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Educators' experiences: the process of integrating virtual world technology in higher education

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Dissertation

**EDUCATORS' EXPERIENCES:
THE PROCESS OF INTEGRATING VIRTUAL
WORLD TECHNOLOGY IN HIGHER EDUCATION**

by

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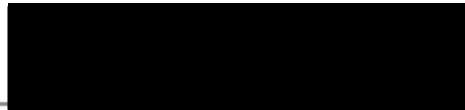
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To Papa and Mama

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Virtual worlds emphasize the interactions of a community. In a similar manner, this study evolved through the thoughts and insights of numerous individuals from inception to the finished product. Along the way, I have met individuals who generously shared their thoughts on, not only about virtual worlds, but their insights on education and life in general. I have learned a lot from them. My views are different now from the time I started. I hope to pay it forward.

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This exercise was a test of patience and perseverance. There were some low points along the way to the point that I thought that this process would never end. However, I got by with a little help from my friends.

To my parents, Jose and Amparo, who let their sons follow their own paths. They did not impose. They let us be even as we make mistakes. I do not think I will have it any other way.

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from one stage of the process to the next. As I became too immersed in the subject, she brought up valid points that I was not able to see. Most of all, despite the physical distance between us, she continues to be there for me.

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ABSTRACT

This study focuses on educators in higher education who had used, or are currently using, virtual worlds in their courses. The focal point of most studies with regards to virtual worlds is on the technology itself. There have been very few studies where the focus is on educators. It is important to include educators, the human component, as part of the conversation in the process of integrating technology in education. Through their thoughts, views, and the challenges they experienced in using virtual world technology, the educational community would be able to see where the strengths are and the issues that need to be addressed. This study interviewed 11 educators from different colleges and universities in the United States. The findings underscored the crucial role educators have in the successful implementation of virtual world technology as a teaching tool. The results also revealed that, given the high learning curve of the technology, these educators found value in technical and peer support to overcome obstacles as they designed and built their own virtual learning environments. As these educators spent more time with the technology, they became more adept and comfortable with virtual worlds. In addition, there is a need to create an

environment of support for these educators to help these educators sustain their use of the technology. At the same time, it would encourage other educators to consider the use of the virtual worlds as part of their teaching. However, these are not enough reasons to convince other educators to use virtual worlds. Despite the benefits that some educators experienced from using virtual worlds, they refused to learn or deal with the technical aspect of the technology. There is no doubt that virtual worlds will continue to develop, given its history, but the educational community should take an active role in the technology's development most particular ways that would lower the high learning curve of the technology and that the technology would be able to support the educational process.

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Chapter 1: Introduction

Technology and Society

The development of telecommunications technology has profoundly affected the manner in which we function in society. Technologies such as the Internet and mobile devices have enabled us to interact and exchange information with one another regardless of where we are located. With these technologies, the accessibility, speed, and volume of information have reached unprecedented levels. Henry Jenkins (2009) noted that new technologies have transformed our culture from passive to participatory. Jenkins defined *participatory culture* as a situation in which members are not only consumers of information but also contributors or producers of information. The precursors of participatory culture took the form of neighborhood newspapers and local community radio. Today the Internet, mobile devices, and other digital products provide new avenues for people to share their thoughts and ideas with a larger audience possessing shared interests, without the burden of high costs demanded by traditional mass-media outlets. Anyone can create a multimedia blog or website that showcases interests or expresses views on certain issues. The blogger or webmaster can invite people to share their thoughts with regard to the topics.

In addition to creating websites or blogs, people can also create discussion forums. Here, people with similar interests or who are employed in the same profession can come together and discuss issues that concern their field. In this virtual community of practice, novices and experts alike can seek and provide advice on new methods and

techniques in the field, unfettered by constraints of time and distance.

Technology in Education

With regard to education, these new and emerging technologies offer features not available in traditional media: faster, easier access to more information that circulates with increasing velocity, as well as the ability to interact with people synchronously and asynchronously, both locally and globally. The teaching and learning process depends on the interactions among teachers, students, subject-matter materials, and the learning environment (Schwab, 1973). Because of their unique capacities to access, represent, reshape, and communicate information, new technologies may serve to deepen and broaden interactions in the education space.

For example, in learning about the American Civil War, a student overcomes the constraints of the traditional school textbook by searching the Internet for more information about a particular person or event, including stories, personal accounts, news coverage, speeches, illustrations, photographs, and more—information that is represented in text, audio, video, or a combination of any of the three media. Students can use digital tools to manipulate varied information media to deepen their understanding of subject matter and the nature of information generally. They can also communicate and interact with experts on the subject.

One emerging technology with considerable instructional potential is the use of virtual-world technology or virtual-environment technology. Virtual environments have already been used for gaming and social networking, but since the last decade of the 20th century, educators have noted the merits of the technology as a teaching tool and have

begun to integrate it into their respective knowledge domains.

Virtual Worlds

A virtual world is a computer-generated simulated environment (Bartle, 2004), which can exist in text form, 2-D, or 3-D graphical form. Through a desktop computer, a user or player is able to interact with the virtual environment or with other users in the virtual environment. What users can see, how they can act, and the nature of their interaction with others are determined by the parameters designed into the Internet-based environment.

Virtual worlds such as Active Worlds (<http://www.activeworlds.com/>) and Second Life (SL; <http://www.secondlife.com>) offer educators a venue on the Internet (i.e., a virtual environment) in which to create learning environments suited to their respective content areas. For example, Harvard University professor Christopher Dede and his team, in cooperation with Active Worlds, created a 3-D virtual town called River City (<http://muve.gse.harvard.edu>) with which middle school students could learn and practice scientific inquiry skills. In building their 19th-century River City community, the developers used historical data, such as sociological and geological conditions prevalent during that period, to create a virtual town plagued with health problems. Upon “entering” River City students, are challenged to identify health problems, identify the causes of these problems, and present possible solutions. Students work in teams as they go through these exercises. They confer and compare notes in order to confirm their findings and discuss possible solutions for the problems affecting River City. In the process, students not only learn scientific procedures by gathering evidence,

hypothesizing, and testing their hypotheses through experiments, but also learn how teams must collaborate, cooperate, and compromise to succeed. Research studies show that other educators are also using virtual worlds in their respective areas of study, such as life science (dos Santos, 2009; Ketelhut, 2007; Ketelhut, Dede, Clarke, & Nelson, 2006; Murfin, 2001; Trindade, Fiolhais, & Almeida, 2002), business and management (Godat, Yahaya, Singh, & Euler, 2007; Lee, 2009; Schiller, 2009; Wagner & Ip, 2009), the arts (Arver, 2007), language (Wang, Song, Stone, & Yan, 2009), communication (Jarmon, Traphagan, Mayrath, & Trivedi, 2009), social development and social awareness (Baker, 2008; Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Edirisingha, Nie, Pluciennik, & Young, 2009; Imholz, 2008; Jamaludin, Chee, & Ho, 2009), and counseling (Walker, 2009). A number of scholars have focused attention on virtual worlds specifically in the educational process (Bainbridge, 2007; Bennett, 2008; Kozdras, 2009; Twining, 2009; Zhang, 2009). Most of these studies have indicated that the technology benefited teaching and learning.

What unique characteristics of virtual worlds may positively influence the teaching and learning process? Steven Warburton (2009) listed several, including:

- Extended or rich interactions: Virtual worlds provide opportunities for social interaction between groups and other individuals, as well as interactions with objects and media found within a virtual world.
- Visualization and contextualization: Virtual worlds enable users and educators to produce or reproduce historical, rare, lost, or imaginary objects or environments for people to see. For example, one may be able

to walk the streets of the city Pompeii before Mt. Vesuvius erupted and destroyed the city.

- Exposure to content and culture: Virtual worlds enable users to “transport” themselves to places that feature different cultures and languages. Such an immersive environment (see below) provides an added value for people learning a certain language.
- Individual and collective identity play or role play: Virtual worlds enable users to assume an identity in a given scenario. With the visualization that the virtual environment provides and the use of avatars, an educator can create a setting for students to perform in a role provided to them.
- Immersion: When interacting with a virtual world, users tend to be intensely focused on the task at hand, to the point of losing a sense of time.
- Simulation: Virtual worlds enable users to be placed in a situation in which multiple system factors interact and the consequences of actions and decisions can be observed. The participant can interact with objects or with other fellow participants.
- Community presence: In virtual worlds, users are given opportunities to come together, discuss various topics based on their common interests, and deliberate on solutions.
- Content production: Virtual worlds enable users to create objects for others to see, interact with, and use. For example, in a 3-D environment, a

student can interact with a simulated object, such as a scientific instrument. Another example is that of art students creating a masterpiece impossible to build in the physical world.

An example may help illuminate some of Warburton's points. Virtual World Best Practices in Education (<http://www.vwbpe.org/>) held its fourth annual conference in March 2011 using the virtual world of Second Life (SL). Within a virtual world, an organization can conduct a conference that accommodates a number of participants and offers simultaneous events, similar to conferences held in the real world. This particular SL-based conference included various talks, workshops, and tours. Educators from all over the world logged in to gather and "talk shop." Conversations were held simultaneously in different parts of the SL "island." One could move around the island and simply join in on the conversations or teleport into a talk. With the exception of teleportation, the conference was like any other conference in the "real" world. The ease with which such explorations can be conducted offers numerous advantages over "real-world" explorations, in which one has to deal with multiple factors such as time, high travel costs, or even the physical ability or inability to go places, among other issues.

Furthering the Conversation

A search of the virtual world literature, drawn from Education Full Text, EditLib Digital Library, Google Scholar, and other databases, revealed studies focused mainly on the technology itself, its potential benefits and shortcomings (i.e., Bennett, 2008; Edirisingha, Nie, Pluciennik, & Young, 2009; Walker, 2009), or on features used by educators who have recently begun applying the technology in their classrooms (i.e.,

Campbell, 2009; Pereira, 2009; Wang, Song, Stone, & Yan, 2009). Few studies have featured the experiences and thoughts of educators who have used virtual worlds for several years. Unlike those educators who have used virtual worlds for the first time in their class or course, experienced virtual-world educators may provide some valuable insights into using virtual world technology. For example, these educators would be able to identify the challenges and pitfalls inherent in virtual-world technology and how they addressed these issues. Virtual-world veterans may also have reflected on matters of pedagogy and virtual-world use, including the discoveries they made along the way and the adjustments they made with regard to their teaching style. This is the primary focus of my research study. I thought that this is an important issue to address if we are to move things beyond the technology's promise to actual use in education.

Whether any technology's educational potential is fully realized depends on educators' willingness to invest the time to explore, practice, and refine the technology's use in the classroom. The experience of veteran virtual-world users is an important addition to the present body of knowledge as a guide for other educators who are interested in using virtual worlds in their own courses. They can suggest what need to be taken before using virtual-world technology in the classroom. For example, what does the learning curve for mastering the technology look like? How does the technology affect pedagogical decisions instructors must make?

Research Questions

To this end, this study proposed to investigate educators who have used the virtual-world technology in their classroom or courses for more than a year. The

overarching question is: *How do these educators navigate the process of integrating a virtual environment or virtual world into their courses or classes?*

The following questions guided this study:

1. What attracted educators to using virtual-world technology in their courses?
2. In the course of using virtual worlds in their course, what did the educators discover about the technology? What were their thoughts and reactions to these discoveries?
3. What challenges do these educators face as they implement this technology in the classroom?
4. What types of support are needed to encourage educators and help sustain the use of the technology?

Researcher Profile

I consider myself more of a media and technology person than an educator. I am trained as a media person and have worked in a media company. For most of my professional life, I have been involved in media such as television and the Internet. Before pursuing my doctorate in Educational Media and Technology in Curriculum and Teaching, I was involved with designing and producing instructional content for school children living in remote rural areas. Although I am interested in technology, I am more interested in utilizing these technologies effectively to promote community development.

With regard to virtual world, I discovered Second Life in 2006. My initial thought on the technology was that it was more of a fad than an educational tool. As a

technological tool, I also found it quite clunky and very limiting. By 2008, however, I was surprised by the technology's evolution. Educators and institutions were considering this technology as an educational tool. Yet I am not interested solely in Second Life; I am even more interested in the educational development and use of virtual worlds in general. Second Life, for me, was a starting point. From there, I learned about other virtual worlds, such as Active World, OpenSim, World of Warcraft, and City of Heroes, to name a few. Before starting this study, I spoke with different educators who have used virtual world in their teachings and have come to recognize its potential as a tool for education. Based on Rogers's (2003) definitions for of innovation adopters, I consider myself somewhere to be situated somewhere between the categories of *early adopters* and *early majority* when it comes to technology. I follow the developments of various emerging technologies. For example, in addition to virtual worlds, I am also interested in augmented reality, next-generation smart phones, video games, and 3-D television technology. Because I am involved in education, I prefer to use a technology to enhance the teaching and learning experience rather than for the mere sake of using technology.

Chapter 2: Literature Review

Introduction

This chapter begins by defining the term *virtual world* and differentiating it from other technologies with the same conceptual and technical foundation. This clarification will make the unique qualities and characteristics of virtual worlds easier to recognize and describe and will clarify the effects of these characteristics on the teaching and learning process. As will become apparent from this review of the literature, virtual-world technology contributes strongly to certain pedagogies and theories of learning, especially constructivism. Achieving this potential depends on the quality of classroom implementation, so I will consider how the literature on technology adoption informs our understanding of the facilitating factors and the barriers facing virtual world adoption in education. I will conclude the chapter by describing this study's research approach as informed by the existing literature.

Defining Virtual World

Defining the term *virtual world* (VW) is challenging; the technology is still evolving (Bell, 2008), and VW technology can be confused with other similar technologies (Bartle, 2004). Writers have applied a variety of labels to the technology, which is an evolving construct. The terms *virtual world*, *virtual environment*, *multi-user virtual environment* (MUVE), and *synthetic world* are often used interchangeably to describe the same technology. Castronova (2007) provided a useful distinction between the virtual world and the real world: The former is made up of elements such as earth,

wind, and fire, and the latter is made of computer bits and resides in a server. However, this distinction is not definitionally sufficient, because a virtual world residing in a server shares the same foundation as a virtual reality and a cave automatic virtual environment (CAVE), both of which should be understood as distinct constructs.

At first blush, one might recognize little difference between a virtual world and virtual reality. Schroeder (1996), for example, defined virtual-world and virtual-reality technology as “a computer-generated display that allows or compels the user (or users) to have a sense of being present in an environment other than the one they are actually in, and to interact with that environment” (p. 25). As noted above, both technologies rely on a computer-generated environment. However, Bartle (2004) insisted that a virtual world is different from virtual reality in regard to the number of participants these types of technology can accommodate. Virtual reality allows up to four users to participate in the same virtual environment at the same time. With virtual world, the technology is able to accommodate tens or hundreds of users to share a virtual environment at a given time. Furthermore, Schroeder (2008) differentiated between these two technologies, describing virtual reality as “being there” and the virtual world as “being there together.”

According to Schroeder (2011), three factors fostered the evolution of virtual world. The first factor was the Internet. In the mid-1980s, the United States military used the technology for battlefield simulation; they found it less costly to train personnel to destroy virtual objects such as military vehicles and structures. The second factor was networked computer games. These networked games started from text-based *multi-user dungeons* (MUDs) where the world was described through text and users interacted by

typing in commands to either know more about the place they were in or initiate certain actions. As the processing power in computers started to improve, the virtual world began to introduce 2-D blocky graphics for people to socialize in, such as *Habitat*. Image 2.1 is a screen capture of what *Habitat* looked like when it first premiered.



Image 2.1. Screenshot of *Habitat* (1986) by Lucasfilm Games. (www.gamasutra.com)

Years later, with further improvement to the processing power in computers, users entering into a virtual world would see more refined and realistic 3-D graphics such as those found in *Second Life*, *Runescape*, and *Guild Wars*. Users no longer had to type in commands. Through a combination of mouse and keyboard, they were able to direct their avatars to perform certain actions. The third factor comprised the development of virtual-reality technology that allowed more than a single user to interact in the virtual environment. Developers shifted their focus to see if it was possible to add another user. As a result, they were able to find ways to have up to four users in a virtual environment at the same time (what was referred to above as “virtual reality”).



Image 2.2. Four people accessing virtual reality through head-mounted displays (HMDs). (Lockheed Martin)

Image 2.2 is an example of a virtual reality wherein in a person wears a head-mounted display (HMD) to view the virtual environment and wired gloves that enable the wearer to interact with that virtual environment.

Another variation of virtual reality is called CAVE. As seen in image 2.3, the virtual environment is projected on the walls of a room. With special glasses and wired gloves, a user is able not only to interact with the environment but also to interact with and manipulate a virtual object found in the virtual environment. However, among the problems of virtual-reality technology are the costs of specialized equipment, required space, and availability. This is not the case for virtual world.

Virtual-world technology achieved what virtual reality could not: the capacity to have large numbers of users interacting with the virtual environment and one another without the substantial costs of equipment and space. The most common



Image 2.3. Another type of virtual reality wherein images are projected on the walls. The user wears special goggles and gloves to manipulate a virtual object. (www.electronics.howstuffworks.com)

requirements for accessing a virtual world are (a) a desktop computer that met the minimum system requirements and (b) a broadband connection. Some virtual worlds



Image 2.4. World of Warcraft (Blizzard, Inc.)

offer rich and complex features that encourage users to revisit the site more than once. One example of such a virtual world is the popular online fantasy game called *World of Warcraft*

(<http://www.worldofwarcraft.com>) or *WoW*. *WoW*

(Image 2.4) is a 3-D virtual world known as a *massive multiplayer online role-playing game* (MMORPG).

The game's 8.3 million subscribers are given

objectives to accomplish (i.e., quests) in order to advance to the next level or move on to the next task at hand (Poeter, 2013).

Another example of a virtual world is *Second Life* (Image 2.5). *Second Life* (*SL*) is a 3-D social virtual world that had 769,000 unique users as of December 2009, up from 668,000 during the same month in 2008 (Linden Lab, 2010).

Unlike *WoW* and other MMORPGs, *SL* does not have established objectives or quests. It is more of a virtual social-networking world where people can explore parts of *SL*, build virtual objects such as buildings and landscapes, and create clothes and jewelry, among other activities. It was created primarily as a place where people could meet and socialize with other avatars. *SL* has a strong interactive

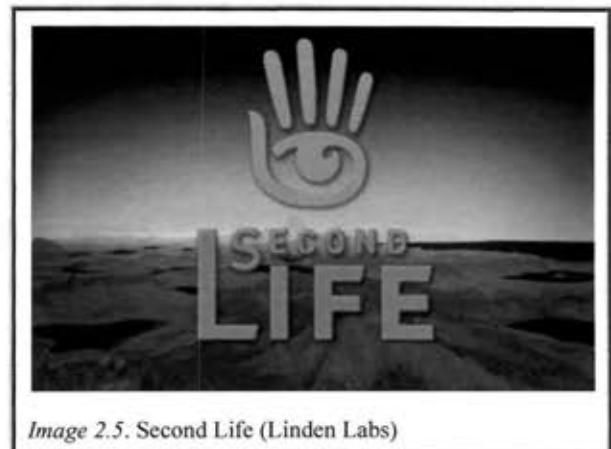


Image 2.5. Second Life (Linden Labs)

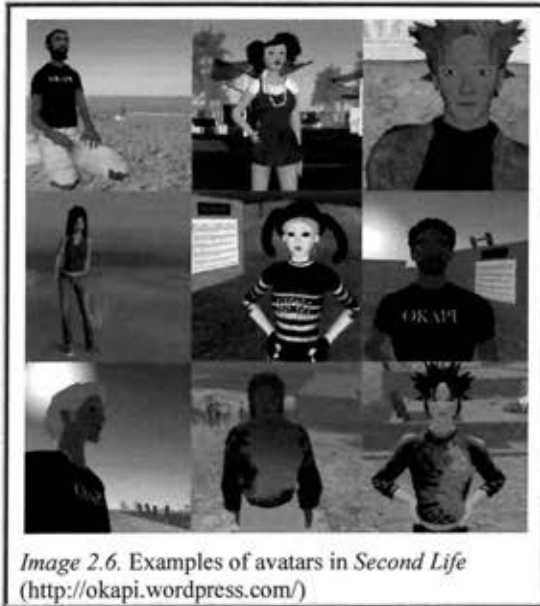
component, with users becoming involved in various social activities and interacting with the virtual environment in real time.

Features of a Virtual World

Bell (2008) identified five criteria to distinguish virtual worlds from other similar technology. First, a virtual world has the *quality of persistence*. This means that the virtual world will continue to exist and develop even as participants log off. In *SL*, a user who returns to this virtual world after a long absence may find structures or new islands that were not there before. The graphics may have become better. There may also be more participants. If the user happens to be a landowner in *SL*, he or she will find his or her creation intact, but the environment may have changed. However, changes are not only limited to the virtual environment. The participants themselves, or rather the characters they create to represent themselves in the virtual world, can change. For example, in *WoW*, after a long absence from the game, a user may see that friends have acquired new equipment, new articles of clothing, or new weapons and powerful artifacts. These friends may have also completed more quests and moved on to higher levels.

In contrast, in a console video game such as *Gods of War*, *Mario Brothers*, *Sonic*, or *The Godfather* that are played in Sony Playstation 3, Nintendo Wii, or in a personal computer, the progress of these games depends solely on the user. A player who stops playing at a certain level in this type of video game will remain at this level until the player resumes playing the game. This type of game does not qualify as a virtual world because it does not have the quality of persistence.

