

---

# Acquiring a Professional “Second Life:” Problems and Prospects for the Use of Virtual Worlds in Business

**Katherine Bessière**

HCI Institute  
Carnegie Mellon University  
Pittsburgh, PA 15213 USA  
kbessiere@gmail.com

**Jason Ellis**

Social Computing Group  
IBM T.J. Watson Research Center  
P.O. Box 704  
Yorktown Heights, NY 10598 USA  
jasone@us.ibm.com

**Wendy A. Kellogg**

Social Computing Group  
IBM T.J. Watson Research Center  
P.O. Box 704  
Yorktown Heights, NY 10598 USA  
wkellogg@us.ibm.com

**Abstract**

The current surge of interest in virtual worlds suggests they are poised to make an evolutionary leap to the workplace, as instant messaging did a decade ago. In recent work we have introduced dozens of new users to teambuilding activities in the Second Life<sup>®</sup> environment, meeting both enthusiasm and skepticism. We document five issues for professional users of virtual environments: initial motivation, technical difficulties, interacting competently, becoming socially proficient, and finding compelling activities. Based on these we describe a training strategy to enable professional users of virtual worlds.

**Keywords**

Collaboration, virtual worlds, serious games, social translucence, social affordances, adoption, user training

**ACM Classification Keywords**

H.5 [Information Interfaces and Presentation]:  
H.5.1. Multimedia Information Systems – *artificial, augmented, and virtual realities*; H.5.3 Group and Organizational Interfaces – *collaborative computing, computer-supported cooperative work, synchronous interaction*.

---

Copyright is held by the author/owner(s).

CHI 2009, April 4 – April 9, 2009, Boston, MA, USA

ACM 978-1-60558-247-4/08/04.

## Introduction

This paper is concerned with the prospects for the routine use of virtual worlds in the workplace. Recently, Gartner predicted that by the end of 2011, 80% of active internet users would have a “second life” in a virtual world and that “major enterprises will find value in participating in this area in the coming years.” [10] Nevertheless, the report also stated that current business leaders often dismiss virtual worlds as “merely games.” This dismissive appraisal of business value is reminiscent of another once-deemed “frivolous” technology that has since become ubiquitous in business – namely instant messaging.

In 2002 many articles described the executive and CIO view of instant messaging as a teenage dating tool that would most likely be a security risk and/or productivity sink if widely disseminated as a business tool. This attitude might have persisted except that users took matters into their own hands, using external instant messaging tools to communicate with colleagues and business partners inside and outside their organizations. By 2004, the picture had changed significantly with Shipra Arora commenting “... once seen as eating away into the organization’s productive time, Instant Messaging [...] is an established medium of improving employee productivity. Instant Messaging [...] is coming of age – from being a ‘teen fad’ to a corporate ‘must have.’” [1].

While there are similarities between virtual worlds and instant messaging – for example, supporting awareness, team building, having immediacy, etc. – there are also significant differences between the two technologies. Instant messaging is simpler and more lightweight than a virtual world in terms of attention,

screen real estate, and system requirements. Virtual worlds require more preparation and learning from users. By making an analogy, we mean only to point to the folly of dismissing technologies that emerge in non-business contexts out of hand.

Gartner’s current recommendation for businesses is to begin tempered experimentation with virtual world technologies until platforms and capabilities have stabilized [9]. For the past three years, our large multinational enterprise (henceforth “LME”), has been exploring a variety of business uses of virtual worlds. For example, we have developed in-world storefronts for clients that provide new ways for their customers to engage with products (e.g., try out a new refrigerator and stove in a 3D model of your own kitchen before you buy). We have developed in-world conference venues that physically mirror their real world counterparts and enable remote colleagues to participate remotely in real time. We have developed in-world visualization tools that allow users to collaboratively navigate and discuss large-scale scientific data. We have built in-world studios that allow designers to present their work, clients to offer feedback, and for design changes to be mutually explored. These engagements have met with varying amounts of success. Some have become part of our corporate culture while others have ended. A key challenge that has emerged through this experience is barriers to adoption that users face.

This paper is organized as follows. We briefly discuss the distinction between game-oriented and open-ended virtual worlds. We describe the source of our observations: introducing professional users to virtual world activities, and characterize a number of

challenges faced by these users. Finally we discuss the challenges and offer heuristics for successfully addressing them.

### **Two kinds of virtual worlds**

Virtual worlds come in different forms with their history stretching back to text-based MUDs (“multi-user dimensions”), virtual ‘worlds’ which often took the form of multiplayer Dungeons & Dragons style “hack and slash” games. Today’s most popular virtual worlds are *multi-user virtual environments* (MUVes) like Second Life® and more game-focused Massively Multiplayer Online Role Playing Games (MMORPGs) like World of Warcraft®. Both are 3D worlds with users represented as avatars, but there are key distinctions. MMORPGs direct the player’s experience to a large degree, where MUVes provide a more open-ended experience. The power of MUVes derives from their extensive affordances for user interaction, but that greater range also makes them more daunting for new users.

