology: Jim, “the griever;” Phil, “the designer;” Mike, “the addict;” and Melissa, “the observer.”

Jim is a 28-year-old construction worker who reports playing “every few days for an hour or so,” a significant reduction from a previous period of his life when he says he “played all the time and didn’t do anything else.” His primary objective when online in *Second Life* is to “annoy boring people.” By “boring people,” he explains that he means “the people who look like Barbie and Ken dolls.”

Phil, a 25-year-old video game designer, only ventures into *Second Life* when he has a “productive purpose,” such as learning about three-dimensional drawing or mocking up a character or setting for one of the games he builds for his employer. When online, he likes to “travel around to look at all the cool things other people are building” but interacts little with others “because I rarely see anyone else.”

Mike, a 43-year-old self-described *Second Life* “addict,” ventures into the world at least once a day for two hours or more. A self-employed computer technician by day, he reports having “gone through phases” in his *SL* participation, beginning with “clubs and dancing and all the things people typically do,” but then becoming more interested in exploiting the affordances of the medium to engage in experiences unavailable (or at least inconvenient, expensive, or potentially damaging) in the material world: “I’ll fly around as a bird for a while or put on one of these [robot] skins and walk around. You can’t do this stuff in real life. That’s what makes *Second Life* so cool.” He has acquired such a collection of costumes, accessories, and trinkets that he reported spending six hours one day organizing his “inventory,” a virtual object repository organized as folders.

Melissa, a 40-year-old healthcare worker and Mike’s wife, also enters *Second Life* daily, but most of her activities mirror the activities and interests in her off-line life, particularly listening to music and dancing with friends. When not interacting, she enjoys taking on the appearance of a dog or cat, then sitting at the edge of a social group and watching: “People don’t pay attention to you when you look like an animal, so you see and hear all sorts of things you wouldn’t as a human-looking avatar.”

Maintaining Face

The concept of “face” provides a lens for identifying the unwritten rules of the emergent “interaction order” in *Second Life* and to demonstrate how material world practices and expectations are being replicated in virtual interactions. The following examples regarding the visual appearance of one’s avatar are illustrative.

One of the activities Mike and Melissa like to do together in *Second Life* is listen to live music performances and to dance. One evening, Melissa had gone to a “rocker club” with some friends where Mike was to join her after he had spent time in one of the fantastical areas within *Second Life* that he enjoyed. When he arrived, his avatar was still in the form of a bird:

“I told him he had to change [his appearance], and other people started giving him grief as well until he put on his rocker clothes [jeans and a t-shirt].”

A similar sequence of events occurred on another occasion when Mike tried to talk to Melissa in front of her friends when he was in his “Harry the Homeless” representation. Mike reported that he also had felt uncomfortable until his avatar’s appearance had changed and offered that he would have felt equally uncomfortable—and appeared “odd”

to others—if his avatar had arrived in the fantastical world he visits wearing a human-looking form: “No one would have talked to me there if I’d looked like a human.”

Jim, the “griever,” provides the final example. “Griefing” is the term used in *Second Life* to indicate a wide range of behaviors engaged in specifically to annoy or shock others. Similar to Mike and Melissa’s experience, though differently motivated, he has found that one of the most effective ways to make others uncomfortable is to appear in “inappropriate” attire or, in this case, no attire at all:

“Sometimes I change into a fat, naked dude and run through a crowd just to see people’s reactions.”

In each of these examples, we can see that despite the technical freedom to experiment with one’s visual representation and transcend the constraints of material life, norms of “appropriateness” have developed regarding avatar appearance. Similar to material world encounters, those participants interested in presenting a socially-desirable “self” feel social pressure to comply with the norms and feel uncomfortable and likely to be left out if they do not. A screen shot of Sun Microsystems’s MPK20 (below left), a proprietary virtual world for within-company collaboration, showing workplace avatars in the “business casual” attire typical of high-tech companies, suggests that similar norms will be reinforced in corporate virtual worlds.



As these examples illustrate, the emerging interaction orders of virtual worlds seems to have replicated both the individual obligation to present a socially acceptable self central to the organization of material-world interactions and the contextually specific definition of “socially acceptable.” Participants are expected to alter their avatars’ appearance and conduct as they move through virtual spaces to appear “appropriate” to the context.

In contrast, however, the social obligation in material contexts to support others in the presentation of a positive “face” seems to have gotten left behind. Many *Second Life* participants seem to feel very comfortable being openly critical of those who violate the appearance norms, making fun of others’ appearances and explicitly requesting appearance changes, rather than feeling socially obligated to ignore or otherwise

smooth over the gaffe, a seeming parallel to the “flaming” identified by Sproull and Kiesler [1986] in e-mail interactions under conditions of anonymity.

Taken together, we see the replication of a pattern common to the introduction of all new media, that is, the use of a new medium reflects both users’ prior interactive experiences and their experimentation with (and exploitation of) the medium’s novel affordances.

