



VIRTUAL WORLDS, VIRTUAL LITERACY

An Educational Exploration

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Visual Aspects of Immersive Learning

Imagine learning about the eighteenth century by becoming a resident of colonial Williamsburg. In the three-dimensional role-playing game, *Revolution*, students are immersed in the political and social aspects of this history-themed virtual world. Settings like *Revolution* allow students to practice their skills and learn from their failures through authentic and active experiences that emulate those found in the real world or deviate from it. Further, educational entities and business have established locations in virtual worlds, and the Horizon Report (2007) indicates that “educational use of these spaces is already underway and growing” (18).

From one of seven social perspectives ranging from an upper class lawyer to an African American slave, student players in *Revolution* become residents of the colonies on the eve of the revolt between the American colonists and the British Empire. If a student adopts the persona of a conservative patriot and skilled lawyer like Robert Carter Nicholas, he conducts legal business wearing clothing that indicates his position in society—a formal suit consisting of a royal plum-colored tailored jacket with large brass buttons over a light blue, striped dress shirt with an elaborate white collar that forms a V across Robert’s broad chest. As he speaks to his fellow colonists, Robert’s pose is attentive, with well-manicured hands positioned at his sides and spiral-curved golden locks pulled back neatly under a three-cornered hat.

In contrast, a student who has become Hannah, a house slave for a wealthy patriot named George

Steadmond, performs domestic duties wearing servant’s attire. Her drab uniform hangs loosely on her thin frame with muddy gray sleeves rolled up to her elbows. Her short, coarsely-textured hair is protected by a bright yellow handkerchief that is tightly wrapped around her head. While no one would mistake Robert or Hannah for real actors, their features, clothing, and body language simulate an actual person well enough to contribute to the player’s immersive engagement in that role.

Within the colony, a student-player may navigate through the grassy open areas or relax at the rustic tavern in front of a warm, glowing fireplace. Or, if wealthy enough, the participant may travel through Williamsburg’s more developed areas among newly planted trees to drink tea using an exact replica of a colonial teapot (a classic 3D mesh that has been used in early university 3D rendering experiments and in Pixar films) on Mr. Steadmond’s palatial plantation served by one of the house slaves.

Players react to the various historical events as they unfold. One might join a revolt among the colony’s politically discontented as they wave flaming torches in protest. Or, perhaps as the colony’s wealthy blacksmith dressed in elegant leather-like pants, a gray blousy shirt with subtle ruffles at his wrists, a player might decide to support a local merchant who has been bullied by the Patriot group by merchants like himself to persuade that merchant to sign a formal petition to be printed in the *Virginia Gazette*.

A participant can interact and collaborate with other players and with colony residents, who act as

informal guides, working together to devise solutions to dilemmas based on politics, gender, and class issues typical of this period. Your moral beliefs may be challenged by the choices you are asked to make as a participant. For instance, Hannah might be asked to hide a runaway slave named Tom. She might disguise him as a free black laborer in a set of work clothes that she obtains from the local tailor, Catherine Grimes. The game, while remaining true to the constraints of the historical period, responds to the player’s choices, and its outcomes are affected by the decisions the participants make.



Residents of Williamsburg gather around the colony courthouse.

Revolution: The Education Arcade

Another example of a scenario-based virtual world is *Prospero’s Island*, based on the play, *The Tempest*. In this space students become immersed in a Shakespearian narrative, initially by selecting a set of clothes to wear and taking on the role of a storm-tossed, shipwrecked traveler (for example, a sailor, stowaway, or servant) by selecting an avatar—a digital, animated character. This traveler struggles to survive massively peaked waves and is eventually stranded on a remote island. Generally the setting is modeled on the text of the play, but the designers of this world have also added features typical of an island, such as sandy beaches and



The traveler struggles to survive the storm in Prospero's Island.

The Royal Shakespeare Company and the Massachusetts Institute of Technology

wild-growing, emerald-hued foliage. While everything seems somewhat fantastical, the game is grounded in the period and scope of the play. For example, the objects were inspired by artifacts typically found in Renaissance cabinets of curiosity, and the events and characters are in keeping with the plot and tone of *The Tempest*.

Through the exploration of the island and exchanges with other characters, the student is able to play out key themes of *The Tempest*, experiencing them through self-discovery. At the corner of the screen, a rip in the image opens to the appropriate section of the play (see figure 3). If a student tears back one of these small, triangular openings, it reveals a canvas of text behind the island scenery. Thus the text is visually and metaphorically mapped to the related scene, encouraging students to switch back and forth between image and word, experiencing them as related layers of meaning.

