

ARTWORK BY MARK PARKINSON : [HTTP://WWW.MARKPARKINSON.COM](http://www.markparkinson.com)

# Journal of • Virtual Worlds Research

Volume 2, Number 1.

Pedagogy, Education and Innovation in 3-D Virtual Worlds.

ISSN 1941-8477

**Vol. 2. No.1**  
**“Pedagogy, Education and Innovation in 3-D Virtual Worlds”**  
**April 2009**

**Guest Editors**

Leslie Jarmon  
Kenneth Y. T. Lim  
B. Stephen Carpenter

**Editor**

Jeremiah Spence

**Technical Staff**

Andrea Muñoz  
Amy Reed  
Barbara Broman  
John Tindel  
Kelly Jensen

This issue was sponsored, in part, by the Singapore Internet Research Centre,  
the Department of Radio, TV & Film at the University of Texas at Austin,  
and the Texas Digital Library Consortium.

The Journal of Virtual Worlds Research is owned and published by the  
Virtual Worlds Research Consortium,  
a Texas non-profit corporation.  
(<http://vwrc.org>)

# Journal of • Virtual Worlds Research

jvwresearch.org ISSN: 1941-8477

**Vol. 2. No.1**

**ISSN: 1941-8477**

**“Pedagogy, Education and Innovation in 3-D Virtual Worlds”**

**April 2009**

## **Using Second Life to Teach Operations Management**

By Peggy Daniels Lee, Pennsylvania State University

### **Abstract**

*This paper describes the use of Second Life to enhance the author’s delivery of the core MBA Operations Management course at a major northeastern university. The purpose of the Second Life Project was to help students to attain the learning objectives for the course and to expose them to a Web 2.0 technology. The students wrote brief papers summarizing their research findings and presented their work inside of Second Life. Resident course delivery and in-world student work were augmented with in-world office hours, guest speakers and technical assistance provided by the instructor and the university’s instructional design staff. At the completion of each term, students were asked to complete a questionnaire that asked them whether the Second Life experience helped them to meet each course objective. They were also asked their opinions regarding whether Second Life has a place in the MBA curriculum. My findings indicate that some of the learning goals were met and that although some students were not sure within which course Second Life should be included, the consensus was that virtual worlds are the wave of the future and should be included in the curriculum.*

**Keywords:** Second Life; operations management; management education; virtual worlds.

---

This work is copyrighted under the Creative Commons Attribution-No Derivative Works 3.0 United States License by the Journal of Virtual Worlds Research.

## Using Second Life to Teach Operations Management

By Peggy Daniels Lee, Pennsylvania State University

Virtual worlds such as Second Life, Active Worlds, World of Warcraft, Entropia, HiPiHi, and THERE.com are the next frontier in communication, social networking, electronic commerce and education. Developed by their creators as multiplayer online role playing games (MMORPG) and Multiuser Virtual Environmens (MUVEs), these 3D virtual worlds have grown exponentially, creating many opportunities and challenges for educators, businesses, social scientists, policy makers, and the legal profession. Businesses use Second Life for collaborative activities such as virtual team meetings, employee training, product prototyping, customer support and sales activities. Educational institutions from Harvard and MIT to corporate universities have a presence in some virtual world, many of them in the Linden Labs-developed Second Life. There are approximately 300 educational institutions with some form of presence in Second Life (Jones, 2008). Educational institutions' level of involvement varies greatly, from a group to a full island that includes a replica of all or a portion of the institution's campus. Some institutions are only to be found in Second Life. For example, Rockville University is a Second Life-only university which has aspirations to provide research opportunities for educators as well as undergraduate and graduate degrees. The convergence of almost every media into one platform has been primarily responsible for this phenomenon. Educational institutions use Second Life to extend their resident course offerings into distance education, student course registration activities, and online library resources. The Gartner Group (Gartner, 2007) estimates that by 2011, 80% of internet users will be engaged in some form of virtual world technology. Given this prediction, it behooves educators to spearhead this innovative learning experience and to prepare students for this "brave new world".

