Teaching Marketing Through a Micro-Economy in Virtual Reality

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Abstract

Teaching retailing principles to students is a challenge because although real-world wholesale and retail decision making very heavily depends on dynamic conditions, classroom exercises are limited to abstract discussions and role-playing. This article describes two interlocking class projects taught using the virtual reality of secondlife.com, which allowed students to use their recently gained skills in wholesaling and retailing. The exercises provided students with unique educational experiences without the need of "bricks and mortar" product development, wholesale, or retail spaces. This spurred students' creativity and entrepreneurship. Students described the simulations as "fun" and "interesting." Students also reported a greater depth of learning as a result of participating in the virtual simulation. This article describes the interdisciplinary team efforts to develop educational experiences for students. It also uses previous research in virtual reality implementation for classroom use to provide a framework for assessing the credibility of the set of assignments.

Keywords

learning environments, teaching/learning strategies, virtual reality, simulations, Second Life

A primary goal of business curriculum is to prepare students for the professional workforce, including the development of critical thinking and decision-making skills. Experiential learning has long been accepted in the field as an effective means of teaching and preparing students for real-world situations. Experiential learning techniques can better prepare students by eliciting active learning, resulting in higher levels of thinking and deeper understanding of concepts (Diamond, Koernig, & Iqbal, 2008; Kolb & Kolb, 2005). Traditional experiential methods of teaching such as role-plays and case studies, student-run stores, internships, and hands-on interactive facilities and assignments are typical of most programs (Seitz & Razzouk, 2002; Sojka & Fish, 2008). Although traditional methods have been successful, new challenges facing educators include the need to better connect with technologically savvy "NetGen" learners, and respond to technological changes in the workplace. One solution to the problem is incorporation of recent technologies for classroom learning tools without losing focus on core competencies (Borin, Metcalf, & Tietje, 2007; Granitz & Hugstad, 2004; Karns, 2005; Li, Greenberg, & Nicholls, 2007; Matulich, Papp, & Haytko, 2008).

Educators have responded to the call to create courses that successfully adopt relevant technologies into business curricula for higher student learning, ranging from experiential learning activities to virtual or online classrooms (Hansen, 2008; Hu, 2009; Newman & Hermans, 2008; Peltier, Schibrowsky, & Drago, 2007; Ryan, Valverde, & Rodriquez-Ardura, 2001; Simon, Haghirian, & Schlegelmilch, 2003). Emerging Internet technologies have been used to enhance experiential pedagogy by enabling experiences that are more lifelike for the student compared with other experiential learning activities (Cronin, 2009; Kaplan, Piskin, & Bol, 2010; Workman, 2008). Also, vitally important to marketing programs is the inclusion of exercises that develop students' soft skills, accomplished using web-enabled tools (Dacko, 2001; Hansen, 2008; Kaplan et al., 2010; Kelley & Bridges, 2005). In particular, virtual reality (VR) workplace simulations, or virtual learning environments, have been used to help students understand the connection between textbook knowledge and its application (Chou & Liu, 2005; Jarmon, Traphagan, Mayrath, & Trivedi, 2009; Piccoli, Ahmad, & Ives, 2001; Tuten, 2009; Wood, Solomon, & Allan, 2008).

For marketing students, VR has been used to mimic real-world experiences (Tuten, 2009). The complexity of the virtual world matches that of the real world and, therefore, is beneficial for expediting marketing plan projects, heightening students' engagement in course content, and promoting their personal growth (Tuten, 2009). Further possibilities of virtual applications for marketing courses are also considered, including advertising case studies of companies already

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found in Second Life, evaluation of consumer behavior exclusive to Second Life, marketing and retail experimental research designs, and the exploration of new product development processes (Wood et al., 2008).