The degree of directedness in these environments differs in two major ways. The first lies in the motivation and goals of the participant. Both MMORPGs and MUVes are intrinsically motivating to discretionary users; people participate in them because they find them interesting and fun, which serves as its own reward [11]. In a workplace context, however, the motivation to use a MUVe may be primarily extrinsic (i.e., the company expects you to), leading to participation in the short term but not necessarily to intrinsic rewards. A user entering a virtual world at the urging of an employer may have more trouble overcoming not knowing where or how to begin. In contrast, goals in MMORPGs are designed to be progressive and incrementally prescribed: users

complete quests and, in the process, increase the skills of their characters (experience points) and explore the world (most of which is not immediately accessible).

The second difference is in the content (e.g., objects, places, activities) of the world. In a MMORPG the game’s producer provides nearly all in-world content. A MUVe, on the other hand, features content almost entirely created by users. This leads to a more diverse and typically less coherent experience, reflecting the diversity of creators and less high-level coordination.

The lack of constraints in MUVes bespeaks a need for directed content for novice users. This is confirmed by our experience, where we found a surprising degree of difficulty recruiting participants and teaching them basic skills for effective interaction in a virtual world.

### **Data sources**

The analysis presented here is based on the authors’ combined thousands of hours of experience in Second Life®. This experience includes everything from exploring new areas of the world to attending events to hosting events to running subjects in controlled studies. The first author, for example, has spent more than 60 hours doing detailed observations of study sessions alone.

Our core data come from work we did in three studies involving cooperative [8] and competitive games. In the first study, 3 real-world distributed teams (with 4-5 members each) spent 5 hours over 5 days doing a range of activities under our observation. The first hour was an introduction to Second Life®. In the next three hours, participants played three different cooperative

games. The final hour was spent on debrief: survey fill-out and post-interview.

The second study involved 35 participants from within [LME] formed into groups of 3-5. These participants spent 2-2.5 hours on one day. The first 45 minutes they were given an introduction to Second Life<sup>®</sup>. The next hour they played either a cooperative or a competitive game. The final 45 minutes consisted of a survey and post-session interview.

Our third study involved 36 participants from [LME] USA and [LME] China. They participated for 1.75 hours and were grouped into teams of 3-5. Each team consisted of a mix of participants from the US and China. The first half hour consisted of a Second Life<sup>®</sup> introduction. The following hour they played a cooperative game. In the remaining 15 minutes, participants were interviewed and completed a survey.

For each study we collected detailed observational notes, conducted semi-structured interviews (either in-world or via instant messaging), and analyzed chat logs and survey results. As the studies progressed, we refined our approach to introducing new users to the virtual world. The findings discussed here derive from this iterative process.

Finally, we note that this paper is not about challenges involved in particular virtual world activities, such as our games. Rather, our focus is on the challenges users face when attempting to gain the competencies necessary to participate in *any* activity in a virtual world. Having observed similar challenges emerge across a variety of activities and situations, we believe the issues we will describe have generality and are

typical of new users. In what follows, we assess virtual world challenges in the light of collaborative tools already in use in business contexts. We also provide a set of heuristics that we have found helpful in addressing user needs in this space.

### **Five challenges for virtual worlds users**

Our analysis identified five central challenges for the adoption of virtual worlds: motivation, technical difficulties, controlling one's avatar, interacting with others, and finding compelling activities. In this section, we detail these challenges and provide examples.

#### *Motivation*

The likelihood of trying out a new technology is affected by factors such as self-efficacy [2], previous experience with similar technologies, favorable impressions, the value that the technology is presumed to have, and curiosity. In addition to these intrinsic factors, extrinsic ones such as organizational requirement, necessity, or even social factors such as peer pressure come into play.

The hardest challenge we faced in carrying out our studies was convincing employees to participate. Only those with high intrinsic motivation (those already in Second Life<sup>®</sup> and those wanting to learn in a safe environment) or those with sufficient external prodding (namely a manager or esteemed colleague requesting their participation) signed up. Some employees seemed skeptical of the use of virtual world technology in the workplace, viewing it as a distraction at best, and potentially risky or immoral at worst. Many wanted to wait until there were proven benefits to engaging in virtual world activity. As one participant said about her frustration getting fellow team members to sign up:

*"Lots of teams where people weren't in SL [Second Life®] [and] couldn't bring themselves to sign up."* As it turns out, there were several reasons for this, which we now discuss.

#### NOTHING WILL EVER REPLACE FACE TO FACE INTERACTION

Many potential participants seemed to view face to face interaction as the "gold standard" for collaborative work, and were suspicious of a technology that might seemingly usurp its privileged role. Despite the fact that many participants were members of distributed teams that had never met in person, the fear that virtual worlds would replace face to face interaction in the workplace, particularly meetings, was widespread.