### What is Second Life?

Second Life, launched in 2003 by Linden Labs of San Francisco, California, is an online, virtual 3D multi-user environment that functions as a virtual world. It is an immersive social interaction environment. It is not a game in that the actions of its residents are not predetermined by a set of rules. All of the content of Second Life is created by its residents. According to Linden Labs (2009), there are approximately 16.9 million residents of Second Life who build community, create content, and own and operate businesses. Social interaction is one of the primary reasons why people create avatars (a real person's virtual persona). Research suggests that avatars are extensions of their real counterparts and that people tend to treat their avatars as if they are in real social space (deNood & Attema, 2006). However, content creation is the fabric of Second Life. Everything that exists is there because a resident or a group of residents created it. Because residents own everything they create, they can market and sell those creations to other residents, creating a thriving economy and a rich environment within which instructors can teach business concepts and skills experientially.

Second Life has a vibrant economy with millions of Linden dollars exchanged between buyers and sellers of goods and services. Second Life has its own currency exchange (Lindex) which allows Second Life entrepreneurs to "cash out" their Linden dollars for U.S. dollars

(USD). Some Second Life entrepreneurs have become USD millionaires with their virtual businesses. In 2006, Anshe Chung became the first USD millionaire. This achievement was marked with her avatar's picture on the cover of Business Week (Hof, 2006). As of the end of December, 2008, according to statistics at Secondlife.com (2009), there were 62,929 virtual business owners in Second Life. Of those, 373 of them processed transactions greater than \$1,900 US and 205 of them had positive monthly cash flow of greater than \$5,000 US (Linden Labs, 2009). Individual residents are also spending large sums of money in Second Life. In the month of December, 2008, 693 residents spent more than 1,000,000 Linden dollars, which is equivalent to \$3,782 US. Second Life residents sell anything from land to pizza to fellow residents (derived from Linden Labs, 2009). The most prevalent businesses are real estate and event planning.

Real life businesses and corporations see Second Life as a way to improve productivity through training, education and simulation, enhance collaboration through the use of virtual teams, and improve customer service through R&D and prototyping, sales meetings, and customer support centers. Toyota, General Motors, IBM, Sony, Wells Fargo, Kelly Services, Ben & Jerry's and other major corporations have used Second Life to explore business opportunities or to introduce the virtual world to their product offerings. Firms have developed and launched new products (L'Oreal), sold virtual products (Nike, Adidas, Toyota), held sports simulcasts (Major League Baseball), news (Reuters), and virtual water coolers (Cisco). IBM, in particular, has been instrumental in assisting Linden Labs in its Open Source grid.

Linden Labs lists education as one of its primary markets (Blog.Secondlife.com, 2009<sup>1</sup>) and provides support for educators and researchers through two forums: the Second Life Educators and Second Life Researchers. These allow educators and researchers to collaborate on projects, seek advice on educational pedagogy, and work together to improve educational opportunities for students in Second Life. Some educators teach their entire courses in Second Life, as another delivery vehicle for distance education. Others augment their resident courses with Second Life projects, class lectures, and office hours. The project described in this paper uses the latter approach.

### **Experiential Learning and Operations Management**

Experiential Learning (Kolb, 1984) is a generally accepted teaching strategy. Teaching strategies based on experiential learning are particularly useful when the instructor wishes students to progress quickly along Bloom's 1956 taxonomy of the cognitive domain from the acquisition of knowledge to application and synthesis of knowledge. Experiential exercises, cases, role playing, and online games have all been used to varying degrees in teaching Operations Management. In particular, the use of online games to teach Operations Management (OM) is not new. The beer distribution game, first used at Harvard to illustrate systems dynamics, has been converted to an online version. One such version was developed by Bob Jacobs of Indiana University and can be found at <http://www.pom.edu>. Littlefield Technologies, which can be found at <http://www.responsive.net>, is an online factory simulation through which students manage a simple 4-step factory. Innov8, developed by IBM, is a 3D simulator used to

---

<sup>1</sup> See tables under Economic Statistics section.

teach Business Process Management, and can be found at <http://www-01.ibm.com/software/solutions/soa/innov8.html>. Individual instructors have developed their own online games to teach OM.