Bell's second criterion for a virtual world is the presence of a *network of people*. According to Bell, virtual worlds allow participants to form relationships with other participants, as well as interact with the environment. For example, in *SL*, users can create different social groups; alternatively, players can form a group and collaborate with one another in order to succeed in certain quests (as in *WoW*, *City of Heroes*, or *Wizard101*). Some quests found in *WoW* cannot be completed by a single player, thus forcing individuals to collaborate with one another in order to accomplish the mission.



The third criterion for a virtual world is that each player is represented by an *avatar*. An avatar is a textual or graphical representation of a user in a virtual world. In earlier versions of virtual worlds, an avatar was expressed in text form, specifically names (Meadows, 2008). Players represented themselves with monikers such as “digitalman” or “daurthvayder.” Today, technological advances have enabled participants to create avatars that are more graphical in nature. Depending on the virtual world, an avatar can be expressed in either 2-D or 3-D graphics. Some virtual worlds provide readymade avatars, while others give players the opportunity to customize their own. For example, in *WoW*, a participant has an array of choices for creating an avatar in terms of gender, life form (e.g., gnome, night-elf, tauren, orc), and class (e.g., mage (magician), hunter, druid, shaman). *WoW* also provides options

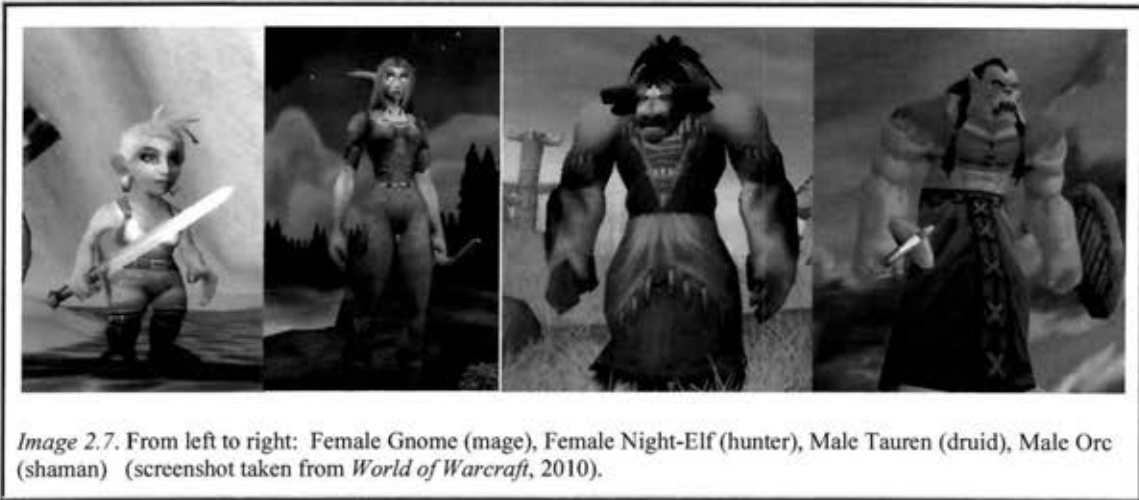


Image 2.7. From left to right: Female Gnome (mage), Female Night-Elf (hunter), Male Tauren (druid), Male Orc (shaman) (screenshot taken from *World of Warcraft*, 2010).

for the physical appearance of one's avatar, such as hairstyle (e.g., mohawk, long hair, short hair); markings (e.g., tattoo or no tattoo); and jewelry (e.g., earrings, nose rings).

Bell's fourth criterion for a virtual world is that it provides a *synchronous environment* in which people can communicate with one another in real time. Although virtual-world technology can accommodate asynchronous communication, similar to that of other technologies, its strength lies in synchronous communication. While synchronous communication is not unique to virtual world—other technologies, such as teleconferencing and chat, also have this feature—virtual-world technology enables individuals not only to converse but also to come together and collaborate in various activities. For example, people can meet in *SL* to view the virtual Sistine Chapel and the works of art within its structure. As they walk through and view the different works of art or look at the architecture of the virtual Sistine Chapel, the group can share comments and hold discussions, even if they are from different parts of the country or the world.

The synchronicity of virtual worlds can also prove useful for other aspects, such as skills development or professional development. People from different professions can meet peers from different parts of the world to learn from each other without having to be in the same real-life geographical location. The ISTE (www.iste.org), for instance, has an island in *SL* where they organize events and workshops, and where teachers from various geographical locations can come together and discuss different topics.

The final criterion for a virtual world is that it is facilitated by a network of computers. The memory capacity of network computers allows multiple users to interact with one another in a virtual world. In addition, the virtual-world servers are able to track the progress of each participant. Bell (2008) contrasted this final point with *Dungeons and Dragons*, a board game created in 1974 by Gary Gygax and Dave Arneson (http://en.wikipedia.org/wiki/Dungeons_%26_Dragons). This game's theme is similar to that of *WoW*, but the latter is able to store the progress of its 8.3 million subscribers (Poeter, 2013). Users who leave the virtual world temporarily can log in once more and start from the point where they left off. Such progress would be hard to keep track of with merely paper and pencil when there are more than a million players involved.

Virtual Environment as an Educational Tool

With the combination of the progress made in computer processors and Internet connectivity and the features that define virtual worlds, the virtual world has expanded beyond its roots in gaming and socializing to become a medium for teaching and learning, collaborating, and training, as reflected in research studies from diverse fields such as education (Campbell, 2009; Hudson & Degast-Kennedy, 2009; Kluge & Riley,

2008), commerce (Godat, Yahaya, Singh, & Yuler, 2007; Lee, 2009), medicine (Heinrichs, Youngblood, Harter, & Dev, 2008), and psychology (Baker, 2008; Bers, 2001; Imholz, 2008). In education, for example, virtual worlds such as *Whyville*, *Quest Atlantis*, *River City Project*, and *Revolution* were designed to teach elementary-level children social studies, history, math, and science. In these virtual worlds, children are given opportunities to test and practice what they have learned from school.

Examples of Educational Applications: River City and Quest Atlantis

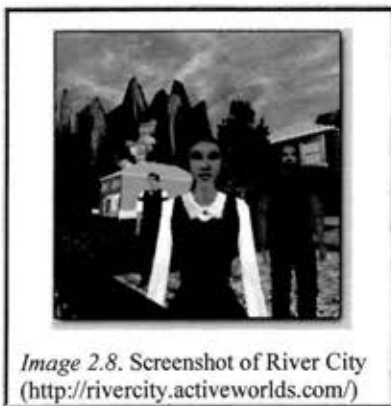


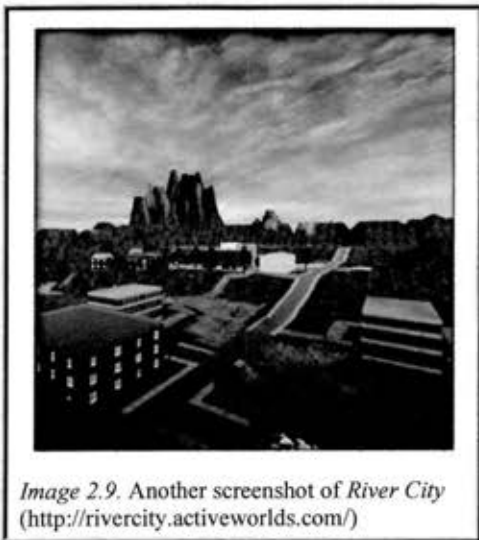
Image 2.8. Screenshot of River City (<http://rivercity.activeworlds.com/>)

River City, mentioned earlier, is a good example of the virtual world's entry into the educational domain. *River City* is a virtual world built by Active World and Harvard University through a grant from the National Science Foundation. Set in the 19th century, *River City*'s objective is to enable students from grade levels six

through nine to learn and apply knowledge of scientific inquiry (Ketelhut, Clarke, Dede, Nelson, & Bowman, 2010).

Diane Ketelhut and her research colleagues carried out a study to gauge the effects of engagement with *River City* on a variety of student behaviors (Ketelhut et al., 2010). The objectives of their study were as follows: (1) to investigate whether students participate in inquiry in the virtual environment of *River City*; (2) to compare a control group with other groups that uses *River City* in learning the content and inquiry; (3) to compare the results of inquiry learning between standardized-type testing and performance assessment; and (4) to identify the strengths and limitations of the

technology as it is being used in the classroom. The research team used a quasi-experimental method with 2,000 students in major urban areas in New England, involving eight schools, 12 teachers, and 61 classes. The team randomly selected students and divided them into a control group and experimental groups. The teachers in the control group used no virtual-world technology. The experimental groups were divided into subgroups, each of which experienced a different implementation of the virtual world. To collect data, researchers used content tests, surveys, questionnaires, and interviews. The results indicated that using the virtual environment to teach scientific-



inquiry skills was more beneficial than traditional classroom teaching methods. Use of *River City* appeared to provide other benefits as well, including improved attendance, a decrease in disruptive behavior, and greater student participation.

In an earlier study of *River City*, Ketelhut (2007) focused on students' self-efficacy as they learned about scientific inquiry. This study stemmed from a larger study in which students in "high guidance" treatment groups had more access to information in the form of guidance hints than did students in other treatment groups. For example, in the "high guidance" group, for a given question, the participants were given three hints, as compared to the "low guidance" group, in which students received only one hint. As students went through *River City*, the multiuser virtual environment (MUVE) afforded

the students a nonlinear approach to learning. Students had the option of approaching the problem as they saw fit. There is no uniform path for solving the problems posed in *River*

City. Based on data analysis, Ketelhut (2007) found that in the initial stage, students with high self-efficacy tended to gather more data than students with low self-efficacy. This finding supported previous findings in this regard. But as students logged more virtual visits to *River City*, the difference among the students in the degree of self-efficacy disappeared. Ketelhut was cautious in directly attributing this to the MUVE. However, indications emerged that the MUVE played a role in such a result based on her observation of student behavior.

Another popular virtual environment in education is *Quest Atlantis*. To date,



Image 2.10. Logo of Quest Atlantis

approximately 3,000 students are registered in this virtual world.

Participating schools are located

around the U.S. and countries like Singapore, Denmark, and Malaysia (Barab et al., 2005). *Quest Atlantis* is a virtual game world in which students ages 9 through 12 are sent off on quests to different worlds in order to prevent the destruction of Atlantis (Barab et al., 2005). Each quest that a student completes earns the student points; earning enough points promotes the student to a higher level and to more challenging quests. The underlying goal in this virtual world is to enable students to see the world holistically; each academic subject they learn in this virtual world has a role to play in the environment they are living in, both in the virtual world and in the real world. The activities in these quests are not limited to the virtual realm—that is, the domain of *Quest*

Atlantis—but also involve activities that need to be accomplished in the real world.

Quest Atlantis has a game-like quality that engages and motivates students to participate in various activities and complete each task.



Image 2.11. Screenshot of *Quest Atlantis* Welcome (<http://wirededucator.files.wordpress.com/>)

Embedded in each of these tasks are lessons that are closely tied to the school curriculum; as each student pursues each task, students learn the different concepts related to academic subjects such as math, science, and language. In addition, *Quest Atlantis* adds a social dimension that brings relevancy to what is being learned. The students are given opportunities to demonstrate and apply the knowledge they gather from the virtual world in their own communities. The teachers here play an active role in guiding their students as the students pursue the different quests. These teachers monitor their students' progress through written reports and consultations.

In *River City* and *Quest Atlantis*, some quests are not situated exclusively in the virtual world. Students also receive related tasks that must be completed in the real world. Some quests require students to write a report, a letter, or an essay based on what they have found in the virtual world. This bridge between virtual world and real world distinguishes *River City* and *Quest Atlantis* from *WoW* or similar MMORPGs. In

MMORPGs, once a quest is completed, a player moves on to a different quest within the virtual world.

Learning in the virtual world is not limited to elementary and middle-school children; it is being used in higher education levels as well. For example, Jamaludin, Chee, and Ho (2009) used *SL* to help college students understand the concept of argumentative knowledge construction. Argumentative knowledge construction is the process of identifying the different issues of an argument and providing the necessary evidence to support one's claim. In this class, students discussed different life events and their implications for religion, morality, and ethics. In facing these issues, students were expected to present their arguments and counter-arguments while discussing the issues with fellow classmates. The main objective for this class was not only to develop one's ability to argue but to also develop the ability to write a coherent essay that reflects the argumentative knowledge construction process.

Jamaludin et al. used the role-playing method in *SL*. Students customized their avatars based on the roles they were playing. According to the authors, there were four main characters: Amy, the protagonist; Kok Leong, Amy's partner; Wendy, the antagonist; and Santokh, Amy's friend. Five different scenarios were presented. Each scenario represented a certain stage as the characters grew up and matured. For example, in the first scenario, the characters were all teenagers. The issues centered on self-image: weight issues, different types of diets, and the like. In the third scenario, the characters were middle-aged and significant events such as marriage had already happened. To deepen the experience, students customized their avatars to match the alternate point of

view they took on.

Aside from providing simulation and role play for the purpose of learning and applying different concepts, the virtual world can also be a venue for professional development. For example, Jacqueline Derby (2008) is a teacher who lives in a remote rural area of the United States. Being in such a location represented a challenge for her in terms of developing and improving her skills as a teacher. The school's limited time and resources made it impossible for her to attend out-of-town conferences and symposia. Using *SL*, Derby was able to overcome these obstacles. Through virtual environment, she was able to meet with her peers not only from around the country, but from across the globe as well. By attending virtual-environment conferences, symposia, and events organized by education organizations, Derby has been able to establish a network of peers and resource people with whom she can consult.

Characteristics of Virtual Worlds in an Educational Context

From the qualities that Bell (2008) enumerated in defining a virtual world, Delgarno and Lee (2010) sought to identify the special characteristics of a 3-D virtual learning environment that can influence the learning and teaching process, drawn from their examination of desktop 3-D virtual worlds, simulations, virtual reality, and multiwall CAVE. They placed these characteristics into two categories: representational fidelity and learner interaction (see Table 2.1). Representational fidelity focused on the level of realism of the virtual environment as the user interacts with it. Representational fidelity is not limited to the graphical presentation of the virtual environment; it also includes the avatar, how the avatar moves and interacts with the environment, and the

Category	Characteristics
Representational Fidelity	<ul style="list-style-type: none"> • Realistic display of environment • Smooth display of view and object motion • Consistency of object behavior • User representation • Spatial audio • Kinesthetic and tactile force feedback
Learner Interaction	<ul style="list-style-type: none"> • Embodied actions including view control, navigation and object manipulation • Embodied verbal and nonverbal communication • Control of environment attributes and behavior • Construction of object and scripting of object behaviors
<p><i>Table 2.11. Distinguishing Characteristics of 3-D Virtual Learning Environment (Delgarno & Lee, 2010).</i></p>	

feedback it garners from such interaction among others. With learner interaction, it is the degree of exchange and manipulation between the objects within the virtual environment and the amount of communication, verbal and non-verbal, between avatars. Delgarno and Lee (2010) argued that representational fidelity and learner interaction are crucial factors that would result in immersion; the more realistic the virtual environment is and the more opportunities of interaction that the virtual environment provides, the higher the degree of immersion. From an educational standpoint, this dynamic will lead to richer collaborative learning.

According to Delgado and Lee (2010), these characteristics allow learners to experience the construction of identity, a sense of presence, and co-presence, among other things, as seen in image 2.12. The ability to construct an avatar-based identity in a virtual world ameliorates the challenges some learners face in the real world (social awkwardness, shyness, physical limitations, and the like). Virtual-world technology provides a safe haven and minimizes the risks often found in the real world for people who may be particularly vulnerable. Those who wish to learn and practice their social

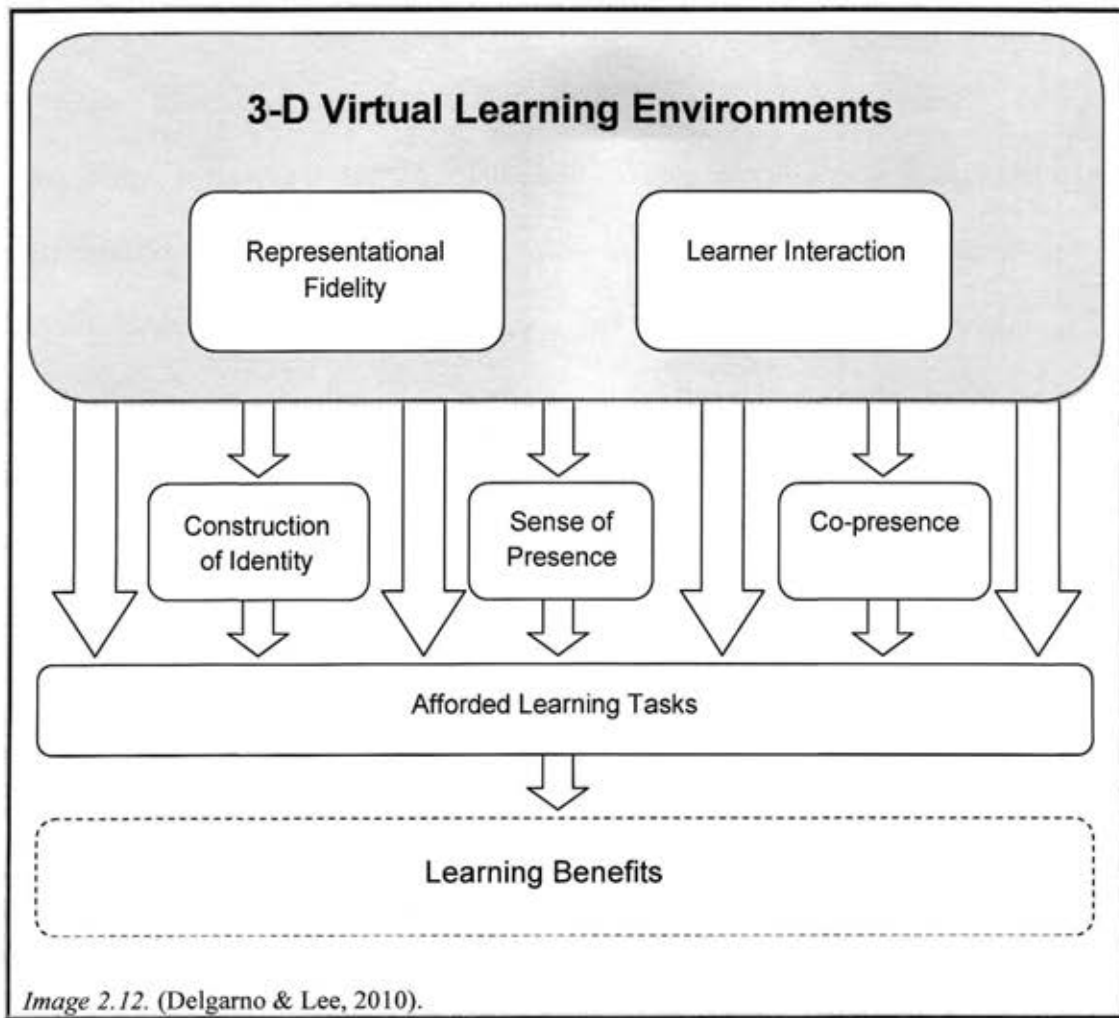


Image 2.12. (Delgado & Lee, 2010).

skills (Baker, 2008; Parsons, Mitchell, & Leonard, 2004) can do so in a virtual world, as can those who wish to start overcoming social phobias (Klinger, Chemin, Légeron, Roy, Lauer, & Nugues, 2003). Virtual worlds also provide a venue for people to socialize who are physically infirm or disabled (Guest, 2007).

A sense of presence with regard to virtual worlds generates in the user a feeling of being in the place and thereby being able to interact with the environment. Witmer and Singer (1998) attributed this experience to several factors that are consistent to what Delgarno and Lee mentioned in their study. These factors include control factors (i.e., being able to control one's avatar, being able to affect the environment around one's avatar, and anticipating events); sensory factors (i.e., as the avatar moves through the virtual environment, she or he is presented with rich audio and a visual environment. In some cases, such as virtual reality, tactile elements are included.); distraction factors (i.e., a user may be given a task or decide to explore the virtual environment); and realism factors (i.e., scenes that look realistic and are consistent with the physical world).

Co-presence is being aware of others within the virtual environment (Delgarno & Lee, 2010). Through their avatars, users can communicate with other avatars in various ways, whether verbally or nonverbally. In the virtual environment, avatars can work together to perform certain tasks, as illustrated in *The River City Project*, where students work together, as a team in a virtual environment, for a common goal.

Delgarno and Lee (2010) argued that these three capabilities—identity construction, sense of presence, and sense of co-presence—can yield important learning benefits that other technologies cannot. They identified five learning “affordances” that

match the learner and the learning objectives to the appropriate technology. They recognized that technology, in general, does not cause learning to occur, but only facilitates the learning process if properly matched to the learning and the objectives.