As a further investigation of the merits of using VR in college classrooms, and in particular the marketing discipline, this article reports on the results of a virtual, semester-long project in two upper-division retailing. The assignments making up the final project integrated principles of merchandising, marketing, and related fields. Students in each class were required to apply their knowledge learned in the business curriculum to simulations mimicking real-world pressures using Second Life.com. The final project was one in which students played either the role of a buyer or product developer and interacted among their cohorts as such. The combined objectives of the retail-buying and product development courses required the student to do the following:

1. Comprehend and apply the basic concepts and principles involved in the manufacturing of apparel products.
2. Apply the steps involved in sourcing, production, finishing, and distribution of sewn products to a virtual simulation.
3. Communicate using terms used in typical buying/retail situations.
4. Play the role of the buyer in decision making and understand the consequences of decisions on store economic growth.
5. Develop an awareness of the challenges involved in retail-buying decisions.
6. Solve basic buying dilemmas using calculations learned in class.
7. Discern differences in basic retail mathematical operations and learn how to properly apply them to real-life buying challenges.
8. Make professional decisions based on results of profit-and-loss statement analysis.
9. Determine the fit and readiness of VR applications for apparel production curriculum.

Both groups of students involved in the project were given two sets of assignments, each corresponding to their roles in the simulation. Product development students were further divided into separate student groups within the class, resulting in four teams. Buying students were to work individually on their tasks.

The product development teams produced their own lines of virtual business apparel. The retail mathematics class would attend the "fashion week" in the virtual market expo where the product development class would display the new product lines. Figures 1 and 2 are snapshots showing outside and inside views of the expo. The retail mathematics class would select and purchase, using in-world currency, nonexclusive licenses to mark up and sell the apparel products in retail

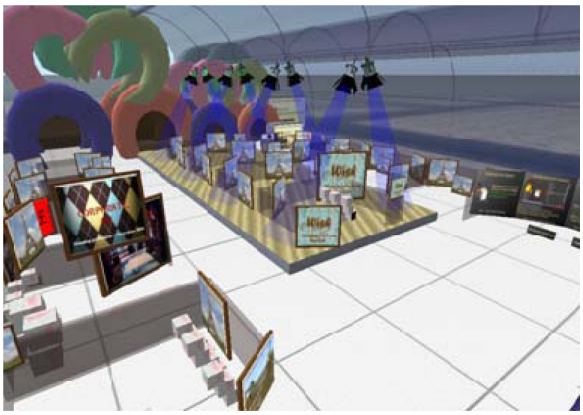

Figure 1. Inside aerial view of virtual apparel market expo showing vendor booths created by product development students

Figure 2. Outside view of virtual apparel market expo where product development students sold virtual goods to retail-buying students

stores of their own creation. An example of a student retail space is found in Figure 3. These retail stores would be open to students participating in the project who had a predetermined budget and who were assigned the task of shopping the retail stores as personal shoppers.

To fully examine the overall impact of the project, a comparison will be made in the current article with a model of effective VR implementation to determine the overall strengths and weaknesses of the project. Student feedback will be provided and recommendations are given.

Background

Emerging Technologies in College Classrooms

Web 2.0 tools have been previously used in marketing courses to achieve learning goals including increased student classroom engagement, collaborative approaches to problem

Figure 3. Picture of virtual retail store design

solving, active learning development, and improvements in "soft skills" (Cronin, 2009; Kaplan et al., 2010; Workman, 2008). Wikis and blogging, in particular, have been shown to effectively teach students' critical thinking and communication skills. Also, students are being introduced to using new technologies. However, unlike other academic fields, marketing courses are slow to adopt VR technologies for classroom use.

From liberal arts to the sciences, several disciplines have capitalized on the advantages of virtual learning tools. Because real-world emotions are transferred through avatar interactions in the virtual world, critiques of student art and design projects are possible (Gaimster, 2008). An advantage to virtual critiques over real-world, face-to-face evaluations is a more relaxed environment where both students and educators are more at ease. Psychologists have also explored and come up with strategies for having students work in virtual environments (Antonietti & Cantoia, 2000; Baker, Wentz, & Woods, 2009). Virtual environments have been shown to elicit thinking processes differently than from real-world nonimmersive environments, thus allowing for more abstract thought on the part of the student (Antonietti & Cantoia, 2000).