We continue to seek ways to make OM “come alive” for students, especially those with non-business undergraduate degrees. Often students cannot visualize a shop floor or a bank check processing center. The author, who teaches the core and only operations management course in the MBA curriculum, faced this challenge as well as the problem of ensuring that students learned the basic principles of OM in an accelerated MBA program. Well over 90% of the student body is composed of working professionals, the average age being between 28 and 34. Classes are held two nights each week for three hours each night for seven weeks. In this way, students can take two courses in a 14-week semester without taking them simultaneously. This highly condensed delivery format means that instructors make heavy use of experiential learning techniques such as simulations, games, and case studies. . In the past, the author has used case studies, experiential exercises, lectures, and guest speakers to ensure that students are learning OM. The use of Second Life presented an immersive technology to allow students to not only learn the material, but also to use, apply, and synthesize it. The learning objectives for the core MBA Operations Management course were:

1. Define Operations Management and its relationship to other disciplines.
2. Ascertain the appropriate product and process design strategies in manufacturing and service companies.
3. Make production and operations management decisions based on quantitative and financial analysis, including facility location and queuing theory.
4. Define and use scheduling algorithms and dispatching rules
5. Determine the appropriate inventory control policy to sue in specific circumstances, and
6. Analyze and improve a business process.

Thus, the research question is whether Second Life can enhance the attainment of the learning objectives for the course.

### ***Research Methodology***

At the end of each seven-week semester, students were asked to complete a questionnaire, which had three parts: 1) a learning objectives section; 2) an experiences section with open-ended questions; and 3) a demographic section. In the learning objectives section, the students rated each item using a seven-point Likert scale, indicating whether they strongly agree (7) or strongly disagree (1) with whether the Second Life project helped them to attain each of the learning objectives for the course. All 75 of the students who took the class between September 2007 and April 2008 completed the “learning goals” section of the questionnaire. However, only 67 completed the demographic portion of the questionnaire. The demographic portion asked for gender, age, number of years since completing their baccalaureate degrees, and previous virtual worlds or gaming experience. A third section of the survey asked for feedback on their experiences with the project. The instructor used the feedback from the open-ended questions to change the project as the year progressed.. Information was also gathered by the instructor as a participant observer, in the sense that the author kept notes that summarized conversations with students and transcripts of guest speakers’ and students’ presentations. The

content of these documents was analyzed to establish patterns and the evolution of student thought and perceptions throughout the course. Table 1 provides results of the demographic section of the survey.

**Table 1.** Student Demographics

	<b>Number</b>	<b>Percent</b>	<b>Average Age</b>	<b>Post-Bacc Yrs</b>
Male	49	73.1	31.7	8.5
Female	18	26.9	27.4	5.0
	67	100.0	29.1	7.4

### **The Second Life Project Activities**

The Second Life Project is an individual assignment in which students researched a Second Life business type (retail, real estate, event planning, resort, music venues, sports facilities, etc.) and reported on their findings. The goals of the project were: 1) to experience a virtual business environment; 2) to learn about virtual businesses and compare their operations to real world business operations of the same type; and 3) to gain exposure to a Web 2.0 technology. Assignment deliverables were:

- 1) a paper that compares the virtual business type with a real world business of the same type and describes how one or more operations management decision areas (design of goods and services, managing quality, process strategy, location strategy, layout strategy, capacity management, human resources, supply chain management, inventory management, scheduling, and maintenance) manifests in the virtual business operation; and
- 2) a short presentation of their findings.

The presentations were made inside of Second Life. Student work was supported with in-world office hours, guest speakers and technical assistance provided by the instructor and the university's technical staff.