Implications for Business Uses

The other ways in which this emergent order replicates and deviates from that of in-person interaction are the focus of the ongoing analysis, but the immediate implication for organizations is that interaction in synthetic worlds cannot be expected to simply replicate existing material-world practices. Initial corporate forays into virtual worlds of work are, so far, yielding generally positive results (see Susan Stucky’s presentation in this panel). This study suggests, however, that we cannot expect the interactions in these synthetic replications of material-world workspaces to simply be a “richer” version of their off-line analogues. Instead, the emergent orders are more likely to represent a pragmatic combination of familiar material world practices and exploitations of the affordances of the medium, with both positive and negative consequences. Organizational “standards of conduct” can provide a starting point and orienting device for employees moving into these worlds for the first time, but practice will eventually exceed policy as workers respond to the emergent conditions of each interaction situation [Suchman, 1987].



III. CAN “SERIOUS LEARNING” OCCUR IN A GAME-LIKE ENVIRONMENT? (STARR ROXANNE HILTZ³)

More than 100 universities have reportedly held classes or sessions in *Second Life*. What are the pros and cons? Is it ready for serious learning? At the New Jersey Institute of Technology (NJIT), we have begun a project to explore the following questions:

(1) *What is the impact of using new forms of ICT, specifically, 3D virtual worlds such as Second Life, on meaningful learning?*

(2) *What are effective ways of adapting this technology to teaching and learning at the university level?*

We adopt a constructivist view of learning, which is that knowledge is individually and socially constructed by learners based on their interpretations of experiences in the world [Jonassen and Rohrer-Murphy 1999]. Consider the four criteria for meaningful learning from a constructivist view: learning that is (1) collaborative, (2) inquiry-based, (3) reflective and (4) authentic.

This raises the following set of questions. First, can a 3D Multi-User Virtual Environment (MUVE) support and enhance the social construction of knowledge? Information and communications technologies (ICT) can certainly support collaboration and can make asynchronous collaboration particularly effective [Hiltz 1994; Hiltz and Goldman 2005]. A 3D MUVE might further enhance this collaboration and motivate students to participate even more actively.

The second criterion—inquiry-based learning—can certainly be supported with ICT, but this approach is the basis for mainly lab-based and case-based courses. ICT might have an impact, but the course content and instructional processes might have such a large impact that the ICT impact is not significant.

The third criterion—reflective learning—goes back to Socrates and the idea of students thinking critically about their own ideas. Threaded asynchronous discussions have proven to be very good for this purpose, since they allow students to think about, research, and edit their critical responses before posting them. Instructors often comment about the “greater depth” of discussion in this mode, as compared to “off the top of the head” synchronous responses. This would be lost in the synchronous chat mode of synthetic worlds.

The fourth and final criterion of authenticity means that the students find that the course content is relevant to them and that it reflects the complexity of a real life environment. This is an interesting criterion in that 3D MUVEs could simulate real life environments and even environments with rules that can only be imagined.

Is this environment currently better or worse for these objectives than alternatives such as text based, asynchronous and threaded discussion environments (e.g., WebCT)? We have heard much about the “millennial” generation of students who have grown up on the Internet and who are bored by lectures and other “traditional” modes of learning. There has been prior research into the use of MUVEs in teaching and learning with subjects drawn from middle school students. Two examples are *Quest Atlantis* and *River City*.

The *Quest Atlantis* project uses a MUVE with a mythological context of a world in trouble in the hands of misguided leaders <inkido.indiana.edu/barab/rsrch_qa.html>. Two findings from this research are especially relevant to our proposed efforts. The first is that the MUVE was able to successfully engage players in critical reflection in terms of academic content and pro-social issues, and the second is that there is no difference in terms of overall participation rates in the MUVE between boys and girls [Barab, Dodge, Tuzen, et al. 2007; Barab, Dodge, Thomas, Jackson, and Tuzun 2007].

The *River City* project uses a MUVE with the storyline of a 19th-century town besieged with health problems <muve.gse.harvard.edu/rivercityproject/>. They found no gender or racial differences in student success and also concluded that the use of reflective guidance found in both constructivist and cognitive processing-inspired educational environments requires further research [Dede, Ketelhut, and Nelson 2004; Nelson 2007].

Are environments such as *Second Life* more appropriate for younger students (e.g., high school or undergraduates) than older (e.g., graduate) students? Also related to our second research question is the issue of what kinds of assignments or activities seem to be most effective in an environment such as *Second Life*.

³ This section is based on joint work with George Widmeyer and Roberto Munoz.

The preliminary answers that will be described here are based upon two pilot studies using *Second Life* in courses at NJIT, acting as a “participant observer” in a course on using this environment for teaching offered “in world” by the Sloan Consortium, and information from e-mail discussion lists devoted to this topic. We have extensive experience with various learning management systems (aka course management systems, although there is a difference) such as WebCT, Virtual Classroom®, WebBoard and Moodle. Our experience with these learning environment tools informs our expectations for the impact of 3D, multi-user virtual environments on meaningful learning.

The first pilot study was in a small Ph.D. level course in Computer Mediated Communication in April of 2007 for a single chat session in an online course enrolling distant as well as on campus students. Note that this course enrolled “Gen X” and “baby boomers” ranging in age from about 25 to 50, rather than the younger “Gen Y” students. There was one week of preparation: the students were told to load *Second Life*, choose and customize their avatars, go through “Orientation Island” and become comfortable with controlling their avatars prior to the 1.5 hour live chat session, which took place on the “IT World” island. Meanwhile, the instructor also went through these preparations and planned the topics of the discussion and what would be “visited” during the session.