Virtual simulations have been used as an alternative to field laboratory research in earth and environment sciences courses (Ramasundaram, Grunwald, Mangeot, Comerford, & Bliss, 2005) to enhance the visualization of complex molecule structures in chemistry (Limniou, Roberts, & Papadopoulos, 2008) and in teaching engineering concepts (Ong & Mannan, 2004) in addition to applications in the marketing discipline.

The results of courses that have implemented VR are encouraging but not without risk. VR differs from many Internet-based programs that are used to support classroom activities in that VR programs foster community through collaborative endeavors and a dynamic format dependent on student interaction with the program (Piccoli et al., 2001). One goal of virtual activities is to promote active learning as students become responsible learners and provide the final product. Students using VR-based programs should experience learning outcomes different from those of teacher-centered approaches (Piccoli et al., 2001). VR can capture the interest of students as a fun and creative way to learn course material (Kelton, 2008) and is regarded as allowing for significant learning experiences not previously made possible in the real world (Jarmon et al., 2009). VR provides a format, used to teach marketing principles, through its simulated virtual economy (Tuten, 2009) and allows students to make strategic and decision-making mistakes in a safe, learning environment (Tuten, 2009; Wood et al., 2008).

Perhaps VR has not been readily adopted because of perceived risks associated with its use. Previous projects have shown that drawbacks can include the demands on time for both students and faculty, and the need for careful planning to execute projects successfully (Cronin, 2009; Kaplan et al., 2010; Piccoli et al., 2001; Tuten, 2009; Wood et al., 2008; Workman, 2008). A considerable learning curve may be experienced by students, using VR for the first time (Jarmon et al., 2009; Kelton, 2008), who may be overwhelmed by the great deal of learner control afforded by these learning environments (Piccoli et al., 2001). Regarding student satisfaction, researchers have found some students are less satisfied with Internet technology–enabled courses compared with traditional methods (Piccoli et al., 2001).

Characteristics of Effective Virtual Reality Implementation

Sulbaran and Marcum (2004) have determined characteristics that contribute to effective VR implementation based on previous studies in educational research and experimentation in virtual worlds (Johnson, Moher, Ohlsson, & Gillingham, 1999). Johnson et al.'s (1999) groundbreaking work posits that effective VR implementation must include four criteria: The learning goal must be important, hard, enhanced by the use of VR, and based on contemporary learning practices (Johnson et al., 1999). Sulbaran and Marcum's (2004) model builds on Johnson et al.'s (1999) model and recognizes that the simulation must include the following characteristics: an effective educational component, interaction, navigation, and fidelity. The current project is evaluated based on Sulbaran and Marcum's (2004) criteria to assess the validity of the course design and effectiveness of the virtual facilities created for the project.

The educational component included in Sulbaran and Marcum's (2004) work entails that learning goals that are challenging, important, significantly enhanced by the introduction of virtual worlds, grounded in contemporary educational practices, and include an element of collaboration are implemented. Collaboration is essential to creating real-life virtual scenarios typical of the student's future professional field (Calongne, 2008).

Interaction is defined as the students' ability to actively select and manipulate objects in the environment for use in the prescribed learning activity (Sulbaran & Marcum, 2004). Two things are necessary for interaction in a virtual environment: an object target and feedback that the target has been selected. Object selection can include simple visual queries where no actual contact between the user and the environment is made, or more complex content-building tasks. Object manipulation includes the ability to perform tasks in the virtual world such as rotating, relocating, and changing object attributes and/or behaviors. Object manipulation makes possible the creation of virtual content in the environment and is important in being able to perform tasks to expedite virtual simulations (Sulbaran & Marcum, 2004).