Enhance spatial knowledge. Virtual environments “can be used to facilitate learning tasks that lead to the development of enhanced spatial knowledge representation of the explored domain” (Delgarno & Lee, 2010, p.18). For example, one may be able to recreate a historic landmark that has long been gone or perhaps recreate a city as it existed in a certain era. Here, through their avatars, students can walk through the streets and hallways and see what it was like during those times. A picture or a 2-D representation can only provide a certain perspective. A 3-D model enables a person to see a landmark or city in various perspectives. One may be able to see the city as a whole from high above or up close. As another example, one can also create a model of a place in modern times and even include variables such as the terrain, weather, animal movements, and human settlement. By manipulating the variables and observing the results, students may better understand the relationship of each variable to the environment and how it affects human civilization.

Learning by doing. The second affordance is that virtual world technology provides a venue for experiential learning or “learning by doing,” as users immerse themselves in a virtual world where they are not subject to the same potentially harmful outcomes of actions as in the real world (Dickey, 2005). Depending on how the virtual world is designed, a user is able either to observe how different factors interact or to experiment by manipulating these factors and observing the outcome. For example,

students participating in *River City* who are engaged in their quest to solve the virtual city's health issues are able to identify the factors that play important roles in the overall health of the city and discern what needs to be done to address whatever deficiency is present that threaten its health. Such a simulation would be difficult to replicate in the real world without incurring actual costs and risks.

User engagement. Delgarno and Lee's third affordance is the virtual world's ability to hold the attention of users or learners and enhance motivation and engagement. Given certain objectives that one must fulfill, the student is given the choice of how to achieve the objectives. If there is more than one task to complete, students may be given a choice as to what task to focus on first before moving on to other tasks, such as a task that would interest them most. Learners are given a choice of how to achieve a specified goal.

Acquaintance with the unfamiliar. Virtual-world technology may help familiarize users with places they have not yet visited. For example, through an avatar one may navigate a 3-D model of the streets of Manhattan in New York City, discovering where the points of interest are—something that might prove useful when one visits Manhattan in the physical world. Photos of the storefronts and what the streets in Manhattan look like provide better visual cues that the 3-D model can illustrate to the users. Exposure to a location via a virtual world may prove to be a more useful tool than having a 2-D map that contains only names or symbols.

Rich collaborative learning. Lastly, virtual-world technology offers a richer experience for collaborative learning. Lee (2009) defined collaborative learning as “a

student-centered approach in which groups of individuals work jointly in a well-defined task.” Individuals within a group depend on one another and are accountable to each other. Through their shared experience regarding the task, each individual may be able to contribute to the learning of one another. Other individuals may be able to provide a different perspective that another person may not have considered.

For example, through cooperation between Italian schools and Israeli schools, students from ages 12 to 19 studied the Dead Sea Scrolls with respect to history, religion, philosophy, and literature (Di Blas, Paolini, & Poggi, 2003). The project involved 700 students with 40 teachers acting as guides in the learning process. The project merged traditional methods of learning, such as homework, field research, and studying, with other methods, such as interacting with students with different sociocultural backgrounds and games related to the subject at hand. Part of the learning process occurred in the virtual world, where the games were held.

Delgarno and Lee (2010) cautioned that the affordances enumerated in their study were by no means definitive, but did offer potential benefits. Delgarno and Lee based their conclusions on their review of different literatures that discussed the use and benefits of the technology in an educational setting. The affordances indicate the ways in which virtual-environment technology can enhance the teaching and learning process if skillfully implemented in the classroom. This present study aimed to shed light on what might constitute the skillful implementation of virtual worlds in educational settings.

In deciding to use virtual-world technology for their courses, educators have an option of using either an existing virtual world only, or to design and create a virtual

world based on their specifications, or to do a combination of both. For example, an educator may decide to use *WoW* for math purposes. Alternatively, an educator may decide to create a virtual environment in *SL* and then take advantage of the other virtual environment existing within *SL*. An educator may tell her students to visit other places within *SL*. In this regard, this study was open to any of these situations. This study sought to shed more light on what educators who have been using virtual-world technology are looking for in this technology.

Locating Virtual-World Technology within Educational Theory

Virtual worlds like *River City*, *Quest Atlantis*, and *SL* encourage users to participate in learning rather than to be passive users as they progress through the different quests or tasks. In both *River City* and *Quest Atlantis* classes, the teachers act more as guides than providers of knowledge. As students carried out the different quests, the teachers helped students who were having problems completing certain quests by asking them questions or providing hints that would turn the students in the right direction. Learning is derived primarily from the learner's interactions with the virtual environment and with other users in the same virtual space. As such, virtual-world technology is firmly grounded within constructivism and social learning theory.

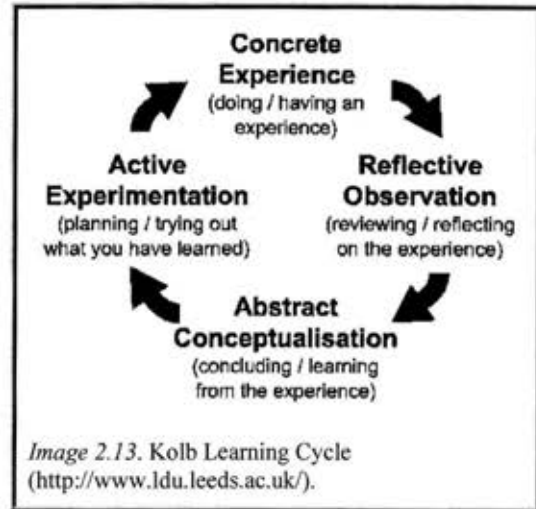
Constructivism and virtual worlds. The central tenet of constructivism is that the learner is an active constructor of knowledge and, as a corollary, that the student derives meaning and knowledge from interacting with and manipulating one's environment. (Kluge & Riley, 2008). In virtual worlds, students take active roles in the learning process, in contrast to the passive learning most often associated with lectures

and meaningless rote memorization. Rather than learning about concepts through memorization and drill and practice, students inquire about and observe how different factors within a system (whether social, scientific, political, or otherwise) interact and produce an outcome.

Interaction in a virtual world often presents to users what they already know. This aspect of the challenge is reminiscent of Jean Piaget's process of assimilation. According to Piaget (1959), people fundamentally learn through their own personal experiences; they undergo a process of assimilation and accommodation. In assimilation, people adopt a new notion that adds to their existing body of knowledge. In accommodation, people learn through their mistakes or through the mistakes of others, discarding previous notions that led to such mistakes. They will then adopt a new notion that constitutes a refinement in their understanding and in their ability to predict outcomes. In a virtual world, the technology affords users the ability to make as many attempts as they desire and to experiment with different ways of completing a certain task. As seen in the example of *River City*, students had the option of choosing a starting point in addressing the problems presented to them.

Furthermore, from students exercising their knowledge of scientific inquiry in *River City* or those who engage in role play in order to gain multiple perspectives and understanding of different life events in *SL*, it becomes evident that these examples support David Kolb's (1984) experiential learning theory. He posited that "learning is the process whereby knowledge is created through the transformation of experience" (p.41).

Kolb's theory has four main parts: (1) concrete experience (feeling); (2) reflective observation (watching); (3) abstract conceptualization (thinking); and (4) active experimentation (doing). Kolb presented this theory in a cyclical model as illustrated in image 2.13. According to Kolb, in most cases, learning starts with concrete experience, and then the learning process moves in a sequential manner. To relate Kolb's theory with the *River City* example, students went through the four cycles as they



were faced with health issues plaguing the city. As they found the causes for the health issues and provided their recommendation, they observed, reflected, and experimented. Furthermore, Kolb recognized that individuals have their own learning style. He identified four learning styles (McLeod, 2010):

- Diverging – People using this style tend to look at the problem from different perspectives, gather information, and use their imagination to solve the problem. These people tend to watch more than do.
- Assimilating – People using this style tend to be more concerned with ideas and concepts than with people. They take a logical approach to the problem.
- Converging – The main concern for these learners is finding solutions to the practical problems. These people are more focused on the technical

task than on interpersonal relations.

- Accommodating – These learners tend to lean more on feeling than logic. They rely on other people's analysis.

In recognizing that at least four different learning styles exist, one of the implications is that educators should be able to accommodate these types of learners as they design their learning activities. As illustrated in the *River City* example, virtual-world technology was able to support such a theory in practical application.

Social learning theory and the virtual world. Collaboration supports constructivist learning, and collaboration is a key attribute of virtual worlds. Vygotsky (1978) underscored the power of collaboration. He believed that in order for children to develop, they must interact with the people around them and learn together with their peers. This process is integral to narrowing over time what he termed the *zone of proximal development* (ZPD). Vygotsky defined ZPD as

the distance between the actual developmental level as determined by the independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (p. 86)

In both *River City* and *Quest Atlantis*, students form teams to work with one another as they carry out the different quests. They confer with one another to compare their findings. Though such collaboration can be accomplished in other technologies, virtual-world technology not only extends the possibility of collaborating with other people beyond the borders of one's country, as illustrated by the collaboration of schools

from Italy and Israel in studying the Dead Sea Scrolls (Di Blas et al., 2003) but also provides the richness and authenticity of the virtual world, the synchronous interaction between users and virtual objects, and the anonymity provided by an avatar.

Technology Cycle of Adoption

Despite the positive findings, reviews, and indications of how virtual world could play a role in the teaching and learning process, history of technology adoption in the classroom raises questions about the likelihood that virtual worlds would reach its educational potential. Previous instructional media such as film, television, and computers failed to significantly integrate into the teaching and learning process despite investments and expenditures on infrastructure, hardware, and software (Cuban 1986, 2001, Geoghegan, 1994, Reiser, 2001, Saettler, 1990). For example, according to Geoghegan (1994), higher education has invested about \$70 billion on computer-related goods and services from 1980 to 1994. Out of the \$70 billion, \$20 billion went to the support of teaching and learning. However, despite these investments, only about 5% of the faculty population integrated technology into their teaching — that is, going beyond using technology as a replacement for chalk and blackboard. Cuban (1986, 2001) has similar findings not only with regards to the use of computers in the classroom, but also other technologies such as television and film – similar investments had been made on a particular technology that produced little return.

The dismal return on instructional technology investment is not because teachers are resistant to change or that teachers are “technophobic” or afraid of using technology in the classroom. On the contrary, teachers had demonstrated their willingness to use

technology in the classroom (Cuban, 2001). As computers have become a major part of everyday life, teachers are using emails and various software programs as a supplement to their teaching and to manage their classes. This is one indication that teachers are not averse to technology.

A key reason for small returns from technology investment has been that schools failed to consider the needs of their target users, the faculty population (Geoghegan, 1994). Everett Roger's Diffusion of Innovation Theory offers an explanation. The Diffusion of Innovation Theory looks at how innovation is communicated in a social system over time (Rogers, 1995).

In any society, there will always be groups who think and view things differently regarding innovation. Based on Everett Roger's Diffusion of Innovation Theory, Roger (1995) identified five types of adopters: innovators, early adopters, early majority, late majority, and laggards. According to Rogers, each type of adopters has a different view of innovation that is grounded on culture and individual personal and professional beliefs and needs.

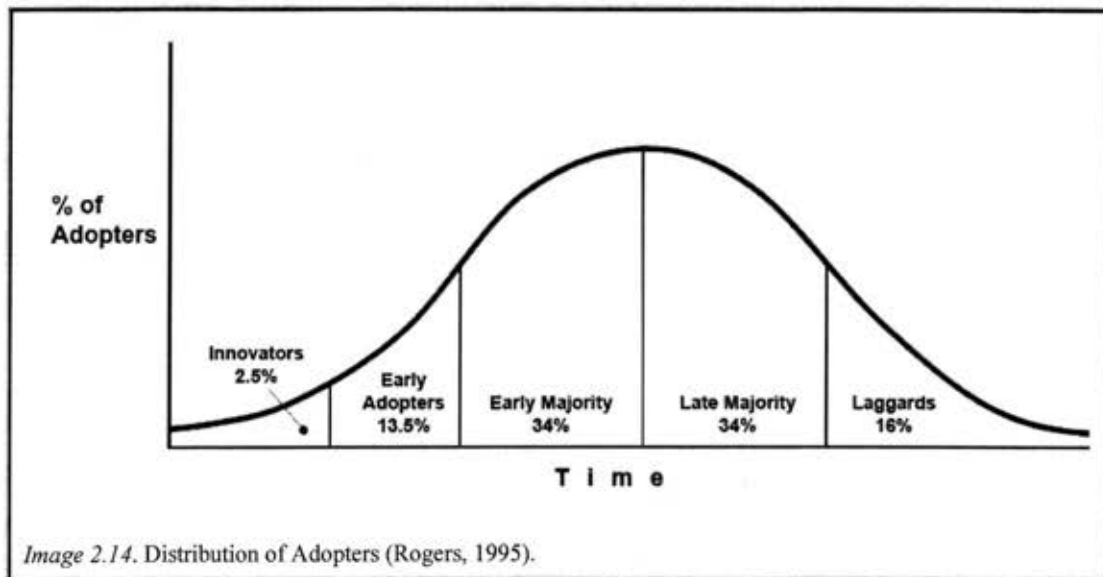


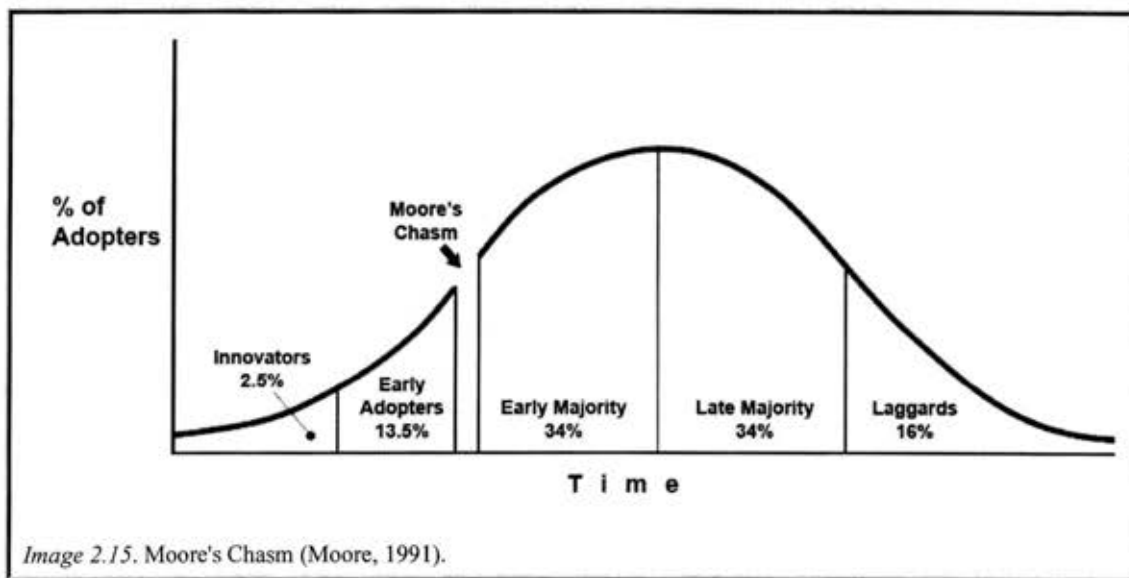
Image 2.14 shows what percentage of a given community become the different adopters. These categories are defined as the following (Rogers, 1995, Geoghegan, 1994, Moore, 1991):

- Innovators – The people are popularly referred to as “techies.” They are the ones who are more interested in the technology itself than how it is applied. They keep themselves up to date with the latest technological development.
- Early Adopters – The people here are also interested in technology, but in contrast to the innovators, they look at technology as a solution that may improve how they do things in their professional lives. They are willing to take risks and explore the potentials of new and emerging technologies. These people are not afraid of failure. They network with

innovators. They need little or no technical support when they navigate certain technologies.

- Early Majority – The “pragmatists.” These people are more concerned with the problems that need solving rather than focusing on the technology. These people are comfortable with technology, but they need solid evidence where a technology can help them improve their work or help solve their problems before they consider adopting the technology into their teaching. They are risk averse and are not open to failure. They take an evolutionary stance rather than a revolutionary stance – meaning methods that are commonly used at work are being modified and not discontinued or replaced with others.
- Late Majority – The other half of the majority are skeptical of the changes. Compared to the early majority, they are less comfortable with technology. They will accept a technology when it has been generally accepted and adopted by the majority. Also, these people will accept the innovation when the technology has been streamlined and ready to run. They do not want to do any tinkering with the technology. They have a high level of risk aversion.
- Laggards – These people are unlikely to use a new technology. They will not integrate a technology into the classroom. They are against technology and sometimes antagonize those who do.

Moore (1991) pointed out that there are transition points as the innovation moves from one adoption group to the next. However, between early adopters and early majority, Moore mentioned a chasm existed between these two groups (see image 2.15). It is also at this point where failure to adopt an innovation will most likely happen. In order for an innovation to enter into mainstream, it has to cross this chasm.



Moore advised that in order to move from early adopters to the early majority, promoters of such innovation must provide a different kind of approach to their target audience. Based on Table 2.2, early adopters and early majority have significant differences; their outlooks on innovation are in contrast with one another. It is clear that any approaches that were successfully used to “market” the innovation to early adopters will not work with the early majority group. Failure to understand where university faculty fall within these adoption categories can doom efforts in successfully adopt any technology, no less virtual world technology.

Early Adopters	Early Majority
Favor revolutionary change	Favor evolutionary change
Visionary	Pragmatic
Project oriented	Process oriented
Risk takers	Risk averse
Willing to experiment	Want proven application
Generally self-sufficient	May need significant support
Horizontally connected	Vertically connected

Table 2.2. Early Adopters vs. Early Majority (Geoghegan, 1994).

Barriers

Every technology presents barriers that must be overcome. In their study, Delgarno, Lee, Carlson, Gregory, and Tynan (2011) conducted a survey among education practitioners to identify barriers to the use of the 3-D immersive virtual world in higher education. One barrier they discovered concerned accessing the virtual world: for example, bandwidth, firewalls, and hardware requirements. Most virtual-world technology, if not all, requires a broadband connection and a graphics card that meets the minimum requirements of a virtual world. Delgarno et al. noted that the bandwidth issue may present more of a concern when students access the virtual world in their own homes rather than within school grounds. On the other hand, the study mentioned firewalls as a problem because some schools and universities do not allow students to access the virtual

world from within their systems as a matter of policy. Another technical problem regarding the use of virtual worlds is configuration and settings, such as students being unable to communicate with one another either through text or voice or because the relevant software is unable to run in the student's computer. Lowe and Clark (2008) and Cheal (2009) had similar findings regarding technical issues when using virtual worlds, particularly *SL*, in their respective courses.

A third barrier is student perception. Delgarno et al. (2011) noted that students and academic staff considered virtual-world technology not to be a serious learning tool. In their findings, the students noted that the technology was "...more as fun than as a learning tool" or "...was weird and [so they] decided against it." Also, if the technology is not part of the assessment process, students and academic staff will most likely not value the use of virtual-world technology. Delgarno et al. attributed this perception to students' and academic staff's unfamiliarity with the virtual world. The problem will be solved in time as people become more and more familiar with virtual-world technology. However, at present, this lack of appreciation is a barrier for any educator wishing to use the virtual world as a teaching tool.

In the same study, Delgarno et al. (2011) mentioned another barrier for educators who favor using the technology in their courses. These educators do not enjoy the support of their respective universities in applying virtual-world technology in such areas as professional development, IT support, infrastructure, and policies. Without encouragement from their respective universities, educators do not have the incentive to use the technology.

Finally, the fifth barrier lies in the educators themselves. Brickner (1995) identified one of the obstacles that kept educators from adopting such a technology as their beliefs about teaching. This obstacle not only refers to teachers' beliefs with regard to her profession but also to their values and other personal beliefs. A teacher's beliefs about the profession may be either an advantage or a hindrance in a given situation. For some teachers, the use of virtual-world technology presents a vastly different way of teaching, especially for those teachers who are used to lecturing and rote-learning methods. It is possible that these educators are not against technology in general but are simply reluctant to use a technology such as virtual world that promotes a new and different teaching style. These educators may look favorably on a technology that supports how they already teach. Unless virtual-world technology can be proved to enhance learning to the point that these educators must take notice and consider the technology seriously, they will not be adopting the technology anytime soon. These are the issues this study of virtual-world users sought to illuminate.

Summary

From the literature, it has been illustrated that virtual-world technology contains unique features that contribute to the learning and teaching process and support learning theories. Given how educators use the technology, it seemed that technology's strengths rest on theories related to constructivism. However, barriers must be overcome before educators can use the technology effectively. At this point, most of the education-related literature regarding virtual-world technology that I have encountered has focused on the

technology itself. In an attempt to move the conversation forward, this study focused on educators and how they integrate virtual worlds into their courses.

Chapter 3: Methodology

Introduction

The focus of this study was on educators in higher education and how they integrate virtual-world technology. The questions for this study concerned these educators' motivation for using the technology, how they used the technology in their particular course, the challenges that they met, and the support needed to use such a technology. This study was structured qualitatively in gathering the necessary data, analyzing these data in order to answer the questions set forth. Merriam (1998) noted that one of the key concerns of qualitative research is understanding the phenomenon and its meanings from the point of view of the participants rather than that of a researcher.

Another reason for choosing the qualitative approach lay in the study's focus on discovery and exploration. Variables, and the relationships between these variables, had yet to be identified. In this case, the study needed an approach that was flexible enough to address any issues arising in the course of data gathering that might affect the study. According to Creswell (2003), the qualitative approach enables the researcher to modify research questions or change the manner in which data are gathered, depending on what emerges in the course of the study. For example, in the course of interviewing educators about virtual-world technology, something might come to light that was important and need to be included as part of the research study.