The students were asked to write and share a short report on the pros and cons and potentials they saw for educational use of *SL*. Of seven students, only two seemed comfortable or competent by the end of the experience. Rather than engaging in “meaningful” discussion on the topics that had been prepared, almost all of the chat that appeared was related to issues of navigating in world and sharing impressions of features in the environment. Several reported that they were unable to find hardware powerful enough to load *SL*, or connections fast enough to avoid lag; for instance:

“The hardware requirements of *SL* are very critical to your experience there...I could literally see the screen being drawn, which is why I think I was seeing naked avatars everywhere. My movements were slow as well.”

Most reported disorientation when “flying,” inability to control their avatar, distraction and confusion:

“I actually got a huge headache from it.”

“It’s like having to walk, talk, and chew gum at the same time.”

Poor orientation experiences, problems with “crashes” or unavailability of the system at all times and frustration with limited text interaction were also common themes of the students’ self-reports on their experiences:

“I could not get out of the orientation ... I felt that the controls of the avatars were too complex and therefore took too much mental bandwidth.”

“Seems to lack a discussion thread capability.”

Most of the “meaningful learning” that took place occurred in the asynchronous threaded discussions following the *SL* “field trip” rather than in world. The logistical costs for a single session were obviously too high, and most of the students really did not like the environment. But perhaps these problems could be solved by creating a much longer period of immersion in the environment as part of a course (e.g., several weeks rather than just one session), and by engaging an undergraduate class with much younger, “millennial generation” students.

Our second attempt at enhancing learning experiences by using *SL* was thus a four week set of “field trips” designed for students in sections of the undergraduate “Computers, Society and Ethics” course, Fall 2007. Rather than trying to assemble everyone at the same time for a chat session, the students (mostly males about 20 years old, with extensive online gaming experience) were given a number of sites to visit over those weeks, and they were asked to write about what they saw as the social, ethical and legal issues raised by such systems. After their experiences online, semi-structured interviews were conducted with several of them to explore our research questions.

When asked how easy or difficult it was for them to communicate with someone and to make themselves understood in the virtual world, a kind of “ho-hum” response was evident:

“It’s fancy chat; it lets people act out their emoticons.”

“It is a good thing, but it’s in the eye of the beholder.”

One student said, "If you are not used to 3D environments (like those found in online 3D games) it would be difficult; if you are used to them, then it is simple." There was also criticism of the graphics and other features as not being up to those they were used to in games, with the graphics referred to by such adjectives as "outdated."

In terms of 'meaningful learning,' we asked, "Explain whether or not it would be easier for you to learn online from a class using virtual worlds, as opposed to software such as Blackboard or WebCT." One subject responded, "SL has more personality [than WebCT] since you see people represented in avatar form." A second subject said, "It depends on the course, if it's standard training (meaning courses in which students don't have to interact with real physical and tangible objects) yes, it is preferable." When asked directly, these two preferred SL over WebCT, but not with a lot of enthusiasm, and they did not give any specific examples of anything they had "learned."

There are also administrative considerations. How much will this cost? How can you keep weirdos, "griefers" and naked people (the types of people Julie Rennecker talked about earlier) out of your educational environment? The answer is that you need to buy and build on "land," —for which the minimum academic price is about \$3000 (which includes one year's maintenance fees). Then somebody will have to spend time and/or money to "build" the environment you want. Moreover, SL is not currently optimized for teaching and learning, by any means; many features are missing that would be desirable, including archived threaded discussions, easy integration of course materials such as readings and quizzes, and the ability to use "real names" of students and faculty. As Anthony Picciano of Hunter College recently remarked on the Sloan-C mail-server discussion, "It would be great if somebody could find the resources to develop a virtual environment product that was designed for educational purposes."

So why would anyone want to do this if the results so far are disappointing and there is more cost to this in time and money than with older technologies? The answer is that we, along with other educators who have tried it, think that there is a lot of potential there, even if the current SL system is disappointing. In the November 14, 2007 *Computerworld*, for instance, Ian Lamont writes:

"But here's the thing, we have only just scratched the surface of this virtual world's potential. Consider:

The ability to simulate real-life objects in three dimensions.

A safe space that protects the privacy of users while letting them project real or ideal identities...."

Besides constructing environments optimized for education and easier to learn and use, we need most of all to invent or discover the most appropriate pedagogical techniques for stimulating and supporting collaborative and constructivist learning activities. We think that role playing exercises might be one such strategy (see Susan Stucky's comments later in this panel). Role-playing scenarios could be organized for some students to act out how the various points of view (e.g., Kant or the ACM) would approach the ethical dilemma or debate the "best" behavior and the important considerations for that scenario. Other students could ask questions and then vote on who won the debate. Each student could be a role player in one scenario and a questioner or a judge in other scenarios.