In response to published accounts of unsavory activities in Second Life and to set the stage for future class work, in her introductory lecture on Second Life, the author reiterated that they were students of the university and that all codes of conduct established by the university were still in effect in virtual space. She also told them that if they wished to engage in personal



activities outside of the university's island, they were not to represent the university. This was done to reinforce the fact that the virtual world was an extension of the bricks and mortar classroom. The introduction to Second Life also included information on business use of virtual worlds, other virtual worlds in existence, other higher education institutions with a Second Life presence, and statistics about Second Life's economy.

The specific activities students had to complete in order to complete the assignment were:

1. Learn about Second Life from the web site and from discussions with the instructor
2. Create an avatar and a basic (i.e., free) account with Linden Labs
3. Complete the Second Life Orientation, moving through to Help Island, which is a place within the 3D world for residents to get help from Second Life Mentors who are trained for that purpose.
4. Send the instructor an Instant Message from within Second Life with the avatar's name and the students' real names
5. Attend office hours at least once within the 3D virtual world
6. Find and join the class group within Second Life
7. Explore enough of the virtual world to be able to select a business type to study
8. Find and interview one or more virtual business owners about how their businesses operate
9. Compare and contrast the Second Life business type with its real life equivalent, focusing on operations management issues (e.g., inventory, capacity management, facility location, queuing, etc.).
10. Write a two-page paper with findings
11. Give an individual presentation at the school's space in the Second Life virtual world.

Every activity in the assignment was designed to enhance student learning. For example, rather than give students names of people to interview about their virtual business operations, they were instructed to explore the Second Life community, meeting people on their own. In this way, students learned:

1. How to use the Search function of Second Life to find businesses to visit;
2. How to teleport between Second Life locations;
3. How to use the Edit function of Second Life to get the properties of an object such as its creator and owner;
4. How to find and join a group;
5. How to edit their avatar's appearance;
6. How to communicate with other avatars using instant messaging and voice;
7. How to earn Linden dollars; and
8. How to purchase items in retail stores.

In short, every activity was used to help students to maneuver around in the 3D virtual world and to translate that knowledge into OM principles and techniques. In-world office hours were used for students to ask questions and they were also given written and verbal instructions on how to use Second Life's voice chat capability. Students were given the option to use voice or text to present the results of their research. As a consequence of this fairly unscripted approach, students were given the freedom and the flexibility to decide how involved they would be in the Second Life community. The minimum level of involvement in the Second Life



community expected was to learn enough about it to be able to select a business type to study and find and interview a Second Life business owner about how the business operated.

The learning curve for becoming “fluent” in Second Life can be steep. We flattened the learning curve by having class in a computer lab on the second night of the course. The instructor guided students through the process of creating an avatar and a basic (i.e., free) Second Life account. We also went through the Second Life orientation and answered any questions. As each student sent the instructor an instant message with his or her Second Life and real names, the instructor responded by sending “getting started” information in-world in the form of note cards. Students used this information to further explore and learn more about Second Life. This information also gave them a head start on their projects. If there is enough time remaining after each student has sent the instant message and received the “getting started” information, students were allowed to remain in the lab to explore Second Life, with the instructor available to answer questions and provide any assistance. Other teaching strategies used included in-world office hours on one night when face-to-face class was not held. Office hours were optional. However, guest speakers were scheduled during this time period. The guest speakers were Second Life entrepreneurs. Students were allowed to use the guest speakers’ presentations as a basis for their reports and were encouraged by the guest speakers to contact them for a more in-depth interview. Finally, Second Life was also used for group presentations and debriefings of the Littlefield Technologies factory simulation, which the author also uses to teach operations management. The picture below (figure 1) shows students in a debriefing session for the Littlefield Technologies factory simulation. The debriefing was held in a “treehouse”.



