STUDENT USERS' PERCEPTIONS OF SECOND LIFE AS AN EDUCATIONAL TOOL

A Thesis

by

CHRISTOPHER CARLTON SHEPPERD

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2012

Major Subject: Agricultural Leadership, Education, and Communications

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Chair of Committee,	Tracy Rutherford
Committee Members,	Theresa Murphrey
	R. Daniel Lineberger
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ABSTRACT

Student Users' Perceptions of Second Life as an Educational Tool. (May 2012)

Christopher Carlton Shepperd, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Tracy Rutherford

Second Life (SL) is gaining popularity in an educational context. Based on the need for educators to understand emerging technologies and their potential for use in the classroom, this study explored student users' perceptions of the use of SL in an educational setting. Students enrolled in a traditional classroom that had a SL component merged into the curriculum, were surveyed to determine their perceptions on the use of SL in education. A modified version of Li and Bernoff's (2008) Social Technographic® Ladder was used to classify students based on their use of technology. Findings indicated that while students did not perceive the value of the use of SL as it was used in the traditional classroom, they agreed on its potential for use in education, predominantly in a virtual classroom setting. Students agreed on the potential of SL for collaboration, simulations, team building, and interaction with peers, among other things. A key implication of this study is that educators need to utilize SL to move outside the walls of the classroom and offer opportunities not afforded in the traditional classroom setting, rather than simply replicating the traditional classroom in a virtual format.

DEDICATION

To my wife, Leisha, for her unending love, dedication, patience and support of me throughout my education.

ACKNOWLEDGEMENTS

First I would like to thank my wife. Your support and encouragement has meant the world to me. I could not have done this without you.

I would also like to thank my committee chair, Dr. Tracy Rutherford, for her continued inspiration, advice, support, and feedback throughout my entire journey. I am also grateful to my committee members, Dr. Dan Lineberger and Dr. Theresa Murphrey, for their feedback and patience.

I would also like to thank the department faculty and staff for their continued support of my education. It is an honor to be considered part of the ALEC family. I have grown exponentially during my time at Texas A&M University.

I would also like to thank Hayden Paul. Your friendship and encouragement has meant a great deal to me on this journey. Thank you for working late nights and encouraging me to move forward as the process dragged on.

Finally, thanks to my mother, father, mother in-law, father in-law, and the rest of my family for unending encouragement, patience, support, and love. I am forever indebted to you.

NOMENCLATURE

3D	Three-Dimensional
CMC	Computer Mediated Communication
IM	Instant Messaging
MMOG	Massively Multiplayer Online Games
MUVE	Multi-User Virtual Environment
SL	Second Life
STL	Social Technographics Profile
VW	Virtual World

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CHAPTER I

INTRODUCTION

In the past 25 years there has been an overwhelming emersion of Web-based technologies. With so many new technologies emerging, there has been a change in how people communicate, socialize, and educate. The large assortment of social networking and communication technologies include learning management systems, instant messaging services, blogs, podcasts, YouTube, Vimeo and Google video, Twitter, Facebook, and 3D Virtual Worlds. The growth and change in these new technologies paired with the way people interact with them is comparable to huge Internet initiatives during the past 15 years. Fetscherin and Lattemann (2007) noted that technologies on the Web "are undergoing an evolution comparable to that of the Internet in the mid 1990s and it has the potential of profoundly impacting the way people interact and conduct business" (p. 4). A 3D virtual world may provide a more conducive environment for teaching and learning that is hard to replicate in other non-interactive environments. Because of the popularity and current use of these environments, it is critical to determine what current student users perceptions are about using these virtual environments in an educational setting.

Technology Characteristics of College Students (Millennials)

Studies consistently describe millennials as having a “digital lifestyle”

This thesis follows the style of the *Journal of Agricultural Education*.

(McMahon & Pospisil, 2005; Bennett, Maton & Kervin, 2008). Technology is part of their work, study and social lives. As technology rapidly advances, millennials are on the forefront of knowledge and the understanding of its use. Millennials are described as living lives immersed in technology. They are surrounded by and consistently use computers, videogames, smart phones, and other tools of the digital age (Prensky, 2001). Bennett et al., (2008) stated that millennials are active experiential learners, proficient in multi-tasking, and dependent on technologies for accessing information. Millennials are also defined as having an information technology mindset (McMahon & Pospisil, 2005). Unlike previous generations that took a more individual approach to learning and education, millennials focus on social interaction and connectedness with teachers, family, and friends. Interaction between participants, when using distance education as an instructional tool, increases the level of student satisfaction (Irby, Wynn, & Strong, 2011; Richardson & Shaw, 2003). Li and Bernoff (2008) stated that the way people connect with each other and the communities created out of that connection are the building blocks for cohesion and collaboration. Oblinger described millennials (2003) as preferring teamwork, experiential activities, structure, and the use of technology. It is important for educators to be aware of the communication tools and styles used by students in order to adequately apply them into an educational setting (Jonas-Dwyer & Pospisil, 2004).

Virtual Classrooms

The traditional definition and understanding of a virtual classroom has been wrapped around a Computer Mediated Communication system (CMC). CMC's allow students to send and receive messages, interact with professors and classmates, take tests,

read lecture material, and more, without having to attend a scheduled class within the confines of the traditional classroom (Hiltz, 1993). CMC's created an environment where learning could take place from any location, at any time, both synchronously and asynchronously. This offered a structure to support collaborative learning while allowing for more equality of participation than a traditional face-to-face setting (Hiltz & Wellman, 1997). The virtual classroom functioned as a mechanism of communication and collaboration from person to person via a computer-based system. This type of virtual classroom is in contrast to a newer form of virtual environment offered through SL and other 3D virtual environments.

3D Classrooms

Three-dimensional virtual environments provide new and innovative ways for teaching and learning in an environment that can offer a simulated learning situation rather than replicate a traditional classroom. Greenidge and Daire (2005) argued that simulation and gaming technologies have been underutilized in education and practice. Although gaming and virtual environments are not new, online multiple user 3D virtual environments (MUVEs) are. Foreman (2003) forecasted, "advanced videogames appear to be a next generation educational technology waiting to take its place in academe" (p. 12). Leggette, Rutherford, Sudduth, & Murphrey, (2011) state that "the integration of virtual environments into the traditional classroom setting as well as distance education programs is one mechanism of encouraging immersion," (p. 1) among students. Virtual worlds are a place where people can co-inhabit with millions of other people simultaneously. Virtual worlds exist in real time and afford users the chance to communicate, cooperate and collaborate with each other (Fetscherin & Lattemann,

2007). These virtual environments create a fully altered reality where real life merges with virtual life.

Second Life

SL is one such 3D virtual environment. SL, developed by Linden Labs in 2003 (Linden Research, 2009), has seen use both recreationally and educationally (Kumar et al., 2008; Linden Research, 2009). Linden Labs describes SL as a "3D virtual world where people meet and socialize with friends, enjoy live music, play games, explore and create virtual environments, shop for virtual goods, and participate in the world's largest user-generated virtual goods economy" (Linden Research, 2011). SL offers options unlike what can be found in the traditional classroom. The SL website states their view on the educational use of SL (2011);

> "Second Life's persistent virtual environments enable students to work together synchronously and then return, individually or as a team. The learning space is always available, not just for geographically dispersed groups but even those who meet regularly in the physical world. This is particularly useful when students require more flexible schedules or need to work asynchronously on the same project. Second Life amplifies learning beyond capabilities afforded by teleconference calls and Web presentation tools--but it also creates opportunities for field trips inside virtual organs, machines and other environments that go far beyond the walls of traditional learning spaces. Training simulations are also incredibly powerful in Second Life because they simulate complex

> processes in the physical world and avatars can take on different roles to enhance learning (para. 3).

Benefits

Students have a high level of comfort with technology due to their consistent use of it throughout the day. A technology-enhanced classroom can increase student engagement as well as achievement (Carle, Jaffee, & Miller, 2008). Students are already using technology throughout the day to communicate and share information with their peers. Studies show that student engagement can increase simply by using similar tools within the context of learning (Dunleavy, Dede, & Mitchell, 2008). SL and other 3D virtual worlds offer the ability to conduct real-world simulations and imitate research (Leggett et al., in press), providing students an opportunity to engage in and participate in experiences potentially not afforded to them within the walls of the traditional classroom. Virtual worlds also offer diverse learning experiences that can provide activities in support of classroom curriculum (Annetta, Murray, Laird, Bohr, & Park, 2008). Another benefit of SL is that it fosters synchronous communication among students and social interaction while maintaining motivation for simultaneous learning (Alarifi, 2008; Zhang, 2007).

Limitations

As with any technology, SL has its limitations. Atkinson (2008) and Warburton (2009) noted that SL could have an initial overwhelming effect because of its advanced nature. As students face total immersion in a virtual world there can be a sense of unfamiliarity. Because of this, teachers must have a comprehensive understanding of 3D virtual worlds and the strategies required to utilize such technology (Dunleavy et al.,

2008). Barriers include technical difficulty, identity, culture, collaboration, time, economic, standards, and scaffolding persistence and social discovery (Warburton, 2009). Murphrey, Rutherford, Doerfert, Edgar, & Edgar (2011) discovered that while educators may see the increasing value of SL in education, that may not be the case for all students. They also noted that without special attention to how these technologies are employed in the learning environment, students may not be accepting.

Student Perceptions of the Classroom

Computer Anxiety

Howard, Murphy, and Thomas (1986) defined computer anxiety as "the fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer" (p. 630). Studies have consistently shown that there is an inverse correlation between users' experience, and thus their self-perceived comfort level with computer technology and their level of computer anxiety (Ray & Minch, 1990; Rosen & Maguire, 1990). Chua, Chen, and Wong (1999) suggested that instructors should encourage more exposure to technology and computer use among their students to help reduce potential for anxiety.

Distance Education

Distance education has received much attention in literature. A significant amount of literature suggests that distance education courses can be impersonal, superficial, misdirect, and that they disrupt the interactions between faculty and students and among peers that help foster a productive learning environment (Nisenbaum & Walker, 1998; Trinkle, 1999). On the contrary, other researchers suggest that the method of course delivery is rarely a determining factor for student satisfaction (Russell, 1999).

Literature also suggests that it is possible to develop community in distance learning environments (Rovai, 2001). Teaching and studying can be effective using distance education as traditional instruction when the methods and technologies used are appropriate to the tasks set forth in the curriculum and when there is student-to-student interaction (Moore & Thompson, 1990; Verdulin & Clark, 1991). This supports Clark's (1983) view that course effectiveness is not determined by the medium, but by how the medium is used. Rovai and Barnum (2003) found that students felt they could learn better through a traditional classroom setting because a traditional course could foster increased learning due to human energy, personality and the appeal of face-to-face interaction with faculty.

Virtual Classrooms

Virtual Classrooms have opened the door to a broadened view of how and where learning can take place. The ability for both synchronous and asynchronous learning to take place in one environment has allowed for the learning environment to be taken outside the walls of a traditional classroom. Dede (2003) believes that asynchronous communication allows for convenient participation, deeper reflection, and archiving insights, while emotional and social interactions rely on synchronous exchanges. Zemsky and Massy (2004) reported that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work.

3D Virtual Worlds

A study of literature concerning student's perceptions of the use of 3D virtual worlds in education reveals few results. However, Annetta et al., (2008) stated that

students are open to the use of MUVEs in the classroom because of the novelty involved and the comfort level of students with technology. Also, Cheal (2009) noted that students responded favorably when the active components of learning–exploring, communicating, and building–were incorporated into virtual classroom curriculum.

Traditional Classrooms

Literature suggests the traditional classroom has often held an edge over other virtual options because students perceive a stronger connection via face-to-face communication and interaction (Rovai & Barnum, 2003). Shea, Li, and Pickett (2006) state that there is a clear connection among students between perceived teaching presence of the professor and the students' sense of learning community. Chickering and Gamson (1987) stated that:

> "Learning is enhanced when it is more like a team effort than a solo race. Good learning…is collaborative and social, not competitive and isolated. Working with others increases involvement in learning. Sharing one's own ideas and responding to others' reactions improves thinking and deepens understanding." (para. 15).

Conceptual Framework

The conceptual framework for this study builds upon Rogers' (2003) Diffusion of Innovations. Rogers (2003) described an innovation as "an idea, practice, or object that is perceived as new by an individual" (p. 12). He also stated that the perceived newness of an idea or innovation determines an individual's reaction to it.

> "The potential advantage of a new idea impels an individual to exert effort to learn more about the innovation. Once such information-seeking

> activities reduce uncertainty about the innovation's expected consequences to a tolerable level, a decision concerning adoption or rejection can be made (Rogers, 2003, p. 14).