The lines between games conducted in virtual worlds and simulations that take place in custom settings have begun to blur. De Freitas (2006), a scholar who examined both, considers the difference to lie in the fact that “simulations represent

aspects of reality while games do not” (344). For example, medical training simulations model real experiences to teach a process or procedure. They employ structured narratives from real-life case-studies. They prepare interns to apply techniques that they’ve learned in class to virtual patients in the simulation. A player may be assigned to a patient who shows signs of shortness of breath and complains of pain. As a medical investigator, the student must decide which tests to conduct on the basis



An abstract image of one of the tears that players may find as they travel through Prospero's Island.

The Royal Shakespeare Company and the Massachusetts Institute of Technology

of the diagnosis, the costs of the procedures, the time involved for each one, and the side effects the patient is likely to experience.

Of course, a virtual world can also create the equivalent of science fiction in which certain information is accurate, but the characters and narratives are fictional constructs. Within this vivid visual experience, students are encouraged to imagine, to actively investigate, and to develop a deeper understanding of the content. When Barab and his colleagues (2005) created *Quest Atlantis*, a 3-D multi-user virtual environment (MUVE) designed for children between the ages of 9 and 12, their goal was a game that was



A “Quester” prepares for action in Quest Atlantis.

Quest Atlantis, Center for Research on Learning and Technology, Indiana University

both educational and entertaining. They describe this MUVE, which is set in a virtual world, as a “game without guns” that not only serves as a teaching tool, but also fostered “learning, growth and the development of a sense of wonder” (87). Like other virtual worlds, *Quest Atlantis* is navigated by players with avatars that can be customized by using the game’s avatar creator feature. Players undertake quests in hopes of helping the residents of Atlantis. Along the way, they also interact with other players and mentors who provide information about the environment, culture, art, and music that will be useful when solving the quest. These educational activities, tied to local academic standards, are designed to be engaging and immersive.

Visualization Builds Affective Understanding Alongside Content Knowledge

In virtual worlds students are able to experiment with identity and develop shared values, learning-to-be through seeing, knowing, and doing. As they handle tools and materials, observe and interact with others, student-players can experientially develop a deeper understanding of a theme, topic, period of time, or concept. Since players are offered many options and the game responds to their choices, student-players

often feel as if they are in control of their learning and, as a result, own their learning process (Herz 2001).

Instead of reading a textbook entry about the civil unrest before the American Revolution, a student playing *Revolution* becomes Catherine Grimes, writing letters to her parents in Massachusetts about the struggles she faces and the instances of civil unrest she witnesses in Williamsburg. Adopting the stance of this business owner struggling to keep her shop running smoothly, the student can develop empathy while learning about specific events leading up to the American Revolution. Similarly, students are given the opportunity to get into the skin of Shakespearean characters on *Prospero's Island* while they construct a visual, theatrical experience of participating in an unfolding play. Some students have asserted that they learned more through this game than they would have if they had only read the text (Van 2007). As an added benefit, scaffolded activities are far more likely to create a safe environment with minimal risk of failure or embarrassment (Steinkuehler 2004).

Visual Literacy

Virtual worlds have many common visual digital artifacts and computer-based agents. Increasingly, modern players expect complex special effects and high quality graphics that create an immersive and realistic experience. Situated within a visually rich and engaging space, players are encouraged to interact with each other and travel to virtual lands by selecting from a diverse array of paths at various points. The designers utilize visual feedback such as hue, lighting, and shape to guide player's activities. Moreover, players are able to create a sense of space through a

process that Kalay (2004) contends is a "combination of context, activities, and action" (196); they employ intellectual decision-making to accomplish both personal and in-game goals.

Successful players often use visual thinking strategies. Students can plan by mapping out (both mentally and with pencil and paper) strategies to overcome challenges and navigate chartered and unchartered paths. Players may explore alternatives or different viewpoints by modifying the visual display, for example by selecting the avatar's expression or switching between first- and third-person viewpoints. Even the physical act of controlling an avatar in real time may raise the students' consciousness of the architectural constraints and possibilities. By overcoming challenges, mastering tasks, and participating in communal activities presented within these virtual places, students are typically rewarded by gaining both points and status among other players (see, for example, Herz, 2001). One study (Green and Bavelier 2003) suggests that regular participation in these worlds can improve visual skills; skills that allow a student-player to decipher complex scenes, adapt more readily to distractions, and quickly and efficiently process fast-changing imagery and visual feedback.