The meeting distinction is a crucial point: the fear of losing face time seemed largely driven by the thought that Second Life® would primarily be used for meetings and events. Traditionally, distributed teams will attempt to meet in person if at all possible, and this is what many were defending. *"But given the choice of not getting any training this year because there's no budget, or attending virtual training via SL because there's no budget, I'd take the latter. Much better than [an] instructor-led online course, for example."*

When asked to compare a technology such as Second Life® to alternative collaboration technologies to face to face, there was a much different reaction. *"Comparing to other technologies, big step up. Can probably adequately replace F2F for some tasks. Nowhere near a true replacement for F2F."* Note that this participant defended face-to-face interaction while admitting the possible value of a 3D virtual world.

Once users had firsthand exposure to the variety of interactions going on in an environment such as Second Life® (e.g., live events, other corporate presences, educational resources) they began to see business possibilities beyond meetings. After a week with us, one participant commented: *"I'm no longer skeptical after what I've seen here... a ton of businesses are here and they are engaged in activities linking commerce and marketing and networking together."*

#### THIS IS A GAME, NOT REAL WORK

Virtual worlds are identified primarily with socializing and playing, rather than working. One participant remarked *"Some friends - unfamiliar with SL - were truly skeptical of the benefit. It seemed like play unrelated to work even when existing businesses were identified."* The media often present virtual worlds as magnets for people who want to engage in sexual or deviant behavior. Some virtual worlds are rendered in a "cartoon-like" graphical style, perhaps adding to a perception of virtual worlds as silly and fun, not serious. Depending on where a user travels in-world, they may not encounter a great deal of business-oriented content.

#### THE VALUE OF TIME

Closely related to the 'this is play, not work' issue is the willingness of busy people to devote time to an activity they see as of questionable value. For employees whose time was billable, taking time out of the workday to 'play' in a virtual world was difficult to justify. One woman, although impressed with the level of camaraderie achieved in our team-building activities, remarked *"not that this isn't fun... just that taking 2 hrs from work to play cards is tough..."* and then one minute later *"I really do think there's great potential in*

*using Second Life to collaborate in teams."* Many people primarily work on distributed teams, and having a technology that improves a team's performance would be valuable in the long run. However, process improvement isn't billable, and until virtual worlds have proven their efficacy for improving productivity, using them will continue to be viewed as a non-starter.

A side effect of the time issue is that many people came to our Second Life® activities without proper preparation, despite guidance on how to prepare. One employee with experience in virtual world events stated *"I delivered education events last year [...] many people think they can hop in and just start running BUT you cannot do that. I lost a lot of naysayers b/c they would not take the time to set themselves up."*

#### THE ISSUE OF MANAGEMENT

Some individuals expressed concern that management would not view their participation favorably, often for the reasons outlined previously. Thus despite a willingness to explore virtual worlds, external factors limited participation. Some found ways to participate on their own time or made up lost hours. Whether perceived or actual, management resistance reflects the reality of the virtual worlds' adoption curve; even if encouraged at the corporate level, at the day-to-day managerial level they are an unproven technology that takes time away from mandated work. Within our company, nevertheless, grassroots progress is being made by virtual world enthusiasts, who are finding ways to use and proselytize virtual worlds.

#### VIRTUAL WORLD SELF-EFFICACY

The last major theme we found with respect to motivational challenges is what we might call 'virtual

world self-efficacy.' Self-efficacy is the belief in one's personal capabilities [2], in this case the belief that one can successfully navigate a virtual world. Research on computer self-efficacy suggests low self-efficacy is associated with increased anxiety when approaching a computer tasks, and that performance is adversely affected [6]. We might thus expect users with low virtual world self-efficacy to be more anxious and less willing to engage with an unfamiliar environment. Low-efficacy individuals may be more likely to encounter problems, experience greater frustration [3], enjoy themselves less, and be less likely to return to the environment. They may act differently as a result of their perceived lack of competence, *"I'm a competency nut, I like to be good at things. My avatar's personality is different because her SL skills are low."*

We encountered people reluctant to enter virtual worlds without having an idea of what to do or how to do it. The lack of familiarity seemed to undermine any belief that they would be able to act appropriately. Fear of public embarrassment might have been a factor; one user said: *"I was afraid I would come in here with a bunch of experts and look like a fool."* This participant was concerned enough that he took the time to educate himself prior to arriving at our session.

#### *Technical Difficulties*

Virtual world users currently face a variety of technical difficulties, in part because the software tends to put a heavy burden on computing equipment. Hidden aspects of the environment can affect the user experience in unanticipated ways, causing frustration [3]. Although these difficulties will no doubt lessen over time, they can discourage even the hardiest user and kill motivation entirely for others.