Another example is that teams of students could actually use the environment to build things and to show one another their artifacts, thus exercising programming skills in a visible environment. We hope to explore such possibilities in the future, along with tailoring our own idea of a hybrid learning environment constructed as a version of "Sloodle," a combination of *Second Life* with the open source text based discussion environment, Moodle. If those ideas do not garner more enthusiasm and produce better evidence of student learning, we will probably try something else. After all, it is fun, and it would be a good thing to bring more fun back into learning.

IV. CAN PLAY BE RESCUED IN CORPORATE LEARNING TECHNOLOGIES? (SUSAN U. STUCKY⁴)

It seems that virtual worlds are being "colonized" as technologies of work in the corporate world. Irving Wladisky Berger, formerly at IBM, observed that "...meetings and learning and training may very well be the killer apps of virtual worlds" (<http://irvingwb.typepad.com/blog>). Furthermore, a key player in IBM's virtual world business opportunity group has said, "no games"! This raises important questions about the place of play and fantasy in corporations' adoption of virtual worlds for communicating and learning. Is the corporate world drawing the boundaries around virtual worlds too tightly? What are we losing by excluding play and fantasy from institutional

⁴ Thanks go to the Rehearsal Services Group at IBM and our intrepid collaborators outside of research. Thanks in particular to Ankur Chandra and Wendy Ark.

adaptations of virtual worlds? For instance, in our development work, there is active and lively discussion as to whether participants in a business meeting held in *SL* can show up as a rabbit (she can, and she did, though the meeting was *about* virtual worlds...).

To address these and other questions, IBM Research is developing and conducting research on and with multi-user virtual environments. Rehearsal Services is one such effort. One goal, and the one I'll focus on here, is to develop a set of tools and methods that can be used to design and "run" 3D virtual world experiences, with the focus being on learning in the form of rehearsals. The second, which I'll not draw on as fully here, is to conduct research via virtual worlds. These worlds promise a fertile research environment as outlined in Bainbridge [2007]: "Online virtual worlds, electronic environments where people can work and interact in a somewhat realistic manner, have great potential as sites for research in the social, behavioral, and economic sciences, as well as in human-centered computer science."

In this section, I'll draw on four of our Rehearsal Services learning experiences, which are in varying degrees of development. Inevitably this account is merely a snapshot in time, around the end of 2007 and the beginning of 2008. It goes without saying that the relationship between virtual worlds and business is evolving rapidly.

Why the Newfound Emphases on a Time-Tested Approach to Learning, Namely Rehearsal?

The move to explore rehearsal in services research at IBM predates the interest in virtual worlds and came about for three reasons. As IBM moves from a traditional multi-national to a globally integrated enterprise, there is an increasing premium placed on productive interaction among people of diverse cultures and values. Increasingly complex service engagements, often involving hundreds of people, inevitably require pulling together remotely located participants into culturally and professionally diverse teams. Rehearsing, which implies practicing ahead of time, should be able to produce higher project success rates.

Secondly, we see a need to focus on the co-creation of value. Customer co-creation is one of the hallmarks of a service (as opposed to a good). This puts a high value on being able to, for example, communicate, negotiate, and re-negotiate, all skills that benefit from practice.

Thirdly, as corporate training and education has evolved, it has become compartmentalized and expensive. It tends to be individually-based, just at a time when the world of work has become dependent on large scale collaboration. Virtual worlds hold promise for the kind of collaborative learning that addresses the social foundations of learning (as outlined in, e.g., Lave and Wenger 1991). The social dynamics of learning are becoming increasingly relevant in work environments that are marked by increasing levels of diversity and rapid change.

Virtual Worlds to the Rescue?

What is it about virtual worlds that gave us the impetus to embark on such an ambitious R&D effort? In the end, it was the fit between the concept of rehearsal we were developing and the affordances of virtual worlds. These worlds provide an opportunity to stage complex social simulations such as rehearsals. The promise of immersive, experiential learning seemed well suited to the marriage of rehearsal and virtual worlds. The arrival of *Second Life* and other worlds like it provides a flexible platform on which to develop such simulation and holds the promise of quick and easy prototyping. The richness of the 3D aspects of these worlds also seemed ideal for being able to work out rough spots from different practices needed to deliver complex information systems. Finally, the nature of the social interaction that can and does take place in these virtual worlds seemed as if it would allow us to take a principled approach to developing and analyzing the patterns of value creating interaction, as well as value diminishing interaction, a long term goal of our effort.

But what should these experiences be like? We have found the Schultze and Rennecker [2007] motivational space for using virtual worlds (Figure 1) helpful not only for understanding the space we were designing in, but for assisting us, our co-designers and users in picking where they wanted their learning experience to be and why. In what follows, I'll describe the four efforts we have underway and their position in that space (Figure 3).

Given the questions we raise in this paper regarding the relationship of work and play, I will classify the efforts according to Bonnie Nardi's (next section in this paper) qualities of play. "Play (1) makes people feel good in some way, (2) is voluntary, (3) takes place in a space separate from the stresses of real life, and (4) involves known, repeated, ritualistic activities." (While the fourth quality, "involves known, repeated, ritualistic activities" seems most suited to games, I will nevertheless evaluate it with respect to the projects at hand.) I will also explore the use of the relationship between the motivational space and the qualities of play to further refine our understanding of what is going on in the learning experiences currently being designed and "run" at IBM Research.