Visual Creativity

I am a participant in *SL* as a doctoral student in the School of Library and Information Science at Indiana University, Bloomington. *SL* is a virtual world whose content is completely created by its users. For example, Info Island, merely one of the library locations in *SL*, was designed by individuals affiliated with the Alliance Library System.

In this virtual library, visitors can approach the reference librarian to find out how to locate a virtual book by Jane Austen, where to buy custom-made jewelry for their avatar, or who they should contact to purchase land. They may even ask where they might locate building blocks, which are also referred to as "prims." Opportunities to interact with objects, notecard books (book-like objects that are used to store and share text) and images that are diffused throughout the environment are everywhere. Library users can flip through the pages of a magazine while they read its bold text from a large display-screen. But the Info Island experience is more varied than a physical library. For fun, a patron can pick up a multicolored beach ball, rotate it in her hands, and toss it up in the air. Or, at the end of a long day, a visitor may sit at a bustling waterside café and enjoy a steaming cup of Moroccan tea from a white, porcelain mug while chatting with the dashing handsome waiter who resembles a young movie star.

Exhibits and special collections are located throughout the island. One recent exhibit, depicting nineteenth-century London, was created by J. J. Drinkwater, the Director of the Caledon Library. In a special collection in the Religious Resource Area, a patron can obtain information about religious topics by interacting with the objects or through discussions with other players. There is even a place to sit quietly on floor pillows in shades of rust and teal and meditate while incense slowly burns in the background.

Although some artifacts and regions of *Second Life* were created by individuals, many are the result of the collaborative efforts of libraries,

non-profit organizations, for-profit entities, educational organizations, and other groups of volunteers around the world. These spaces not only provide areas for players to engage in conversations with others, but they also enable visitors to add their own creations or make personalized modifications of the environment.

First Impressions in a Virtual World

As a player in *Second Life* (SL), I am continually making decisions based on visual input. For example, one day as I approached a building adjacent to the reference desk while reading the bright yellow news headlines that scrolled across my screen—much like students interact with the text found on *Prospero's Island*—I was approached by a young male avatar who was not wearing any clothes. Even though the avatar was not anatomically correct, I confess to being a bit flustered by being approached by a naked male in a secluded area—a striking visual first-impression! Then I recognized that he was probably a newbie, new to SL. Unlike the pre-set personas students select in *Revolution* and *Prospero's Island*, “blank” new players in SL usually begin their experience by altering the appearance of their naked avatar. Players are able to select clothing from a wide array of items (including socks and underwear), as well as the shade of hair color, the style of their eyebrows, and the color of their eyes. When he attempted to strike up a conversation with me, chatting in at least five different languages—none of which I understood—I decided I was more interested in catching up on the day's news events and trying to figure out how to get my avatar to sit down in a black leather executive's chair. Eventually he left in search of more fluent avatars who

could “speak his language.” In this case my initial visual impression of this avatar was eventually modulated by my knowledge of new player behaviors and by the likelihood that we wouldn't be able to communicate with each other easily. Like *Revolution*, these activities mimic real-life events rather than those found in fictional constructs such as *Prospero's Island*; instead of Williamsburg, though, I was interacting with and responding to other players near the reference desk at the library.

Players also experiment with the visual impact that they have on each other. On my way to investigate the



A patron approaches the Info Island reference desk in Second Life.
Second Life, Linden Research, Inc.

upcoming events that were displayed on the large plasma screen-like devices that mirror each other along a perimeter wall, I passed the Reference Desk and noticed a reference transaction between the librarian on duty and a patron. The librarian was dressed in an elaborate gray dress with a hem that hovered over the ground at her ankles. Despite the fact that real life librarians normally do not dress in formal gowns when they go to work, the most striking element of the SL librarian's attire was her bushy tail, similar to one found on a squirrel. While animal appearance items are available for selection, there are times when wearing one may hamper or divert the purpose of the interaction

because its presence deviates from the norm. In this case, for example, the main topic of the reference questions being posed that evening was the librarian's tail. Other librarians who are experimenting with their avatar's effect on others create two or more SL avatars (or alts), one for professional purposes and the other(s) for personal exploration. In contrast, students who play *Revolution* or *Prospero's Island* are restricted in their ability to customize their identity and explore the ways that appearance affects the interactions they have with others.