Navigation includes both the user's ability to manipulate his or her avatar and to be able to effectively move throughout the environment without getting lost. Elements needed to navigate in the virtual environment include a well-planned layout; clear directional clues such as maps, signage, and so on; and key location points that can serve as landmarks. Fidelity refers to how well the project is expedited and conforms to the original plan for the project both in terms of environmental integrity and real-life, real-time expectations met online (Sulbaran & Marcum, 2004).

Procedures

Preliminary Steps

The implementation of the project began with very careful planning. Even so, many changes had to be made throughout the planning process and while expediting the assignments during the semester. Prior to implementing the simulation, faculty met to brainstorm ideas that led to the development of a project plan, objectives, training methods, and measures of learning outcomes for the two collaborating courses. Next, a general outline of the simulation was created on a Wiki page accessible to all collaborating faculty members as a framework for implementing the actual project.

Because of its relative ease of use, and free service to basic account holders, Second Life was determined to be the best fit for use by the students. Also, the researchers' levels of expertise in using the virtual world and previous experience with the program contributed to the decision to use secondlife.com. Virtual real estate is based on a system of either renting or buying virtual islands on which to build content. For the current project, space on a virtual island was rented for the duration of the planning and implementation of the virtual simulation. Figure 4 shows an aerial view of the virtual island housing the simulation. A college of business grant funded the rent and monthly maintenance fees associated with renting the virtual space.

Once the general idea of the type of simulation desired was dictated, assignments were carefully created to make the abstract simulation idea concrete. Assignments were created not only as a means for students to expedite the simulation but also as a way for faculty to ensure that all details for successful completion of the simulation were in place. An example of a simulation assignment can be found in Appendix A.

Figure 4. Snapshot of virtual island on which the simulation occurred

A Wiki page was used as a resource for students to find assignments and related tutorials for using applications in VR, and on how to use the Wiki page itself. Also, students were required to submit marketing and advertising promotions for each of the retail stores, and samples of produced goods on the Wiki page (see Figure 5). The Wiki was chosen because it allowed the students to read and edit the web page in a real time, collaborative manner. The Wiki also allowed for a higher level of learner control through the ability to access teaching materials at any time, provided an Internet connection is available (Piccoli et al., 2001).

After the assignments were created, and prior to being distributed to students, the necessary components of the virtual world were created by faculty as a means to expedite the simulation. secondlife.com allows account holders to "build" virtual content using the Linden programming language exclusive to Second Life.com. Components of the virtual world created by the researchers included the retailing and wholesaling "shells." For the current research, the term *shell* refers to the basic virtual venues created by the researchers for students to later use as either a retail store or a wholesale expo (see Figures 6-8). The island on which the simulation took place was designed with the expo central to the region and outlying retail stores surrounding the wholesale expo. Design of the layout of the region was both planned and implemented by the researchers to simulate the environment typical of retail venues.

Secondlife.com also has its own economy in which U.S. dollars can be exchanged for Linden dollars for use in the in-world. Credit or debit cards can be used to purchase, or exchange, U.S. dollars for the in-world currency. After the money is exchanged, the in-world currency is transferred into