#### HARDWARE INCOMPATIBILITIES

Many of our users did not have equipment up to the task: For example, Second Life® was incompatible with the graphics chip provided in a make and model of machine common among our users. Running the client would cause machines to freeze up and produce the “blue screen of death.” Often crashes occurred within seconds of entering the world. After a few instances of this, many people did not bother coming back. One team lost 3 members to hardware incompatibilities and had to end their engagement in the virtual world.

#### CLIENT-SERVER ISSUES

The client-server architecture used by virtual world software means that users can encounter problems out of their control. A common issue is server lag: when the server gets overloaded or the network is slow, the world can act in unexpected ways. Actions taken by the user will take a long time to be reflected on-screen. For instance, in playing our teambuilding games, players would hit a key repeatedly in an effort to move a “stuck” piece. Eventually the server would catch up and the piece would jump from its current position to one far away, necessitating further keystrokes to move it back. Lag was a frequent complaint.

Client issues related to the local machine cache can also cause problems. When local data is not up-to-date or becomes corrupt, the way one user sees the world can get out-of-sync with others’ views. In Second Life® this can result in an inability to change clothing, or in clothing being displayed incorrectly.

#### UNEXPLAINABLE DIFFICULTIES

Periodically, things happened that could not be immediately tied to a cause and were not reproducible.

In our experience users often seemed to find these random errors amusing. However, they could also result in bewilderment and frustration over time.

In one case, an avatar was unable to stay clothed for more than a few seconds before the clothing disappeared, and we were unable to remedy the problem during the session. The team, however, including the woman behind the avatar, was able to take it in stride. An important aspect of such errors is correctly attributing the problem source. In this case it took some time for the experimenter to understand the error, highlighting the difficulty of determining whether the problem is due to software, hardware or the user.

Another set of examples involved strange behavior of our game objects. For instance, puzzle pieces being moved by players began simultaneously floating off into space and players were no longer able to control them. In another instance, a stack of blocks that had been created by players violently exploded when a new block was placed on the stack when normally they would have simply fallen to the ground. Some even landed on different islands – a feat usually impossible.

#### *Becoming a Competent Virtual Person*

Once a new user enters the world, becomes embodied as an avatar, and attempts to move, talk, and navigate the virtual landscape, they find themselves faced with new challenges. Perhaps because of visual similarities to the real world, many users seem to overlook the difficulty of learning effective interaction with the world and becoming a competent virtual person. The sheer number of participants who came to our sessions without reading the training sheets provides some support for this.

#### USER INTERFACE AND INTERACTION PARADIGMS

Virtual worlds are all about interaction: a user interacts both with the world and the other people in it. Virtual worlds employ a variety of interaction paradigms, often mutually inconsistent. Even within a single world there can be a curious mix of interface elements and multiple ways to accomplish the same action. For example, avatar movement is typically mapped to the arrow keys. In some contexts, though, the arrow keys may be used to turn the avatar or to move the camera view around the avatar. Many worlds provide redundant menu schemes for avatar movement, as well as short-cut key combinations. Other common interaction methods include pie menus, pop-up menus on objects, and buttons around the screen. In some worlds, one cannot interact with objects by clicking on them at all (text commands are used instead), while in others one left or right clicks to evoke different actions. Buttons may serve as the primary means of interaction, or all four methods may be in use. To complicate it further, sometimes the same action can cause different things to happen *in the same world*; left-clicking on an object may result in nothing, in the object speaking to you, in the object doing something, or in you sitting on it.

This level of function overloading and inconsistency can confuse even the most patient or advanced user. Our participants commented repeatedly on the need for training in navigating the world (*"I find that [name] is harder to navigate in than other online games I've played."*) and interacting with objects (*"I sometimes wished I'd had more time in advance to practice handling objects. That was sometimes very frustrating."*).

Across the board, there was a realization at the amount of time that must be invested, a comment repeated both by those new to Second Life<sup>®</sup> and those experienced in running events in-world. Many also commented that having an experienced team member was invaluable. There was some disagreement among users as to whether or not Second Life<sup>®</sup> was easy to 'get.' Some felt it was easy; *"SL has a steep learning curve - but once you get it, it goes quick. That is why the orientation sessions are critical for new players."* Others felt it was immensely difficult: *"So we were in an environment where we were very incompetent (no offense). By the time I understood what was going on, I had to leave for my next appointment."* The difference between these points of view often seemed to be amount of experience and virtual world self-efficacy. Those with less experience and self-efficacy seemed to have more frustration and be more likely to view obstacles as insurmountable.