The insights presented here are based primarily on observation, and, in two cases, surveys of the participants post-pilot. As such, they are “gleanings” rather than findings; they are data that prompt further investigation. While we are also instrumenting the virtual environment for more quantitative studies and exploring the use of unstructured data analysis to search for patterns of interaction, findings are not yet available.

How Do the Rehearsal Services Learning Experiences (to Date) Stack Up?

In each of the Rehearsal Services projects below, there are three sets of players: the R&D team, the internal client team who has requested to work with us, and the end users. In one case, an external party is involved.

1. **Client Engagement Rehearsal:** A 16-hour experience with multiple “places” including an auto parts manufacturing plant in “China,” two distribution centers, an assembly plant in “Mexico,” a client headquarters, and an IBM team room. Involving more than 10 people and their avatars, the case was provided by Workplace Technologies and Research, Inc., a research-based consultancy.
2. **Cross-cultural Communication (CCC):** Rehearsing communication styles in the context of two diverse cultures, U.S. and India. Here, scripts for 14 scenarios were developed by the participants in the cross-cultural learning effort. We are using the notion of breakdown and repair as a basis for measurement. So far, we have structured rehearsals around one of the scenarios in a pilot on a teleconference. We have before and after data on the rehearsal in teleconference, and we have before data in a virtual world. It has proved difficult to get all parties up and running in a virtual world for technical reasons, but we are hopeful.
3. **Sales Renegotiation:** We are designing the pilot at this point, so the remarks below are based on the concept to date. Here the participants will have the opportunity to practice one of fourteen skills in the context of a complex sales re-negotiation. It is being set up so that the sessions are recorded and can be replayed either as a whole, for reflection, or as tagged by observers and coaches based on a set of predefined criteria. The notion of observer is flexible, ranging from the project team to multiple “apprentices.”
4. **Sales Pitch Rehearsal:** In the early stages of design, these learning experiences are targeted at sales people who have to build a pitch based on new technology features and new value propositions. Adopting and adapting to specific client needs is the goal of the practice sessions.

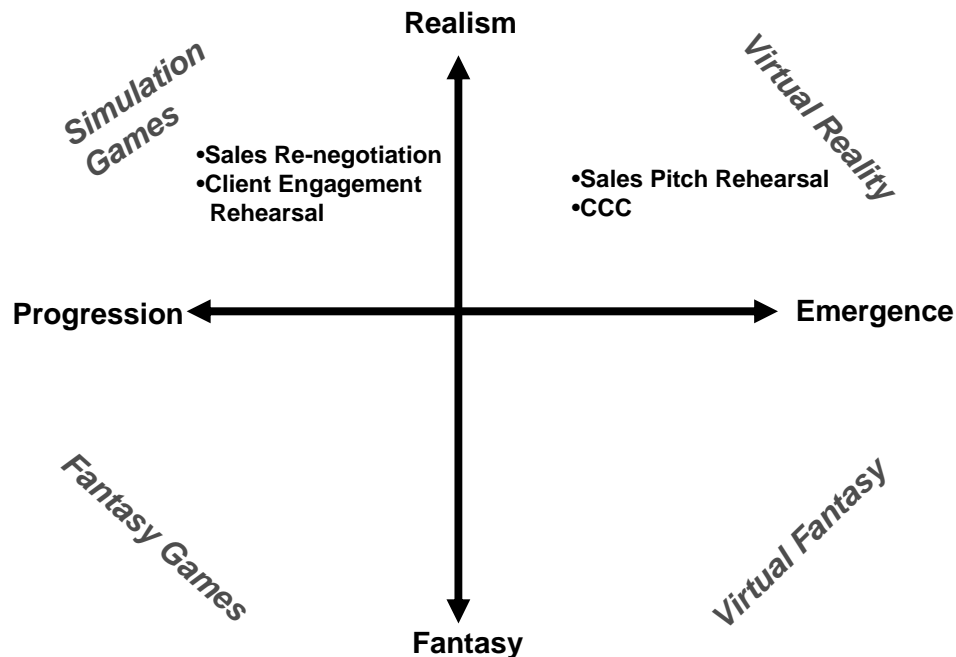


Figure 3. Locating the Rehearsal Service Projects in the Synthetic Worlds Framework

While the positioning of the four projects within the synthetic world typology should not be taken too literally, we can see that fantasy has little appeal. One of the learning experiences does require participants to fly around to “Mexico” and “China,” but otherwise people are in roles that are common in IBM, such as project executive or salesperson.

The Sales Re-negotiation experience will be using some props that verge on fantasy. As the venues are not photo-realistic, we have placed these lower in the quadrants.

There is more latitude taken in whether the experience being designed has a progression that the experience provides or whether through the experience the emergent behaviors are the ones that shape the experience. In the Cross-Cultural Communications project, the effort is put into developing a scenario up front that the participants then improvise on in the experience. In the Sales Pitch experience, we will likely see even more use of the emergent aspects, since the goal will be to adapt content to a particular situation.