Rogers (2003) identified five categories of adopters: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. He points out that innovation is more likely to be accepted if the value of the material is clear to potential users. Rogers' technology diffusion model is based on slowly changing and slowly developing innovations that take place over time. With changes in technology happening almost daily a change in the technology diffusion model is required. Using a similar structure to Rogers (2003), Li and Bernoff (2008) introduce the Social Technographics® Ladder (STL) in the book *Groundswell: Winning in a world transformed by social technologies*. Li and Bernoff (2008) defined 'Groundswell' as: "A social trend in which people use technologies to get the things they need from each other, rather than from traditional institutions like corporations" (p. 9). With increased participation in Web 2.0 activities among technology users, Li & Bernoff (2008) created the STL to place people into one of six groups based on their interactions with technology: (1) Creators, (2) critics, (3) collectors, (4) joiners, (5) spectators, and (6) inactives. Figure 1 (Appendix D) shows Li and Bernoff's (2008) Social Technographics® Ladder.

Li and Bernoff (2008) noted that 'Social' refers to the person-to-person activities in the groundswell. 'Technographic' refers to technology behaviors. The STL was developed specifically for use in a business setting. No research was found tying STL to the educational use of social networks. While the STL does not incorporate virtual worlds, participation in online social networks such as SL can be identified within these

adopter categories. Modification of the STL with the inclusion of virtual world participation is illustrated in Figure 2 (Appendix E). This modified STL allows for the incorporation of virtual worlds to more accurately describe the use of and engagement with Web 3.0 technologies. When looking at the STL in relationship to SL, creators are users who own land in SL and/or build/create environments on personal land within SL. Critics are users who work collaboratively with owners of land to help develop content in SL. They might also interact with other users in sandbox environments for community building and development. Collectors are users who attend publicized events in SL, add landmarks to favorite locations within SL, add friends via request, and/or shop/purchase items in SL. Joiners are users who maintain their SL profile, wander around SL, interacting with elements within SL, and/or visit art exhibits/museums/cultural locations within SL. Spectators are individuals who use SL based on requirement and/or attend mandatory events within SL. Inactives do none of these activities. Users can be in more than one category simultaneously.

When evaluating technologies with the groundswell framework, Li and Bernoff (2008) ask the following five questions: (1) Does it enable people to connect with each other in new ways? (2) Is it effortless to sign up for? (3) Does it shift power from institutions to people? (4) Does the community generate enough content to sustain itself? (5) Is it an open platform that invites partnerships? They noted that technologies that can answer yes to each of these questions are most likely to catch traction.

SL can answer yes to many of the questions above. SL connects users in a virtual world both synchronously and asynchronously allowing for interaction in a variety of ways: Visually, audibly, and through text. SL maintains a simple registration process.

Users create a profile online, download the software, and are ready to enter SL. SL thrives on user collaboration and partnerships. Regarding the generation of content, in Q4 of 2010 more than 750,000 unique users spent over 105 million hours participating in SL activities while trading more that $150 million in Linden dollars – the SL currency (Linden Research, 2011). Using the questions identified by Li and Bernoff (2008), SL can be identified as a technology that will quickly gain traction among its users.

Purpose

The purpose of this study was to identify student users' perceptions of SL as an educational tool.

Objectives

The following objectives were used to guide this study:

1. Describe the technology characteristics of student SL users.
2. Describe how student users use SL before and after class participation.
3. Describe student's perceptions of SL after class participation.
4. Determine whether significant differences exist in student users' expectations of SL potential when compared to students' self-perceived comfort with new computer technology.
5. Determine whether significant relationships exist between students' perceived potential of Second Life in education and classroom setting.

Assumptions

The study was conducted under the following assumptions:

1. SL student users will report information factually and to the best of their ability.

2. SL student users have adequate technological capabilities to operate and function within SL.

Limitations

The following limitations were identified in this study.

1. A purposive, convenience sample was used because of the specific student population.
2. The results of this study are not generalizable.
3. The researcher did not control students' interaction with SL.

Methodology

The purpose of this section is to describe the methods and procedures used in developing and conducting this study.

Institutional Review Board

This study was presented to the Institutional Review Board (IRB), as required by Texas A&M University regulations, to ensure the rights and protection of human subjects as part of social science research. Permission was granted to complete the study. A copy of the approval, IRB protocol number 2010-0976, is presented in Appendix A.

Population

Frankel and Wallen (2009) stated that researchers can use personal judgment to select samples based on knowledge previously held about a population and the specific purpose of the research. A purposive, convenience sample of 146 (n=146) students enrolled in Communication and Popular Culture (COMM 340) constituted the population for this study. A purposive study utilizes people with the most relevant information.

This sample was chosen because students enrolled in this class were required to use SL in an educational setting throughout the tenure of the course. The researcher identified these students as users due to their continued exposure and interaction with SL in a controlled educational environment. This sample was composed of students from 22 different majors and from all classifications of baccalaureate education. The students in COMM 340 were introduced to SL early in the semester. Throughout the course of the class students were required to be in SL a total of six times. The scheduled interaction with SL was spread out evenly over the span of a full semester. Students were not fully immersed in the technology. As part of the course's designed interaction with SL, students were assigned the task of finding a cultural experience in SL that was not offered to them in their local environment, and to write a paper about their findings. Other activities included attending lectures and presentations in SL.

Accessible Population

The accessible population for this study was students enrolled in Communication and Popular Culture (COMM 340) in the 2011 spring semester at Texas A&M University.

Sampling

The sample of students used for this study was a self-selected convenience sample of students that attended class on March 4, 2011 (pre) and May 2, 2011 (post).

Research Design

To determine students' perceptions of the use of SL in education, a descriptive design was used in this study. Descriptive design allowed the researcher to use an instrument to gather information from a selected group of students (Ary, Jacobs,

Razavieh & Sorensen, 2006, p. 31). Quantitative data were collected through questionnaires. Questionnaires permitted the researcher to measure attitudes and perceptions of SL student users. Questionnaires were directly administered to students in COMM 340**.** Directly administered questionnaires provide a statistically higher response rate (Ary et al., 2006, p. 416). Students were incentivized to participate with the opportunity to win a $20 Best Buy gift card. A random student was selected upon completion of the questionnaire to receive the gift card.

Data Collection

Pre-course and post-course questionnaires were distributed to students enrolled in Communication and Popular Culture (COMM 340) to determine students' perceptions of the use of SL in education. The students had at least two prior instances of exposure to SL before receiving the pre-course questionnaire. The students had at least four additional instances of exposure to SL for class-related purposes before receiving the post-course questionnaire.

Instrumentation

The pre-course questionnaire (see Appendix B) consisted of four sections: demographics, technology adoption, normal use of technology, and use of SL. The first section of the questionnaire contained four questions to gather demographic information about the respondents. Questions concerning age, gender, and ethnicity were used to gain an understanding of the population. Items included fill in the blank and multiple-choice answers. The second section of the questionnaire contained four questions about participants' adoption of technology. Respondents were asked what types of technology they currently use/own, and questions regarding their personal computer and its

operating system. Items included multiple-choice and multiple answer choices. The third section of the questionnaire contained eight questions about participants' normal use of technology. Respondents were asked which social media channels they interact with and how often they interact on a weekly basis for both education and leisure. The respondents were also asked about their comfort level with new technology. This section contained fill-in-the-blank, and multiple-choice answers. The fourth section of the questionnaire contained 12 questions about respondents' use of SL. Questions included frequency of SL use, length of stay in SL for each stay, appearance of respondents' avatar, and general activities completed in SL. This section contained multiple-choice and scaled answers. Respondents answered the scaled question on a 5-point rating scale of 1.00-1.49 as "not at all important," 1.5-2.49 as "a little important," 2.5-3.49 as "somewhat important," 3.5-4.49 as "important," and 4.5-5.00 as "very important."

The post-course questionnaire (see Appendix C) consisted of five sections: normal use of technology, use of SL, impressions of SL after continued use, potential of SL in education, and the effectiveness of certain factors in both traditional and virtual classrooms. The first section of the questionnaire contained four questions about participants' normal use of technology. Respondents were asked which social media channels they interact with and how often they interact on a weekly basis for both education and leisure. The respondents were also asked about their comfort level with new technology. This section contained multiple-choice answers. The second section of the questionnaire contained 10 questions about respondents' use of SL. Questions included frequency of SL use, length of stay in SL for each stay, appearance of respondents' avatar, and general activities completed in SL. This section contained

multiple-choice and scaled answers. Respondents answered the scaled question on a 5-point rating scale of 1.00-1.49 as "not at all important," 1.5-2.49 as "a little important," 2.5-3.49 as "somewhat important," 3.5-4.49 as "important," and 4.5-5.00 as "very important." The third section of the questionnaire contained three questions regarding respondents' impressions of SL after multiple instances of exposure. Questions asked respondents to rate their experience with SL and asked about levels of association between certain factors and SL. This section contained scaled answers. Respondents answered the questions on either a 5- or 7-point rating scale. The fourth section of the questionnaire contained three questions regarding respondents' perceptions of the potential and future of SL in education. Questions asked respondents their perspective on universities using SL in education, their prediction for the future of SL, and their perceptions of the potential of SL in education in: role-playing, basic content concepts, distance learning programs, conducting training, professional development, team building, teaching full courses, artistic expression, simulation activities/scenario based training, and group work/collaboration/meetings. This section contained multiple-choice and scaled answers. Respondents answered the scaled questions on a 5-point rating scale. The fifth section of the questionnaire contained two questions regarding the effectiveness of certain factors in both traditional and virtual classrooms. Questions asked respondents how they would rate the access and effectiveness of the following in both traditional and virtual classrooms: use of multimedia, interaction with faculty, interaction with peers, facilitated learning, access to additional resources, collaboration. This section contained scaled answers. Respondents answered the scaled questions on a 5-point rating scale where 1 was "none" and 5 was "high."

Validity

Content validity of both instruments was evaluated by a panel of experts composed of members of the graduate faculty of Texas A&M University. Revisions to questions were made based on suggestions from the panel of experts prior to administration.

Reliability

Post hoc reliability analysis yielded Cronbach's Alpha score of .92. A pilot test was not feasible because there was no access to a comparable population.

Data Analysis

SPSS 20 was used for statistical analysis. Descriptive statistics (mean, standard deviation, independent sample *t*-tests) were used to analyze the quantitative data. ANOVA was used to compare the two scales of students' perceptions of the potential of SL and classroom setting type.

CHAPTER II

MILLENNIALS IN A VIRTUAL WORLD: STUDENT USE AND PERCEPTIONS OF SECOND LIFE IN EDUCATION

Introduction

In the past 25 years there has been an overwhelming emersion of web-based technologies. With so many new technologies emerging, there has been a change in how people communicate, socialize, and educate. The large assortment of social networking and communication technologies include learning management systems, instant messaging services, blogs, podcasts, YouTube, Vimeo and Google video, Twitter, Facebook, and 3D Virtual Worlds. The growth and change in these new technologies paired with the way people interact with them is comparable to huge Internet initiatives during the past 15 years. Fetscherin and Lattemann (2007) noted that technologies on the Web "are undergoing an evolution comparable to that of the Internet in the mid 1990s and it has the potential of profoundly impacting the way people interact and conduct business" (p. 4). A 3D virtual world may provide a more conducive environment for teaching and learning that is hard to replicate in other non-interactive environments. Because of the popularity and current use of these environments, it is critical to determine what current student users perceptions are about using these virtual environments in an educational setting.

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Limitations

As with any technology, SL has its limitations. Atkinson (2008) and Warburton (2009) noted that SL could have an initial overwhelming effect because of its advanced nature. As students face total immersion in a virtual world there can be a sense of unfamiliarity. Because of this, teachers must have a comprehensive understanding of 3D virtual worlds and the strategies required to utilize such technology (Dunleavy et al.,

2008). Barriers include technical difficulty, identity, culture, collaboration, time, economic, standards, and scaffolding persistence and social discovery (Warburton, 2009). Murphrey, Rutherford, Doerfert, Edgar, & Edgar (2011) discovered that while educators may see the increasing value of SL in education, that may not be the case for all students. They also noted that without special attention to how these technologies are employed in the learning environment, students may not be accepting.

Conceptual Framework

The conceptual framework for this study builds upon Rogers' (2003) Diffusion of Innovations. Rogers (2003) described an innovation as "an idea, practice, or object that is perceived as new by an individual" (p. 12). He also stated that the perceived newness of an idea or innovation determines an individual's reaction to it.

> "The potential advantage of a new idea impels an individual to exert effort to learn more about the innovation. Once such information-seeking activities reduce uncertainty about the innovation's expected consequences to a tolerable level, a decision concerning adoption or rejection can be made (Rogers, 2003, p. 14).