**Figure 1.** Littlefield Technologies Debriefing in Second Life

The following picture (figure 2) shows students presenting and waiting to present the results of their research. They are allowed to be creative in their choice of avatar as well as costumes and clothing since changing one’s appearance is one method to learn how to maneuver within the virtual world. Some students interviewed retail clothing store owners, who gave them free clothes or taught the students how to purchase them using the ubiquitous vendors, which operate like soda dispensers. Each student is given a school tee shirt after his or her presentation.



**Figure 2.** Student Presentation of Research Findings

### **Student Research Findings**

Each student prepared a two-page paper and made a two-minute presentation of their findings during a class session held in Second Life. The two-minute restriction was to allow all students the chance to present their work in a three-hour class period. The types of businesses researched by the students are only limited by their imaginations since so many types of businesses are present in Second Life. Each student was allowed to select the type of business he or she wished to research in consultation with the instructor. The most prevalent types of firms researched by the 75 students who participated in this assignment were:

1. Land development and real estate
2. Retail clothing, furniture, etc.
3. Tours (i.e., guided tours of points of interest in Second Life such as the Second Life Louvre)
4. Amusement parks
5. Sports facilities (triathlon training facility, golf club, health spa)
6. Business center
7. Restaurants, including a pizza delivery place
8. Music venues and dance clubs

In addition to a general experience of surprise at the vibrancy of the Second Life economy, most students were also surprised and delighted to find that they were able to apply the OM concepts that they learned in class in a virtual environment. In addition, each of them was able to apply a specific OM decision area to the virtual enterprise with varying degrees of success and, of course, accuracy. They also expressed concern that the virtual entrepreneurs they interviewed did not understand concepts such as inventory control, process analysis, and total quality management. The students found that they had to translate the OM terminology they learned in class into language that the virtual entrepreneurs understood. This is exactly the outcome the author was hoping to attain. Bloom (1956) calls this the “application stage” in the cognitive domain of learning, where students are able to apply what they learned in a new and

different context, environment or situation. Although we would want to move students to the “synthesis stage”, it is not realistic to expect such a high level of attainment in only seven weeks.

One student said “I was shocked that none of them seemed to understand anything about business.” This is a key finding of the students’ research. In general, Second Life entrepreneurs are not trained business people. They tend to be people who were attracted to Second Life because they wanted to become part of a community, and who then learned to create content (e.g., clothing, houses, furniture, etc.), in Second Life. They subsequently discovered that their creations were good enough to sell to other resident avatars, and as a result, a business was born. Many of these virtual entrepreneurs are able to use the revenues from their business ventures to cover the tier (or monthly payment) on land they own in Second Life or to pay the annual premier account fee to Linden Labs.

Another concept that emerged from the students’ research is the fact that the supply chain is flat. In Second Life, the business owner is the creator, builder/manufacturer, and retailer. They may purchase software (Photoshop, for example) or devices to dispense their products to their customers (called vendors) from another avatar. The use of a vendor means that the store owner does not need to be present to make a sale. They may also need to rent space in a shopping area from a land owner. However, that is the extent of the supply chain. The virtual nature of these business ventures means that supply chain structures are not as complex as they are in real life. This came as a surprise to the students and we were able to discuss how this finding might be useful in managing real life supply chain networks.

The third key finding of the students’ research was the fact that inventories in Second Life are managed in a very different way than they are in real life. Once an item is designed and created, which can take many hours of work in-world and off-line, the item is put into a dispenser, which releases a copy of the item to the purchaser. This means that the store owner only needs to make the item once. If the item remains unsold, therefore, no excess inventory exists.

Students generally found that operating a virtual business in Second Life held fewer financial risks than in real life, could be disbanded with very little difficulty, and could be financially lucrative.

### **Research Findings and Attainment of Learning Objectives**

In general, students found the project worthwhile, although many were not sure whether it belonged in an operations management class. Most of them stated that virtual worlds are part of the future, so they need to be exposed to them. Some indicated that it was time consuming, and that they were at a loss as to how to proceed once they finished the orientation. This feedback was received verbally early in the fall of 2007, which is why the instructor began to give class time for setting up basic accounts and selecting avatars. As to the attainment of course learning objectives, the table below shows results for the 75 students who took the course between September 2007 and April 2008.