Let's now take a look at these learning experiences with respect to the qualities of play laid out by Bonnie Nardi (see next section). Table 1 summarizes the findings for each of our Rehearsal Services projects. Interpretations are based on observation, interviews and surveys.

Table 1. Comparing Rehearsal Services Projects to Qualities of Play

Qualities x Projects	Makes people feel good in some way	Is voluntary	Takes place in a space separate from the stresses of real life	Involves known, repeated, ritualistic activities
Client Engagement	YES <i>I would do it again. From the beginning - not working in PM or Marketing - forced me to take on roles I was uncomfortable with. The first week was harder. During the second week I was willing to take more risk. I would have liked to know what was expected of me. Learn more about the tool and how I could talk my team into it. I had fun. Became braver. Took me out of my shell.</i>	Both Will be both a required experience for some people, but voluntary for others.	NO The learning experience was so involving that people leave their everyday work behind. Participants did say they had a hard time carving out the time required from their regular jobs. (This is now being addressed by management.)	YES Participants noted that usually "training" didn't usually preclude multi-tasking, while this had an experience that did.
CCC (baseline data for teleconference rehearsal)	YES <i>Most of the participants were eager to participate in the role play. It offered even experienced cross-cultural communicators a lot to learn.</i>	NO Voluntary at this point, though, feedback included that the rehearsal conducted should be "mandatory for everyone..." (restricted to teleconference data so far)	NO Repeatedly we had to deal with real world pressures. Including the difficulty of getting access to virtual worlds at work. No doubt this will be addressed in time.	YES
Sales Re-negotiation (early design phase only)	N/A	Both Will be both required and optional	NO	YES

So what can we tell from this small set of experiences? First, fantasy is not being taken advantage of to the extent that it could be. Nevertheless, participants reported that they tried out behaviors that they would not otherwise engage in. Can we/should we push harder on this?

It is well worth using frameworks and lists of attributes and affordances of the virtual world to help shape the kind of experience that will best fit the needs and opportunities of our "clients." Linking these to what makes for a learning experience will take time, experimentation and comparing experiences. It is far too early to say how virtual worlds will play out in corporate life.

V. MAKING WORK MORE LIKE PLAY (BONNIE NARDI)

Educators and managers have noticed the seemingly effortless ways in which players in multiplayer online games train and support one another, manage knowledge through FAQs, forums, and wikis, and self-organize in virtual space. Can these practices be brought to education and business? Multiplayer games are successful because play (1) makes people feel good in some way; (2) is voluntary; (3) takes place in a space separate from the stresses of real life; and (4) involves known, repeated, ritualistic activities. As a particular form of play, games are enjoyed because they provide a sense of mastery, continued challenge, and competition. Since most education and business environments do not reflect these characteristics, how can the desirable behaviors associated with gaming environments be replicated at work or in school?

I have been studying online games for the last two years. My research has focused on *Worlds of Warcraft (WoW)*, a game with a medieval fantasy theme based on Tolkien's novels. The game was released by Blizzard Entertainment in 2004 and has 10 million players world-wide. Nearly half are in China. WoW is available in seven languages: two versions of Chinese, English, French, German, Korean and Spanish.

My research focuses on collaboration [Nardi and Harris 2007], learning [Nardi, Ly, and Harris 2007] and creativity [Nardi and Kallinikos 2007]. I am currently writing up research, conducted in summer of 2007, on *World of Warcraft* in China. In this study, I explore the hybridity of game spaces, which incorporate the usage of technologies inside and outside the game, social interactions in physical and virtual spaces, and interactions with strangers, friends and family.

Corporations and schools are interested in reaping some of the benefits of gaming. These include the countless hours players voluntarily remain actively engaged, the collaboration among players, and the support and help players give each other.

Sutton-Smith [1975] refers to the migration of practices of play to non-play arenas as "adaptive potentiation." How viable is it that work be done in virtual worlds, and what practices and policies will need to be developed to facilitate adaptive potentiation of gaming practices? What rules around representation, conversation, and collaboration will organizations and institutions need to develop? How will some of the following practices, which are common in online games, impact trust and identity: One person playing multiple characters, multiple people playing one character (i.e., sharing account information), people playing a character whose gender is not reflective of their own (i.e., men playing female characters), and the presence of bots or NPCs (non-player characters)?

Even though gamers frequently help each other with mundane, everyday game tasks, it is unclear that this ethos of voluntarism and collaboration is transferable to work settings. What reward and time allocation schemes will be needed for this helpful behavior to transfer to work and school? And to what extent could virtual work worlds be used as places for low(er) risk socializing among colleagues, for instance in virtual cafes and bars? In virtual worlds such as *World of Warcraft* and *Second Life*, players socialize with their real-world and in-world friends. Compared to social networking technologies, virtual worlds seem to offer a relatively low-risk socialization space, given that if people do not like one another, they simply move away and play with someone else.

I would like to close with some fundamental questions that I believe organizations and educational institutions should consider as they develop virtual worlds technologies:

- What exactly is the value of 3D graphics for workplace communication and collaboration?
- How useful are the avatar, game geography, and objects without the fun of a game and the fantasy elements?
- Can fantasy elements be used? If so, who will program them and at what cost?
- What are the implications of being able to create multiple avatars and to share them with others?
- Games respond to our needs for competition, collaboration, and creativity. How will these needs be met in virtual work worlds?