Rogers (2003) identified five categories of adopters: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. He points out that innovation is more likely to be accepted if the value of the material is clear to potential users. Rogers' technology diffusion model is based on slowly changing and slowly developing innovations that take place over time. With changes in technology happening almost daily a change in the technology diffusion model is required. Using a similar structure to Rogers (2003), Li and Bernoff (2008) introduced the Social

Technographics® Ladder (STL) in the book *Groundswell: Winning in a world transformed by social technologies*. Li and Bernoff (2008) defined 'Groundswell' as: "A social trend in which people use technologies to get the things they need from each other, rather than from traditional institutions like corporations" (p. 9). With increased participation in Web 2.0 activities among technology users Li & Bernoff (2008) created the STL to place people into one of six groups based on their activities: (1) creators, (2) critics, (3) collectors, (4) joiners, (5) spectators, and (6) inactives. Figure 1 (Appendix D) shows Li and Bernoff's (2008) Social Technographics® Ladder.

Li and Bernoff (2008) noted that 'Social' refers to the person-to-person activities in the groundswell. 'Technographic' refers to technology behaviors. Li and Bernoff (2008) developed the STL to categorize populations based on their use and interaction with social networks technologies for use in a business setting. No research was found tying STL to the educational use of social networks. While the STL does not incorporate virtual worlds, participation in online social networks such as SL can be identified within these adopter categories. Modification of the STL with the inclusion of virtual world participation is illustrated in Figure 2 (Appendix E).

This modified STL allows for the incorporation of virtual worlds to more accurately describe the use of and engagement with Web 3.0 technologies. When looking at the STL in relationship to SL, creators are users who own land in SL and/or build/create environments on personal land within SL. Critics are users who work collaboratively with owners of land to help develop content in SL. They might also interact with other users in sandbox environments for community building and development. Collectors are users who attend publicized events in SL, add landmarks to

favorite locations within SL, add friends via request, and/or shop/purchase items in SL. Joiners are users who maintain their SL profile, wander around SL, interacting with elements within SL, and/or visit art exhibits/museums/cultural locations within SL. Spectators are individuals who use SL based on requirement and/or attend mandatory events within SL. Inactives do none of these activities. Users can be in more than one category simultaneously.

When evaluating technologies with the groundswell framework, Li and Bernoff (2008) ask the following five questions: (1) Does it enable people to connect with each other in new ways? (2) Is it effortless to sign up for? (3) Does it shift power from institutions to people? (4) Does the community generate enough content to sustain itself? (5) Is it an open platform that invites partnerships? They noted that technologies that can answer yes to each of these questions are most likely to catch traction.

SL can answer yes to many of the questions above. SL connects users in a virtual world both synchronously and asynchronously allowing for interaction in a variety of ways: Visually, audibly, and through text. SL maintains a simple registration process. Users create a profile online, download the software, and are ready to enter SL. SL thrives on user collaboration and partnerships. Regarding the generation of content, in Q4 of 2010 more than 750,000 unique users spent over 105 million hours participating in SL activities while trading more that $150 million in Linden dollars – the SL currency (Linden Research, 2011). Using the questions identified by Li and Bernoff (2008), SL can be identified as a technology that will quickly gain traction among its users.

Purpose

The purpose of this study was to identify student users' perceptions of SL as an educational tool.

Objectives

The following objectives were used to guide this study:

1. Describe the technology characteristics of student SL users.
2. Describe how student users use SL before and after class participation.
3. Describe student's perceptions of SL after class participation.

Assumptions

The study was conducted under the following assumptions:

1. SL student users will report information factually and to the best of their ability.
2. SL student users have adequate technological capabilities to operate and function within SL.

Limitations

The following limitations were identified in this study.

1. A purposive, convenience sample was used because of the specific student population.
2. The results of this study are not generalizable.
3. The researcher did not control students' interaction with SL.

Methods

The population contained a purposive, convenience sample of 146 (n=146) students enrolled in Communication and Popular Culture (COMM 340). A purposive

study utilizes people with the most relevant information. This sample was chosen because students enrolled in this class were required to use SL in an educational setting throughout the tenure of the course. The researcher identified these students as users due to their continued exposure and interaction with SL in a controlled educational environment. This sample was composed of students from 22 different majors and from all classifications of baccalaureate education. The students in COMM 340 were introduced to SL early in the semester. Throughout the course of the class students were required to be in SL a total of six times. The scheduled interaction with SL was spread out evenly over the span of a full semester. Students were not fully immersed in the technology. As part of the course's designed interaction with SL, students were assigned the task of finding a cultural experience in SL that was not offered to them in their local environment, and to write a paper about their findings. Other activities included attending lectures and presentations in SL.

To determine students' perceptions of the use of SL in education, a descriptive design was used in this study. Descriptive design allowed the researcher to use an instrument to gather information from a selected group of students (Ary, Jacobs, Razavieh & Sorensen, 2006, p. 31). Quantitative data was collected through questionnaires. Questionnaires permitted the researcher to measure attitudes and perceptions of SL student users. Questionnaires were directly administered to students in COMM 340**.** Directly administered questionnaires provide a statistically high response rate (Ary et al., 2006, p. 416). Students were incentivized to participate with the opportunity to win a $20 Best Buy gift card. A random student was selected upon completion of the questionnaire to receive the gift card.

Pre-course and post-course questionnaires were distributed to students enrolled in Communication and Popular Culture (COMM 340) to determine students' perceptions of the use of SL in education. The students had at least two prior instances of exposure to SL before receiving the pre-course questionnaire. The students had at least four additional instances of exposure to SL for class-related purposes before receiving the post-course questionnaire.

SPSS was used for statistical analysis. Descriptive statistics (mean, standard deviation, independent sample *t*-tests) were used to analyze the quantitative data.

The pre-course questionnaire (see Appendix B) consisted of four sections: demographics, technology adoption, normal use of technology, and use of SL. The first section of the questionnaire contained four questions to gather demographic information about the respondents. The second section of the questionnaire contained four questions about participants' adoption of technology. The third section of the questionnaire contained eight questions about participants' normal use of technology. The fourth section of the questionnaire contained 12 questions about respondents' use of SL.

The post-course questionnaire (see Appendix C) consisted of five sections: normal use of technology, use of SL, impressions of SL after continued use, potential of SL in education, and the effectiveness of certain factors in both traditional and virtual classrooms. The first section of the questionnaire contained four questions about participants' normal use of technology. The second section of the questionnaire contained 10 questions about respondents' use of SL. The third section of the questionnaire contained three questions regarding respondents' impressions of SL after multiple instances of exposure. The fourth section of the questionnaire contained three

questions regarding respondents' perceptions of the potential and future of SL in education. The fifth section of the questionnaire contained two questions regarding the effectiveness of certain factors in both traditional and virtual classrooms.

Content validity of both instruments was evaluated by a panel of experts composed of members of the graduate faculty of Texas A&M University. Revisions to questions were made based on suggestions from the panel of experts prior to administration.

Post hoc reliability analysis yielded Cronbach's Alpha score of .92. A pilot test was not feasible because there was no access to a comparable population.

SPSS 20 was used for statistical analysis. Descriptive statistics (mean, standard deviation, independent sample *t*-tests) were used to analyze the quantitative data. ANOVA was used to compare the two scales of students' perceptions of the potential of SL and classroom setting type.

Results

Objective 1

The first objective attempted to describe the technology characteristics of student SL users. Table 1.1 shows the frequencies of the nine technology adoption and usage questions. 75% (n = 60) of the students classified themselves as an intermediate user of technology. 60.5% (n = 49) of the students described their comfort level of technology as comfortable. 75.3% (n = 61) of the students indicated they own/use a wireless home network. 72.8% (n = 59) of the students indicated they own/use a MP3 player. 70.4% (n = 57) of the students indicated they own/use a smart phone/PDA. 33.3% (n = 27) of the students use Mac OSX as their operating system when using SL. 31% (n = 25) of the

students use Windows 7 as their operating system when using SL. 30% (n = 24) of the students use Windows XP as their operating system when using SL. 70.9% (n = 56) of the students accessed SL while using a wireless network.

Table 1.1

Technology characteristics of student SL users (N = 81)

Technology Characteristics	Subgroups	n	%
# of Personal Computers	1	61	75.3
	2	17	21.0
	3	1	1.2
	More than 4	1	1.2
Operating System	Mac OSX	27	33.3
	Windows 7	25	31.0
	Windows Vista	24	30.0
	Windows XP	3	3.7
Internet Connection while using SL	Wireless Connection	56	70.9
	Direct high-speed LAN	12	15.2
	Direct high-speed DSL	10	12.7
	Dial-up	1	1.3
Own/Use following technology	Wireless Home Network	61	75.3
	MP3 Player	59	72.8
	Smart Phone/PDA	57	70.4
	Navigation System	33	40.7
	Digital Video Recorder	27	33.3
	iPad	6	7.4
	Portable Video Player	6	7.4
# of online courses taken	0	31	24.0
	1	16	12.4
	2	12	9.3
	3	11	8.5
	4	6	4.7
	5	3	2.3
	more than 5	1	0.8

Table 1.1 (continued)

Technology Characteristics	Subgroups	n	%
# hours spent per week on internet for leisure	6-10 hours	32	40.0
	1-5 hours	31	38.8
	more than 10 hours	17	21.3
User self classification of technology	Intermediate	60	75.0
	Novice	15	18.8
	Advanced	5	6.3
Comfort level with new computer technology	Comfortable	49	60.5
	Very Comfortable	22	27.2
	Not Comfortable	10	12.3
How long using SL	Less than a month	40	49.4
	1-6 months	38	46.9
	6 months-1year	2	2.5
	1-3 years	1	1.2

Objective 2

The second objective attempted to describe how student users used SL before and after class participation. Table 1.2 shows the means and the frequencies for the 10 questions about student SL use both before and after class participation. Prior to class participation, 70.4% (n = 57) of students reported they accessed SL less than once a week. 27.2% (n = 22) indicated they accessed SL about once a week. 74.1% (n = 60) indicated they stayed in SL between ten and thirty minutes. 73% (n = 59) indicated they did not interact with friends while in SL. 65.4% (n = 53) indicated they wandered around in SL when logged in. After class participation, 48.5% (n = 47) of students indicated they accessed SL less than once a week. 46.4% (n = 45) indicated they accessed SL about once a week. 78.9% (n = 77) indicated they stayed in SL between ten

and thirty minutes. 78.9% (n = 77) indicated they did not interact with their friends while in SL. 53.4% (n = 53) indicated they wandered around in SL when logged in.

Table 1.2
Describe how student users use SL before and after class participation

Student Users pre and post class		n	%	n	%
		Pre-test			Post-test
Logged in to SL in last 2 weeks					
	Less than once a week	57	70.4	47	48.5
	About once a week	22	27.2	45	46.4
	2-3 times a week	1	1.2	5	5.2
	Several times a week	1	1.2	0	0.0
How long do you stay in SL					
	Less than 10 minutes	0	0.0	5	5.2
	10-30 minutes	60	74.1	77	80.2
	30-60 minutes	18	22.2	13	13.5
	1-2 hours	3	3.7	0	0.0
	2-3 hours	0	0.0	1	1.0
Home location					
	Last place	44	54.3	64	65.3
	Aggieland	33	40.7	32	32.7
	Specific Destination	2	2.5	0	0.0
	Do not remember	2	2.5	2	2.0
Multiple avatars					
	No	80	98.8	97	99.0
	Yes	1	1.2	1	0.8

Table 1.2 (continued)

Student Users pre and post class		n	%	n	%
Avatar most used					
	Basic info	34	42.5	42	42.9
	Not edited	32	40.0	51	52.0
	SL identity	11	13.8	3	3.1
	Completely filled out	3	3.8	2	2.0
Importance of appearance					
	Not at all	43	53.1	56	57.1
	A little important	17	21.0	26	26.5
	Somewhat important	17	21.0	14	14.3
	Important	2	2.5	2	2.0
	Very Important	2	2.5	0	0.0
Overall appearance					
	Rarely change	56	69.0	69	70.4
	Resembles self	28	35.0	38	38.8
	Different than self	8	10.0	11	11.2
	Not human	2	2.5	2	2.0
	Opposite gender	1	1.2	1	1.0
	Changes	1	1.2	1	1.0
	Animal	0	0.0	1	1.0
Number of friends					
	0	62	77.0	78	79.6
	1-10	18	22.2	20	20.4
	11-30	1	1.2	0	0.0
How do you interact with friends					
	Do not use this feature	59	73.0	77	78.9
	Chat	14	17.3	9	9.2
	Instant messages	11	13.6	12	12.3
	Teleport	4	5.0	1	1.0
	Share Objects	1	1.2	1	1.0

Table 1.2 (continued)

Student Users pre and post class		n	%	n	%
General activities in SL					
	Presentations	58	72.0	74	75.2
	Wandering	53	65.4	53	53.4
	Teaching/Learning	40	49.4	44	44.5
	Dancing	11	13.6	14	14.5
	Meetings	7	9.0	7	7.2
	Meet new people	7	9.0	3	3.2
	Shopping	2	2.5	2	2.0
	Attend performances	1	1.2	2	2.0

Objective 3

The third objective attempted to describe students' perceptions for the potential of SL after class participation. Table 1.3 shows the percentages for the three questions of the potential for SL in education and its predicted future. In regards to the three questions about the potential of SL in education and its predicted future students had mixed responses. The students agreed that SL has potential in education for distance learning, (M = 3.97). They also agreed on the predicted future of SL (M = 3.53). The students disagreed that SL had potential in education for team building (M = 2.18); teaching courses (M = 2.41); role-playing (M = 2.49); and professional development (M = 2.49).