**Table 2.** Attainment of Learning Objectives

<b>Learning Objective</b>	<b>Mean</b>
Define Operations Management and its relationship to other disciplines	4.12
Ascertain the appropriate product and process design strategies in manufacturing and service companies	4.02
Define and use Total Quality Management and Statistical Process Control principles, tools and techniques	3.48
Make operations management decisions based on quantitative and financial analyses, including facility location and queuing theory	4.00
Determine the appropriate inventory control policy to use in specific circumstances	4.08
Analyze and improve a business process	4.65

These results were as expected since the focus of the assignment was how virtual businesses operate and the linkage between real and virtual business enterprises. It would make sense that TQM and SPC knowledge scored low, and that business process analysis scored the highest, because students asked process types of questions. They were asked, for example, how the products made, procured, sold, inventoried, etc. The quality of the student research varied widely. It was very clear which students spent time learning about Second Life and which did not. In addition, some met with their business contacts multiple times and visited their establishments to learn about the business type they were studying. To address this issue, the instructor changed the project in subsequent semesters. Each student was given a set of ten questions to ask, all of which addressed the ten operations management decision areas discussed in the textbook (Heizer and Render, 2008). Initial indications are that this has improved the quality of student learning as well as the project's deliverables.

As a participant observer, the instructor was able to develop a clear picture of whether students learned operations management beyond their self-report on the survey regarding the course learning objectives. Students who did well on the Second Life project were those who were able to explain OM concepts in layman's language in their interviews with Second Life entrepreneurs who generally had no previous business or OM knowledge. This ability demonstrated that the students had reached the synthesis stage in Bloom's taxonomy (Bloom, 1956). Further, these students spent more time in Second Life, learning enough about the virtual environment to enable them to better understand the SL culture and vocabulary used by their interviewees. The experiential nature of Second Life caused some students to perceive other

projects that could be tried in Second Life, such as prototyping of new products, creating businesses on their own, collaborating with colleagues in other locations, and holding virtual team meetings. In fact, some teams decided to use Second Life as their primary venue for team meetings for other work in the course.

### **Advice to Instructors - Caveats**

Although these results indicate that virtual worlds are useful tools for teaching Operations Management, there are nevertheless some caveats to be kept in mind when using a virtual world technology for any purpose. First, make sure to have a purpose for the technology prior to using it. Decide what learning outcomes are expected and design the project so that students clearly understand them and how the project achieves those objectives. The instructions should be explicitly stated and in writing. Class time should also be used for the initial introduction to the virtual world. This gives the instructor time to answer any questions and reduces the time students take to become fluent. Instructors are advised to spend time exploring and learning about the virtual world on their own prior to using it for instruction since students will see the instructor as the expert. The use of virtual worlds technology is not for every student, nor every instructor, nor every course (at least at this early stage). The educational tools available have improved since 2007, as Second Life becomes a potential venue for distance education and experiential learning. Slide viewers for power point slides, note card givers, online indicators, recording devices for voice conversations, and homework collectors are just a few of the educational tools that now exist. Since Linden Labs views educators as valued customers, these tools can only improve. An excellent open source course management system is Moodle, which has an add-in for Second Life educators called Sloodle. Training classes for educators are held in Second Life regularly. Finally, care should be taken to ensure that there is a good fit with the course learning objectives.

### **Conclusion and Implications**

The New Media Consortium's 2008 Horizon Report lists three challenges to higher education in the next five years. These include "a need for innovation and leadership at all levels of the academy"; the "expectation to deliver services, content and media to mobile and personal devices"; and "a need to provide formal instruction in information, visual, and technological literacy as well as in how to create meaningful content with today's tools." (New Media Consortium, 2008, p 3). Virtual worlds have the potential to address at least the first and last of these challenges. The use of virtual worlds in higher education indicates willingness on the part of the academy to step out of the traditional bricks and mortar campus environment and to innovatively and creatively address the educational needs of today's and tomorrow's students. The fact that the number of educational institutions with a Second Life presence has increased from about 150 in early 2007 to over 300 today is testimonial of this (Jones, 2008). Further, virtual world technologies can be used not only to teach disciplinary content, but also to improve technological literacy, a critical skill in tomorrow's job market and economy.