Merriam (1998) mentioned that several approaches exist for performing qualitative research, such as ethnography, phenomenology, and case study. This study was a multiple-case study; I interviewed several educators on their experiences as they

went through the process of integrating virtual-world technology into their course. In doing so, the researcher compared their experiences with one another thus getting a better understanding of the process. According to Merriam (1988), in doing a case study, a researcher takes an “intensive, holistic description and analysis of a single instance, phenomenon, or social unit” (p. 21). Merriam (1998) added that in using a case-study approach, “the researchers are more interested in insight, discovery, and interpretations rather than hypothesis testing” (pp. 28-29).

This study was intended to explore the experiences of VW users as a basis for constructing explanations for the successful implementation of the technology in educational settings. These explanations derive from the data itself; therefore, the study’s methodology falls within the general domain of grounded theory. As Eisenhardt (1989) pointed out, “The process . . . is highly iterative and tightly linked to data. This research approach is especially appropriate in new topic areas” (p. 532). Based on the literature, I argue that the integration of virtual worlds in education is just such a topic area.

Choosing Participants

The first requirement for participants was that they be educators using VW in their teaching. As a matter of convenience in terms of access and time, I focused on teachers in higher education. I also looked for educators who had used virtual-world technology as a teaching tool in a course for more than a semester. As discussed in chapter 1, teachers who are experienced VW technology users would have deeper insight into the limitations and advantages of virtual-world technology relative to someone who has used the technology for only one semester. I anticipated that I would be able to gain a

better understanding of the technology as it is being used in a formal education setting.

One criterion that I did not include as part of my search for subjects was the requirement that all educators focus on a single academic subject. I was not confident that a sample population limited to educators in a single academic subject would yield enough educators to support a study. I believed that I would have a better chance of gathering sufficient participants if I did not limit my search based on academic subjects.

In searching for potential subjects, I posted an online ad (see Appendix A) on several websites: a couple of listservs such as Second Life Educators (SLED), educator organizations such as International Society for Technology in Education (ISTE) and New Media Consortium (NMC), and on Facebook and LinkedIn, where I follow several organizations such as Second Life for Educators and ReactionGrid Educators. I also attended the Games Learning Society (GLS) conference. There, I approached potential participants and asked them if I could interview them for my study. I also emailed those whom I had met in the course of my study and asked whether they were willing to be interviewed. Finally, I asked interviewees for referrals to other individuals who had used the technology and were willing to be interviewed for the study. Once it was determined that an individual met the selection criteria, I asked for an appointment with that person. The interviews were conducted in the summer of 2012, a time when the subjects would not be busy teaching and would be willing and more able to spend time answering my questions.

Most of the responses I received passed the initial screening—the educator was either currently teaching or had taught at the higher-education level, and she or he had

used virtual-world technology for longer than a semester. From an initial pool of 23 potential participants, 13 responded to the invitation to participate and were interviewed. Eleven individuals did not respond. However, of the 13 individuals who were interviewed, two participants dropped out, either by refusing to answer follow-up questions or by not responding to my request to conduct an observation in their class.

Among the 11 educators interviewed for this study (see table 3.1), nine were currently teaching, one had recently moved to an administrative job, and the other had retired in 2011. The range of teaching experience for this group was between 2 and 44 years. In terms of subject area, the group was diverse. Four of the 11 participants were currently teaching or had taught library science. The rest were either currently teaching or had taught in the fields of education, English, physics, computer science, law, and philosophy. Most of the teachers had taught using different modes of teaching, such as face-to-face, hybrid (a mixture of face-to-face and online), and online only. While the study was being conducted, three participants were teaching in a hybrid mode and one was teaching face-to-face. The rest of the participants taught online.

Participant	Teaching Experience (years)	Subject Area	Mode of Teaching
VWF01(see note below)	26	English	Hybrid
VWF02	10	Education	Online
VWM03	20	Language	Online
VWM04	3	Law	Hybrid
VWM05	12	Philosophy	Face-to-face
VWF06	27	Library Science	Online
VWF07	34	Physics	Hybrid
VWM08 (ret.)	44	Library Science	Online
VWF09	17	Computer Science	Online
VWF10	3	Library Science	Online
VWM11	2	Library Science	Online
Note: VWM means VWMale; VWF = VWFemale			
<i>Table 3.1. Study Participants.</i>			

Conducting Interviews

Before conducting each interview, the participant was sent an informed-consent form to read and acknowledge. For the online interview, I sent the informed consent via email a day before the actual interview. I asked participants to send a reply to acknowledge that they had indeed read and understood the informed-consent form. If a participant had not sent an acknowledgement email, I asked the participant before the interview whether he or she had read the informed-consent form.

Once the interviewee gave consent, I read an explanation of what the research was about, gave an approximation of the interview's length, and told the interviewee that his or her identity and answers would remain confidential. The interview was semistructured, using a guide questionnaire (see Appendix B). After each interview, I reminded the interviewee that I would contact him or her for follow-up interviews.

Most of the interviews were conducted online, either using Skype or in a virtual world that the educator used for teaching. I was also able to interview a couple of educators face-to-face at a conference I attended. All interviews were audio recorded.

Profile of the Virtual Worlds

Study participants used different virtual worlds in their teaching: *Second Life*, *ActiveWorld*, *World of Warcraft*, and *OpenQwaq*. The breakdown of participants using these virtual worlds was as follows:

Virtual World	Participants
<i>Second Life</i>	7
<i>Active World</i>	2
<i>World of Warcraft</i>	2
<i>OpenQwaq</i>	4

Table 3.2. Number of study participants who used certain virtual worlds.

The following brief description of these virtual worlds will show how they share the common characteristics of virtual worlds, as discussed in chapter 2.

Second Life (www.secondlife.com) is a 3-D virtual world created by Linden Lab in 2003. It is one of the most popular social 3-D online virtual worlds to date. This virtual world was built mainly for people to meet and socialize through their avatars. With a computer that meets the minimum system requirements and a broadband Internet connection, a person can log in to *Second Life* for free. This virtual world provides a tremendous amount of flexibility and options in terms of user functionality. *Second Life* allows users to design the appearance of their avatars. Once inside, the person can visit different places by transporting, walking, or even flying. For a fee, these places can be designed and developed by the users themselves using the Linden Scripting programming language; users are then given the capability to create and store virtual objects. For

example, a user can program an object to play a video if someone else's avatar clicks on that object; the user can program that same object to transport the avatar to another place. Users can communicate with each other through chat or voice.

Unlike a multiplayer online role-playing game (MORPG), there are no objectives or tasks that need to be accomplished or different levels for the avatar to attain. Avatars are free to do as they please in this virtual world.

OpenQwaq (Teleplace) has features similar to those of *Second Life*. It can accommodate a certain number of users. Users use their own computers to log in and choose an avatar to represent them in the virtual world. Users are able to interact with one another through text and voice. Depending on the educator, students can be given the option of creating or modifying virtual objects. *OpenQwaq* was built with education and business institutions in mind. These institutions use the technology to provide their students or employees a virtual space in which to come together and collaborate. The system allows users to post documents, videos, and other media. However, some differences exist between the two VW systems. For example, *OpenQwaq* is a closed 3-D virtual world system. Unlike the terms of *Second Life*, a user must be invited and registered in order to enter into the system.

ActiveWorlds (www.activeworlds.com), another 3-D virtual world, is the oldest among the online virtual worlds featured in this study. Like *Second Life* and *OpenQwaq*, the features found in a virtual world are present in *ActiveWorlds*, in terms of space, communication, and the option to design and create objects and virtual learning environments. However, *ActiveWorlds* does not offer the same freedom and flexibility

similar provided by *Second Life*. For example, non-paying users (“tourists”) are free to visit and look around in *ActiveWorld*, but these users are limited to certain areas only. To gain full access, users must pay a monthly fee. Full access enables users to customize their own avatars, have access to different places, and own and build properties. This virtual world runs on Windows only.

World of Warcraft (<http://us.battle.net/wow/en/>) is a massive multiplayer online role-playing game (MMORPG). It possesses the basic features that define a virtual world. However, one main difference between *World of Warcraft* and previously mentioned virtual worlds is that it has a definitive theme; the virtual world is similar to that of Tolkien’s *Lord of the Rings* trilogy. *World of Warcraft* was created primarily for entertainment purposes. Here, players are given tasks and quests to complete in order to move to the next level. *World of Warcraft* does not offer the same level of flexibility and freedom present in *Second Life*, *ActiveWorlds*, and even *OpenQwaq*. For example, in these virtual worlds, users are able to design and create their own virtual environments. This is not possible in *World of Warcraft*, as all users must adhere to the rules of the game. However, some qualities found in *World of Warcraft* make it appealing for educational use. For example, some educators use the storyline of the game and the process of going through each task as a writing exercise. Students are assigned to write their experiences as they go through these tasks. An educator can leverage the pre-existing, fixed environment by taking advantage of the user interaction and collaboration present in such an environment. For example, if the learning objective is to teach the value of teamwork and cooperation among students, an educator can use the guild

featured in *World of Warcraft*. In order to progress, a guild must attain a certain number of achievements to “level up” or rise to the next level. As the guild levels up, it is rewarded with new features that would prove advantageous to the guild. However, in order to move up to another level, the students must be familiar with their roles and collaborate with one another.

Other Data-Gathering Methods

As an additional source of information, I collected documents, asking my interviewees if I could have a copy of their syllabus. If they had a website, I visited it. Because all of them were using virtual worlds in their teaching, I went online and visited their virtual places. In some instances, I would go to their virtual environment when no classes were in session. In other instances, I observed while classes were ongoing. Depending on the situation, I would either do a screen grab or make a video recording. All of these data-gathering exercises were done with the consent and knowledge of the subjects in the study.

Data Analysis

All interviews were transcribed. I transcribed the first interview by hand in order to familiarize myself with the data. Given the volume of interview data, however, I outsourced the remaining transcription work to Amazon Mechanical Turk (www.mturk.com). I uploaded my audio interviews to the site, and any registered worker at the company could choose to work on the job I had posted at the price I specified. To preserve confidentiality, I divided each interview into 5-minute segments. For example, I

divided a 40-minute interview into eight segments. I then uploaded these segments to the transcription site. The segments were labeled in such a way that only I could trace the segment back to a particular interviewee. A registered worker at Amazon Mechanical Turk could only choose one segment at a time. He or she could not have access to the other interviews unless finished with his chosen segment. By then, it was most likely that the other segments had been chosen by other workers. From the segments of interviews that I had uploaded to Amazon Mechanical Turk, I confirmed that no single worker had transcribed all of the segments of any single interview (each worker has a unique identification number).

To ensure each transcription's accuracy, I went over the transcripts and compared the work with the audio recording. If there were words that I could not understand, I marked these words accordingly. Because all transcriptions were in digital format, I printed the transcriptions out in order to start the data-analysis process.

In the first stage of data analysis, I read through all the transcripts in order to gain familiarity with the data. No markings on the transcripts were made at that time. In the second stage, keeping in mind the study's four guiding questions mentioned in the first chapter, I started coding each transcription. As I went through each interview, I wrote down potential themes. I created a grid noting the themes and from whom the theme originated using Excel. I generated numerous themes from the transcripts, some of which stood alone and others of which would eventually be merged in order to arrive at a manageable number of distinct themes of comparable scope. This step was the third stage. Once I had reduced the number of themes, I looked at the transcripts to see whether

the markings made previously fit the theme or whether there were themes that had been overlooked.

In the fourth stage, I formalized these themes by providing definitions for each one and then created a code sheet. The code sheet contained the code, the abbreviation, and a definition for each code. The code sheet served as a reminder for me as I did another pass for each transcript, making sure that the code given to certain passages was accurate. In the fifth stage, I associated the derived themes with the study's four guide questions, copying certain participant responses from the transcripts into an Excel spreadsheet. Each guide question had its own worksheet within the Excel file to accommodate the matching process. Aside from the guide question, each worksheet in the Excel file contained the following elements: themes, responses from the transcripts, the page number, and who had said it. At this point, I looked at the responses to see whether I needed to create subcategories in each theme.

Building Credibility

In conducting a qualitative study, efforts must be made to ensure that the information obtained in the study is credible and truthful. In a quantitative study, this is the equivalent of validity and reliability (Guba & Lincoln, 1985). As I went through each process, in order to increase the confidence of my data, I asked people independent from this study to go through three or four interviews and code these interviews themselves. I provided them with the main research question and its four guide questions. This step was done to confirm that what they derived from the interviews were similar to what I had elicited from the same interviews.

Summary

Based on the focus of this study, it was most appropriate to conduct a qualitative study as opposed to a quantitative study. The main method for data gathering was interviewing educators in order to find out about their experience and insights from the time they started using virtual-world technology to the present. In analyzing the data, results presented numerous themes. Some of these themes were beyond the scope of the study. These themes were set aside for possible future use. Those themes within the scope of the study were organized based on a research question in the next chapter.

Chapter 4: Results

Introduction

The results featured in this chapter are based on the nine interviews and follow-up interviews conducted. In addition, observations were made “inside” the virtual world as some of these participants oriented their students to the technology or lessons were conducted. I also made it a point to ask for course syllabi and online links that featured their course. These steps were made in part to build credibility from the results acquired from the interviews. I was unable to observe all participants for several reasons. Two participants decided to discontinue using the technology before I had the chance to observe their classes. Another two participants happened not to be teaching the course where they use the technology at the time I was conducting the study.

I have divided and organized the data based on each of the four research question. From a macro standpoint, the presentation of results starts from educators being introduced to virtual-world technology, moves to their deciding to use the technology in their courses, and ends with their assessments of the technology. The four research questions serve as markers or transition points from one phase to the next. Under each question, I divided the participants’ answers into themes or issues. The research questions are as follows:

RQ 1: What about the virtual world attracted educators to using the technology in their courses?
RQ 2: In the course of using virtual worlds in their course, what did the educators discover about the technology? What were their thoughts about and reactions to these discoveries?
RQ 3: What challenges did these educators face as they implemented this technology in the classroom?
RQ 4: What types of support are needed to encourage educators and help sustain the use of the technology?

RQ 1: What About the Virtual World Attracted Educators to Using the Technology in Their Courses?

The first question centers on the discovery and introduction of virtual-world technology. I wanted to know from these participants how they discovered virtual-world technology and what made them consider the possibility of using the technology in their respective courses.

The first three points often mentioned in the course of the interviews—interaction, multichannel communications, and the sense of being present with others—were some of the qualities and features found in the technology that drew the participants to consider the technology. These three points are forms of synchronous communication. The final

point within this question was that educators took the time and effort to get to know the technology in depth. They went beyond familiarizing themselves with the basic interface and navigation.

Interaction. The common theme mentioned by participants was interactions between students, teachers, and course-related materials. The form of interaction is synchronous in nature. I divided this part into two sub-categories: interaction with students and peers and interaction with course-related materials.

Interaction with students and peers. Among the participants' goals was to promote interaction between students and faculty, not only during class but outside the classroom as well. Some participants believed that virtual-world technology could provide that opportunity, with the quality of interaction they were looking for. For example:

VWM08: "We decided one of our key things we wanted was people in different programs running into each other and talking to each other. Serendipitously, but also through activity that we set up that asked them to do that..."

"...One of the things they're going to gain is students who, if you construct it properly, the students are really going to take ownership of their own learning. They're going to engage with their fellow students."

VWF01: "I'd had this experience with my virtual worlds, my research in virtual worlds course where some of the students spontaneously chose to play *World of Warcraft* together, and they had a really good experience and a really positive experience. So they suggested that students in the future should actually do the

same thing as a requirement.”

VWF06: “It enables people to come together. It’s enabled for . . . enabled for planned interactions, but also serendipitous interactions. Most of the other tools out there, you actually have to plan to come together to meet and to do certain things versus using the virtual environment you have those serendipitous interactions. Now, when you’re teaching distance education courses, some things that are missing are for example when you’re on a college campus. You walk around. You’re out in the hall. You talk with your peers.”

Some participants focused on the importance of faculty interacting with students in the role of coach or mentor, because this was part of their teaching philosophy. This is consistent with constructivist learning theory, discussed in the previous chapter. Some of the participants had expressed the view that a virtual world would be a superior platform for interaction. VWF06 and VWM08, both working in the same university at one point, came to the consensus that they would rather use a virtual world than a learning management system (LMS) such as *Blackboard*. They found that the LMS their university was using lacked the degree of interaction that they were seeking.

VWF06: “I believe in social constructivism and as a social constructivist kind of following that philosophy, people have to interact in order to be able to learn. They have to. You have to have that social part in there. I am not a lecture type of teacher and I firmly believe in some of this, also even backs up to my research with professional development and adult learners, et cetera, of making it meaningful.”

VWM11 offered a similar view on learning management system. In his experience of using LMS and virtual worlds, he felt that the LMS made the learning process too mechanical. Students would log in and perform the required tasks of writing comments in discussion boards, and reading the course materials for the week. There was minimal opportunity for students to get to know one other. VWM11 came to work in the same department as VWF06 because he saw that the department was using a virtual world as their teaching platform.

VWM11: "I could see the blended learning spaces, obviously; I mean the benefit that *Teleplace* brings to State U (not real name) is that our students tend to be dispersed widely and so bringing them together for any real face-to-face time, you have to have a pretty strong reason to do that."

Interaction with the course-related materials. The ability to create and interact with the environment was among the things that participants also valued highly. In this category, the replies varied as participants looked at the different aspects of how they used the technology in their courses. VWF07 saw how the visual aspects could aid her in resolving the problems that her students were having in understanding physics problems. Before using a virtual world, she used a modeling software that ran on a Mac. However, the software was discontinued. As a result, she searched for a viable replacement.

VWF07: "Most deaf high school graduates read at about a fourth grade level. Right. Now, look at even a high school physics book and try to read the problems. They don't understand passive voice. If you say, "The boy was hit by the girl,"

then they will pick out a picture of a boy hitting a girl, because the boy doesn't mean anything . . . One of the big problems I had was giving them problems that they could read and understand. You can't solve a physics problem if you can't read it. If you don't understand what the problem's saying. Try to imagine yourself taking physics in a language that you understand fairly imperfectly. Yeah. So I started out by using this modeling software. I would take their problems and it would say "An object is moving to the right with a constant velocity of 4 meters per second" and I would set up a little QuickTime movie that I made with this interactive physics software to actually show that motion. To model the problem and then I could put. Interactive Physics is a wonderful piece of software. I'm very sad that they don't make it for the Mac anymore. I could set up graphs that would show velocity and acceleration and position as the object moved the graph would create itself. I could do all kinds of things with it, and I did. I created all kinds of problems and test questions and I tried to use it for modeling as much as I possibly could to give them a bridge between a strictly visual view of the problem and what they were reading."

VWM05, who teaches philosophy, expressed his frustration to one of the technical people in his university regarding his teaching of the Allegory of the Cave found in Plato's *The Republic*. He thought that there had to be a better way of illustrating Plato's cave. The technical person introduced to him the concept of the virtual world, specifically, *Second Life*. The technical person described to him how students could enter into a virtual cave as described by Socrates. This intrigued him enough to agree to try

using the virtual cave once completed.

After participating in different role-plays in *Second Life*, VWM03 thought of using it in his Spanish class. He thought of designing and creating an environment decorated with cultural artifacts so that students could become familiar not only with the language but also with the culture. At times, he would bring students on an online field trip in *Second Life* to visit other places with similar themes.

Other participants thought of creating settings for simulation purposes or for students to do role-playing activities. VWF07 saw simulation and role playing as a necessary learning experience so that students could understand more of the concepts or the roles they would be playing once they finished with their courses and joined the professional world. She teaches and train education students to become teachers. VWF07 proceeded to build classrooms for different grade levels. The classrooms were designed according to what one would find in a typical classroom for each grade level.

VWF07: “So, what I give them is basically experience that they wouldn’t have in a face-to-face classroom. So, the simulation to being able to actually be in a virtual elementary school in a virtual classroom that has been created by experts in the field to show them this is the best type of environment for this grade level.”

VWF06 and VWF11 had views similar to those of VWF07. They saw the importance of getting students comfortable in the roles and environments of their professional fields.

VWF06: “Some of the newer things that we’re doing and how we’re venturing off with the virtual environment is doing role play simulations, epistemic gaming.

Where we are putting people into the roles that they are going to be in when they get a job in that chosen field. We're also putting people in situations where they're working with other people in those roles.”

VWF11: “It gives you some sense of, you know, the type of instructional activity that we were trying to do with the students and.. you know, trying to make it as real as possible for them, so they could see the results of their decisions, rather than just kinda conceptualize them.”

Beyond simulation and visuals, VWM08 saw the virtual world as a venue for students to see and learn from their classmates’ or other people’s work. Moreover, he wanted students to contribute to that prior work and leave something for others to contemplate and benefit from.

VWM08: “What I was trying to create was an environment when they were plunked down in the middle of the environment and it didn't make any difference which way they went but they began a story. And as they explored they left behind artifacts for other students to see...

“How can we have that person explore something, but leave behind an artifact for other people to come in and see and reflect upon and then that person then leaves an artifact etcetera, etcetera?”