Table 1.3
Describe student's perceptions of SL potential (N = 98)

SL Potential		M[a]	SD
Feel about offering courses in SL	I feel…	2.72	1.23
Potential for SL in Education [a]	Distance Learning	3.97	1.11
	Basic Content Concepts	2.99	1.21
	Conducting Training	2.88	1.13
	Simulation/Scenario	2.87	1.16
	Artistic Expression	2.80	1.24
	Collaboration	2.70	1.29
	Professional Development	2.49	1.22
	Role-Playing	2.49	1.23
	Teaching Courses	2.41	1.40
	Team Building	2.18	1.24
Predicted future of SL [b]		3.53	1.28

Note: Multiple scales: [a] 1 = No Potential … 5 = High Potential; [b] 1 = It would diminish my overall learning experience, 2 = It would somewhat diminish my learning experience, 3 = Neutral, 4 = It would be somewhat valuable to my overall learning, 5 = It would be very valuable to my overall learning.

When comparing the effectiveness of the traditional classroom to the virtual classroom, the students agreed that the traditional classroom is effective for all six areas presented in this study: Interaction with peers, interaction with faculty, facilitated learning, collaboration, use of multi media, and access to additional resources. Table 1.4 shows the means and standard deviations of the six areas of effectiveness in both the traditional and virtual classroom. The students agreed that the virtual classroom was effective for the use of multi media (M = 3.79). The students disagreed that the virtual classroom was effective for interaction with peers, (M = 2.26) and collaboration (M = 2.45).

Table 1.4
Describe student's perceptions of SL effectiveness (N = 98)

Effectiveness in the Classroom [a]				
	Effectiveness in Traditional classroom		Effectiveness in Virtual classroom	
	M	SD	M	SD
Interaction with peers	3.95	1.13	2.26	1.10
Interaction with faculty	3.88	1.16	2.57	1.21
Facilitated learning	3.86	0.95	2.68	1.15
Collaboration	3.79	0.99	2.45	1.17
Use of multi media	3.76	0.96	3.79	1.24
Access to additional resources	3.71	1.00	2.81	1.16

Note: [a] Likert-type scale: 1 = None … 5 = High.

Conclusions and Implications

Today's students are described as "millennials" and a digital generation (McMahon & Pospisil, 2005; Bennett, Maton & Kervin, 2007) because of their extensive and continued use of technology in everyday life. The students who participated in this study indicated they are comfortable with technology and its use. Rogers (2003) states that there is compatibility for adoption when innovations align with previously adopted ideas. Li and Bernoff (2008) suggest that technology, one of the forces behind driving a groundswell, has changed the way people socially interact with each other. The students who participated in this study identified themselves as comfortable with new technology. They are comfortable with both the use of technology and the introduction of new technology. SL is not far removed from the types of technology that these students are already using on a daily basis. Based on Rogers (2003), these students will be open to SL because it closely aligns with other technologies they have already accepted and infused into their daily lives. Educators should encourage students to use technologies they are not currently using in an educational setting. Educators must be aware of how

students are interacting and learning on a daily basis and integrate those tools into education. Li and Bernoff (2008) noted that technologies that enable new relationships in new ways are more likely to catch on faster than technologies that don't.

The students who participated in this study indicated they were less interested in SL after class participation than they were before participation. This is consistent with literature that states students will show initial interest in technology in the classroom before the novelty wears off (Annetta et al., 2008). Students in COMM 340 demonstrated this by their decrease in varied activities while in SL. As the class progressed, students indicated they participated in less random activities and aligned closely only with the required activities for the class.

When using the STL to categorizing students who participated in this study, the researcher discovered that the STL did not account for forced participation. This group would include segments of a population that are forced to participate with a certain technology. This is understandable in the context that STL was developed. From a business marketing perspective users are not forced to interact with and participate in the use of technology. In the business context users willingly participate. However, in an educational setting it is often required that students use technologies which are unfamiliar to them. Often if the use of technology is not a requirement of the educational setting then the students will not willingly choose to participate. Forced participation in education can act as a desensitizing agent to participant and hinder further use (Noe, 1986). However it can also encourage students to go above the required level of participation (Takle, Sorensen, & Herzmann, 2003), and can help promote community (Shapiro, 2006). One thing is certain, there is not a general consensus on whether forced

participation is effective in education (Dyer & Osborn, 1995). As stated already in this study, the way SL is utilized in the classroom is critical for adoption and continued use. The students in COMM 340 were forced to regularly attend lectures and presentations in SL in addition to the traditional classroom meetings. They were also encouraged to do some basic exploring. But no other activities were required for the class. Educators need to consider the abilities and functionality of SL when designing courses. While studies show that integrating SL into the classroom can encourage immersion among students (Leggette et al., in press), it is imperative to recognize that teachers must have a comprehensive understanding of 3D virtual worlds and the strategies required to utilize such technology (Dunleavy et al., 2008). Curriculum utilizing SL that lacks an opportunity for students to collaborate, explore, and build is less likely to be accepted among students. Dunleavy, Dede, and Mitchell (2008) stated that virtual environments offer students an engaging "Alice in Wonderland" type experience. One of the main benefits of a virtual environment is that it opens the door for students to experience things otherwise unavailable in the traditional classroom setting. As Li and Bernoff (2008) state, "concentrate on the relationships, not the technologies" (p. 18). They go on to say that technologies are not the point. It is the use of technology intersecting with people to foster collaboration and build relationships that have sustained meaning and purpose. By limiting the use of SL to events that mirror traditional education settings, these students did not see the value of utilizing SL in their specific educational setting. Therefore, using SL simply to supplement the traditional classroom may not be the best use of the technology. For the students who participated in this study, their interaction with SL was based on forced participation. The students who participated in this study

do not accurately fit on the STL without further modification. The researcher proposes a rung be added to the modified STL between "Inactive" and "Spectator." This new rung would allow for classification based on forced participation. The addition of the "Forced Participants" category as well as further modifications to the STL is shown in Figure 3 (Appendix F).

There were a few participants in this study that had prior exposure to SL and would be classified as collectors. Limiting the use of SL to events and activities that can be completed within the walls of the traditional classroom hinders the creativity involved in how students interact with the technology. As this study shows, the result is a lack of varied and continued use. While the students reported an increase in their frequency of logging in to SL, this can be explained due to the increased requirements for the class. However, students reported a decrease in their varied activities while in SL. They also reported less interaction with their peers via chat and instant messaging while logged in to SL. Studies show that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work (Cheal, 2009; Zemsky & Massy, 2004). If properly utilized, education can take students to the critic level on the modified STL. As students begin to interact in SL and increase their awareness of its functions and capabilities, they will start climbing the ladder from spectator all the way up to critic. Critics categorically collaborate with other users. As SL is used for interaction, simulation, and collaboration, it increases its potential use in an educational setting. Some disciplines such as engineering, landscape design, urban planning, and architecture could potentially

catapult students into the creator category as they implement creation and design into their curriculum using SL as a platform for visual design and interaction.

Research should be done to broaden the scope of this study using a sample of students across multiple classes that are utilizing SL and if that correlates to the students' perceptions of SL in an education setting. Also, research should be done to more adequately identify members of each category on the Social Technographics® Ladder in reference to SL. Also looking at the addition of forced participation to the ladder.

CHAPTER III

DO STUDENTS' SELF-PERCEIVED COMFORT LEVELS WITH TECHNOLOGY AFFECT THEIR PERCEPTIONS OF POTENTIAL FOR SECOND LIFE IN EDUCATION?

Introduction

In the past 25 years there has been an overwhelming emersion of web-based technologies. With so many new technologies emerging, there has been a change in how people communicate, socialize, and educate. The large assortment of social networking and communication technologies include learning management systems, instant messaging services, blogs, podcasts, YouTube, Vimeo and Google video, Twitter, Facebook, and 3D Virtual Worlds. The growth and change in these new technologies paired with the way people interact with them is comparable to huge Internet initiatives during the past 15 years. Fetscherin and Lattemann (2007) noted that technologies on the Web "are undergoing an evolution comparable to that of the Internet in the mid 1990s and it has the potential of profoundly impacting the way people interact and conduct business" (p. 4). A 3D virtual world may provide a more conducive environment for teaching and learning that is hard to replicate in other non-interactive environments. Because of the popularity and current use of these environments, it is critical to determine what current student users perceptions are about using these virtual environments in an educational setting.

Student Perceptions of the Classroom

Computer Anxiety

Howard, Murphy, and Thomas (1986) defined computer anxiety as "the fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer" (p. 630). Studies have consistently shown that there is an inverse correlation between users' experience, and thus their self-perceived comfort level with computer technology and their level of computer anxiety (Ray & Minch, 1990; Rosen & Maguire, 1990). Chua, Chen, and Wong (1999) suggest that instructors should encourage more exposure to technology and computer use among their students to help reduce potential for anxiety.

Distance Education

Distance education has received much attention in literature. There is a significant amount of literature suggesting that distance education courses can be impersonal, superficial, misdirect, and that they disrupt the interactions between faculty and students and among peers that help foster a productive learning environment (Nisenbaum & Walker, 1998; Trinkle, 1999). On the contrary, other researchers suggest that the method of course delivery is rarely a determining factor for student satisfaction (Russell, 1999). Literature also suggests that it is possible to develop community in distance learning environments (Rovai, 2001). Teaching and studying can be effective using distance education as traditional instruction when the methods and technologies used are appropriate to the tasks set forth in the curriculum and when there is student-to-student interaction (Moore & Thompson, 1990; Verdulin & Clark, 1991). This supports

Clark's (1983) view that course effectiveness is not determined by the medium, but by how the medium is used. Rovai and Barnum (2003) found that students felt they could learn better through a traditional classroom setting because a traditional course could foster increased learning due to human energy, personality and the appeal of face-to-face interaction with faculty.

Virtual Classrooms

Virtual Classrooms have opened the door to a broadened view of how and where learning can take place. The ability for both synchronous and asynchronous learning to take place in one environment has allowed for the learning environment to be taken outside the walls of a traditional classroom. Dede (2003) believes that asynchronous communication allows for convenient participation, deeper reflection, and archiving insights, while emotional and social interactions rely on synchronous exchanges. Zemsky and Massy (2004) reported that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work.

3D Virtual Worlds

A study of literature concerning student's perceptions of the use of 3D virtual worlds in education reveals few results. However, Annetta et al., (2008) stated that students are open to the use of MUVEs in the classroom because of the novelty involved and the comfort level of students with technology. Also, Cheal (2009) noted that students responded favorably when the active components of learning–exploring, communicating, and building–were incorporated into virtual classroom curriculum.

Traditional Classrooms

Literature suggests the traditional classroom has often held an edge over other virtual options because students perceive a stronger connection via face-to-face communication and interaction (Rovai & Barnum, 2003). Shea, Li, and Pickett (2006) state that there is a clear connection among students between perceived teaching presence of the professor and the students' sense of learning community. Chickering and Gamson (1987) stated that:

> "Learning is enhanced when it is more like a team effort than a solo race. Good learning…is collaborative and social, not competitive and isolated. Working with others increases involvement in learning. Sharing one's own ideas and responding to others' reactions improves thinking and deepens understanding." (para. 15).

Conceptual Framework

The conceptual framework for this study builds upon Rogers' (2003) Diffusion of Innovations. Rogers (2003) described an innovation as "an idea, practice, or object that is perceived as new by an individual" (p. 12). He also stated that the perceived newness of an idea or innovation determines an individual's reaction to it.

> "The potential advantage of a new idea impels an individual to exert effort to learn more about the innovation. Once such information-seeking activities reduce uncertainty about the innovation's expected consequences to a tolerable level, a decision concerning adoption or rejection can be made (Rogers, 2003, p. 14).