#### REAL-WORLD METAPHORS... OR NOT

The sense of being embodied and moving through space is strong in most virtual worlds, which makes drawing on the real-world as a metaphor attractive to both designers and users. But the resemblance to reality can confuse as well as assist new users, especially when something that seems fairly obvious requires a new interaction technique. Resemblance to reality may have a more subtle impact too: users may not be able to get beyond the temptation to do things exactly as they do in real life. One experienced user tested this by holding two different meetings: one in a typical boardroom with the requisite chairs and table, and another in an apple tree. When asked which meeting was more successful, she responded *"Well, the apple tree"* as if it had been obvious all along.

As with all interface metaphors, the correspondences to reality are incomplete and flawed. This, coupled with the complexity of interaction techniques described previously, makes it hard for new users to infer how even simple gestures might be done. One participant had trouble sitting down on a chair, despite repeated instructions. The correct method for this is to right click the chair and select 'sit' from the pie menu. But, as we discovered after nearly two hours, the participant had been clicking on her *avatar*. This reflects a direct mapping: trying to "make herself do something," she (quite reasonably) clicked on her avatar. After all, touching a chair in the real world does not cause your knees to bend and your body to be seated.

This type of confusion is so widespread that it has been incorporated into popular culture. A recent episode of the U.S. television show *South Park* featured a father rushing into World of Warcraft at a critical moment to give his son the sword he needed to vanquish an enemy. He rushes up, the son is amazed ("Dad! How did you get that?" "No time... just take it...here"). He reaches out his arm to hand over the sword... and realizes he has no idea how to hand it off. [17] They spend crucial battle time negotiating user interface issues instead of fighting the enemy, much to the viewer's amusement.

We laugh because it's funny and we laugh because it's true. The discrepancies from the real world of basic control of one's body are a violation of expectations from a lifetime of experience, and they are exacerbated by the verisimilitude of the virtual world. While we might get closer to a direct mapping of virtual actions to real world actions in the future, today's designers must rely on a variety of metaphors and methods to

enable people to navigate such worlds. Nevertheless, the difficulties for users must be taken into account by facilitators of virtual world activities.

#### *Coordinated Action: Interacting Well with Others*

Because of the expressiveness of personal avatars, and the social interaction that virtual worlds provide, there are a number of social challenges for workplace users. For example, individuals must make decisions about their appearance. Social norms and work practices may be different and therefore more difficult to discern and develop in a virtual world, especially with inexperienced or mixed-experience groups. Organizations will be sensitive to the effects on their brand and image of participating in virtual worlds, and to preserving a high quality of interactions and relationships with and among employees and clients.

#### SOCIAL SIGNALING

Second Life<sup>®</sup> provides quite a few ways by which a user can signal their social self to others. Beyond obvious expressions of text and voice communication, there is body position, direction of gaze, and various gestures and animations that enable a person to alter their demeanor for social expression (e.g., waving, smiling). Many of our participants learned how to use gestures completely on their own, indicating a real desire to enact a range of expressions. One performed a back handspring every time a game was completed. Others passed out champagne glasses to team members as a sign of celebration, or danced with each other. More advanced users had entire macros set up with text, voice, sound effects, and gestures all set up together to indicate particular moods. "♪♪ ♡ WOOOOOO HOOOOO HOOOOO ♡♪♪" was accompanied by music and a dance.

The immediate adoption of gestures as well as the desire to alter default avatars (particularly after being exposed to the variety of user-modified avatars and clothing in-world) indicates that the ability to differentiate oneself through personal expression is important, even to new users. We found that teams wanted to differentiate both their avatars and their team from others almost immediately. One team, the Blue Angels, outfitted themselves with wings on the first day. Another team put on birthday hats to celebrate a member's birthday and wore them throughout the session. The first author gave many pointers to clothing stores, skin and hair shops to users who wanted to improve their appearances.

#### FANTASY OR REALITY?

In business contexts, virtual worlds raise new issues about self-expression. In corporate virtual worlds, users will need to find ways to balance their real-world and virtual identities. One of the most powerful affordances of a virtual world is the ability to take on different appearances or enact different selves. Research indicates that people enjoy this, and sometimes bring characteristics first exercised online back to their real-world personas [12]. In World of Warcraft®, individuals who suffer from high depression or low self esteem create characters that reflect aspects of their 'ideal' selves [4]. In virtual worlds, the possibilities for self-expression are endless, but if your manager appears at a meeting with an animal avatar?

This scenario occurred more than once in our work. While most participants chose default avatars, some went with riskier choices. In an interview after the weeklong study, one user said he was *"surprised people mostly stick with human avatars. I've heard comments*

*from some co-workers that the non-[company] avatars are inappropriate and are doing and saying inappropriate things."* Tension between self-expression and norms of corporate behavior can be seen at play here: both people and organizations are uncertain about what policy, if any, should be in force.