Multichannel communication. Participants cited “multichannel communication” as another virtual-world capacity that attracted them to the technology. They mentioned the different ways of communicating with people in a virtual world (e.g., chatting, instant messaging, and voice) that affords users the flexibility of interacting with one another).

This, they, found was a motivating factor that encouraged use of the technology.

VWF01: “Part of it was back-channeling, in fact. Because what we usually would do is use voice in *Second Life*. So the speaker would be speaking but we’d have running chats going on at the same time. Some of it was distracting people. I would be joking and making comments on the side. But to me that added a very different kind of connection that you wouldn’t have if you know it was all one way...

“One of the things was, is that we were often there for two hours with these speakers. I kind of assumed that no one could pay attention to lecturing. Then more(?) often there were dialogue but I think it helped keep people engaged in a way that would have completely inappropriate for a face-to-face class but everyone would have been asleep by the end of the first hour. That was a different kind of affordance I suppose. Not that I’m recommending you use *Second Life* for traditional lectures all the time.”

VWM08: One of the things I like about *Teleplace* is that there are multiple ways... multiple channels of communication. In a face-to-face classroom, teacher is talking or when the student is talking everybody is supposed to be quiet, paying attention. Ok, students whisper then tell.... Somebody's talking to you. One of the interesting effects that happens until the students become comfortable as they would they can't say so as the teacher is talking, and the teacher asks the questions, students tend to answer in text...

... Well, you're getting into two things: one is, the students can whisper in the

virtual world and private text and you don't know. So it's not distracting in that way, it may be distracting to the two people engaged in it, but nobody else is aware of it.”

VWF06: “I came in this environment and I can see you. In the background in here, you don't know this was happening, but one of my students just sent me a private text message and their group was working and they were having a few questions and she was wondering if she could ask me now and I told her I was in the middle of an interview and I'll catch her in a little bit. And she said, ‘That's fine.’ I mean, that doesn't happen in a course management system. It's also very . . . It tends to be—I don't know, I'm trying to think—tends to be a little more linear. Doesn't enable as much, necessarily as much, creativity. It doesn't enable the work for people get in and actually work together and talk and think through things together”.

Sense of being present to others. Although communicating with people online is not an exclusive feature of virtual-world technology, some participants had discovered that virtual-world technology adds a unique quality that they have not seen in other technologies—the sense of being in the presence of others to whom you are communicating. For example, one participant, whose department was in the process of transitioning from courses in a traditional classroom setting to online, wanted to create an online environment wherein social interactions come naturally.

VWM08: “...The other thing, probably the most striking thing, was actually a negative but it proved to be a positive. I'll explain. We had a couple, two women,

in the course who reported in the follow-up: 'I had a situation where somebody I didn't know, came up to me and their avatar came very close to me and I was at home. I was safe. My door was locked. And I was very uncomfortable.' They didn't like that. Our first reaction was, 'Well, okay. So we shouldn't be working in a public world because we don't know about the behaviors of other people.' The thing that, on reflection, that it really told us is, 'Wait a minute, there's something more powerful going on here than people just looking at pixels on a screen.' That they actually felt, they felt threatened by the closeness. Wait a minute. That's the same thing that happens in the real world. There's something going on here that we need to understand. That might be a very powerful kind of thing if used positively, if not just strangers coming up and invading your space. There's a sense of presence that goes beyond just seeing a name on a screen. So, it was that kind of thing that, the following year...

"...One thing that created was an interesting perspective on the dynamics appear if you're online and you see somebody else. You can't do that on webpages by lists of people and that type of thing. But it turned out that if you could actually go see an avatar of somebody else, people tended to do that."

Because some of these participants were already familiar with and had used other technologies in their teachings, they were able to compare the quality of interactions that one technology offered over another.

VWF10: "...they're interacting with each other as they come and go. They're in that thing with me. So there's a sense of presence and a sense of place that allows

for a lot more collaboration, interactions, spontaneous interaction. It's just, it's a feeling to me of not being isolated. I have a community that's there and that I can see. I can see an avatar. I can talk to a student even if they're not in the same forum I'm in. So I think that that really adds a richness and a depth that I'm just not able to get in *Blackboard* and, like I was talking about, not being able to engage, motivate, facilitate participation in the Moodle course (a course management system similar to *Blackboard*) that I tried to teach.”

VWF01: “Even with Skype, of course. Unless you have a group video conferencing kind of thing. I mean I suppose video might have been similar. Except there was still something about the embodied nature of it. I think that was quite different. Each person had a personality. You weren't some kind of disembodied base if you even had that in video conferencing. And I think it led to a different dynamic with the speakers.”

Verifying through immersion. For some participants, the attraction of using a virtual world came through a lengthy process of experimenting with virtual worlds to decide whether it was as attractive as initially thought.

An example is VWM03, who teaches foreign language using *Second Life*. Before implementing *Second Life* in class, he attended conferences and seminars in order to know more about the technology. He opened an account in *Second Life* and created an avatar for himself so he could explore on his own before letting his class use it.

VWM03: “I heard about him [referring to Alan Levine] doing that [referring to virtual world] and I was intrigued by it, so I got into *Second Life* because of him

and New Media Consortium. So I joined the New Media Consortium and became involved with the work they were doing in *Second Life*. They were just doing some incredible builds. I don't know if you've ever visited the NMC islands, but they were pretty early into adoption and really heavy into it, had made a really big investment in three or four islands. Spent a lot of money on development and they had a lot of programs. They had a lot of speakers. They did symposiums in-world, so I went to several of their in-world symposiums. And it was a really good community. And then ISTE got involved. ISTE has a presence in *Second Life* did a little with them. And then I saw that I could start developing, and then I started developing as well. It was also curious, before, while I was doing that, I kind of had a split personality. I had my professional avatar, but then I had my own social private one. And that's how I really learned the potential. I became a Roman senator at a really big Roman themed sim, and I got really involved. And this sim was actually put together by someone who teaches archeology."

VWM08, who was conducting a job interview, was intrigued by the applicant's description of virtual world.

VWM08: "But I looked at it and I explored a little bit more and discovered that at the time *ActiveWorlds* one of the, probably [?] two Virtual Worlds existed were tools[?] at the time was offering free space for educators...

...And so I grabbed some of our masters degree students going up to conference in Chicago...[we had a] long drive in a van, and I broached the possibility of trying to use this free space in *ActiveWorlds* as a learning environment, and we

brainstormed around it, and we kind of performed [sic] a little team and created in this space and tried it out in the course that fall, fall of 1999.”

RQ 2: In the Course of Using a Virtual World in Their Course, What Did the Educators Discover about the Technology? What Were Their Thoughts and Reactions to These Discoveries?

At this point, the educators had decided to implement a virtual world in their courses. The question now turned to the discoveries they had made about how best to introduce and use the technology with their students. The questions in the interview protocol (see Appendix B) provided educators the opportunity to reflect on their expectations of the technology and the realities they encountered as they implemented the technology in their courses. This question contained four parts: the paths that educators had taken as they decided to use virtual-world technology, their level of comfort with the technology, students’ reactions to the technology, and the quality of students’ work.

To initiate discussions concerning this question, I asked whether participants recognized a need to revise their syllabus to accommodate the technology. All mentioned that they did not.

VWF02: “We planned it like a traditional course... A very traditional graduate course in terms of readings and things like that. What made it untraditional was that we were doing a whole lot of work in these virtual spaces. So it was, as I said, kind of innovative on the one hand and not so innovative on the other, but it needed to meet university requirements, you know, as a regular graduate course...”

Two paths. From this point, the participants diverged onto two paths in terms of how the virtual-world technology was to be used for their respective course. The majority of the participants decided to create their virtual learning environment. Others decided to take advantage of premade virtual worlds. Rather than building their own virtual learning environment, these participants decided to take advantage of the different features in different virtual worlds. These two paths are not mutually exclusive whereas an educator had to choose one path over the other. One participant decided to combine both paths. VWM03 designed and built a virtual learning environment in *Second Life* for his course. He teaches Spanish to graduate and undergraduate students. In teaching his course, he did not limit his students within his virtual learning environment. He took them on virtual field trips to other places that featured Spanish themes and artifacts within *Second Life*; if they were lucky, they had the opportunity to interact with Spanish-speaking avatars.

Designing their own virtual learning environment. Those educators who decided to design and create their own virtual learning environment identified the technical aspects as they built and used the technology as the most salient factor. I will discuss the technical issues in more detail in the third research question. With the help of technical support, they were able to realize their vision of a virtual learning environment and the activities within this environment for students to interact. They expressed the importance of having people to build their virtual learning environment, noting that they would have a more difficult time without them. However, these educators took an active role when building their learning environment rather than let technical support do all the building. Some of the participants expressed their interest in being able to build virtual

objects and minimize their dependence on technical support. As a result, they decided to learn scripting language.

VWF02: "In those three or four months I was planning the course, I was also learning a little bit at a time. I learned how to build. The scripting took longer. I'm still hitting my head against the wall with the scripting. I'm a little better now than I was then. I finally understand that since I had the script which I thought was a tremendous accomplishment on my part. I do like to control a lot of what I do."

One participant took advantage of the community found within the virtual world as a form of technical support when her university decided to discontinue their subscription in *Second Life*. VWF07's virtual learning environment resides in *Second Life*. At the time she built her first virtual learning environment, her university provided technical support. However, her university decided to discontinue using virtual worlds because it could no longer afford to subscribe to the technology. No longer could she use the space that her university provided her, so she rented space available in *Second Life*. She transferred her virtual objects there and set up her physics lab.

Similarly to the other participants, she learned scripting language and how to create virtual objects. In addition, she took advantage of the existing community within the *Second Life* by purchasing virtual objects for her physics lab. If she needed to build a certain virtual object, she could ask for some advice within the *Second Life* community. Given *Second Life*'s popularity, she did not find help lacking.

VWM08, on the other hand, had no technical support from the university to help him build his virtual learning environment. However, he had help from his graduate students.

VWM08: “It was difficult. I basically spent all of the spring and the following summer building the course. Trying to figure out what I wanted to do and how to do it. As with all things, I imagined certain things happening that didn't happen.”

Using pre-made virtual worlds. While some participants chose to design their own virtual learning environment, other participants decided to use a premade virtual world. Two participants, VWM04 and VWF01 decided to use features found in both *World of Warcraft* and *Second Life* in their courses instead of building their own virtual learning environment.

VWF01: “ I'd had this experience with my virtual worlds, my research in virtual worlds course where some of the students spontaneously chose to play *World of Warcraft* together, and they had a really good experience and a really positive experience...

... You know, they were doing all sorts of different things, and it was clear that the group in *World of Warcraft* formed a real bond because of their common...

... So they thought it would be great if everyone did that, assuming that it would replicate their sort of experience. They also thought it would be great if the instructor, if I was involved too. ... We wanted to use the virtual worlds as a space for people to learn about things like how a community forms in virtual worlds, how people use language.”

These two participants decided to co-teach the course. Among the participants, they were the only ones who used two virtual worlds.

VWF01: “So that was what led me to the course in the spring, where we required the students to play *World of Warcraft* and we held class meetings in *Second Life*. So we used the two tools quite differently.”

One difference between those who created their own virtual learning environment and those who chose to use premade virtual worlds was that the latter had minimal need for technical support. Technical support was not highly involved for those who decided to use premade virtual worlds, while it was a major concern for those who customized their virtual learning environment. In relation, the former group of educators did not spend time and effort the building their own virtual learning environment. That time was spent in designing activities that took advantage of the different features offered in virtual worlds that they decided to use.

Comfort level: from anxiety to confidence. Among the questions asked in the interview protocol were for participants to recount what they had been feeling the first time they used the technology in their course. The purpose of this question was to see how much progress they had made, if any, by comparing what it had been like when they had used the technology for the first time and how they perceived the technology at the time of the interview (that is, if the participant was still using the technology).

During the initial implementation of virtual-world technology in their respective courses, the initial feeling of some of these participants as they used the technology was that they felt intimidated and scared. They were afraid that they did not know enough

about the technology, and thus would not know what to do in case something went wrong. Likewise, they were apprehensive about the reception virtual world would receive from their students.

VWF06: "I was a little concerned, because it's like, 'Oh, my gosh. How am I going to be able to create courses and then build spaces to teach in, and all my learning curves are going to be really, really sharp, and I don't know if I can do all of this immediately.'"

One participant felt that her first day of using the technology was disastrous, despite reassurance from others that this was not the case.

VWF02: "OK, The first day was a disaster! That's probably the best way how I can describe it. I was naive (laughs). I didn't know, you know, a lot of things could go wrong. Which they did. Well first of all it was a class of 36 students. Meeting all at the same time, at the same time. So I had about half of them not show up on time, and they were stressing because they couldn't log on. Because there were so many. So that was the first major problem that accrued. The second one is that I had not prepared them for how to sit or how to behave in the environment. So I had them wandering around, you know when I told, can you sit down? Find a chair? And then it was difficult because they didn't know how to sit down, they didn't know the environment was pretty much the same as in an actual classroom that you were going to have class, you find a spot and you sit. (Laughs) So but they were too freaked out about the whole situation, they were wandering around and some of them on top of tables."

One of the things that helped them overcome such fears and anxieties was that they had someone on whom they could depend or rely on in case things went awry.

VWF10: "I was very intimidated. I figured it out. Other people figure it out, I figured out too. I also had Lita [not her real name] as a fantastic mentor, and she offered to co-teach each one of these courses with me in the virtual world. Then she met with me several times in-world before the semester even started. So I knew that I had her support and I was able to lean on her a lot as I got going and that was really critical for me."

VWF06: "Well, when I was up on campus and I was talking to Craig Smith (not his real name) who happened to be the program coordinator at the time with library science, we were sitting there looking at the world and I was kind of like, "you know, I'm really concerned, because it seems like too much to tackle at one time, to learn how to build in this space and also design the syllabus for my courses and learning all of this at one time". And he is the one. He threw out to me. He said, "No, rethink how you're doing things a little bit." And he showed me some of what he was doing in the environment, where it wasn't as dependent on specific spaces."

As these participants continue to use the technology, there were signs that the participants had become comfortable with the technology. The first sign was that they were starting to plan ways to improve or add to their own virtual learning environments. For example, VWF07 wanted to have more scientific instruments in her virtual physics lab in addition to what she presently had. In the case of VWM03, he mentioned that he

was on a constant look out for places in *Second Life* where he could bring his students.

A second sign was that the participants expressed a desire to look for ways to present their courses differently, using a virtual world, from the ways they present it in a face-to-face classroom setting. For example, VWM08 explained that although he had experienced initial difficulties in creating his virtual learning environment in *ActiveWorlds*, he had become more proficient the more time he spent building. His concern was more focused on formulating activities that promoted student engagement. He mentioned that as one attempt to create activities in a virtual world, the temptation was to translate activities done face-to-face into the virtual world. VW08 emphasized that rather than creating activities equivalent to those done in other modes, such as face-to-face, participants should create activities that take advantage of the features afforded by the technology. His vision, as he created his virtual learning environment, was for students to learn in a nonlinear fashion. A student could start at any point in a course and progress from there.

Finally, a third indication that these participants had achieved a high level of comfort with virtual-world technology was the comparison between their initial experience when they started using the technology and their experience at the time I interviewed each one of them. As part of my interview protocol (Appendix B), I asked them to recount their experience. During the data-gathering phase, I asked participants if I could observe them in the virtual world as they conducted their classes. It was here that I saw their progress in using the virtual world, in terms of their comfort level with the technology. For example, VWF02 mentioned that in her first time using virtual world in

her course, it had been a disaster. In the observations I made as she oriented her students of *Second Life*, she performed in the manner of a seasoned veteran conducting a face-to-face class (which by the way, she has been teaching for more than ten years). During the orientation, she gave students some exercises for them to do—activities that would help them navigate and communicate with one another in *Second Life* and other activities that would help them in the course while in the virtual world. None of this happened when she had used the technology for the first time in her course.

Another example is VWF06. I observed her while she was conducting a class in *OpenQwaq* or *Teleplace*. The interaction that I saw in her class was similar to that found in a typical face-to-face class. The comfort level of using the technology was high for both teacher and students. One student was having a technical problem communicating with the class. Some students, as well as the teacher, provided some suggestions on how to address the technical issue. As this was going on, it did not distract the entire class, nor did the lesson stop in order to solve this student's technical problem. The student who was having a technical problem was not panicking. She knew what to do. In a short span, she was able to join the class discussion. Another insight was when I was interviewing VWF06. It was my first time to log into their virtual world. She gave clear instructions as to how to communicate and navigate. She let me know that the virtual world we were in could record our interview. In addition, at one time I was having an audio problem. She gave me the steps for resolving the issue. This was clearly a person who had achieved a comfort level in using virtual-world technology.

A final example that indicated that these educators had reached a point where they

are at ease with the technology what VWF10 said as she was dealing with technical issues with her students.

VWF10: “We had some trouble with sound and several of our forums, mine, my uh, 50-10 forum, so that's a, a course for brand new students, had major sound issues so for the first couple of nights that we met, uh, several of my students - they can't hear me, I can't hear them, they can't hear each other, they're freaking out, they're sending me private texts, “Oh, my God, I'm gonna die, I can't figure this out.” And it's always very dramatic. [laughs]”

Student reactions and performance. In this part, the students' reactions and their performance in the virtual world were noted from the perspectives of the participants. The focus of the study was on educators. I did not interview any students in this study.

VWF10: “The tricky thing was when the students get negative about it, it's really hard for me as a teacher not to also be negative about it, like to say, 'yeah, I don't know why we do this, this is terrible.' Instead, what I just tried to do is say, 'hey, folks, look, it gives us a lot of wonderful tools to use. Yeah, we're having trouble with it right now. It will be worth it later. Let's just plow through it.' And just kind of, when I spoke to them, try to be real positive and constructive about the whole thing, and save my moaning and groaning...”

Concerns about student experience and feedback. Participants concerned about the students' learning experiences adopted a number of changes as they implemented virtual-world technology. One adjustment that some of the participants made in their

syllabus was to provide an orientation for their students, helping these students to understand the virtual world they would be using in class. These participants saw orienting students on how to navigate and communicate in the virtual world as a necessary step. One participant mentioned that he wanted his students to be comfortable with the technology. As a result, the participant spent a class session with the students touring the virtual learning environment where the student would be working. The participant created exercises in order for the students to be familiar with the different features found in the virtual world. In one of the observations I conducted while in *Second Life*, I noticed that VWF02 was constantly reassuring students that if they experienced any technical glitch, the best thing to do was to remain calm and be patient. She taught the students how to do instant messaging within the virtual world so that if a student got lost, she or he would be able to communicate with the teacher using instant messaging. The participant could then provide a SLurl, similar to a URL or a web address, that would transport the student to the location where the class was being held. One of the participants took it a step further by producing video modules on different topics that could help students familiarize themselves with the virtual world the course would be using.

With regard to student orientation, this was a common issue between those who designed and created their own virtual learning environment and those who decided to take advantage of the availability of a premade virtual world. VWF01 and VWM04 had assumed that students knew *World of Warcraft* and *Second Life*. They had thought that there was no reason to conduct a student orientation for students to familiarize

themselves of these virtual worlds.

VWM04: “Should have done that. Totally should have done that. Yeah, and I think you might have heard this from Letty (not her real name). The one thing that we absolutely do differently, we are stupid enough to do this again, is run a bootcamp before the semester starts. Because we were dealing with platform literacy issues for a lot longer than we expected.”

VWF01: “In *World of Warcraft* we actually had one requirement where we paired a newbie and a more experienced student, and had them do peer teaching, which worked for some, but actually I mean it’s interesting, it kind of ties to some of the stuff that Reed (?) was saying as well in some of the other presentations. When we made it an assignment it turned into something that was formal, and therefore not necessarily geared toward what the new player really needed to know because the more experienced players really didn’t know how to organize their instruction. So like, one experienced player took a newbie off to a main city that was at a much higher level than she was, and she hadn’t completed the kind of introductory level where you learn the basic skills. And she didn’t know how to get back! So she was stuck there, and it had not crossed his mind that that would be a problem.”

Beyond knowing the basic on how to navigate and control one’s avatar and communication with one another, VWF01 realized that in using a virtual world such as *World of Warcraft*, students should understand the language and meanings in that

particular virtual world that enabled students to appreciate the virtual world the students are using.

VWF01: "... Some of the activities they did were different. They had to analyze a chat log from the auction house in *World of Warcraft*. So we gave them some articles and tools to do that as a means of helping them see how language was used in a very specific way."

J-Jay: "Right."

VWF01: "In that context, it was kind of a matter of translating something that early on would have made no sense. And still wouldn't make any sense to someone who wasn't familiar with the space. So we used it also as a means of having them demonstrate that they had spent enough time in the space that they could understand that language use."

Despite orienting students with the technology, participants reported some resistance from students as class departed from the traditional face-to-face model to more virtual environments. This was the case for VWF06 and VWM08, whose university department decided to discontinue traditional classes and move these courses online. This was because few students were enrolling in the face-to-face courses. As they transitioned to the online context, the department found some resistance from their current students. The problem did not lie with the virtual technology per se but with the changes that were to be made in the course. VWM08 observed that students who were deep in their program were used to doing their schoolwork in a manner in which they were comfortable. VWF06 supported VWM08's observation.

VW06F: "I had actually had a focus group session with them at the end of the semester to talk about that, and it was very interesting with the focus group because what really came out of it was that when they entered the program most of them had most been in the information session and so when they entered the program they anticipated a face-to-face program, they anticipated coming in, having lecture, doing some activities, and going home and finishing their work. And they did not anticipate the level of engagement that they had to, that we expected of them."