Rogers (2003) identified five categories of adopters: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. He points out that innovation is more likely to be accepted if the value of the material is clear to potential users. Rogers' technology diffusion model is based on slowly changing and slowly developing innovations that take place over time. With changes in technology happening almost daily a change in the technology diffusion model is required. Using a similar structure to Rogers (2003), Li and Bernoff (2008) introduce the Social Technographics® Ladder (STL) in the book *Groundswell: Winning in a world transformed by social technologies*. Li and Bernoff (2008) defined 'Groundswell' as: "A social trend in which people use technologies to get the things they need from each other, rather than from traditional institutions like corporations" (p. 9). With increased participation in Web 2.0 activities among technology users Li & Bernoff (2008) created the STL to place people into one of six groups based on their activities: (1) Creators, (2) critics, (3) collectors, (4) joiners, (5) spectators, and (6) inactives. Figure 1 (Appendix D) shows Li and Bernoff's (2008) Social Technographics® Ladder.

Li and Bernoff (2008) noted that 'Social' refers to the person-to-person activities in the groundswell. 'Technographic' refers to technology behaviors. Li and Bernoff (2008) developed the STL to categorize populations based on their use and interaction with social networks technologies for use in a business setting. No research was found tying STL to the educational use of social networks. While the STL does not incorporate virtual worlds, participation in online social networks such as SL can be identified within these adopter categories. Modification of the STL with the inclusion of virtual world participation is illustrated in Figure 2 (Appendix E).

This modified STL allows for the incorporation of virtual worlds to more accurately describe the use of and engagement with Web 3.0 technologies. When looking at the STL in relationship to SL, creators are users who own land in SL and/or build/create environments on personal land within SL. Critics are users who work collaboratively with owners of land to help develop content in SL. They might also interact with other users in sandbox environments for community building and development. Collectors are users who attend publicized events in SL, add landmarks to favorite locations within SL, add friends via request, and/or shop/purchase items in SL. Joiners are users who maintain their SL profile, wander around SL, interacting with elements within SL, and/or visit art exhibits/museums/cultural locations within SL. Spectators are individuals who use SL based on requirement and/or attend mandatory events within SL. Inactives do none of these activities. Users can be in more than one category simultaneously.

When evaluating technologies with the groundswell framework, Li and Bernoff (2008) ask the following five questions: (1) Does it enable people to connect with each other in new ways? (2) Is it effortless to sign up for? (3) Does it shift power from institutions to people? (4) Does the community generate enough content to sustain itself? (5) Is it an open platform that invites partnerships? They noted that technologies that can answer yes to each of these questions are most likely to catch traction.

SL can answer yes to many of the questions above. SL connects users in a virtual world both synchronously and asynchronously allowing for interaction in a variety of ways: Visually, audibly, and through text. SL maintains a simple registration process. Users create a profile online, download the software, and are ready to enter SL. SL

thrives on user collaboration and partnerships. Regarding the generation of content, in Q4 of 2010 more than 750,000 unique users spent over 105 million hours participating in SL activities while trading more that $150 million in Linden dollars – the SL currency (Linden Research, 2011). Using the questions identified by Li and Bernoff (2008), SL can be identified as a technology that will quickly gain traction among its users.

Purpose

The purpose of this study was to identify student users' perceptions of SL as an educational tool.

Objectives

The following objectives were used to guide this study:

1. Determine whether significant differences exist in student users' expectations of SL potential when compared to students' self-perceived comfort with new computer technology.
2. Determine whether significant relationships exist between students' perceived potential of Second Life in education and classroom setting.

Methods

The population contained a purposive, convenience sample of 146 (n=146) students enrolled in Communication and Popular Culture (COMM 340). A purposive study utilizes people with the most relevant information. This sample was chosen because students enrolled in this class were required to use SL in an educational setting throughout the tenure of the course. The researcher identified these students as users due to their continued exposure and interaction with SL in a controlled educational environment. This sample was composed of students from 22 different majors and from

all classifications of baccalaureate education. The students in COMM 340 were introduced to SL early in the semester. Throughout the course of the class students were required to be in SL a total of six times. The scheduled interaction with SL was spread out evenly over the span of a full semester. Students were not fully immersed in the technology. As part of the course's designed interaction with SL, students were assigned the task of finding a cultural experience in SL that was not offered to them in their local environment, and to write a paper about their findings. Other activities included attending lectures and presentations in SL.

To determine students' perceptions of the use of SL in education, a descriptive design was used in this study. Descriptive design allowed the researcher to use an instrument to gather information from a selected group of students (Ary, Jacobs, Razavieh & Sorensen, 2006, p. 31). Quantitative data were collected through questionnaires. Questionnaires permitted the researcher to measure attitudes and perceptions of SL student users. Questionnaires were directly administered to students in COMM 340**.** Directly administered questionnaires provide a statistically high response rate (Ary et al., 2006, p. 416). Students were incentivized to participate with the opportunity to win a $20 Best Buy gift card. A random student was selected upon completion of the questionnaire to receive the gift card.

Pre-course and post-course questionnaires were distributed to students enrolled in Communication and Popular Culture (COMM 340) to determine students' perceptions of the use of SL in education. The students had at least two prior instances of exposure to SL before receiving the pre-course questionnaire. The students had at least four

additional instances of exposure to SL for class-related purposes before receiving the post-course questionnaire.

SPSS was used for statistical analysis. Descriptive statistics (mean, standard deviation, independent sample *t*-tests) were used to analyze the quantitative data.

The pre-course questionnaire (see Appendix B) consisted of four sections: demographics, technology adoption, normal use of technology, and use of SL. The first section of the questionnaire contained four questions to gather demographic information about the respondents. The second section of the questionnaire contained four questions about participants' adoption of technology. The third section of the questionnaire contained eight questions about participants' normal use of technology. The fourth section of the questionnaire contained 12 questions about respondents' use of SL.

The post-course questionnaire (see Appendix C) consisted of five sections: normal use of technology, use of SL, impressions of SL after continued use, potential of SL in education, and the effectiveness of certain factors in both traditional and virtual classrooms. The first section of the questionnaire contained four questions about participants' normal use of technology. The second section of the questionnaire contained 10 questions about respondents' use of SL. The third section of the questionnaire contained three questions regarding respondents' impressions of SL after multiple instances of exposure. The fourth section of the questionnaire contained three questions regarding respondents' perceptions of the potential and future of SL in education. The fifth section of the questionnaire contained two questions regarding the effectiveness of certain factors in both traditional and virtual classrooms.

Content validity of both instruments was evaluated by a panel of experts composed of members of the graduate faculty of Texas A&M University. Revisions to questions were made based on suggestions from the panel of experts prior to administration.

Post hoc reliability analysis yielded Cronbach's Alpha score of .92. A pilot test was not feasible because there was no access to a comparable population.

SPSS 20 was used for statistical analysis. Descriptive statistics (mean, standard deviation, independent sample *t*-tests) were used to analyze the quantitative data. ANOVA was used to compare the two scales of students' perceptions of the potential of SL and classroom setting type.

Results

Objective 1

The first objective attempted to determine whether significant differences exist in student users' expectations of SL potential when compared by students' self-perceived comfort with new computer technology. Table 2.1 shows the correlation between the student's self-perceived comfort level with new computer technology and their expectations of the potential for the use of SL in education regarding certain factors presented to them in this study. No significant relationship existed between students' self-perceived comfort level with new computer technology and any of the factors of SL potential presented in this study. Those factors included: Role-playing, basic content concepts, distance learning programs, conducting training, professional development, team building, teaching full courses, artistic expression, simulation activities/scenario based training, and group work/collaboration/meetings.

Table 2.1
Differences in expectations of SL and comfort with technology (N = 98)

Second Life in Education[a]	Comfort[b]	N	M	SD	F	Sig.
Role-playing					.391	.677
	Very comfortable	24	2.67	1.52		
	Comfortable	64	2.45	1.17		
	Not comfortable	10	2.30	0.82		
	Total	98	2.49	1.23		
Basic content concepts					.342	.712
	Very comfortable	24	2.83	1.17		
	Comfortable	64	3.06	1.26		
	Not comfortable	10	2.90	0.99		
	Total	98	2.99	1.21		
Distance Learning programs					.311	.733
	Very comfortable	24	4.13	1.15		
	Comfortable	64	3.92	1.06		
	Not comfortable	10	3.90	1.37		
	Total	98	3.97	1.11		

Table 2.1 (continued)

Second Life in Education[a]	Comfort[b]	N	M	SD	F	Sig.
Conducting training					.632	.534
	Very comfortable	24	2.96	1.40		
	Comfortable	64	2.91	1.03		
	Not comfortable	10	2.50	1.08		
	Total	98	2.88	1.13		
Professional development					.759	.471
	Very comfortable	24	2.67	1.49		
	Comfortable	64	2.48	1.14		
	Not comfortable	10	2.10	0.99		
	Total	98	2.49	1.22		
Team building					.602	.550
	Very comfortable	24	2.42	1.50		
	Comfortable	64	2.13	1.13		
	Not comfortable	10	2.00	1.25		
	Total	98	2.18	1.24		
Teaching full courses					1.057	.351
	Very comfortable	24	2.46	1.59		
	Comfortable	64	2.48	1.31		
	Not comfortable	10	1.80	1.48		
	Total	98	2.41	1.40		

Table 2.1 (continued)

Second Life in Education[a]	Comfort[b]	N	M	SD	F	Sig.
Artistic expression					.594	.554
	Very comfortable	24	2.67	1.43		
	Comfortable	64	2.89	1.20		
	Not comfortable	10	2.50	1.08		
	Total	98	2.80	1.24		
Simulation activities/scenario based training					.719	.490
	Very comfortable	24	2.79	1.32		
	Comfortable	64	2.95	1.09		
	Not comfortable	10	2.50	1.27		
	Total	98	2.87	1.16		
Group work/ collaboration/meetings					.245	.783
	Very comfortable	24	2.83	1.55		
	Comfortable	64	2.69	1.14		
	Not comfortable	10	2.50	1.65		
	Total	98	2.70	1.29		

Note. [a] Likert-type scale: 1 = No Potential … 5 = High potential.

Objective 2

The second objective attempted to determine whether significant relationships exist between students' perceived potential of Second Life in education and classroom setting. Table 2.2 shows the correlation between students' perceived potential of Second Life in education and classroom setting for both the traditional and the virtual classroom. The correlation coefficient value ranges between -1.00 (a perfect negative relationship)

and +1.00 (a perfect positive relationship). The strength of correlation was measured using Davis' (1971) measures of association. Davis described association as follows: .70 to 1.00 (Very Strong), .50 to .69 (Substantial), .30 to .49 (Moderate), .10 to .29 (Low), and .01 to .09 (Negligible). A low level of correlation was found in three categories in the traditional classroom. Significant correlation was primarily found with the virtual classroom. Substantial correlation was found in the virtual classroom between professional development/interaction with faculty (.52), professional development/interaction with peers (.51), professional development/facilitated learning (.50), professional development/collaboration (.55), team building/facilitated learning (.54), team building/collaboration (.51), teaching full courses/interaction with faculty (.50), teaching full courses/facilitated learning (.54), teaching full courses/collaboration (.53), group work/interaction with peers (.51), and group work/collaboration (.59). Moderate correlation was found in the virtual classroom between role-playing/interaction with faculty (.41), role-playing/interaction with peers (.45), role-playing/facilitated learning (.35), role-playing/access to additional resources (.32), role-playing/collaboration (.42), basic content concepts/interaction with faculty (.37), basic content concepts/interaction with peers (.45), basic content concepts/facilitated learning (.47), basic content concepts/access to additional resources (.31), basic content concepts/collaboration (.44), distance learning programs/use of multi media (.43), distance learning programs/interaction with faculty (.33), distance learning programs/facilitated learning (.34), distance learning programs/access to additional resources (.35), distance learning programs/collaboration (.39), conducting training/use of multi media (.30), conducting training/interaction with faculty (.41), conducting

training/interaction with peers (.42), conducting training/facilitated learning (.39), conducting training/access to additional resources (.34), conducting training/collaboration (.38), professional development/access to additional resources (.40), team building/interaction with faculty (.47), team building/interaction with peers (.42), team building/access to additional resources (.38), teaching full courses/interaction with peers (.49), teaching full courses/access to additional resources (.43), artistic expression/interaction with faculty (.30), artistic expression/interaction with peers (.30), artistic expression/facilitated learning (.32), scenario based training/use of multi media (.37), scenario based training/interaction with faculty (.34), scenario based training/interaction with peers (.34), scenario based training/facilitated learning (.34), scenario based training/access to additional resources (.30), group work/interaction with faculty (.47), and group work/facilitated learning (.47).