#### SOCIAL NORMS AND PRACTICES

Symbolic interaction suggests that social norms and practices develop through interaction with others and with the environment [5]. People learn social norms and the situations in which they apply through experience. The development and nature of social norms in virtual environments has been studied [16]. For example, Yee found that norms for interpersonal distance are replicated in 3D environments. Avatar positioning and behavior unfolds similarly in the virtual world as in reality, and similar expectations seem to hold [18]. But even this deeply embedded norm does not translate to all situations or behavior.

We observed many instances of real-world norms being appropriated or changed, and of new norms being developed through team interaction. For example, initially everyone was clothed, apologized when they ran into other avatars, and deferred to the experimenter. Facing people with whom one was speaking (chatting) was normative but was dropped over time as users found it unnecessary. Breaking real-world expectations can have positive consequences, as evidenced by the success of the woman holding a meeting in an apple tree.

Being in a business context and interacting with real world coworkers suggests that real world norms will have a persistent influence on virtual world

interactions. Participants who came from real-world teams did notice differences in their virtual interactions – they reported feeling less inhibited in the virtual world. *"We definitely bring our personalities to 2d Life [sic], but it gives us more freedom to be expressive,"* said one. *"And can help how we relate in real life"* Concluded a teammate.

#### INTERACTION WITH THE REST OF THE VIRTUAL WORLD

Another challenge business users of virtual worlds may face is managing the behavior of outsiders who interact with those in the business context. Outsiders may not conform to organizational norms, or may have avatars seen as shocking or inappropriate. They may behave in rude or unconventional ways, and may even cause grief to others or destroy in-world property. They may gain access to private areas, or access to data that they should not have.

For example, when an unknown person arrived on our private-access island during a session, he interrupted what the participants in the study were doing by attempting to talk to them. When they ignored him, he took an object from our land (that he should not have been able to manipulate) and set it directly in the middle of the game that they were playing. (This kind of behavior is sometimes referred to as "griefing.") The solution was to ban him from the island and remove the object from the middle of the playing field. Griefing can also be done using scripts on objects. One participant managed to pick up an item of clothing that caused his avatar to begin moving in a suggestive manner, ultimately causing embarrassment. We quickly told him how to remove the offending article of clothing.

Alongside malicious behavior is inappropriate behavior. In an open system, employees may pursue non-business interactions on their own time. We spoke with a few employees who run nightclubs and art galleries within Second Life® in the evenings. This could conceivably be seen as an issue since a user's company affiliation is visible to anyone that views the avatar's profile. Most employees do not wear corporate group tags outside of the corporate islands unless on official business, but nevertheless some question remains as to whether employees should be required to use a different avatar altogether outside of work.

#### *Finding Compelling Activities*

Like many networked technologies, the more users a virtual world has, the more valuable it becomes to all users. A new email user will thrive only if she has people to correspond with and reasons to write messages. Virtual worlds in the workplace will similarly have to offer their users compelling reasons to be there. Particularly during initial engagements, having a critical mass of social activities for workers helps demonstrate value. One participant noted, *"I do feel that there is a lot of empty space... easy to get bored if you don't look for events or popular places."* Another noted *"I find myself getting a little bored with SL when I travel to other lands. I'm mostly the other person at the place and it's not much fun to shop or look around by myself all the time. I've found the few organized events that I've attended to be much more interesting."* Without high intrinsic motivation to be there or stimulating content, an individual is unlikely to stay engaged or explore further.

### Approaches and solutions

Initially, we only had a short training session prior to our study activities, which proved insufficient. This resulted in spending significant study time doing troubleshooting and helping people understand how to interact in the world. Given this and the challenges to adoption detailed above, we developed a lengthier training curriculum for virtual worlds. By spending more focused time on orientation, we hoped to make adapting to virtual world interactions more straightforward for users.

Early experiences in a virtual world can have a disproportionate effect on people's perception. Accordingly, we assisted participants in essential preparations for in-world interactions: running the software, creating an avatar, and practicing basic skills. We developed a carefully crafted set of training activities that give participants an extended opportunity to get comfortable in their new (virtual) skins before attempting more structured interactions.

The orientation consists of interactive tutoring on basic skills people need (e.g., sitting, walking, chatting) in order to participate in typical virtual world interactions. This tutorial is followed by one of the following group activities: decoration of a team house, a card game, a puzzle game, a scavenger hunt, and the opportunity to explore the island with a knowledgeable guide nearby to help should they encounter problems. Two perspectives were particularly useful in developing this training: constructionism and intrinsic motivation.



**figure 1.** A clubhouse decorated by Team Green.

#### *Constructionism*

Constructionism, a philosophy of education, argues that learning through the design and building of personally meaningful artifacts is better than learning by being told [14, 15]. Systems like MOOSE Crossing [7] have shown that constructionism can be equally applied in virtual worlds as in the physical one. Because MUVes like Second Life® allow users to build collaboratively in-world, it may be possible to create opportunities for self-motivated individual or team learning.