There were difficulties convincing the advanced students to at least try the new method.

VWF06: "Carl (not his real name) (one of her colleagues) was on the panel and listened to them and one of the students, who was like always grumbled about the virtual environment. She finished her whole presentation, addressing questions from everyone, et cetera and she gets ready to leave the station and she goes, 'Wow. That was really fun.' And Carl and I both commented. It's like, 'Well, it took us all the way to the end of the program to get it, you know, to get her to see some of the advantages and benefits, but we finally got there.'"

As time progressed, the students became more accepting of the method, according to VWM08 and VWF06. Students who were new to virtual worlds were more likely to be engaged in the new environment if there were a significant number of people simultaneously using the technology. They called this phenomenon *reaching critical mass*.

VWF06: "One of the things we've learned, is that for the environment to, for people to feel comfortable, is you have to get a critical mass of people going in here so that I don't know what it is. People, when they come in alone, they kind of feel alone. So, I mean, that's part of the reason we're using it is so that there are people around and then, after from the pilot test, we decided to go ahead and continue using the *ActiveWorlds* and start developing and using *Teleplace* more."

VWF06 and VWM08 realized that they needed to reach this critical mass in the virtual world for student engagement to occur.

Educators who decided to use a premade virtual world, provided further insights as to how students reacted as they navigate and go through the tasks assigned to them. The first example was that while in a virtual world, students expressed to their professors that they were uncomfortable when their professors were present during certain activities.

VWF01: "The other thing that was weird that we didn't anticipate, and again primarily in *World of Warcraft*, is that the students who were new and just getting you know sort of their feet on the ground were very uncomfortable with having their professors in the same space watching them look like fools. And one woman actually, we had them view bloods (?), one woman actually said you know: "I always want to be a good student." She says: "I was very uncomfortable, Sarah (not her real name) was there and she was trying to give me advice, she was giving me money, she said I was horrible," you know. "I can't, my professor giving me gold." I mean it's *World of Warcraft* gold. You know and I'm like what

the heck? But she felt like a fool and so it was fascinating how their real-life identities and concerns translated into the virtual space.”

As a result, VWF01 made some adjustments to the course.

VW01: “It was clear after that second class meeting that the *World of Warcraft* interactions were not going as planned and that we both, me in particular, I kind of backed off from interacting with them in the space. We had been thinking we would do a whole lot of group quests and things like that.”

The second example that both VWF01 and VWM04 experienced in their course was that students were able to find ways to complete the task without going through the process that the participants had expected their students to complete. It caught them by surprise. VWF01 wanted her students to collaborate by going through different dungeons. She was willing to help the students go through such tasks by providing some guidance to the group as they go through a dungeon. However, one of the students recruited her son to join the group in a dungeon. The son’s avatar had reached the game’s highest level and eliminated obstacles that the low-level players in the group would have had to struggle to overcome themselves. In *World of Warcraft*, dungeons and quests have assigned levels. In order to enter into a dungeon or do a certain quest, the player must have a character that is close to that level. Otherwise, the character is not qualified to enter such a dungeon or do that particular quest. However, in the game, it is possible for a player to solo a dungeon with a character that has a high level. If the level of the characters matches the level of a dungeon, it would take five players with assigned roles to complete that

dungeon. VWF01 did not realize that a high-level player could join with low-level players when completing a dungeon quest.

VWF01: “So what I realized what was happening it was they were sending off the kid who was just slaughtering everything [making it easy to pick up loot in the dungeon].

... And everybody else was picking up the loot. So there was no need for teamwork. There was no need for teamwork! I know. I was just shocked.”

[Laughs]

VWF01 also noticed that even if students had prior familiarity with *World of Warcraft*, their skill did not provide these students with an advantage when it came to learning the course. She observed that, for some students, their concentration was more on the game rather than on the lesson at hand or the course objectives. One student who eventually dropped the course was attracted to the course because it was using *World of Warcraft* and thought it would be fun to be in that course. He found out that he would rather play than learn.

Quality of student work. Participants remarked that there were some noticeable differences in terms of students’ work. They thought the students’ papers and projects were more reflective and in depth compared to earlier papers from traditional courses. However, the participants cautioned that they were uncertain as to whether this was a direct cause of using the virtual world. For example, VWM05 had a virtual world version of Socrates’ Cave for students to visit and then write a reflective paper on.

VWM05: “I get a lot more personal stories about caves that were really, really hard to come out of. Yes, much more graphic. Like, I’ve been in Austin this long and I didn’t realize my town was so small and my religious upbringing was . . . And I don’t know again I haven’t sorted that out if that is because they are twice thinking about the cave in the semester.”

Two other participants gave similar assessments.

VWF09: “I think our students got more in depth with it on the classes that we taught. They were able to have a deeper understanding of the subject. One thing we did with the class is that in the end, their final presentation, was we asked them specific questions that they addressed and it was really an evaluation tool for us as instructors and for how it was being delivered.”

VWF10: “I don’t know actually why this is. But their assignments were more carefully done, they were longer, richer. I don’t know why. I don’t know if it has to say anything at all about campus versus online, just being the particular group of students. I also tend find that a really small group isn’t ideal. So for the campus classes, I have like four or five students in a class. And for me it is not just having a robust group of, say, 10 to 15 students in which they have figuring different viewpoints to the table, there is lot of stimulate conversations and they will not always agree with each other. That tends to turn out richer assignments and more critical thinking I think and then you have a group of may be four or five students who are a small group, kind of homogenous group as well.”

VWF06 also offered a similar comment. Her course teaches management of school-library media centers. She explained that at the beginning of the course she asked class to draw a graphic map as to the role of a media coordinator and the objectives of a media center. As the course progressed through the semester, the students updated the concept map. At the end of the course, the students were able to see the changes and development from the first concept map to the last one they made before the course ended. VWF06 pointed out that one of the attributes of virtual world that contributed to such learning was that students were able to see the evolution of their thoughts on the role of a school library media center.

RQ 3: What Challenges Did These Educators Face as They Implemented This Technology into the Classroom?

The third research question was straightforward, as most of the participants have continued to use virtual-world technology. I asked them to identify, from their perspectives, the obstacles and challenges they face as they continue to use the technology. Based on the response provided by the participants regarding the third research question, I divided these responses into three parts: technology, learners, and school.

Technology. In relating the challenges and issues of using virtual-world technology in their course, I divided the technology aspect into two subsections. The first subsection concerns challenges that participants encountered as they create their own virtual learning environment. The second subsection involves issues that these participants experienced as they start to use virtual-world technology in their respective

courses. In both subsections, I have noticed that the challenges and issues lay more on those who opted to build a virtual learning environment than those who decided to use premade virtual worlds.

Issues in building a virtual learning environment. In this first subsection, the issues concerned exclusively those participants who decided to build their own virtual learning environment. In the process of customizing their virtual learning environment, these participants found some difficulty as they start learning how the components needed in their environment. In addition, they continue to be challenged as they build new virtual objects or write new scripts for their virtual objects that were different from the one they have written before.

VWM08: “The thing that tended to frustrate people when they first started out was orienting the object ... There's a fairly steep initial learning curve. The thing people have to learn is, it just takes time...

“...in order to build you had a huge repository of objects available to you. Even though it was a huge repository, it was still limited. Everything wasn't there. In order to actually build customized facilities, for *ActiveWorlds* you had to use at the time some pretty tough 3-D modeling software.”

VWM08 said that one has to get over the frustration when building such virtual objects. The more one spent time building virtual objects, the easier it became.

Beyond building the virtual objects needed, some participants wanted objects to behave in a certain way. This required learning how to write a script. A script dictates the way in which a virtual object behaves. This was important for VWF07, because she

teaches physics to undergraduate students. She created a virtual physics lab in *Second Life*. Her virtual lab featured different scientific instruments for her students to use and interact with. In this regard, she wanted these instruments to behave in a manner similar to those in the physical world. The object here was for students to become more familiar with the instruments, as well as to gain opportunities to practice with them if the real ones were not available, which was often the case. One of her options to achieve such an objective was to learn how to write scripts. However, this is not an easy thing to do, especially if one is busy with other obligations, both professional and personal. VWF02 also wanted to learn how to write script. She took a significant amount of time learning the scripting language in *Second Life*; and at certain points, she became frustrated when she did not achieve the intended effect.

VWF09 mentioned that it is necessary for participants to have someone to build for them or have someone to help them build their virtual learning environment.

VWF09: “Oh, creating something like this would be impossible for a teacher, because we had a team of four people and we would, that took us three years to develop that. And part of the reason it took so long is about midway in it, you know, *Second Life* went from 1.4.6 to 2.2.0.”

For one participant, the steep learning curve for creating a virtual learning environment is a serious obstacle. VWM05 noted that, even if he knew about virtual worlds, he would not go ahead and create the virtual Socrates’ Cave himself.

VWM05: “I would say, ‘Despair now. You will not be saved.’ They would be tremendous. I mean, John (not his real name), brought the idea to me, had the new

media consortium space, way to go, was willing to put in countless hours in refining it, attended a couple classes where I did it with students. I mean, early on he actually recorded; I think he recorded one or two of those sessions to see how to get us. I think if it was just me and (?) said ‘We’d like you to develop it but we have no IT support, learn the language,’ I’d say, ‘Forget it.’”

Issues in using a virtual world. As educators began using the technology, they discovered some technical issues during implementation. These issues did not arise during the time they immersed themselves with the technology before they decided to use the technology in their respective courses. As I examined their responses, except for the latency issue, I have noticed that the technical issues enumerated here were more from those who opted to design and create their own virtual learning environment than those who use premade virtual worlds.

One example of an issue is lag or latency. *Lag* is a common issue for virtual-world technology or any technology that is network-based. *Latency* is when a user experiences a delay in the reaction time of her avatar as she sends a command. One participant observed that at a certain time of day, they experienced a lag in the virtual world. The participant attributed this to the increased in the number of people using the university’s network.

VWF02: “When the class first started I had noticed that if I go above I’ll say twelve avatars at the same time I’m taking my chances with lag. Twenty plus students at the same time and you’ve got yourself a, you know, a really serious problem because initially at the very beginning of the semester I have all of them

meet at the same time.”

I experienced this issue firsthand as I was interviewing one of my participants in her virtual world. As we were conversing, I noticed that there was a drop in the rate of connection. She explained that these types of glitches were part of the environment and that both faculty and students have learned to deal with it as they used more of the virtual-world technology.

In some situations, the system may be unable to handle the number of users in the virtual world. This results in a crash where the system would reboot or the user would unceremoniously be disconnected from the virtual world.

VWF06: “Ah, there was some issues with *Teleplace* whenever you got more than like 25 or 50 people into a space. It would slow down and crash on you. Then there was one of the courses where students were doing starting to add and do a little bit of building stuff and it wasn't working and actually, I mean, it was a busy place. We were all excited. It was wonderful. We could see students from all of our cohorts and they could see all of us and they were all interacting and we brought. We killed the entire forum. We just brought it down, because we. It got so overloaded, so heavy, and too many people in here and too much of a good thing. The technology couldn't keep up with what we were trying to do.”

The solution to the lag issue that these educators implemented was to limit the number of users when using the virtual world. For VWF02, she divided her class in groups and met with them at different times. It may have solved the lag issue, but it forced her to spend more time meeting with students, as they were divided into groups as

opposed to just meeting all of them simultaneously. For VWF06, students were placed in different rooms. The system could handle users being in different room, but it could not accommodate when all of these students met in one room.

A second example of a technical issue that some of the participants reported was the limited number of prims (a unit in building a virtual object) that they can use within a certain area. This issue concerned more for those participants who chose to design and create their own virtual learning environment.

VWF02: “And so, really that’s the only limitations we have right now and I am always pushing that because the elementary school is very prim-heavy and this summer that’s what, we are renovating it because we have learned a lot since we first built that structure...

...The reason that the prim count was so high in the elementary school that we built was because I want it functioning classrooms. So, that means if that included be the desk, the classroom arrangement it include posters in the wall, instruction materials, books. So that’s why the prim count was very high. And I also built a library in the elementary school that was also prim-heavy because it is a functioning library. You go in there you can type, rich sources that are related to elementary education. So, that’s why the prim count was so high in that area that it was because the classrooms are functional and because we added a third floor after the first semester and so on I have added a building component, a building assignment for my students which I had kind of hesitated on because building is pretty tough here in *Second Life*.”

In addressing this issue, VWF02 made sure that they had enough prims for the class to use by searching for and eliminating unused prims before they met as a class. In addition, at the beginning of her course as part of the orientation, she made students aware of prims and the amount they could only use for building virtual objects.

Sound was another issue that some participants mentioned as they used virtual worlds. As students break into groups for discussion, there were problems with cross-talk in the classroom and with disturbing neighboring classrooms.

VWF07: “Because a lot of cross-talk, we discovered very early, was extremely confusing. You know, students were going, ‘Wait a minute. Is it is he talking to me? Or is he talking to that guy over there?’”

VWF02: “Because we have classrooms right next to each other and you know, sound, you know, travels. We had to, we had to make adjustments so that students could be in rooms right next to each other, talk to each other using voice and not have, and not have them lead over, over each other which can be very, very annoying. So, so yeah, all of that was just a matter of trial and error.”

The solution that the participants implemented was to create rooms that would dampen the voice to the point that people outside the room would not hear what was being said.

Learners. Among the challenges that the participants encountered in using the virtual world was dealing with the mindset of the students with regards to learning and using the technology. For some students, the technology represented a change from the ways in which they learned things. As a result, students expressed negative feelings

toward the technology and resisted using the virtual world. For example, one participant mentioned that students who are used to the traditional methods such as face-to-face were having problems in making the transition.

VWF06: “The student who had not been out in the, who were the ones who were undergrads and just turned right back around. They were not used to working online and with other people. They were all still face-to-face based and their whole mindset was face-to-face based and they used to complain a lot about using the virtual world and about the work online and collaborating and it one of those where I kept working with and working with them.”

VWF06 expanded this thought by mentioning that students had devised their own ways of working with one another. They preferred to work with more familiar technologies such as the Web. Even for students, meeting people in the virtual world was something new for them. VWF02 expressed similar sentiments as she introduced the technology to her class.

VWF02: “Well their first reaction is sheer terror, that's probably the best way to put it, but I've noticed that, because I interact a lot with my colleagues from other colleges and other departments, I've noticed that that seems to be rather unique to College of Education students. Future teachers are terrified of technology as a general rule, which is kind of sad, so they start off with . . . very defined biases against it.”

VWF10 supported this assessment when she saw that her students, especially those who were just entering into the program, felt intimidated by the technology.

VWF10: "I think mostly it's a lot of, just kind of initial fear, intimidation, they're overwhelmed, they're starting this whole program, it's a big step in their journeys, they've made a big commitment to start graduate school, lots of them are working full time, they've got families and now they've got this graduate program and, they're going to going into this virtual world, and it makes them really nervous."

VWF09 mentioned that a few of her students looked down on the virtual world as something that was more of a game, and that they saw it as a form of insult, as though they were not being taken seriously. She explained that this reaction was not directly against the technology, but more a product of past experiences in which some people did not take them seriously as learners. She had to convince the students that this was not the case and that the technology was to help them in their learning. She emphasized that this was not the feeling of the majority in the class. It was that of a few students. However, she felt such an issue was important and that it needed to be addressed.

Participants expressed that it was important to get the students comfortable with the technology first before they experience the benefit that the technology could contribute to their learning experience.

VWF02: "So really what I have to do is sell it to them. I have to, within the first week, if they're not sold on it, they're going to be miserable the entire semester and they're going to be true, they tell me about it every chance they get."

School. There were at least a couple of participants who mentioned that school was part of the challenge when using virtual world. The majority of the participants did not cite school as a challenge when it came to using a virtual world. The participants who

did identify school as a challenge pointed to tradition and mindset in the way their school teaches.

VWM08: “But basically our education is one of four walls and a teacher. And you have to be able to step out of that. That doesn't mean you have to leave it behind completely. But you have to imagine other ways of people interacting with learning.”

VWF06: “Some of the biggest obstacles are actually the structures of, in K–12, of like classes and courses and how in middle school math teacher teaches a 45-minute section of math class and then the only way that sometimes they can think is take all the students into a lab, but then why use a virtual world in a lab unless you're just doing simulations, but they can't do.”

These participants think that the structure itself limits the use of the virtual world. One participant mentioned if the class was taught in a lecture-style then using virtual world would not be appropriate for such mode.

RQ 4: What Types of Support Are Needed to Encourage Educators and Help Sustain the Use of the Technology?

The last research question was also straightforward. It asked the participants, based on their experience, what support they thought was essential as they went through the process of integrating virtual worlds into their courses. From the interviews, three areas emerged that participants often cited as necessary to integrate and support the use of virtual-world technology in their courses. These were technical support, school administration, and peer support.

Technical support. Technical support was one oft-mentioned area, especially for participants who decided to design and create their own virtual learning environment. Even those who wanted to learn how to build a virtual object and knew the scripting language for that particular virtual world still relied on technical support. The availability of technical support for those who decided to build their virtual learning environment proved crucial to their success. For example, VWF02, VWF09, VWF07, VWF10 had at some point had technical people build their virtual learning environment. At a later stage, when VWF07 decided to go on her own, she relied on the community in *Second Life* for support by purchasing virtual objects or asking for help and advice as she learned to write behaviors for her objects from people in this community. A second example is VWM05, who would not have considered using the technology if it had not been for technical support, as he refused to take part in building his virtual learning environment.

Aside from building the virtual learning environment, technical support also played a role in maintaining the virtual world and assisting teachers as they experienced technical glitches at some points in the course.

VWM11: “Luckily, we have a full-time employee, we have a person who works, and her job is to deal with these issues. And, you know, it works out for us. If you are doing this by yourself without the institutional support, then, you know, then it's going to be more difficult. You are going to have more issues that you have to deal with and you are going to have to end up being technologically savvy enough, to do that.”

Others made similar comments about the need of having technical support.

VWM05: “So, he was a catalyst for making me look differently and our IT staff that work with faculty I mean this is gonna sound, there are not secondary players maybe not have faculty titles but as far as I concerned in the faculty use IT much more than I do to if you want something and while you don’t have fits they are partners.”

VWF02: “She is a programmer; I am not. So, huh, she is able to, and she has a lot more resources she gathered over the years. Some scripts she can adjust. I have to create everything from the ground up and that would be a difficult thing for me. The building wouldn’t be a problem, but the scripting would. And so and I still find her valuable, because the thing about it is that even though I can I capable of it, I don’t have the time to do it. So if I have to build all my environment on my own, it would be too much drain on my time, as the results. You know, you do have a lot of other things to do when to build the *Second Life* takes times. So I still depend on her very, very heavily; even though there is something I know I can do myself, I asked her to do it for me.”

VWF06: “I mean, all of us kind of designed our places, our spaces, or come up with ideas. Debbie (not her real name) does most of the building now. It’s one those of like, I have some ideas on spaces and how they might work, but it’s kind of like I don’t really want to play around with the technology and do the building so.”

School administration. The second area that participants identified as essential was support from their leaders, as these leaders would lend their voice in terms of

creating policies that would support the technology by allocating resources. I observed that the participants often started using the technology at the invitation of their universities. One participant remarked that the president of the university was supportive of technologies. It was his idea to subscribe to *Second Life* and purchase an island for the university. Another participant received a laptop from her university when she decided to accept such an offer and use virtual-world technology. VWM08 was the head of his department who, before he retired, made it a policy that his department would be using virtual world as part of their teaching platform. Compared to the other participants, his department was an exception, as he brought the technology to another level, making the technology the norm for his department. Within the department, most, if not all, faculty members were using virtual-world technology in their courses. Other participants in this study represented small pockets in their department where they were the only ones or counted among the very few using a virtual world.

To further illustrate the importance of university or department leadership in support of the technology, I noticed that the most of the participants kept mentioning that their continuation of use of virtual-world technology depended on the decision of their university leaders or their department heads to continue or discontinue resource allocation in support of the technology. Some of the participants remarked that they were in a tenuous position. The leaders who supported the technology had moved on to other roles within the university or retired. One participant remarked that he was not sure whether the new person would still support the technology.

However, it should be noted that without the support of leadership, the use of

virtual-world technology might be difficult, but it would not be impossible. In the case of VWF07, her university decided to unsubscribe to *Second Life*. Previously, they had been the ones who had encouraged faculty to use virtual-world technology in their courses. Rather than stop using the technology, VWF07 decided to use her own personal resources to continue to use a virtual world in her course.

However, there is a limitation here. Having to use one's resources may be viable for an educator as an individual in using the technology for one's own course; on the other hand, if the goal was to encourage other faculty members to use the technology, it becomes apparent that policies of support are needed. For example, VWF06 commented that teachers from other departments were interested in using the technology. This meant stretching their resources to accommodate these teachers. She felt that she was spreading herself thin on this matter. They were hoping that their school would allocate the needed resources for them to continue and grow.