VI. QUESTION AND ANSWER SESSION

Question: I have two questions related to teaching. First, I can appreciate the use of these virtual worlds for simulations in the classroom. But are they really useful for teaching the whole complex of topics we teach in the classroom, from theory to application? Second, have any of you done research on the issue of what we can do in *Second Life* that we can't currently do in the classroom?

Roxanne Hiltz: On the first question, I don't think that *Second Life* is sufficient to teach entire rich content courses. I think you need another meeting place and another medium. But I don't believe in single-medium courses in any case. I've never taught a single-medium course. When I had text-based discussion boards, I also had lectures with PowerPoint and some videos, some reading assignments, and they were handing in long documents for term papers. I think there are some scripted interactions that can go on in *Second Life*, but the deep thinking and exchange still need to occur by asynchronous text-based writing or face-to-face or audio discussions. In virtual worlds, it is so clunky to work with your avatar that it is difficult to have meaningful discussions at the same time.

Susan Stucky: With regard to the second question, this is exactly what we are trying to keep track of, what you can do in these virtual worlds that you can't do right now in a classroom? These worlds will find their niche and their value will become apparent. I think the interface would provide a great browser. I would much rather go walking down a street to a library than look at a list of files. I think there is just great potential there. We are looking at the 3-Dness—if there is such a word—of these worlds, their life-likeness. What would it be like to walk around inside a molecule, especially if you are studying something like chemistry? I think the replay function for learning through reflection is great. The persistence of the environment is another thing that will be big in research, for instance, in memory research people might explore what it is like to have a particular image or place trigger memory. We all know that you can go into a particular environment and it brings back memories. Just imagine you could go back into the exact same classroom that you left, just rez⁵ it up the next time you come in. You can keep a lot of stuff hanging around from one session to another.

Bonnie Nardi: I think one of the things that these worlds are good at is the geography. So any time you need a geography, for instance, in a geography class or military operations where geography is frequently very important, these worlds provide a very different experience than the traditional classroom.

Julie Rennecker: I think it is important to remember that these technologies are relatively new and currently somewhat clunky. So, I want to caution that we don't make our assessments of the technologies' potential on their current capabilities. Some of the people I have observed, who have become very adept at the technology, they are just zipping through screens and through worlds. So, while these worlds might serve as a great browser for Susan and some of the sophisticated users I observed in my research, for me—with my current capabilities—it is a lot faster to browse through a list of files than it is to use these worlds. So, I believe that these worlds will become better with experience. That said, where do we find time to develop these skills and who will fund it, those remain open questions. For instance, at IBM it is hard to get people away from their real jobs. So, at what point does it become okay to block two hours on your calendar to spend in-world to develop those skills?

Chris Sauer: I must be repressed, but I find it difficult to play at the best of times. But I find it particularly difficult to do during work time. To what extent is this an issue in the corporate world? Isn't there a huge mountain to climb with regard to getting corporations to engage a more ambiguous environment in which work and play are mixed?

Susan Stucky: I don't think we know. People are very different: some like to play; some people like the fantasy. After one of our research sessions, we did a report out and found that some people were just dancing and having fun, and others who were just completely appalled, and others who thought it was cool. That's just people. I think that *Second Life* is just like any other intervention in the workplace; it will be effectively used if it helps people do what they need and want to do. And if it becomes enriching in some way, it will stick.

Roxanne Hiltz: I would say that if you have been able to completely separate work and play, you are very unusual. We all have e-mail and the Internet with its host of applications in our homes and offices; we have mobile devices, etc. So, work and non-work have increasingly blended together such that we are potentially "on" 24/7. The boundaries between work and non-work are getting fuzzier and fuzzier.

Bonnie Nardi: And even in the game worlds, there are work-like activities that you have to do in order to complete certain goals. I mentioned the competitive actions earlier. So, the points that are being made here, about the strict divisions between work and play not being true, resonate with the game worlds. I also think there is a generational effect. As millions of people are starting to play these games and getting comfortable with them, they get used to thinking about working and thinking about playing, it won't seem so odd.

Yeliz Eseryel: I am a Ph.D student and I developed a course on ERP systems, so I know how much this takes to set up a course. So, I have a practical question: there seems to be a huge set-up cost for teaching in these virtual

⁵ When objects are created (or instantiated) in-world and then transferred to the Resident's computer, they are said to "rez," which is a reference to the Disney movie *Tron*. [from Wikipedia]

environments. Do you have any advice to junior faculty about how to effectively set up learning experiences in virtual worlds?

Ulrike Schultze: If we think back to a few years ago when the Web became a technology that we wanted to incorporate in our classes, it seemed hard. We had to learn HTML and code our Web pages. But now look at us: we have HTML editors and course management technology that helps us set up the functionality we need with minimal technical knowledge. We are simply dragging and dropping files into content management systems. Similarly, things are going to get better with the support for these virtual worlds. For example, Google is working with Linden Lab to render buildings from Google Maps in *Second Life*. It is not there yet, but it is coming. So, while the technology poses some huge hurdles right now, things are going to get better.