Figure 1 shows an orientation exercise in which a new team is charged with decorating their clubhouse. This exercise serves as an icebreaker, allowing team members to interact informally and give them time to become accustomed to their virtual bodies and to develop basic skills such as moving around and handling objects. The exercise and context were designed to afford constructionist learning. We provide

a wide variety of objects that users can choose from to populate their house and encourage participants to work together to develop a space that reflects their own identity as well as their team identity.

Bruckman states: "Tools can be effectively constructionist only when they are embedded in a constructionist culture. Constructionism works best when it is situated in a supportive community context." [7] In the interactions we have observed, users develop this community as they work through a process of negotiation between their need for self-expression and the larger interests of the group. Together, the team works to prototype, modify, and finalize their space while, in the process, developing important skills for navigating, communicating, and building in 3D MUVes. Because their work is situated in the larger Second Life® world, other community members can visit and offer feedback, allowing the team to refine their work.

#### *A Taxonomy of Intrinsic Motivation for Learning*

Throughout this paper, we have stressed the role that intrinsic motivation can play in the experience a new user will have of a virtual world. In a business context, such motivation could be missing if workers come to the virtual world at the behest of their organization. For this reason, we turned to Malone & Lepper's taxonomy of intrinsic motivation [11], often used by those designing games for learning, to help us develop intrinsically motivating activities that also train users in new skills. This taxonomy distinguishes between individual and interpersonal factors that affect intrinsic motivation and subsequently learning. These factors are: 1) establishing goals for the individual that are meaningful, challenging, and attainable; 2) engaging the individual's curiosity; 3) making the benefits of the

activity clear to the trainee; 4) making a game out of learning; utilizing both 5) competition and 6) cooperation in the activities, and finally 7) making sure the trainees can see the results of their learning.

These seven factors aligned well with the Second Life® environment, so in addition to creating explicit training activities, we designed several areas of interest around our island to encourage exploration. The island featured a town where one can shop for furniture and toys, several lounges aimed at facilitating conversation, and a welcome center with more detailed information on the world alongside and links to self-guided training activities, such as the scavenger hunt, an obstacle course, and an optical illusion test.

We found that these kinds of activities allowed participants to become comfortable within the world in a playful manner. Users were able to assemble the skills and efficacy needed to begin interacting with the world and with others in a low-pressure environment. This way, when participants came back for more formal activities, they were comfortable and could focus on the activities at hand.

#### **Design heuristics**

Our orientation activities were designed to address the challenges we have detailed throughout this paper, drawing on the perspectives discussed in the previous section. We describe attributes we found to be useful for creating effective orientation activities.

*Structured.* Each orientation activity should have a goal that is challenging but attainable (a characteristic similar to the first factor in the taxonomy described above). Due to the steep virtual world learning curve,

the activity should provide attainable goals that lead users through progressively more complex interactions. The overarching goal of teaching skills and becoming more comfortable in the world is the stated goal of these orientations, a goal that was meaningful to our participants, as it would allow them to participate in the team-building session at a later date. We also built goals into the activities such as solving puzzles, getting on the scoreboard, winning the game, etc.

*Purposeful.* Each activity was designed to allow individuals to develop not only different skills but also familiarity with the world and its navigation. The orientation trained skills needed for the team-building activity but more importantly it gave users skills needed for participation in the broader virtual world. Decorating the team house taught users how to manipulate objects, the simple team-building game taught them how to sit down and to move objects, the scavenger hunt taught them navigation skills and camera controls, and the card game taught them how to use a head-up display and interact with each other via in-world chat.

*Engaging/Fun.* The activity should be engaging and fun. The traditional training session does not have a strong element of enjoyment associated with it. We attempted to make our activities more playful by using the affordances of the virtual world to extend activities beyond what a face-to-face training activity can offer.

*Social.* The predominant feature of MUVE virtual worlds is that they allow social behavior and interaction with other individuals, and the orientation activity should tap into this. This enables people to learn how to interact together, but also gives them an initial social group to

explore the world with should they need one. We built our games to be either cooperative or competitive (or both) as well, to encourage social behavior and also to encourage intrinsic motivation.

*Unique Features.* Activities unique to the virtual world (not simply a replication of training activities as they exist in the physical world) will enable people to see the potential in virtual worlds and activate their curiosity about what else is possible. Non-unique activities involving novel interactions also served this purpose well, such as decorating the team house.

*Compelling/Enticing.* The activity should try to move beyond the new/sexy attraction of the virtual world and provide real value. If value is not perceived, then the participants will not be motivated to participate in the activity or in the virtual world in general. This speaks directly to the third taxonomy factor of making the benefits clear to the participants. This is best accomplished by providing opportunities for participants to discover the benefits for themselves.