Table 2.2

Relationships between Perceived Potential of SL and Classroom Setting (N = 98)

	Traditional Classroom[a]						Virtual Classroom[a]					
Second Life in Education[b]	Use of multi media	Interacti on with faculty	Interacti on with peers	Facilitat ed learning	Access to additional resources	Colla borat ion	Use of multi media	Interaction with faculty	Interacti on with peers	Facilitat ed learning	Access to additional resources	Colla borat ion
Role-playing	0.12	-0.04	-0.07	-0.09	-0.06	0.02	0.19	0.41*	0.45*	0.35*	0.32*	0.42*
Basic content concepts	0.16	0.07	-0.04	-0.06	0.01	-0.04	0.26*	0.37*	0.45*	0.47*	0.31*	0.44*
Distance Learning programs	0.16	0.21*	0.15	0.09	0.09	0.13	0.43*	0.33*	0.29*	0.34*	0.35*	0.39*
Conducting training	0.00	0.04	-0.08	-0.07	-0.09	-0.09	0.30*	0.41*	0.42*	0.39*	0.34*	0.38*
Professional development	0.13	0.04	-0.03	-0.02	-0.04	0.01	0.21*	0.52*	0.51*	0.50*	0.40*	0.55*
Team building	0.05	-0.03	-0.14	-0.07	0.02	0.05	0.17	0.47*	0.42*	0.54*	0.38*	0.51*

Table 2.2 (continued)

	Traditional Classroom[a]						Virtual Classroom[a]					
Second Life in Education[b]	Use of multi media	Interacti on with faculty	Interacti on with peers	Facilitat ed learning	Access to additional resources	Colla borat ion	Use of multi media	Interacti on with faculty	Interacti on with peers	Facilitat ed learning	Access to additional resources	Colla borat ion
Teaching full courses	0.19	0.09	-0.01	0.08	0.11	0.10	0.21*	0.50*	0.49*	0.54*	0.43*	0.53*
Artistic expression	0.29*	0.17	0.15	0.06	0.18	0.28*	0.22*	0.30*	0.30*	0.32*	0.22*	0.31*
Simulation activities / scenario based training	0.14	0.19	0.16	0.13	0.14	0.26*	0.37*	0.40*	0.34*	0.34*	0.30*	0.29*
Group work / collaboration / meetings	0.23*	0.04	-0.07	0.04	0.05	0.01	0.15	0.47*	0.51*	0.47*	0.51*	0.59*

Note. Multiple scales: [a] 1= Not Effective … 5 = Very Effective; [b] 1 = No Potential … 5 = High potential.

*. Correlation is significant at the 0.05 level (2-tailed).

Conclusions and Implications

SL and other virtual worlds have the potential to open up students to all kinds of possibilities both in the classroom and beyond. Potential exists to allow students to move outside the walls of a traditional classroom and have tangible experiences that foster education and learning. While a learning curve potentially exists when new computer technologies are introduced, students who participated in this study did not indicate that their self-perceived comfort level with new computer technology had any effect on their perceived potential for the use of SL in education. These findings do not support the idea that there is an inverse relationship between users comfort with technology and their level of computer anxiety (Howard, Murphy, & Thomas, 1986; Ray & Minch, 1990; Rosen & Maguire, 1990). These findings were however consistent with literature that states students have been shown to prefer technological experiences in learning (McMahon and Pospisil, 2005; Bennett, Maton and Kervin, 2008).

The students who participated in this study agreed that SL has potential in education. But they did not indicate that SL was effective in the manner it was used for COMM 340. Inserting SL into a traditional classroom setting without intentionality and specific purpose benefits no one.

While the students who participated in this study indicated that there was no significant relationship between their perceived potential for SL in education and its use in the traditional classroom, there was a significant correlation between students perceived potential for SL in education and its use in the virtual classroom. If the way SL is utilized in the classroom is changed, results may be different. Based on the

response of the students enrolled in COMM 340 SL has more perceived potential for the virtual classroom. Activities like team-building, professional development, role-playing, collaboration, and teaching full courses had significant levels of correlation with students' perceived potential for SL in a virtual classroom. This is consistent with literature that suggests that students respond favorably when the active components of learning–exploring, communicating, and building–are incorporated into virtual classroom curriculum (Cheal, 2009), and that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work (Zemsky & Massy, 2004). Educators need to consider the abilities and functionality of SL when designing courses. While studies show that integrating SL into the classroom can encourage immersion among students (Leggette et al., in press), it is imperative to recognize that teachers must have a comprehensive understanding of 3D virtual worlds and the strategies required to utilize such technology (Dunleavy et al., 2008). Curriculum utilizing SL that lacks an opportunity for students to collaborate, explore, and build is less likely to be accepted among students. Dunleavy, Dede, and Mitchell (2008) stated that virtual environments offer students an engaging "Alice in Wonderland" type experience. One of the main benefits of a virtual environment is that it opens the door for students to experience things otherwise unavailable in the traditional classroom setting. As Li and Bernoff (2008) state, "concentrate on the relationships, not the technologies" (p. 18). They go on to say that technologies are not the point. It is the use of technology intersecting with people to foster collaboration and build relationships that have sustained meaning and purpose. By limiting the use of SL to events that mirror traditional education settings,

these students did not see the value of utilizing SL in their specific educational setting. Therefore, using SL simply to supplement the traditional classroom may not be the best use of the technology.

Consequently, more research should be conducted to determine if there is a correlation between students' self-perceived comfort level with new computer technology and their efficiency of using new technologies for learning. Research should also be done to compare the use of SL in a traditional classroom with the use of SL in a virtual classroom and measure students perceptions of its continued potential in education.

CHAPTER IV

CONCLUSIONS AND IMPLICATIONS

Today's students are described as "millennials" and a digital generation (McMahon & Pospisil, 2005; Bennett, Maton & Kervin, 2007) because of their extensive and continued use of technology in everyday life. The students who participated in this study indicated they are comfortable with technology and its use. Rogers (2003) states that there is compatibility for adoption when innovations align with previously adopted ideas. Li and Bernoff (2008) suggest that technology, one of the forces behind driving a groundswell, has changed the way people socially interact with each other. The students who participated in this study identified themselves as comfortable with new technology. They are comfortable with both the use of technology and the introduction of new technology. SL is not far removed from the types of technology that these students are already using on a daily basis. Based on Rogers (2003), these students will be open to SL because it closely aligns with other technologies they have already accepted and infused into their daily lives. Educators should encourage students to use technologies they are not currently using in an educational setting. Educators must be aware of how students are interacting and learning on a daily basis and integrate those tools into education. Li and Bernoff (2008) noted that technologies that enable new relationships in new ways are more likely to catch on faster than technologies that don't.

The students who participated in this study indicated they were less interested in SL after class participation than they were before participation. This is consistent with literature that states students will show initial interest in technology in the classroom

before the novelty wears off (Annetta et al., 2008). Students in COMM 340 demonstrated this by their decrease in varied activities while in SL. As the class progressed, students indicated they participated in less random activities and aligned closely only with the required activities for the class.

When using the STL to categorizing students who participated in this study, the researcher discovered that the STL did not account for forced participation. This group would include segments of a population that are forced to participate with a certain technology. This is understandable in the context that STL was developed. From a business marketing perspective users are not forced to interact with and participate in the use of technology. In the business context users willingly participate. However, in an educational setting it is often required that students use technologies which are unfamiliar to them. Often if the use of technology is not a requirement of the educational setting then the students will not willingly choose to participate. Forced participation in education can act as a desensitizing agent to participants and hinder further use (Noe, 1986). However it can also encourage students to go above the required level of participation (Takle, Sorensen, & Herzmann, 2003), and can help promote community (Shapiro, 2006). One thing is certain, there is not a general consensus on if forced participation is effective in education (Dyer & Osborn, 1995). As stated already in this study, the way SL is utilized in the classroom is critical for adoption and continued use. The students in COMM 340 were forced to regularly attend lectures and presentations in SL in addition to the traditional classroom meetings. They were also encouraged to do some basic exploring. But no other activities were required for the class. Educators need to consider the abilities and functionality of SL when

designing courses. While studies show that integrating SL into the classroom can encourage immersion among students (Leggette et al., in press), it is imperative to recognize that teachers must have a comprehensive understanding of 3D virtual worlds and the strategies required to utilize such technology (Dunleavy et al., 2008). Curriculum utilizing SL that lacks an opportunity for students to collaborate, explore, and build is less likely to be accepted among students. Dunleavy, Dede, and Mitchell (2008) stated that virtual environments offer students an engaging "Alice in Wonderland" type experience. One of the main benefits of a virtual environment is that it opens the door for students to experience things otherwise unavailable in the traditional classroom setting. As Li and Bernoff (2008) state, "concentrate on the relationships, not the technologies" (p. 18). They go on to say that technologies are not the point. It is the use of technology intersecting with people to foster collaboration and build relationships that have sustained meaning and purpose. By limiting the use of SL to events that mirror traditional education settings, these students did not see the value of utilizing SL in their specific educational setting. Therefore, using SL simply to supplement the traditional classroom may not be the best use of the technology. For the students who participated in this study, their interaction with SL was based on forced participation. The students who participated in this study do not accurately fit on the STL without further modification. The researcher proposes a rung be added to the modified STL between "Inactive" and "Spectator." This new rung would allow for classification based on forced participation. The addition of the "Forced Participants" category as well as further modifications to the STL are shown in Figure 3 (Appendix F).

There were a few participants in this study that had prior exposure to SL and would be classified as collectors. Limiting the use of SL to events and activities that can be completed within the walls of the traditional classroom hinders the creativity involved in how students interact with the technology. As this study shows, the result is a lack of varied and continued use. While the students reported an increase in their frequency of logging in to SL, this can be explained due to the increased requirements for the class. However, students reported a decrease in their varied activities while in SL. They also reported less interaction with their peers via chat and instant messaging while logged in to SL. Studies show that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work (Cheal, 2009; Zemsky & Massy, 2004). If properly utilized, education can take students to the critic level on the modified STL. As students begin to interact in SL and increase their awareness of its functions and capabilities, they will start climbing the ladder from spectator all the way up to critic. Critics categorically collaborate with other users. As SL is used for interaction, simulation, and collaboration, it increases its potential use in an educational setting. Some disciplines such as engineering, landscape design, urban planning, and architecture could potentially catapult students into the creator category as they implement creation and design into their curriculum using SL as a platform for visual design and interaction.

SL and other virtual worlds have the potential to open up students to all kinds of possibilities both in the classroom and beyond. Potential exists to allow students to move outside the walls of a traditional classroom and have tangible experiences that foster education and learning. While a learning curve potentially exists when new

computer technologies are introduced, students who participated in this study did not indicate that their self-perceived comfort level with new computer technology had any effect on their perceived potential for the use of SL in education. These findings do not support the idea that there is an inverse relationship between users comfort with technology and their level of computer anxiety (Howard, Murphy, & Thomas, 1986; Ray & Minch, 1990; Rosen & Maguire, 1990). These findings were however consistent with literature that states students have been shown to prefer technological experiences in learning (McMahon and Pospisil, 2005; Bennett, Maton and Kervin, 2008).

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While the students who participated in this study indicated that there was no significant relationship between their perceived potential for SL in education and its use in the traditional classroom, there was a significant correlation between students perceived potential for SL in education and its use in the virtual classroom. If the way SL is utilized in the classroom is changed, results may be different. Based on the response of the students enrolled in COMM 340 SL has more perceived potential for the virtual classroom. Activities like team-building, professional development, role-playing, collaboration, and teaching full courses had significant levels of correlation with students' perceived potential for SL in a virtual classroom. This is consistent with literature that suggests that students respond favorably when the active components of learning–exploring, communicating, and building–are incorporated into virtual

classroom curriculum (Cheal, 2009), and that students desire the use of technology in learning for three reasons: to be connected to each other, to be entertained, and to allow a vehicle to present themselves and their work (Zemsky & Massy, 2004).

Research should be done to broaden the scope of this study using a sample of students across multiple classes that are utilizing SL and look at how SL is used in each class and if that correlates to the students' perceptions of SL in an education setting. Also, research should be done to more adequately identify members of each category on the Social Technographics® Ladder. Also looking at the addition of forced participation to the ladder. Furthermore, researchers should compare students in a traditional classroom using SL with students in a virtual classroom setting using SL and look at how the experience differs for students from each setting. Consequently, more research should be conducted to determine if there is a correlation between students' self-perceived comfort level with new computer technology and their efficiency of using new technologies for learning. Research should also be done to compare the use of SL in a traditional classroom with the use of SL in a virtual classroom and measure students perceptions of its continued potential in education. In addition, research should be done to compare the use of SL across multiple platforms. Researchers should seek to determine if there is a difference in perceived learning outcomes when SL is used for education versus simulation/training.

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APPENDIX A

Institutional Review Board

12/20/11 U

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

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Human Subjects Protection Program — Institutional Review Board

DATE: 21-Dec-2010

MEMORANDUM

TO: SHEPPERD, CHRISTOPHER
77843-3578

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number: 2010-0976

Title: Recreational Student Users' Perceptions of Second Life Usage

Review Category: Exempt from IRB Review

It has been determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX B

Pre-Course Questionnaire

Student Users' Perceptions of Second Life as an Educational Tool

*Instructions: Please remember that all information provided will remain confidential. Complete each question as accurately as possible by **circling your answer**. We appreciate your participation.*

Avatar Name:

- First _____
- Last _____

Gender:

- Male
- Female

Age Range:

- <18
- 18-21
- 22-25
- 26-30
- 31-39
- >40

Ethnicity:

- White only
- Black only
- Multiracial (including Black)
- Hispanic or Latino
- Asian only
- Native Hawaii only
- American Indian only
- International
- Multiracial (excluding Black)
- I prefer not to answer

How many personal computers do you own?