Julie Rennecker: You raise an important point about the disincentives to do this, especially as a junior faculty member.

Gadi Ariav: But what is the business case for using virtual worlds in teaching? I have attended both of the ICIS panels on virtual worlds and I am more convinced than before that there is no business case. We seem committed to trying to use these technologies, but the set-up costs are high. Nevertheless, we have been using business games for teaching in the past, so would you see yourself, in the next year or two, moving these business game simulations into *Second Life* and teaching them there?

Roxanne Hiltz: Yes, I would if I had a grant and a smart graduate student who would do all the programming for me. If I had to do it myself: no.

Susan Stucky: I think we are going to see a lot of tools that will allow you to build these things, unless the thing crashes and burns, which can always happen. Right now it feels like entire warehouses of stuff are being created, but soon it will all be sorted and accessible. Think back to the beginning of the Web: we all had Webmasters because the content and files were a mess. Today, we hardly have Webmasters any more, really. The Web editors and content management tools have become so much more sophisticated that you can do it yourself. Similarly in *Second Life*: you don't have to go rez up everything yourself; reserve a meeting space. We have a meeting scheduling and reservation system for our islands in *Second Life*. So, the technology components are already there, so you should be able to say "I want this, this and that."

(For a comprehensive—and up-to-date—list of "serious games," i.e., games that have a serious or real result and include simulations used for social activism, teaching and corporate training, visit: <http://seriousgamesportal.blogspot.com>)

Industry Player <http://www.industryplayer.com> also offers business simulation games. Players are global and there are a wide variety of industries to choose from.

An example of a business game that has gained popularity is L'Oreal's E-Strategy game, which L'Oreal uses for recruiting purposes: <http://www.estrat.loreal.com>)

Murray Tuross: One opportunity that I see for virtual worlds is in the area of training, especially for activities that need a lot of practice, such as in manufacturing. So, by the time a plant comes online, you could have your employees trained. So I see a variety of commercial applications for this. But it could also lead to an increase in sweatshops that are set up more quickly and efficiently. So, we have to be aware of the unintended consequences of these virtual worlds.

Susan Stucky: We have to pay attention to the privacy and security issues related to these virtual worlds. They are being worked on and will be worked out. IBM has a code of conduct for these virtual worlds that builds on the IBM overall code of conduct. If you have not yet read Castronova's latest book *Exodus*, which deals with the evolution of the legal system in synthetic worlds, I recommend that you do. There are always going to be unintended consequences, and we need to be vigilant. But we also need to be open to experimentation. Linden Lab is not crazy about working with corporations right now, because *Second Life* is a social experiment as far as they are concerned. Policy is getting worked out in-world, in an evolutionary kind of way. And I think we will learn a lot.

Julie Rennecker: I think people who are proponents of new media tend to underestimate human nature because they are focused on the productive possibility of these media. People who are opponents of new media tend to focus on how it is going to be the demise of society, and they underestimate the munificence of humanity and the emergence of social structure. About the sweatshops: they already exist especially in underdeveloped countries, and I can image some students here in the U.S. working long hours doing the kind of laborious, repetitive tasks that

Bonnie talked about. People are taking over someone's character and playing it to level up to where the character is more fun to play. So this is already happening. It is referred to as "gold farming" in *WoW*. And I think these sweatshop issues fall into the realm of globalization and here the law is very much behind the technology.

(For some videos on "gold farming," within-game virtual markets and issues of exploitation go to <http://www.mtv.com/overdrive/?id=1545907&vid=120059> and <http://www.chinesegoldfarmers.com/Links.html>.)

Brian Mennecke: There are already lots of resources available for *Second Life*. There is the New Media Consortium and scripting engines that you can use. One quick comment: I think structured exploration is a good way to think about teaching activities. There were some articles in the *Journal of Higher Education* recently that made the point that the terms of service are problematic in these virtual worlds. And this has to be something that IBM is concerned with: you can't conduct any proprietary communication in *Second Life* because you are using someone else's network, which is monitored. So, what do you think is coming?

Susan Stucky: I don't know what is coming, but I can tell you what we are doing now. We are not doing anything proprietary and confidential in *Second Life*. And if we are building something, we are building it outside of *Second Life* and piping it in if we have to. So, we are doing the data processing outside and bringing any results back in. We are also working with a host of virtual worlds. We have *Open Sim*, which is our own version of *Second Life* behind the fire wall. We have *Active Worlds*, we have all kinds of things. You lose a lot when you go behind the firewall, though. You lose the serendipity. It is kind of like building warehouses of stuff again. This summer we played around a lot in *Second Life*: we built things, we moved them around, cobbled them together just as fast as we could. But that gets lost when you go behind a firewall. So, I don't know what will happen, but it is a big, big issue.



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EDITOR'S NOTE: The following reference list contains the address of World Wide Web pages. Readers, who have the ability to access the Web directly from their computer or are reading the paper on the Web, can gain direct access to these references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
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3. The authors of the Web pages, not CAIS, are responsible for the accuracy of their content.
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