Peer support. The third area is peer support, though this area was not mentioned often among the interviewees. Some participants said in the interviews that they were independent and more focused on their moving their courses forward than on promoting the use of the technology with their colleagues in their department or in their schools and universities. I asked the participants who went through process of learning the technology sponsored by the university if they ever meet with other people using the technology or are in constant communication with the other faculty members who took the same seminar. They replied that they did, but not often enough to know what the others were doing. They did not know whether those who had taken the seminar were still using the

virtual world in their course. However, the four participants who worked in the same university replied that peer support was important for them. Two of the four participants mentioned that when they had first started using the virtual-world technology in their course, they had felt intimidated. They felt relieved and encouraged when their colleagues supported them.

VWF10: “Well, I just figured that there were ways to do it better and I was going to figure it out. I guess. Luckily, I mean, you met Anna (not her real name), she is fantastic. The department chair at the time and John Doe (not his real name) is also amazing. The two of them explained to me the kinds of things that they were doing in their courses in the virtual world. That got me really excited because the things that they were talking about seem to be a way for me to overcome a good many of the obstacles that I had identified in that previous experience with the Moodle situation. So, I was hopeful about the whole thing.”

As they were developing the use of a virtual world, VWM08 created a working group wherein people interested in the technology would come together and discuss related topics on the technology and its use in an educational setting. According to him, it attracted several faculty members outside their department. These faculty members could come in to listen and ask questions. He noticed that as things progressed, the group grew and changed in terms of the type of people who were attending. He added that when they had started, those who attended were early adopters of the technology. This is no longer the case. VW08 remarked that there are those who feel they do not need to be using the virtual-world technology in their courses. The verdict among the working group’s

attendees was mixed, as there were also those who eventually decided to use the technology in their courses.

Final Note

One finding that surprised me—or rather, that was not mentioned in the interviews—is the avatar feature found in virtual world. Different research studies (e.g., Nowak & Rauh, 2006; Petrakou, 2010) mentioned the contributions that the avatar offers to social interaction in the virtual world. However, this was not the case for the participants in this study. All the participants would not have mentioned the avatar aspect had I not asked about it. One participant noted that one of the reasons he had not chosen *Second Life* for his department was because of the options found in their avatar. VWM08 did not choose *Second Life* because the users could not use their real names and he felt that his students would spend more time personalizing their avatars than focusing on the lesson at hand. VWF06 shared his sentiment on this. She thought that having an avatar with the real name of her students above the avatar and having the option to place one's picture or video embedded in an avatar for others to see what the students look like was more appropriate. In separate interviews, both VWF06 and VWM08 saw avatars more as an access point to the virtual world than as something that represented the student. VWM04 came into the virtual world where his class meets using a woman avatar. He had thought he would get some reactions from his students. He was disappointed that he did not.

Limitations

The limitations of this study were several. One area of limitation is inherent in the research paradigm used and how the data were gathered. Merriam (1988) mentioned that among the limitations of conducting a case study was the sensitivity and integrity of the researcher, the biases that the researcher brings into the study, and the issues of reliability, validity, and generalizability. Despite my best effort to be sensitive to the data and present it in an unbiased and neutral manner, there is always that possibility that some of my biases may have affected the presentation of data during my analysis. If this is true, it is purely unintentional. With regard to generalizability, this limitation was recognized and accepted once the paradigm has been determined. The study may be useful for those educators in situations similar to those represented in the research paradigm. The research paradigm of this study is the case study.

The second area of limitation was the scope of the study. The study looked only at the perspective of educators. The study focused on the process of integrating virtual worlds in a higher education setting. It does not evaluate the effectiveness of the technology in an educational setting.

Summary

For these educators, the process of integrating virtual world into their courses started in getting to know about the technology before they decided to use the technology in their courses. Once decided, they moved on to the next phase in determining how they would be using the technology in line with their learning objectives. As they initially implemented the technology, they encountered difficulties and anxiety. However, by

having technical support and support from their peers, they were able to overcome these challenges and obstacles. These educators saw that as they continued to use the technology, they gained a comfort level adequate to explore different ways of presenting their courses.

From these results, some consistencies emerged with findings mentioned in the literature review, one of which I thought was surprising. In the literature review, the research studies focused on the features of virtual-world technology and how these features tended to support a certain pedagogy, constructivist. This finding was confirmed in the data analysis. The study participants took a constructivist approach as they presented the lessons to their students through virtual-world technology. One factor that I found surprising was the level of importance of the avatar. The impression I had from the different studies was that the avatar was an important feature of virtual-world technology with regard to the teaching and learning process. This is not the case. A couple of educators expressed that having the option to customize one's avatar is more of a distraction than a benefit for them.

In the next chapter, I will discuss the implications and recommendations for future research for virtual-world technology.

Chapter 5: Discussion

Introduction

Technology offers a means to overcome limitations and enhance quality of life. In an educational setting, technology aids educators in overcoming the limitations inherent in such an environment, supporting certain pedagogies, and enhancing the teaching and learning process. However, as with all tools, an educator must know which tools are most appropriate for a given learning objective. No one tool can accommodate all types of learning situations.

The focus of this study was on one particular tool, virtual-world technology, and how educators in higher education integrate this technology into their respective courses. Most of the research studies in the existing literature had focused on the technology and how it performed in an educational setting. Overall, these research studies (e.g., Bers, 2001; Lee, 2009; Schwartz, 2009; Wagner, 2008) have indicated that as a result of their inherent features, virtual worlds has the means to help users in various knowledge domains learn certain concepts, as well as aid those users in understanding these concepts as they interact within a virtual world that mirrors in significant ways the real environments in which they will work. These studies' findings suggested that virtual worlds can indeed aid the teaching and learning processes.

However, a review of the literature revealed a serious research gap in this regard, and its absence raised concerns about current efforts to harness the power of virtual-world technology. Virtual-world technology is complex. Not knowing and understanding

the technology and how best to utilize it with students invites frustration and disappointment on the part of the educator. This study's focus, therefore, was on educators using virtual-world technology.

In the final chapter of this dissertation I will discuss two general questions that arise from the results described in the previous chapter. First, what needs to be done to increase the likelihood of virtual worlds being adopted in education? And second, what further research needs to be done on virtual worlds in education to maximize the technology's effectiveness? I will end the chapter by recommending some topics for future research studies and give my final thoughts.

Making Virtual Worlds Adoptable in the Classroom

Adopting a technology is inviting a certain degree of uncertainty, an area that would take an individual away from her comfort zone. People, in general, are comfortable in their habits and traditional ways. Rogers (1995) has illustrated that most people find it difficult to discard these habits and traditions to something that is innovative. Educators are not exempted to this behavior.

However, one of the objectives of education is to improve oneself. The best professional athletes find ways to elevate their game season after season. In some cases, this meant changing their habits. In business, CEOs and managers are constantly seeking ways to refine the way they do business in order that they stay ahead of the competition. Educators are no exception. They, too, must find ways to improve their ways of teaching. One way of doing so is using technology.

Educators and school leaders play pivotal roles in aiding the adoption of virtual worlds in the classroom. For educators, understanding the different features of the technology before deciding to use the virtual world in their courses is crucial. For school leaders, it is important to create an environment of support that will encourage educators to consider using virtual-world technology in their courses; in the case of educators who are presently using the technology, it is important to continue using the technology by finding new ways of applying it that will help learners understand course-related concepts.

Other elements that may affect the use of virtual-world technology are the technology itself and the cost of the technology. However, based on the study's results, it appears that these costs are manageable as long as educators and school leaders are cooperating with one another.

Educators

Immersion. As educators decide to use virtual-world technology in their course, there are steps to take and points to consider. The first step an educator must make is to take the time and effort to immerse him- or herself in the technology. *Immersion* here means an in-depth exploration of virtual-world technology, which goes beyond knowing how to control an avatar and navigate around the virtual world. Such exploration involves interacting with other users and with the virtual environment itself. Most of the educators interviewed looked at a virtual world as a platform for social interaction. VWF01 mentioned that in order to understand the space and language in a virtual world, one has to spend time being in it. VWM03 took the time to do some role play in *Second Life*

before deciding to use that virtual world. He mentioned that it came to the point that he had a virtual life and a real life.

As part of the immersion, educators should not limit themselves to one virtual world or one type of virtual world. For example, *Second Life* is not the only social virtual world in which people log in to meet other people. Other, similar virtual worlds exist. Also, virtual worlds aimed specifically at education exist. By limiting oneself to a single virtual world or type of virtual world, one sees only a facet of the technology and is deprived of other aspects. For example, *World of Warcraft* has a different culture from that of *Second Life*. If an educator limits herself to one virtual world or one type of virtual world, how can she know what is available and take advantage of the technology?

Two paths. As educators get to know the technology, the second step is deciding what path to take: to design one's own virtual learning environment or to use pre-made virtual worlds. The previous chapter illustrated the advantages and disadvantages of both paths. Designing one's own virtual learning environment offers the flexibility to customize one's virtual learning environment and create the types of activities needed, based on the learning objectives. However, this approach means an educator will need some assistance in building this environment. The interviews in this study reveal that those educators who took the time to learn how to build virtual objects and write scripts found technical support important when building such an environment. The need for technical assistance did not stop after the virtual learning environment had been built; such support needs continued in maintaining the environment.

On the other hand, an educator could take advantage of what premade virtual

worlds have to offer, as illustrated by VWF01 and VWM04, who used *World of Warcraft* and *Second Life* in their courses. They did not build anything. They took advantage of the features found in these two virtual worlds. They therefore needed virtually no technical support. These educators concentrated more on formulating activities for students to perform in the virtual world. However, one of the disadvantages for these participants was the relative lack of flexibility compared to those who opted to design their own virtual learning environment. Rather than building the necessary components for certain activities, these educators who decide to use pre-made virtual worlds were limited to what was available. A possible downside for this approach was that students may be familiar with the tasks, especially if the virtual worlds being used were popular. As experienced by VWF01 and VWM04, some students found alternative ways to achieve the in-game objectives; however, these students missed the learning objective or the point of why they needed to do such tasks. VWF01 and VWM04 decided to use *World of Warcraft*, in order for students to develop teamwork among the group. In doing so, these educators assigned challenging activities that forced students to work with one another. Because of the popularity of the virtual world, the group had no trouble finding an outsider who can easily help them complete the task.

These two paths are not mutually exclusive. They can be combined as seen with VWM03. He created his own virtual learning environment and used other virtual environments found in *Second Life*. He was able to do this by taking advantage of the popularity of this virtual world. In *Second Life*, other users built their own virtual environments, whether for education, leisure, business, or entertainment.

Comfort level. The experiences of these educators when they started using virtual worlds in their course suggest that much work must be done at the beginning of virtual-world use, especially for those who have decided to build their own virtual learning environment. As these educators started to implement the technology in their course, they felt some anxiety in one form or another. There was a feeling of uncertainty as they stepped into the unknown. They did not know how the students would react in class as they used the technology or how the technology would perform as they went through the lessons. This was a common reaction among all interviewees. However, once these educators passed this point, their comfort level started to rise. The more they used the technology, the more they felt at ease with it. This initial discomfort seemed to be a rite of passage for new users. Educators should be aware of this phenomenon. Even if things go wrong the first time, educators should have the courage to continue using the technology. Before they continue, they should identify what went wrong and how to resolve this. VWF02 described her first time using the virtual-world technology her course as “a disaster.” This challenge did not deter her from continuing to use the technology, however. As I observed her in one of her classes, she conducted the class with confidence. She took advantage of the different features of *Second Life* as she taught her class. She knew what to do when one of her students was experiencing technical problems. She accomplished all of this without interrupting her class. At the time of the interview, it was her third year in using the technology. VWF06 and VWF10 both felt some anxiety as they started to use the technology. In my observation and discussion with them, however, they displayed an air of confidence as they went through the details of the

technology and how it was used.

Learner orientation. Technology adoption not only affects educators, but it also affects students as well. A clear illustration of this was the account of VWF06 when her students objected to them working with their online counterparts. VWF06 observed that students were used to the way they learn things (i.e., read the assigned chapters, submit assignments). In requiring students to work with their online counterparts meant bringing them out of their comfort zone. This meant online discussions and doing certain projects online. One of the objectives that VWF06 was pushing for in her program was to establish a community within their program where students and faculty know one another. There should be no “tribes” such as students in the online course and that in face-to-face. VWF06, together with her peers, addressed students’ objections by providing orientations, guidance, and by being patient with them.

As part of integrating virtual-world technology in the course, an educator has to give some time to prepare the students in using the technology. In a similar vein, just as the educator must learn about the technology, students must be given the opportunity to undergo a similar process. Depending on the learning objectives and requirements, this may mean learning how to create virtual objects, how to do certain activities, or learning the culture of the virtual world to fully understand the concepts being taught. For example, VWF02 taught her students how to create virtual objects using prims. They would need this knowledge for future activities in class. This skill would also give students experience in building virtual objects, in case they found themselves teaching in a virtual world. Another example is VWF01. She thought that if students spent more time

knowing the virtual world, they would fully understand the concepts being taught. Her course was about community building.

One way of preparing their students is to provide an orientation at the beginning of the course period. This was done by most of the educators I have interviewed. For selfish reasons, I was glad that I was able to interview a couple of educators who had not provided orientation for their students. I felt selfish and guilty, because it was to my advantage as a researcher to see what would happen if an educator did not provide an orientation for their students with regard to the technology. Naturally, however, I did not want to see anyone fail. VWF01 and VWM04 decided not provide any orientation to their students regarding the virtual worlds they would be using. They thought that given the popularity of the two virtual worlds, *World of Warcraft* and *Second Life*, students would be familiar with them. In addition, in the case of *Second Life*, this virtual world has its own orientation aspect. At the end of the course, they realized that they did indeed need to orient their students to the virtual worlds.

This finding surprised me. In some research studies, the authors mentioned that they had provided orientation to their students as they used a virtual world in their course. However, this was a period when people were getting to know virtual worlds such as *Second Life*. I thought that as people became more familiar with virtual worlds, there would come a point that orientation would be unnecessary. This is on the basis of Prensky's (2001) concepts of the digital native and digital immigrant. Prensky defined a *digital native* as someone who was born or lived during the time a technology has been introduced. He argues that a digital native would have a deeper understanding of the

technology. On the other hand, a *digital immigrant* is someone who was born before the technology was introduced and made available to the community at large. From this perspective, some of VWF01's and VWM04's students could be considered digital natives. These students were familiar with *Second Life* and especially *World of Warcraft*. However, VWF01 observed that despite their knowledge of these virtual worlds, these students performed poorly in the course. One student was unable to separate himself from seeing it as a game and could not conceive of it as a learning tool for that course. This deep familiarity, ironically, was one of the reasons why VWF01 and VWM04 thought no orientation was needed.

School Leaders

School leaders play a pivotal role in the educators' adoption of a technology, at least for virtual-world technology. In some situations, they are the catalyst for convincing educators to use a technology. As seen in the results, some of the study participants began to use the technology at the invitation of their university. This finding is consistent with that of Rogers' (1995) Diffusion of Innovation. In his theory, he cited opinion leaders as those with considerable influence in her community or group. Rogers defined opinion leaders as those who are trustworthy, credible, and considered experts in related matters. In this case, the opinion leaders are those who have the ears of the educational community. He also mentioned that opinion leaders have a higher socioeconomic status than their followers. One participant, VWF09, did not consider virtual worlds until her department head asked her to evaluate virtual worlds in particular, *Second Life*. She

hesitated in doing so as she did not see herself qualified to evaluate such a technology. However, as she went through evaluating the technology, she saw the value in it with regards to education. VWF09 would not have considered the technology without the order from her department head. According to Rogers, these opinion leaders speed up the process of diffusing innovation and acceptance of that innovation.

One indicator that I thought illustrated the importance of the role of school leadership in the promotion of adoption of virtual-world technology was when there was a change of leadership. Some of the study participants expressed concern regarding whether they could continue using the technology because the person who initiated the use of virtual world had moved on to another position or had retired from her or his position. The participants were not sure whether the replacement would continue with the present policy of supporting virtual-world technology or decide to support another technology. This concern was prevalent among the participants. In this light, the leadership has a profound effect in support of the adoption of virtual-world technology by educators.

Environment of Support

VWM08 mentioned that the virtual world started to work for them in their department once it achieved a critical mass. A critical mass for them was when they reached a certain number of students and educators in *Teleplace*, the virtual world they were using. In a similar light, if the adoption of virtual world is to prove successful, the university or college in question must achieve a critical mass of educators and students using the technology. In doing so, these institutions must find other ways besides inviting

educators to use the technology. Such forms of invitation may be right for certain populations of educators but not for others. For example, I have noticed that most of the educators who responded to the invitation were willing to spend time with the technology, to learn how to create virtual objects and code behaviors for these virtual objects. However, one participant, VWM05, was not interested in doing these things. He did not take any steps to know more about the technology, even as one of the technical support people introduced the technology to him. Despite this, he used a virtual world in his course. This is because most of the efforts were made by technical support, such as designing and building his virtual learning environment. There was minimal input on his part, except for deciding whether the virtual cave was good enough for his course. Others like him may respond similarly to this kind of invitation.

In this regard, school leadership must formulate a multifaceted support network that would not only help current users to continue and explore new ways of using the virtual-world technology, but also to encourage different types of educators to at least consider the possibility of using virtual-world technology in their respective courses. The environment of support is composed of technical support, peer support, and policy.

Technical support. This factor is obvious from the data analysis. However, I think it is still worth mentioning. Based on the interviews, it is clear that technical support played a major role in helping to overcome the high learning curve inherent in the technology, as the people in technical support address these problems, especially during the introductory stage. They guide educators as they learn how to build and write scripts. They also help in creating the virtual objects needed for educators' virtual

learning environment. Furthermore, technical support kept a consistent presence as they helped to maintain and modify the virtual learning environment as these educators continue using the technology. Educators expressed without reservation how those people from technical support aided them as they build, maintain, and improve their own virtual learning environment. Even study participants who decided to learn how to build virtual objects and learn how to write scripts expressed that they still need help from technical support. Beyond building and maintaining the virtual world, technical support provides a sort of security blanket for educators, especially those who are just beginning to use the technology in their course. The study participants expressed that they felt at ease knowing they had someone to rely on in case they had technical problems with the technology. In addition to these roles, technical support could serve as another channel to invite educators to consider and use a virtual world. As was mentioned earlier, VWM05 decided to use virtual-world technology in his course when technical support built his virtual learning environment with little involvement on the part of VWM05. The results were positive, as VWM05 used the technology. The use of the virtual world in his course was a benefit for both the educator and his students. If it had not been for technical support taking the initiative, VWM05 would not have been using the technology. If technical support takes a proactive stance similar to the one seen in VWM05, there would be opportunities to add to the number of users adopting virtual-world technology.

Peer support. One thing that I found fortunate as I conduct my study was being able to observe and compare the effects of a factor that was absent in one situation and present in another. I could make some comparisons between these situations. I have

noticed that some of the study participants were islands within their department or university when it comes to using virtual-world technology. They worked independently. I asked these educators if they had opportunities to discuss what they did in the virtual world with any of their colleagues, or if they had met other educators who used virtual-world technology in their colleges or universities to discuss ways of using the technology. They replied that they had met with one of their colleagues once or twice, but not on a regular basis. From this data, it appears that there may be not that many opportunities for expansion, in terms of exploring and considering different ways of using the technology, or for growth, in terms of exemplifying for their colleagues how the virtual-world technology could be used in an educational setting. Wenger (2006) mentioned that in a community of practice, people who share similar concerns and passions learn how to do things better as they interact regularly. From the point of view of university and department leaders, especially those who advocate the use of virtual-world technology, the problem of working alone is that when that educator moves on or retires, the number of users for virtual-world technology in that department or university diminishes.

In contrast, VWM08, together with VWF06, formed a group that meets on a weekly basis. One of the objectives was that of exploring ways to use virtual-world technology and discussing issues as they used virtual-world technology in their course. The group was not limited only to those currently using virtual-world technology in their respective courses. It was open to other educators who were considering using the technology and those who were just curious. VWM08 narrated that they had one educator who has been attending the meeting regularly. However, it took that educator a long time

before deciding to use virtual-world technology in his course. VWM08 was fine with this time frame and understood that everyone had their own process of deciding whether to use the technology or not. VWF06 mentioned that she had had numerous inquiries about the technology and that educators expressed their interests in using virtual-world technology in their courses. However, she complained that the number of people expressing such interest was spreading her thin and that the resources allocated to them were being stretched beyond expectations. From a certain perspective, this is a good problem for those advocating for technology's adoption in education.

Policy. University leaders should create a policy that include some form of stability for educators who are considering exploring virtual-world technology and create opportunities to explore the possibilities of cooperation, in whatever form, between other educational institutions. With regard to stability, there were two observations made in the course of the study that I thought were important. The first one was that most of the study participants expressed their fears that they might not get the support needed as their leader moved on to another position or retired. The second observation was when the institution decided not to support the technology. Although VWF09 had the means to support her use of the technology, other educators may not be as lucky. If educators are considering adopting a technology—an emerging technology, in this case—and see these events, what then is their incentive to try the technology being currently promoted, or the next technology? Educators may be willing to try the next technology if there are enough people using it. Here, the problem becomes evident. How can there be enough educators using a technology if educators are hesitant? One of the objectives in creating a policy is

to provide a period of development and growth for the emerging technologies, not only for virtual-world technology, but for others as well, that would be free from distractions. Educators would not have to worry about their institutions withdrawing support from that technology unexpectedly. Policymakers could create reasonable milestones to evaluate the development of technology and determine whether there are reasons to increase or decrease the allocations of resources.