- 0
- 1
- 2
- 3
- 4
- More than 4

What is the operating system on the computer you use the most for Second Life?

- Windows XP
- Windows Vista
- Windows 7
- Mac OSX
- Other (Linux, Ubuntu, Windows 2000, etc.)

When using Second Life, what is your Internet connection speed?

- Dial-up
- Satellite Broadband
- Wireless Connection
- Direct line high-speed LAN (Local Area Network)
- Direct line high-speed home cable/DSL

I use/own the following types of technology devices (circle all that apply):

- Wireless home network
- MP3 Player
- Internet capable mobile smart phone/PDA (e.g. iPhone, Blackberry, Evo, etc.)
- Digital Video Recorder (e.g. TiVo, DVR)
- GPS Navigation System
- Portable video player
- iPad

How many online courses have you taken?

- _____

On average how many hours per week do you spend on the following activities for ***education***?

- Second Life 0 never 1-3 4- 6 7-9 10-12 more than 12
- Facebook 0 never 1-3 4- 6 7-9 10-12 more than 12
- Twitter 0 never 1-3 4- 6 7-9 10-12 more than 12
- YouTube 0 never 1-3 4- 6 7-9 10-12 more than 12
- Flickr (or other photo-sharing sites) 0 never 1-3 4- 6 7-9 10-12 more than 12
- MySpace 0 never 1-3 4- 6 7-9 10-12 more than 12
- World of Warcraft 0 never 1-3 4- 6 7-9 10-12 more than 12
- Other Virtual Worlds 0 never 1-3 4- 6 7-9 10-12 more than 12
- E-learning 0 never 1-3 4- 6 7-9 10-12 more than 12

Describe how you spend your **<u>educational time</u>** on the computer:

_____

_____

On average how many hours per week do you spend on the following activities for ***leisure?***

- Second Life 0 never 1-3 4- 6 7-9 10-12 more than 12
- Facebook 0 never 1-3 4- 6 7-9 10-12 more than 12
- Twitter 0 never 1-3 4- 6 7-9 10-12 more than 12
- YouTube 0 never 1-3 4- 6 7-9 10-12 more than 12
- Flickr (or other photo-sharing sites) 0 never 1-3 4- 6 7-9 10-12 more than 12
- MySpace 0 never 1-3 4- 6 7-9 10-12 more than 12
- World of Warcraft 0 never 1-3 4- 6 7-9 10-12 more than 12
- Other Virtual Worlds 0 never 1-3 4- 6 7-9 10-12 more than 12
- E-learning 0 never 1-3 4- 6 7-9 10-12 more than 12

How many hours do you spend using the Internet for leisure each week?

- Less than 1 hour
- 1 hour – 5 hours
- 6 hours – 10 hours
- More than 10 hours

Describe how you spend your **<u>leisure time</u>** on the computer:

_____

_____

How would you classify yourself as a user of computer technology?

- Non-user
- Novice
- Intermediate
- Advanced

How comfortable are you with using a new computer technology?

- Very comfortable
- Comfortable
- Not Comfortable

How long have you been using Second Life?

- Less than a month
- 1~6 months
- 6 months~1 year
- 1~3 years
- Longer than 3 years

On average, how frequently have you logged into Second Life in the last two weeks?

- Not at all
- Less than once a week
- About once a week
- 2 or 3 times a week
- Several times a week
- About once a day
- Several times a day

On average, how long do you stay in Second Life each time you log in?

- <10 minutes
- 10~30 minutes
- 30~60 minutes
- 1~2 hours
- 2~3 hours
- 3~5 hours
- >5 hours

What percentage of your time in Second Life is done….

• At school/work	0-25%	26-50%	51-75%	76-100%
• At home	0-25%	26-50%	51-75%	76-100%
• At public access locations (library etc.)	0-25%	26-50%	51-75%	76-100%

When you enter Second Life, where do you typically start (where is your "home" location)?

- My own land
- The last place I was at
- Land my organization owns
- Aggieland
- A specific destination (e.g. provided a SLURL in e-mail or from a web site)
- I do not remember

Do you have multiple avatars?

- Yes
- No

For the avatar account you use the most, your Second Life profile is:

- Completely filled out and updated
- Includes only information about your Second Life identity (no First Life information)
- Includes only basic information
- Not edited / did not know there was one

One a scale of 1 to 5, how important is it that your avatar reflect your real life appearance?

- 1 – Not at all important
- 2 – A little important
- 3 – Somewhat important
- 4 – Important

- 5 – Very important

In terms of your avatar's overall appearance: (Circle all that apply)

- I have designed my avatar to resemble myself
- I have designed my avatar to be rather different from myself
- I am/sometimes appear as an animal
- I am/sometimes appear as the opposite gender
- I am/sometimes appear as something not human (e.g. robot, cartoon, object)
- I regularly change my appearance (I have multiple outfits/representations)
- I rarely or never change it

How many friends/contacts does your primary avatar have (estimated)?

- 0
- 1-10
- 11-30
- 31-50
- 51-100
- More than 100

In what ways do you interact with your friends/contacts? (Circle all that apply)

- I do not use or pay attention to these features
- I send instant messages when I see they are logged in
- I offer them teleports to join me in different locations
- I share objects from my inventory with them
- Chat/Voice/Talk

What kinds of general activities have you done in Second Life? (Circle all that apply)

- Random wandering
- Listening to presentations and talks
- Meeting new people
- Participating in meetings
- Building things
- Shopping
- Attending music/art performances
- Owning and working on my own property
- Dancing
- Teaching/Learning
- Selling things I created

APPENDIX C

Post-Course Questionnaire

Student Users' Perceptions of Second Life as an Educational Tool

*Instructions: Please remember that all information provided will remain confidential. Complete each question as accurately as possible by **circling your answer**. We appreciate your participation.*

Avatar Name: First _____ Last_____

On average how many hours per week do you spend on the following activities for ***education***?

- Second Life 0 never 1-3 4- 6 7-9 10-12 more than 12
- Facebook 0 never 1-3 4- 6 7-9 10-12 more than 12
- Twitter 0 never 1-3 4- 6 7-9 10-12 more than 12
- YouTube 0 never 1-3 4- 6 7-9 10-12 more than 12
- Flickr (or other photo-sharing sites) 0 never 1-3 4- 6 7-9 10-12 more than 12
- MySpace 0 never 1-3 4- 6 7-9 10-12 more than 12
- World of Warcraft 0 never 1-3 4- 6 7-9 10-12 more than 12
- Other Virtual Worlds 0 never 1-3 4- 6 7-9 10-12 more than 12
- E-learning 0 never 1-3 4- 6 7-9 10-12 more than 12

On average how many hours per week do you spend on the following activities for ***leisure?***

- Second Life 0 never 1-3 4- 6 7-9 10-12 more than 12
- Facebook 0 never 1-3 4- 6 7-9 10-12 more than 12
- Twitter 0 never 1-3 4- 6 7-9 10-12 more than 12
- YouTube 0 never 1-3 4- 6 7-9 10-12 more than 12
- Flickr (or other photo-sharing sites) 0 never 1-3 4- 6 7-9 10-12 more than 12
- MySpace 0 never 1-3 4- 6 7-9 10-12 more than 12
- World of Warcraft 0 never 1-3 4- 6 7-9 10-12 more than 12
- Other Virtual Worlds 0 never 1-3 4- 6 7-9 10-12 more than 12
- E-learning 0 never 1-3 4- 6 7-9 10-12 more than 12

How would you classify yourself as a user of computer technology?

- Non-user
- Novice
- Intermediate
- Advanced

How comfortable are you with using a new computer technology?

- Very comfortable
- Comfortable
- Not Comfortable

On average, how frequently have you logged into Second Life in the last two weeks?

- Not at all
- Less than once a week
- About once a week
- 2 or 3 times a week
- Several times a week
- About once a day
- Several times a day

On average, how long do you stay in Second Life each time you log in?

- <10 minutes

- 10~30 minutes
- 30~60 minutes
- 1~2 hours
- 2~3 hours
- 3~5 hours
- >5 hours

When you enter Second Life, where do you typically start (where is your "home" location)?

- My own land
- The last place I was at
- Land my organization owns
- Aggieland
- A specific destination (e.g. provided a SLURL in e-mail or from a web site)
- I do not remember

Do you have multiple avatars?

- Yes
- No

For the avatar account you use the most, your Second Life profile is:

- Completely filled out and updated
- Includes only information about your Second Life identity (no First Life information)
- Includes only basic information
- Not edited / did not know there was one

One a scale of 1 to 5, how important is it that your avatar reflect your real life appearance?

- 1 – Not at all important
- 2 – A little important
- 3 – Somewhat important
- 4 – Important
- 5 – Very important

In terms of your avatar's overall appearance: (Circle all that apply)

- I have designed my avatar to resemble myself
- I have designed my avatar to be rather different from myself
- I am/sometimes appear as an animal
- I am/sometimes appear as the opposite gender
- I am/sometimes appear as something not human (e.g. robot, cartoon, object)
- I regularly change my appearance (I have multiple outfits/representations)
- I rarely or never change it

How many friends/contacts does your primary avatar have (estimated)?

- 0
- 1-10
- 11-30
- 31-50
- 51-100
- More than 100

In what ways do you interact with your friends/contacts? (Circle all that apply)

- I do not use or pay attention to these features
- I send instant messages when I see they are logged in
- I offer them teleports to join me in different locations

- I share objects from my inventory with them
- Chat/Voice/Talk

What kinds of general activities have you done in Second Life? (Circle all that apply)

- Random wandering
- Listening to presentations and talks
- Meeting new people
- Participating in meetings
- Building things
- Shopping
- Attending music/art performances
- Owning and working on my own property
- Dancing
- Teaching/Learning
- Selling things I created

How strongly do you associate the following characteristics with Second Life? (Please answer using a 1-5 scale where (1) is "No Association" and (5) is "High Association."

• Engaging	1	2	3	4	5
• Interactive	1	2	3	4	5
• Easy to Use	1	2	3	4	5
• Realistic	1	2	3	4	5
• Social	1	2	3	4	5
• Global	1	2	3	4	5

Please rate your experience with Second Life on the following attributes. Choose one rating for each using a 1-5 scale where (1) is "Poor" and (5) is "Excellent."

• Ease of creating account	1	2	3	4	5
• Learning how to navigate	1	2	3	4	5
• Learning how to communicate	1	2	3	4	5
• Creating/modifying my avatar	1	2	3	4	5
• Meeting other people	1	2	3	4	5
• Using rich media (audio, video)	1	2	3	4	5

Please refer to your experience of using Second Life over the last month, and indicate how much you agree with the following descriptions. (1- Strongly disagree, 2 – Disagree, 3 – Somewhat disagree, 4 – Neutral, 5 – Somewhat agree, 6 – Agree, 7 – Strongly agree)

• When I was in Second Life, I felt totally immersed in what I was doing	1	2	3	4	5	6	7
• When I was in Second Life, I got distracted by other attentions easily	1	2	3	4	5	6	7
• Using Second life has become automatic to me	1	2	3	4	5	6	7
• Using Second Life is natural to me	1	2	3	4	5	6	7
• I use Second Life as a matter of habit	1	2	3	4	5	6	7

How do you feel about Universities offering courses/activities in Second Life? (Please answer on a scale of 1-5. 1 – It would diminish my overall learning experience, 2 – It would somewhat diminish my learning experience, 3 – Neutral, 4 – It would be somewhat valuable to my overall learning, 5 – It would be very valuable to my overall learning)

• I feel….	1	2	3	4	5

What potential do you see for Second Life in education? (Please rate 1-5 where (1) is "no potential" and (5) is "high potential.")

- Role-playing 1 2 3 4 5
- Basic content concepts 1 2 3 4 5
- Distance Learning programs 1 2 3 4 5
- Conducting training 1 2 3 4 5
- Professional development 1 2 3 4 5
- Team building 1 2 3 4 5
- Teaching full courses 1 2 3 4 5
- Artistic expression 1 2 3 4 5
- Simulation activities/scenario based training 1 2 3 4 5
- Group work/collaboration/meetings 1 2 3 4 5

What is your prediction for the future of Second Life?

- It is the future of the web
- It offers great potential now, but will not be around in five years
- It will achieve some great applications but will never go mainstream
- It is mostly hype and will implode any day now
- Not sure

How would you rate the access and effectiveness of the following in the TRADITIONAL classroom? (Rate from 1-5 with (1) being "none and (5) being "high.")