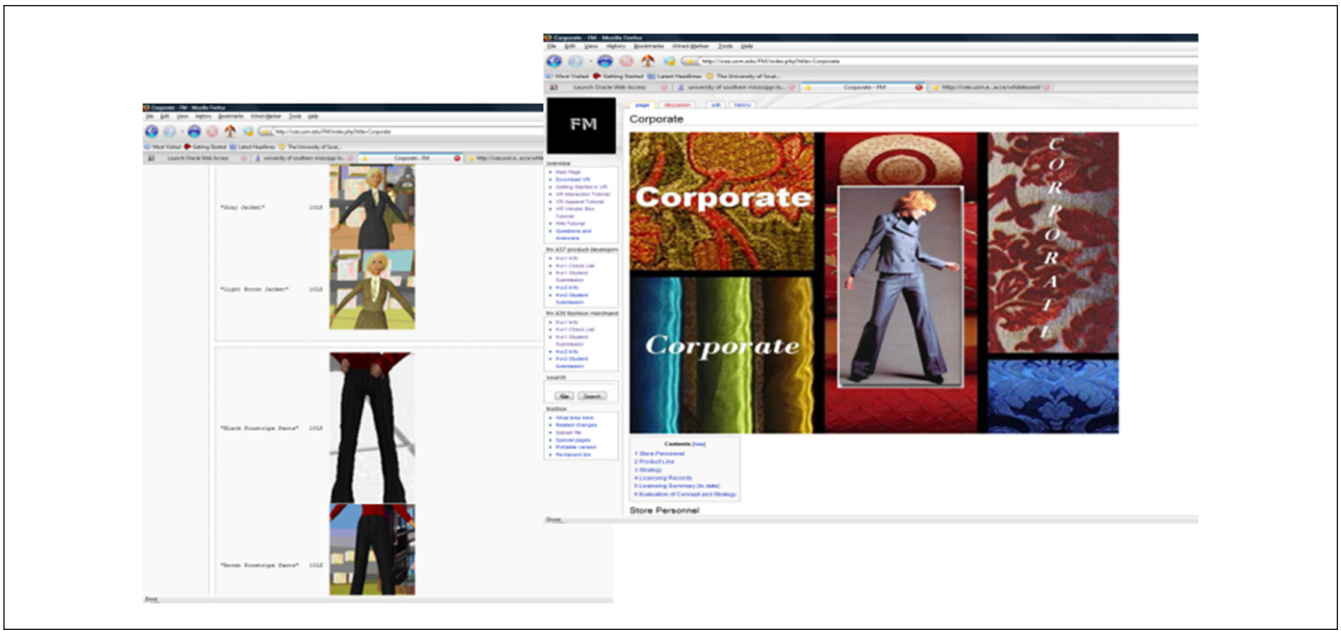

Figure 5. Example of a Wiki page submission by a product development team

Figure 6. Layout of retail store "shells" surrounding the wholesale expo on the island

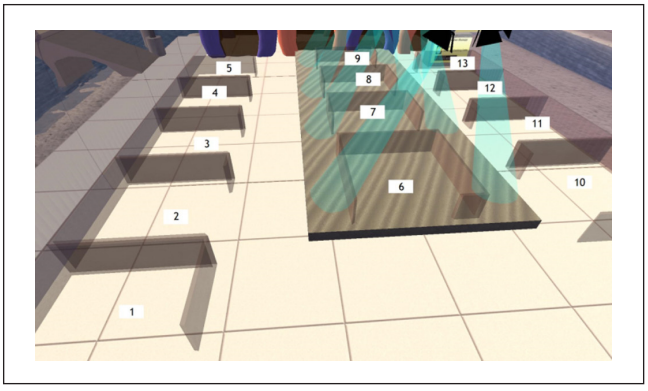

Figure 7. Layout of wholesale expo booth "shells"

the account holder's inventory, which allows the account holder to purchase goods and services in the virtual world. Students were required to pay a nominal lab fee to be exchanged by the researchers for the currency. Access to in-world currency allowed students to complete the tasks associated with each given assignment, including uploading virtual goods, taking and uploading pictures for promotional use, and buying the virtual retail and wholesale goods. To get started, 300 Linden dollars were transferred into each student's inventory where it was accessible to the student.

Preparing Students for the Virtual Simulation

For all students in each course, the first assigned task was to become familiar with the virtual world. Classroom time was used to introduce students to secondlife.com and show them how to maneuver in the virtual world. To start, each student created a Second Life account. In creating the account, students were given several options from which to choose an avatar, including both the avatar's physical appearance and name. On creation of the account and selection of a personal avatar, students were instructed on how to join the simulation by teleporting to the island hosting the simulation and checking in with faculty who would then add the student to the group. By joining the group, the student gained access to the island otherwise restricted to non–group members.