Another aspect worth considering is formulating ways of forging cooperation between other universities, colleges, and schools wherein avatars from one school are able to visit the virtual facilities of other schools and even attend some of the courses conducted in the virtual world. In this way, higher education institutions can share resources and benefit from what each other has built. For example, one does not need to build another virtual Allegory of the Cave. Philosophy students can visit VWM05's Cave. The cooperation need not be limited to the United States. It can go beyond the borders. For example, imagine that VWM03, who teaches Spanish, coordinates with a university in Spain. Those students in Spain learning English can interact with his students. The idea here is that each participating institution creates its own virtual world. These institutions have to decide upon the technical standards and other crucial factors that would allow the avatars of students and educators to access one another's virtual world. These moves would help educational institutions reach a critical mass.

Reflections

Reflecting on my experience while conducting the study and analyzing the data, there are a few notes that are worth mentioning. First, from a micro perspective, the findings of this study underscored the crucial role educators have in the successful implementation of virtual world technology as a teaching tool. There have not been many research studies that focused on educators and how they deal with the barriers inherent in virtual worlds. Despite the contributions that the virtual-world technology can make in the education process, one should not forget that part of the technology-in-education equation involves educators. This study has shown the difficult, albeit manageable, process of learning how to use the technology. As mentioned earlier, educators were able to overcome the difficulty of learning the technology with technical and peer support. However, there are educators who are willing to use virtual worlds but chose not to because of technical issues. This is one of the issues that should not be ignored. It needs to be addressed in order for the development of virtual worlds in education to continue.

Second, it seems to me that educational institutions seek less to mold emerging technologies to the needs of students and teachers than to seek technologies that merely reinforce traditional instruction. Past technologies have demonstrated the contributions that they could make in education, yet most failed to gain traction in educational institutions. Certainly, educators faced challenging barriers to overcome before using the technology in education. Educators had to contend with the high learning curve of past technologies such as film, television, and computer (Cuban, 1986, Saettler, 1990). However, it seemed that rather than addressing these barriers to accommodate the

technology in the education process, education decides to look for the next emerging technology as the illusive magic bullet. This leads to my next point.

In education, emerging technologies go through a hype cycle. The cycle starts with a fanfare that the technology will revolutionize the way people learn. It ends with the technology falling short of its expectations. From there, education searches for the next technology and the cycle starts again (Saettler, 1990). This happened with film, television, and computers. Virtual-world technology is no exception; I was able to witness the technology's rise and fall with education. As of this writing, the attention is on massive open online courses (MOOCs). The hype has started for this technology. If history is our guide, this technology too will suffer a similar fate as virtual worlds and other past technologies unless something different is done. It has been more than a century and yet the cycle continues. The problem with this cycle is that educators are chasing an illusion of a perfect technology for education. It is also counterproductive. For one, new technologies seemed to emerge at a faster rate than in the past. Social media such as Facebook, Twitter, and Instagram emerged within the same decade. This is not counting mobile technology with the development of tablets and smartphones. How will educators keep in pace with the latest technologies? And how will they be able to integrate these technologies into their classes? Most of the technologies used in education, past and present, were not built and were not designed for education. They were most likely designed for entertainment and commerce. If ever, education should take the time and develop a technology or technologies that addressed the needs of educators and students alike rather than riding on the coat tails of other sectors.

Third, in a conducive environment, an individual learns with her teachers, peers, and through her course materials. Based on different research studies, virtual-world technology could be a platform for teaching and learning; or it could serve as an extension to that of the physical classroom. It is an environment where the laws of physics can be controlled and is only limited by the imagination of the user. An educator can build a virtual learning environment that will suit his learning objectives. I thought that these were enough reasons for education to use virtual worlds and educators to learn how to use the technology. However, at its current state, I do not think that virtual-world technology is ready for the majority of educators in higher education. Despite its progress, there are still some technical issues that need addressing. Primarily, developers of virtual-world technology should find ways to lower the learning curve to make it easier for some educators wishing to explore the technology. Rogers (1995) and Geoghegan (1994) mentioned that those educators in the early majority have different concerns than that of early adopters. The early majority focused more on the problems facing their courses. They are open to a technology only if this technology proved to be the solution to their problems. VWM05 exemplified this thought. Despite the benefits that VWM05 experienced using *Second Life* in his course, he still would not want to learn how to build a virtual object. I thought that this is understandable. In the physical world, it would be absurd to expect an educator to build a classroom or a lab from scratch. However, finding ways to lower the learning curve is not a guarantee that the early majority will decide to start using the technology, it would just make it easier for educators to learn how to use the technology.

I do believe that virtual worlds can still play a major role in the teaching and learning process in the long term, despite short-term challenges. I also think that educators and education institutions should invest in the technology by exerting greater influence in the development of virtual worlds. As mentioned earlier, research studies have shown consistently the benefits of using virtual worlds in an education setting. This study has shown that although educators had a difficult time using the technology initially, these educators become more comfortable with virtual worlds as they make more constant use of the technology. By being involved in its development, educators will be able to put in features that they think are important for them.

Educators can ask developers to create a virtual environment that contains virtual objects that are specific to the needs of their course. In this way, educators can set up their own virtual learning environment without having to build the virtual objects from scratch. VWM08 mentioned even though he built a virtual learning environment for his course, he did not like building virtual objects. He found it too complicated. He depended on pre-built virtual objects that came with the virtual world that he was using. However, these virtual pre-built are generic objects such as household furniture. VWF07 said that it was difficult building the virtual instrument for her physics lab. However, once she successfully built one, she can easily duplicate the object. She was thinking of selling a prepackaged physics lab, "a lab in a box." This is for other educators wishing to build their own labs. Rather than going through the process of building every instrument, they can buy the instruments from her. This is an equivalent of an educator going to a store to purchase these instruments. Then he would install these instruments in his physical

laboratory. One good thing about the virtual worlds is that he did not have to exert any physical effort in carrying these instruments to the lab.

As developers of virtual worlds become familiarized with the needs of educators, they can create pre-built behaviors that can be imposed on certain virtual objects or non-player characters (NPCs). These objects will be able to make an appropriate response. At this time, I have encountered NPCs that greets my avatar as he enters into the building. I have yet to meet an NPC where I can answer my questions. For example, VWM03 teaches Spanish to undergraduates and graduates students. Perhaps, in the future, he can tell his students to go to his virtual café. He will asked them to do certain tasks like ordering an espresso or a muffin in Spanish. His students will meet NPCs who happen to be waiters and baristas. As the students state their order in Spanish, the virtual servers will respond indicating whether the order was done correctly or needs further clarification. These are just some of the ways to lower the learning curve.

Another advantage of getting education involved in the development of virtual-world technology is challenging the educator to finding new and refreshing ways to present their course. Courses that are held in classrooms are designed to take advantage of whatever facilities or technology available to the teacher. If an educator was given an opportunity to use a 3D space wherein she can control its environment to augment her course, how will that course look like? VWM08 spoke of designing his course in a non-linear manner wherein a student can choose a particular point within his course and that student will progress from there. The student can choose whatever direction he finds interesting as he goes through the process of learning the course. I thought this would be

difficult to do. It may not be possible for some courses, but it is intriguing to see how this will be done and what the results will be. For educators, the challenge that the 3D space represents is to think beyond the tradition of presenting a course. It is an exercise of looking at a course from different perspectives.

In the future, virtual worlds will continue to develop. The technology will be different from that of the present. Soon, we will be able to access the technology through wearable devices (i.e., something similar to Google glasses) using tactile gloves and eye movements to control the avatar. It will no longer be through desktops. The differences between virtual reality and virtual worlds will disappear as these two similar technologies merge. At a certain point in the future, virtual worlds will become second nature in the manner that people use their smartphones. There will come a point where the technology will mature and be able to adequately address the needs of teachers and students based. However, in order for this to happen, educators must play a major role in its development.

Recommendations for Future Research

Four areas of research merit closer examination in future studies. The first is the quality of work from students as reported by some study participants. They mentioned that the students' works were more in depth and more profound in thought compared to the time when these educators were not using virtual-world technology. From a technological perspective, there is much to gain and little to lose in knowing whether virtual-world technology played a role in such a result. If future researchers found that

virtual-world technology had an insignificant role in affecting such a result, the technology would join other failed technology. We would move on to the next emerging technology. However, if the results were positive and significant, one can imagine the effect it would have on education.

Second, the roles and effects of avatars in virtual worlds need further examination. As mentioned in Chapter 4, one of the intriguing findings from the study was that the participants did not find avatars as important as the literature reviewed portrayed it to be. In fact, two of the educators thought that having the option to customize an avatar was more of a distraction than a benefit. One male educator used a woman avatar as he “entered” into class. He revealed that he did not get any reactions from his class. Perhaps there is a limit to the value of an avatar. I wonder where that would be and in what situation.

Third, while study participants identified positive effects of VW on student work, more needs to be done on how students perceive virtual-world technology. From the data, it seemed that use of a virtual world can be a distraction from learning if the VW is perceived fundamentally as a game. I refer to the student who enrolled in a course that was *World of Warcraft*. The educator observed that the student was unable to put the virtual world in a learning context. If this is the case, should educators limit themselves to using non-game virtual world?

Finally, a closer look is in order to study the culture of educators in higher education and their approach to adopting new technology. This is not limited to the virtual world, but applies to other technologies as well. The participants in this study

seemed to approach the new technology as “lone wolves.” While the principal of a middle or high school may mandate the adoption of new technology, perhaps reinforced by a state requirement, such mandates are less likely to produce broad adoption at the higher education level. More research is needed to understand how best to promote the adoption of new technologies in a way accommodates the unique cultures of the educational institutions.

Final Thoughts

Finally, I want to make two observations that move a bit beyond the data but which I believe are important to those working in the educational technology field. Both observations relate to how educators react to technology. There appear to be dueling factions of educators promoting the superiority of a particular technology in which they have invested time and effort. Sometimes they even disparage other technologies and share their criticisms with school officials to gain a certain advantage in protecting their own technology preference. I do understand where these educators are coming from; however, this is counter-productive for all involved. If teaching and learning are complicated processes where students learn in various ways, no single technology, electronic or otherwise, provides for learners’ needs. With that in mind, I believe we should promote a range of technologies, each serving part of this larger need, rather than promoting a zero-sum game with winners and losers.

On the opposite side of the coin are educators who resist new technologies. They say that their traditional way of teaching has been deemed by their institutions to be effective, so why should they feel the need to change. The metric of effective teaching,

though, should be the quality of student learning. If a new technology provides the possibility of deepening student understanding in ways that traditional teaching approaches cannot, then we ought to be doing more to match the learning goals to the right teaching methods and tools to maximize student understanding. We need to find ways to encourage educators to explore new technologies that will not replace traditional teaching but augment it. Moreover, for those concerned about the loss of the “personal touch” of face-to-face instruction, I would point out that a face-to-face lecture with 100 students hardly constitutes the personal touch. When used skillfully, VW technology can actually provide more opportunities for instructor-student interaction.

Advances in computer technology—larger memory, faster processors—are moving virtual worlds from the domain of the research lab to the arena of the classroom and, as a result, can carry learners out of the classroom into a myriad of virtual places to explore with fellow learners near and far. Further research and on-the-ground school experience will determine whether the promise of virtual worlds will be realized.

Appendices

Appendix A: Online Ad for Participants

Hello All,

My name is Jonathan Araullo. I am a doctoral candidate at the School of Ed in Boston University. My research is on the use of virtual world as an education tool for formal education; I am focusing on the process of using virtual world in an educational setting. I am looking for higher ed teachers who have been using virtual worlds (Second Life, World of Warcraft, Active World, etc) in their courses for more than a semester. I wish to interview these teachers as to the nature of their course, why choose such a technology, and what was the process and challenges they went through in using the technology in their courses.

I do hope you can help me on this research.

If you are one these teachers, please email me either in araulloj@yahoo.com or araulloj@bu.edu.

Also, any advise will be welcomed.

Thank you for reading this email.

J-Jay

Appendix B: Interview Guide

I. Introduction (to be read by the interviewer)

Thank you for participating in this study. This interview will take about 45 minutes to an hour to complete.

Before I continue, I'd like to verify if you have received and signed the consent form that I sent you via email.

Thank you.

The objective of this interview is to know about your experience regarding your use of the virtual world in your course; what made you decide to use the technology; how you went about integrating the technology into your course; and what is your personal assessment of the technology. The study hopes that through your participation and those of others, we will be able understand more about the perspectives of educators using virtual world technology in the classroom. This interview will be used for this study only. Your identity and participation will remain confidential.

Do you have any questions before we begin?

II. Educator Profile

- a. How long have you been teaching?
- b. Please describe the course you are currently teaching, particularly the one where you use virtual world?
 - i. How long have you been teaching this course?
 - ii. What are the learning objectives
- c. Is this course an online course?

- d. Do you teach an online course, a face-to-face course, or both?

III. Teaching and Technology

- a. What are your thoughts on the role of technology in education?
 - i. Based on Rogers' Diffusion of Innovation, he identified five types of users: innovators, early adopters, early majority, late majority, and laggards. Where do you identify yourself?
- b. Before using virtual world in your course, were there any technologies that you have used in the past as a teaching tool?
 - i. What were these technologies?
 - ii. What was the point of using these technologies in the classroom?
- c. Are you still using these technologies? Why or why not?
- d. In your school, did you initiate using technology in your course or did a colleague or maybe an IT personnel asked you to consider using a certain technology?
- e. Does your school encourage you to use technology in your course?
 - i. If so, in what way?
 - ii. If not, why is that?

IV. Thoughts on Virtual World Technology

- a. How did you discover virtual worlds?
 - i. Did someone introduce the technology to you or did you discover the technology yourself?

- ii. If someone introduced the technology to you, what was his/her professional relationship with you (e.g., conference presenter, colleague, etc.)?
- b. What were your initial impressions of the technology?
- c. What made you decide that you want to use this technology in your course?
 - i. What factors convinced you that you wanted to use the technology in the classroom
 - ii. What concerns did you have as you contemplated using virtual worlds in your course?
- d. As you decided to use the technology in your classroom, how do you see the role of this technology play in your course?

V. Planning & Designing

- a. Did you already know what virtual world to use?
 - i. What virtual world(s) did you choose?
 - ii. What factors were you looking for when choosing a virtual world(s)?
- b. How did you go about integrating virtual world in your course?
 - i. Did you consult anyone or ask anyone for help or did you do it yourself?
 - ii. Did you build your own environment or did you use what is there?
 - 1.If building your own, did you have any help?
 - 2.Was it easy or difficult? Degree of difficulty?

- c. I sent a file containing a list of barriers. The list is based on several research studies. I will ask you to look at it at different times during the interview. This is one of those times. Please look at the list now. As you design and plan to use virtual world in your course, which of the barriers apply only at this stage?
- d. What barrier on that list manifests the most at this stage? Why?
- e. What are the top three barriers when it comes to planning and designing?
- f. Are there any barriers that you experienced that are not on the list? If so, please elaborate. Remember only that concerns design and planning.
- g. Were there any problems during this stage that were unanticipated?
 - i. What were those?
- h. Was there a time when you had second thoughts about using this technology in the classroom? What was the situation?
- i. Did you revise or re-design your course when you decided to use VWT?
 - i. If yes, what changes did you have to make?
 - ii. If no, how was the course design already compatible to VWT?
- j. As you plan to integrate virtual world technology into your course, how will you assess whether the technology is useful or not
 - i. What areas will you be assessing?

VI. Implementation

- a. Please describe how you used virtual world technology for the first time in class.

- i. Were there any problem implementing the technology?
 - ii. What are these problems?
 1. How were these problems dealt?
 - iii. Were there any issues or problem that were overlooked or unanticipated as you start using the technology in your course?
 1. What were they?
 2. How did you deal with these issues?
- b. Please compare how you felt when you first used the technology in your classroom then and now?
- c. What was the general reaction of your students when you start using virtual world in your course?
 - i. Did you have to orient your students before using the technology?
 - ii. Did you have students who had difficulty using the technology?
 1. If so:
 - a. In what area(s), do these students have difficulty in?
 2. Why do some students find using the technology easy while others find it difficult?
 3. Do you get similar reactions every semester from students?
 - iii. As you start using virtual world technology in your course, what were the reactions of your peers?
- d. Please look again at the list of barriers. What barriers are on the list that you experienced during the implementation stage?

- i. What barrier gave you the most trouble?
 - ii. At this stage, name the top 3 barriers. Why?
- e. Are there any barriers that you experienced during the implementation stage that are not on the list? If so, please elaborate.
- f. Were there any surprise discoveries as you start using the technology?

VII. Assessment

- a. Having used virtual world technology for several semesters, what are the benefits of using the technology?
 - i. What added value(s) does this technology that (a) is unique to the technology and (b) is worth the cost?
- b. What are the challenges and limitations of using the virtual world in your course?
- c. Did you notice any differences between the time you use virtual world technology and the time when you did not use virtual world in your course, in terms of:
 - i. Student behavior:
 - 1. Performance
 - 2. Participation
 - ii. Your own performance
- d. Were your expectations met when you used the technology? Why or why not?

- e. Based on the indicators you laid out in determining the usefulness of the technology, were they met? How so?
- f. Overall, what are the strengths of the technology when using it as a teaching tool?
- g. Overall, what are the weaknesses, shortcomings, or limitations of the technology when using it as a teaching tool?
- h. Please look again at the list of barriers. Overall, please give me the top three barriers that plagued you the whole time from beginning to end?
 - i. Please elaborate.
- i. Are there any barriers that are not on the list but should be? What and why?
- j. As an educator, when using virtual world technology in your course, do you have to make certain adjustments?
 - i. How you conduct your class?
 - ii. In terms of teaching style?
 - iii. Class Preparation?
 - iv. Student assessment?
- k. What factors and support would have made implementing the technology easier?
- l. What factors and support do you think are needed in order for you to continue using the technology in your course?
- m. What improvements do you want to see in the technology? What doesn't it do that you'd like to see it do?

- n. If teachers approached you and wanted to adopt the technology into their courses, what advice can you give to them?

VIII. Others

- i. Is there anything you want to mention that was not asked, but you think is important?

Thank you again for participating in this study. Do you have any questions?

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Vita

Jonathan Araullo ([REDACTED])

Summary of Qualifications Knowledgeable in research design and instructional technology
Experienced in designing multimedia educational modules
Has extensive experience in digital media production
Has teaching experience both in online and classroom modes in higher education
Knowledgeable in established technologies and emerging technologies
Can work independently or collaborate with others

Academic *Boston University*, School of Education, MA
Edd, Educational Media and Technology, September 2013

Michigan State University, College of Communication, MI
MA, Telecommunication Management, 1999

Ateneo de Manila University, College of Communication, Quezon City, Philippines
BA, Communication Arts, 1992

Areas of Expertise	Instructional Technology	E-Learning
	Emerging Technology	Digital Media Production
	Web Design	Teacher Training

Career history *Office Of Distance Education, Boston University – Boston, MA*
MEDIA ASSISTANT May 2009 – Present

Assists instructional designers in updating online courses before these courses are launched for the coming semester, using Blackboard and Dreamweaver.

Metropolitan College, Boston University – Boston, MA
INSTRUCTOR May 2008 – Present

Teaches e-commerce graduate students the principles of web design, including the concept of usability and accessibility (where students evaluate websites and analyze them based on the qualities mentioned

above, after which they create their own.) Uses production software such as Photoshop and Flash.

Office Of Distance Education, Boston University – Boston, MA
ONLINE TEACHING ASSISTANT May 2011 – June 2013

Assisted instructor in teaching technology integration such as web 2.0 to graduate students. Helped in the evaluation of students' works. Facilitated discussions. Monitored students' progress.

School Of Education, Boston University – Boston, MA
INSTRUCTOR September 2006 – May 2011

Taught graduate students and educators digital video production such as producing and evaluating educational video modules. Provided hands-on training to shooting video and using non-linear editing software program.

School Of Education, Boston University – Boston, MA
TEACHING ASSISTANT September 2007 – December 2007

Assisted professor in managing the basic research course. Helped evaluate students' papers.

School Of Education, Boston University – Boston, MA
TEACHING ASSISTANT June 2007 – July 2007

Assisted students with the use of technology in class.

College Of Communication, Boston University – Boston, MA
TEACHING ASSISTANT May 2007 – June 2007

Assisted students with the use of production software in class such as Photoshop and Dreamweaver.

South East Asian Ministers Of Education Innovation And Technology – Manila, Philippines
CONSULTANT February 2005 – June 2005

Supervised video editors and graphics designers in post-production as part of creating multimedia educational modules for rural public schools in the Philippines, sponsored by Nokia.

*Eskwela Ng Bayan (School Of The People),
Office Of The President Of The Philippines – Manila, Philippines*
CONSULTANT
& EXECUTIVE PRODUCER August 2003 – February 2004

Collaborated with educators, school officials, government officials, producers, and writers in planning and designing multimedia educational modules for remote rural public schools in the Philippines. Supervised and helped create over 100 15-minute modules for four elementary-level subjects (Math, Science, English, and Filipino). Supervised writers, producers, graphics artists.

Key skills and competencies	Blackboard	Dreamweaver	Photoshop
	Flash	Final Cut Pro	Premiere
	Screenflow	Soundtrack Pro	PowerPoint
	Word	Excel	Acrobat
	HTML		

References Available upon request

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