- Use of multi media 1 2 3 4 5
- Interaction with faculty 1 2 3 4 5
- Interaction with peers 1 2 3 4 5
- Facilitated learning 1 2 3 4 5
- Access to additional resources 1 2 3 4 5
- Collaboration 1 2 3 4 5

How would you rate the access and effectiveness of the following in the VIRTUAL classroom? (Rate from 1-5 with (1) being "none and (5) being "high.")

- Use of multi media 1 2 3 4 5
- Interaction with faculty 1 2 3 4 5
- Interaction with peers 1 2 3 4 5
- Facilitated learning 1 2 3 4 5
- Access to additional resources 1 2 3 4 5
- Collaboration 1 2 3 4 5

APPENDIX D

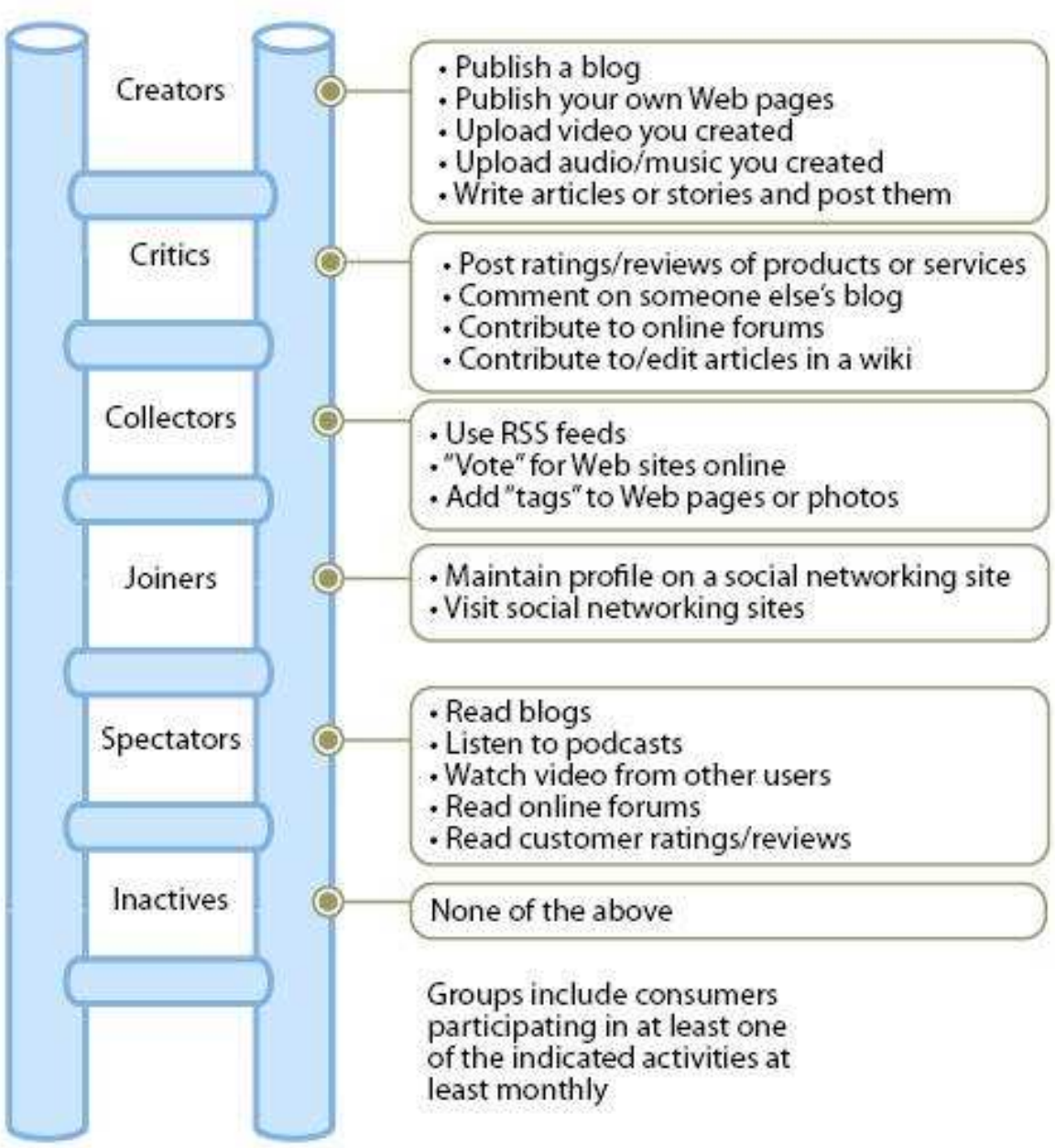

Figure 1. Social Technographics® Ladder categorizing users based on their participation with social networks. Adapted from C. Li, and J. Bernoff, 2008.

APPENDIX E

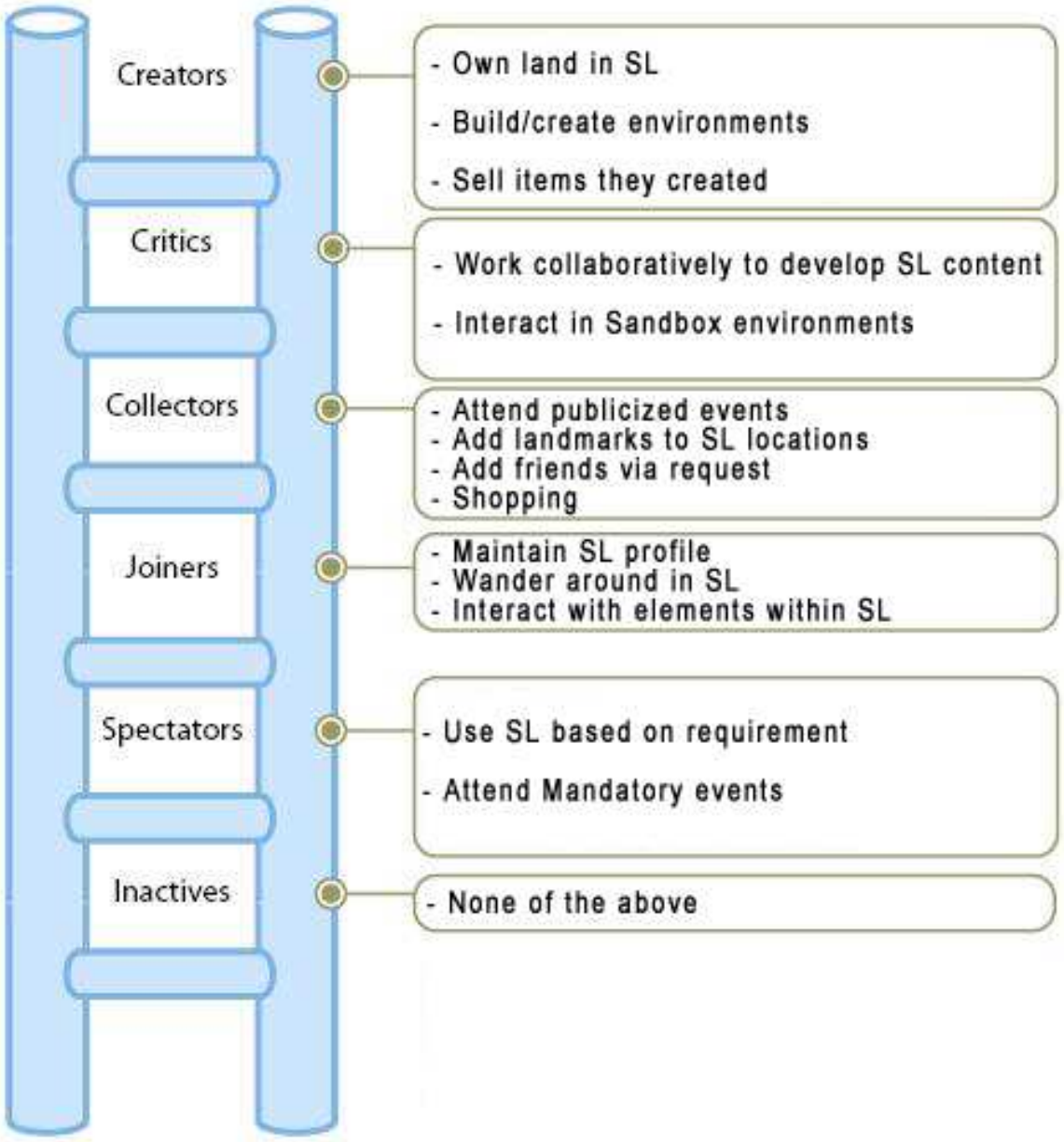

Figure 2. Social Technographics® Ladder categorizing users based on their participation with social networks. Adapted from C. Li, and J. Bernoff, 2008.

APPENDIX F

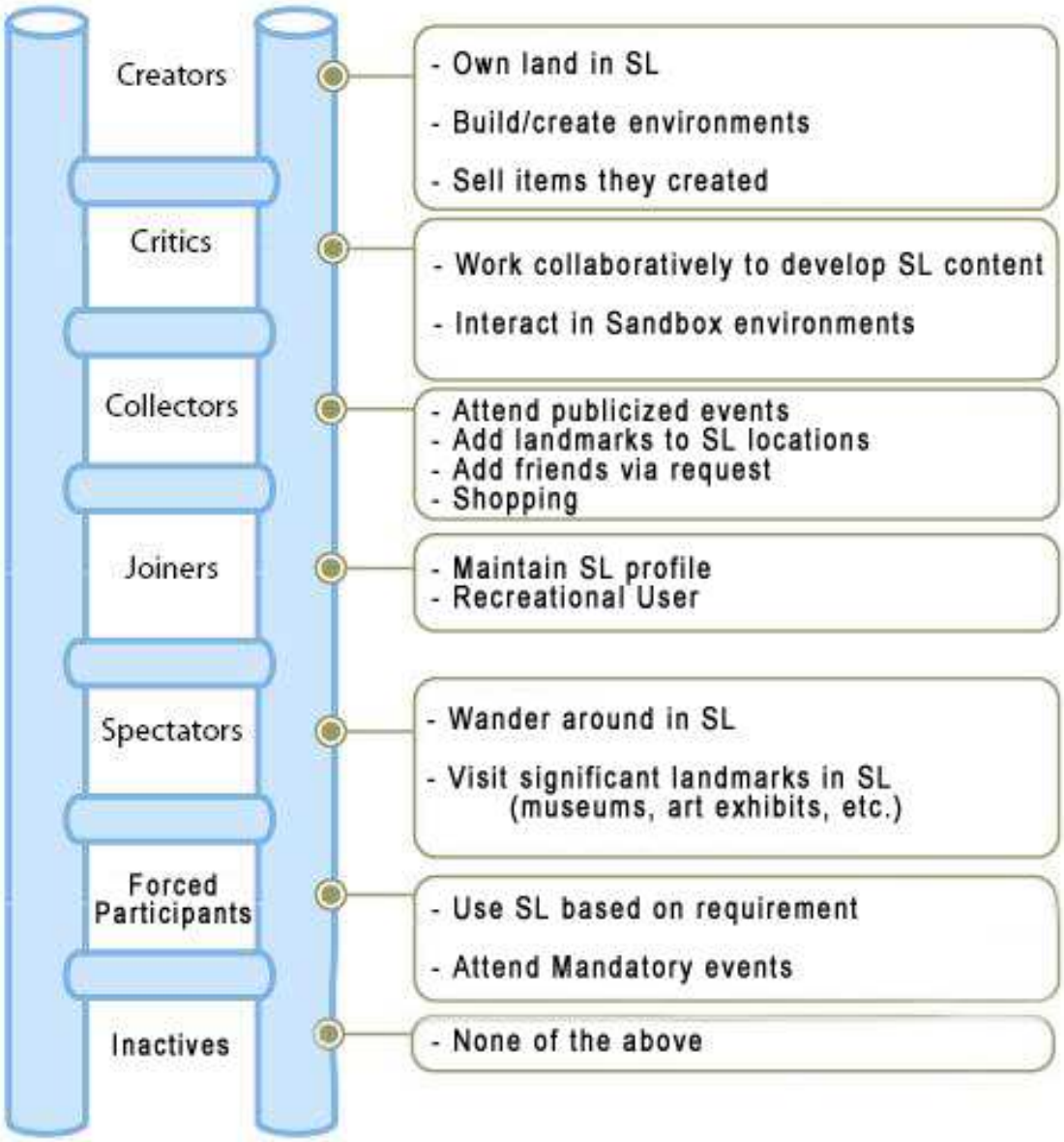

Figure 3. Modified Social Technographics® Ladder categorizing users based on their participation within SL. Adapted from C. Li, and J. Bernoff, 2008.

VITA

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