Once students were granted access to the island by joining the group, they were allowed to explore the island and practice using their avatars. Skills such as selecting items, moving items, and building content were practiced until they became

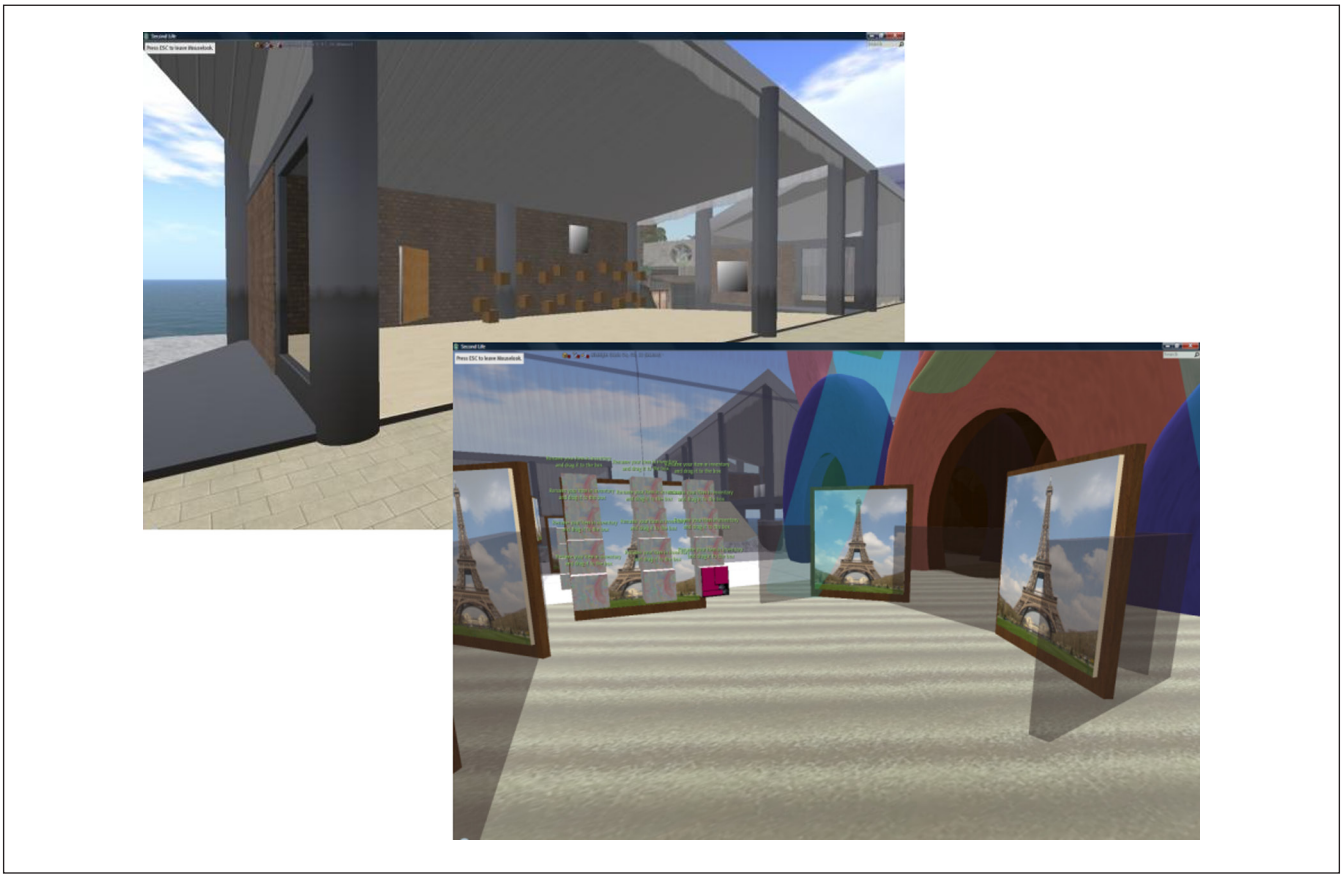

Figure 8. Retail and wholesale shells

proficient in using the avatar. Avatar mobility was also a skill to be developed where students had to practice walking in the environment, including walking around objects, while getting from point to point. Students quickly picked up on flying—a means in which the avatar levitates off the ground to "fly" over objects instead of walking, or running, around objects. Flying became the norm as they found it to be a quicker and easier means of moving through the environment.

Expediting the Virtual Simulation

As each student demonstrated the capacity to perform the basic tasks associated with using the virtual technology, the next step was to charge them with the responsibility of performing tasks to expedite the simulation including completing the typical functions of wholesalers and retailers. Students were able to choose the locations of either the expo booth or the retail store on a first-come first-served basis. The individual student or student group completing a checklist of start-up tasks would be able to choose their location first, and so on (see Appendix B). Once locations were determined, students in each course began the tasks necessary to perform their respective roles in the simulation.

Supporting Simulation Technologies

Wiki pages and tutorials. To help the product development students in creating the virtual goods, tutorials were posted on the Wiki page in order to supplement class explanation of how to create virtual apparel (see Figure 9). In both the Wiki tutorial and class, students were not only shown how to use Microsoft Paint and Gimp as free alternatives but also given permission to use any other software available to them to complete each task. One student group chose to use Adobe Photoshop, but most students used one of the free programs provided on the Wiki page or with their computer's software suite. Templates were provided on the Wiki page for use in creating the design of the virtual apparel. The templates were to be uploaded into the paint/drawing software program of their choosing, where students would then be able to complete the apparel design. The completed templates were then saved and uploaded into the virtual world as apparel goods. Finished apparel goods were saved into the designer's inventory where they could then be transferred into the vendor box, priced, and made ready for sale to the retail-buying students.

Vendor boxes. For both the product development and retail-buying students, wholesale and retail goods were to be