One example of how individuals play with identity when given the option to do so is evident in a class I am taking through the University of Illinois at Urbana-Champaign that meets once a week in SL. Over the course of the week, members may alter their appearance. One week they may have a conservative hairstyle and outfit (for example, sandy blonde hair that skirts the shoulders with a tailored navy blue pant suit) then this same individual may come to class with chartreuse-streaked hair and black combat boots. On occasion, several members of the class were identical from head to toe, confusing me until I noticed that their SL name appears in a bubble above their head. When I see “twins,” I find it difficult to think of them as unique individuals, and as we talk to each other about our library experiences, I find myself wondering how closely my response to twins mimics what happens in the real world. Because *Revolution* and *Prospero's Island* limit the player's choice of appearance, this confusion of identity is replicated in those worlds, as well.

Since visual creativity is a key component of SL, we spent an entire class session discussing the issue of

avatar clothing and appearance in this world. There is a plethora of free clothing options available in *SL*, but there are also virtual clothing stores that sell attire for Linden Dollars. A player may change the avatar's appearance daily, or even hourly, depending on personal preferences and the nature of an event. Currently, my avatar has blue hair, multiple piercings, and blood red rose tattoos that cover the upper portion of my arms. I am able to change any of these features at any time with just the click of my mouse. While players in worlds like *Revolution* and *Prospero's Island* can select a different persona from the options that are available, such as a shipwrecked stowaway on a deserted island or a swashbuckling sailor, they cannot alter the shade of their avatar's rusty brunette hair to mousey-blond tones. In addition to my personal preferences, the norms of a particular *SL* setting play a role in determining what I will wear. For example, some places require avatars to be in semi-formal attire, an outfit I'd never wear on a white, sandy beach while drinking a fruity tropical drink. For me, learning how to be part of the *SL* community (what is acceptable and what is not) often comes through the visual cues communicated by other players.

While this focus on appearances may seem frivolous, corporations are taking it quite seriously. IBM (2007) has just distributed official guidelines to their virtual world employees regarding appropriate avatar conduct. While not a dress code per se, this document emphasizes that employees should be conscious of their avatar's appearance when meeting with clients and conducting business within *SL*. For male employees, this

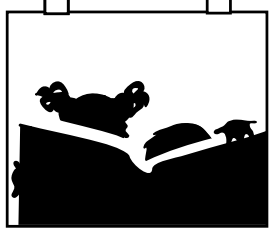
is challenging because men's clothing is difficult to find in *SL*. One of the course instructors has served as a personal shopper while she guided business men through stores that sell suits and other professional work apparel for male avatars. Perhaps as the result of corporate policies like IBM's, *SL* participants will increasingly seek assistance of an Info Island reference librarian on how to match one's visual impact with the purpose, location, and

occasion!

Real Problems of Virtual Experiences


Virtual worlds enable students to practice skills vital to businesses—communicating, critical thinking, navigating and evaluating resources, to name a few. While the power of play is motivating for some students (see for example, Squire 2005), not everyone prefers to learn in a visual manner, which is privileged

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in virtual worlds. Additionally, there is a significant commitment by both instructor and students; a teacher-librarian wishing to introduce students to a virtual experience should plan on prior instruction and hours of playing time before students grasp the main concepts that are introduced in the environment. Further, if students anticipate that the virtual world will be game-like, they may expect the look and feel of slick, commercial products—an experience that is not always available in education-themed spaces (see for example, Elliott et al. 2002). In virtual worlds like SL, other problems encountered by players may include banishment from the world for violations of community standards, encounters with “griefers” (players who cause grief to others in world through harassment), and even the costs associated with inflation. At least initially, some learners may become overwhelmed and frustrated with the virtual world, but Gee (2003) argues that we need

to be willing to accept that in these complex and cognitively challenging spaces, “hard is not bad and easy is not good” (65).

Conclusion

Virtual worlds enable students to learn through seeing, knowing, and doing within visually rich and mentally engaging spaces. Rather than reading about events, such as the bloody conflicts between the colonists and the British soldiers, students who navigate Williamsburg in the history-themed, role-playing game *Revolution* become part of the events through the adoption of a pre-set persona. In more fictional constructs such as *Prospero’s Island*, students interact and collaborate with Shakespearean characters and other players, as well as experience scenes as images mapped to text. Along with visual feedback that guides the players’ activities and the development of visual skills, visual creativity can enrich the students’ learning experiences. In both *Quest*

Atlantis and *Second Life* students can customize the appearance of their avatar and, because the content in SL is created entirely by users, student-players may build content or interact with artifacts created by others. While visual learning is not for everyone, virtual worlds provide students scaffolded spaces that can support practical experimentation, critical thinking, and other information literacy skills, important qualities needed in today’s technology-focused real world.

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