## **Conclusion**

Virtual worlds face challenges in order to deliver on their promise. Earlier in the paper, we discussed some of the experimental uses of virtual worlds inside our enterprise. As with the any experiment deployment, some of the applications (such as conferences and meetings) have found traction, and others have not. Often, a major factor in the failures was the (often overlooked) barriers to use that new users face.

In the near future, we expect applications to emerge that will more fully exploit the unique affordances of virtual worlds. Based on our observations, the aspects

of virtual worlds these new applications of virtual worlds are likely to exploit include embodiment, shared 3D artifacts, and proximity-based social interaction. For example, team-building games, embodied cultural role-plays, and in-world design studios that center on complex artifacts, offering opportunities for shared critique and revision in real time.

In order for these new applications to succeed, however, users need the ability to partake of them. Olson and Olson [13] describe two types of readiness as essential for the uptake of new collaboration technologies. First, the participants need collaboration readiness, which means coworkers share information and are recognized for that sharing. Because our company is a highly distributed company that has a long history of adopting (and inventing) collaboration technologies, a large number of employees meet this criterion.

The bulk of this paper, then, has discussed the second type of readiness: technology readiness. Technology

readiness includes both the behavioral habits and technical infrastructure needed for an organization to successfully adopt a new collaboration technology. Technology readiness implies both equipment that is up to the task of supporting the new collaboration technologies, and appropriate work practices to ensure a good result (e.g., preparation, regular access, and attention given to others' information needs). In the work described here, we encountered deficits on both sides of this equation. On the technology side, for example, some older computers are simply unable to run the virtual world client software. On the work practices side, many social and skills-related barriers inhibit useful virtual world interactions and must be specifically addressed for such engagements to succeed. While it is up to hardware vendors and virtual world creators to work out the technological issues, the work presented here provides a potential way forward, based on our experience deploying virtual worlds, for businesses to begin developing work practices that will support effective virtual world use.

## References

1. Arora, S. Instant messaging: The next wave in business communications *IT People*, New Delhi, India, 2004.
2. Bandura, A. *social foundation of thought and action: A social-cognitive theory*. Prentice Hall, Englewood Cliffs, NJ, 1986.
3. Bessière, K., Newhagen, J.E., Robinson, J.P. and Shneiderman, B. A model for computer frustration: The role of instrumental and dispositional factors on incident, session, and post-session frustration and mood. *Computers in Human Behavior*, 22(6). 2006, 941-961.
4. Bessière, K., Seay, A.F., and Kiesler, S. The ideal elf: Identity exploration in *World of Warcraft*. *CyberPsychology & Behavior*, 10(4). 2007.
5. Blumer, H. Society as symbolic interaction. In A.M. Rose (ed.), *Human behavior and social process*, Houghton-Mifflin, 1962.
6. Brosnan, M.J. The impact of computer anxiety and self-efficacy upon performance. *J. Computer Assisted Learning*, 14(3). 1998, 223-234.
7. Bruckman, A.S. Community support for constructionist learning. *CSCW*, 7. 1998, 47-86.
8. Ellis, J.B., Luther, K., Bessiere, K. and Kellogg, W.A. Games for virtual team building *Proc. DIS 2008*. ACM Press, 2008.
9. Gartner. Corporate use of virtual worlds needs careful evaluation, says Gartner. 2007. <http://www.gartner.com/page.jsp?id=511370>. Accessed: April 14, 2008.
10. Gartner. Gartner says 80 percent of active Internet users will have a "second life" in the virtual world by the end of 2011. 2007. <http://www.gartner.com/it/page.jsp?id=503861>. Accessed: April 14, 2008.
11. Malone, T.W. and Lepper, M.R. Making learning fun: A taxonomy of intrinsic motivations for learning. In R.E. Snow and M.J. Farr (eds.), *Aptitude, learning and instruction III: Cognitive and affective process analyses*, Erlbaum, Hillsdale, NJ, 1987.
12. McKenna, K.Y.A. and Bargh, J.A. Coming out in the age of the Internet: Identity 'demarginalization' through virtual group participation. *J. Personal Social Psychology*, 75. 1998, 681-694.
13. Olson, G.M. and Olson, J.S. Distance matters. *Human-Computer Interaction*, 15. 2000, 139-178.
14. Papert, S.A. Introduction. In I. Harel (ed.), *Constructionist learning*. Cambridge: MIT Press, 1990.
15. Papert, S.A. Situating constructionism. In I. Harel and S. Papert (eds.), *Constructionism*. Norwood, NJ: Ablex Publishing, 1991.
16. Schroeder, R. *The social life of avatars*. New York: Springer, 2002.
17. SouthParkStudios.com. Battle Won, 2006.
18. Yee, N., Bailenson, J.N., Urbanek, M., Chang, F. and Merget, D. The unbearable likeness of being digital: The persistence of nonverbal social norms in online virtual environments. *CyberPsychology & Behavior*, 10(1). 2007, 115-121.