Virtual worlds have the potential to revolutionize higher education by helping higher education institutions to meet these challenges. Educators can immerse students in environments to allow them to experience what they are teaching. For example, Second Life has an island called Renaissance Island, where the avatars who live there role play the renaissance period of history. A history professor could have an assignment where students lived on Renaissance

Island, learning how people lived during that period. In Management education, students can create products and services to sell, build stores, and sell their goods and services. With very little risk, students can simulate basic business concepts, supply and demand, strategy, the development of a business plan, the process of deciding on a business model, the delivery of goods and services, and interaction with suppliers and customers. Of course, safeguards, codes of conduct, and other organizational structures need to be put in place to ensure that the learning goals for the course are attained. Faculty members need to be trained and instructional technologies for in-world education is in significant need of improvement. However, the pedagogical uses of virtual worlds, in the author's opinion, are limited only by the faculty member's imagination, ability to create in Second Life, and experience in this virtual world. Second Life allows professors to provide students with an immersive learning environment hitherto not available in distance education. Educators can develop learning activities that replicate real-world experiences that were previously only available via face-to-face interaction. Students can experience simulations of real life activities from operating a business to building a replica of a university's campus. Students can, using the Second Life scripting and building tools, create their own virtual businesses and communities.

## Bibliography

- Beck, J. and Mitchell W. (2006). *The kids are alright: How the gamer generation is changing the workplace*. **Boston, MA:** Harvard Business School Press.
- Bloom, B. S. (1956). *Taxonomy of educational objectives, handbook I: The cognitive domain*. New York, N.Y.: David McKay Co Inc.
- de Nood, D. & Attema, J. (2006). *The Second Life of virtual reality*, The Hague, EPN – Electronic Highway Platform.
- Foster, A. L. (2008). Using Second Life as platform for education: Professor avatar. *The Education Digest*. January 2008, 73(5), 12-.
- Gartner Group. (2007). Gartner says 80 percent of active internet users will have a “Second Life” in the virtual world by the end of 2011”. [Press Release]. Retrieved April 24, 2007 from <http://www.gartner.com/it/page.jsp?id=503861>.
- Heizer, J and Render, B. (2008). *Operations Management, 9<sup>th</sup> edition*. Upper Saddle River, New Jersey: Pearson Prentice Hall.
- Hemp, P. (2006). Avatar-based marketing. *Harvard Business Review*. June 2006, 48-57.
- Hof, R. D. (2006, May 1). My Virtual Life. *Business Week*, pp 73-82.
- Holger, W. (2007). Second life, second identity? *Journal of Targeting, Measurement and Analysis in Marketing* 15(3), 195.
- Jonas, K. (2008). Taking care of Xerox business-virtually. *Research Technology Management* 51(1), 15.
- Jones, I. M.. Virtually present: interacting in a virtual world”, *Proceedings of the Academy of Educational Leadership*, 13(2), 34-40.
- Kolb, D. (1984). *Experiential Learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.
- Lagorio, Christine. (2007, January 7). The Ultimate Distance Learning. *The New York Times*.
- Linden Labs (2009) [http://secondlife.com/whatis/economy\\_stats.php](http://secondlife.com/whatis/economy_stats.php), retrieved January 13, 2009)
- Marcus, D. C. & B. Ray. (2006). Using massively multiplayer online role-playing games for online learning, *Distance Education* 27(2), 187.
- Paul, H. (2006). Are you ready for E-tailing 2.0? *Harvard Business Review* 84(10),28.
- The New Media Consortium (2008). *The Horizon Report*, Austin, Texas.