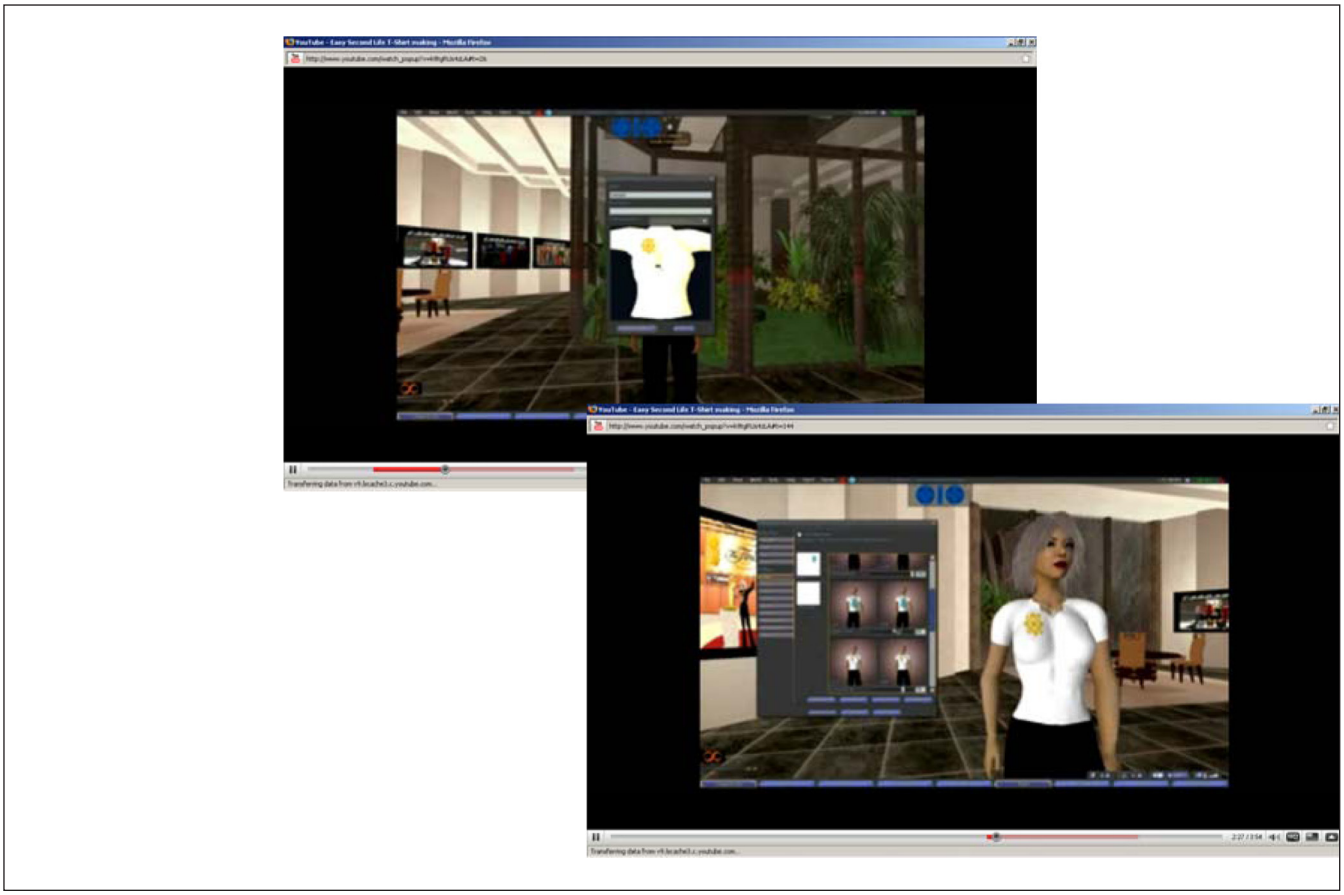

Figure 9. Screenshots of online tutorial for creating apparel

sold using vendor boxes exclusive to the current simulation. Vendor boxes are virtual boxes containing the programming script that enables transactions between seller and buyer (see Figure 10). Clicking on the vendor box once allowed the students to select the item, and then a second click would produce the prompt to confirm the transaction. Confirming the transaction would then transfer money from the buyer's account to the seller's account, and the item from the vendor box to the buyer's virtual inventory. Once the item was transferred into the buyer's inventory, the buyer could then wear or resell the item. Thus, the production students acting as wholesalers would load their virtual goods into vendor boxes and then enable the script to expedite the transaction between the wholesaler and the retail buyer.

Once the items were loaded into vendor boxes by the product development teams, the retail-buying students were able to purchase the goods during the open wholesale expo. After purchasing the goods, the buying students had the item transferred into their inventories. After the goods showed up in the buyers' inventories, the buying students could then transfer the items from their inventories to their own vendor boxes to be used in selling the goods in the retail stores.

Concluding the Simulation

When the retail students finished merchandising and stocking each of the retail stores, the product development students then acted as personal shoppers for a budget-minded target market needing a professional wardrobe. After each product development, students exhausted their $250 budget and the simulation ended with the students presenting their wardrobes, including the cost for each item, to their classmates.

Each buying student computed the retail sales for his or her store and presented the sales figures to the rest of the buying class. Retail sales figures needed to compute a profit-and-loss statement were collected by the buying students in order to determine an overall profit or loss for the virtual store. Some figures in the profit-and-loss statement, however, had to be estimated based on the limitations of the current project. For instance, "unsold" stock had to include those items not sold at all by the retailer. Items not sold at all in the retail stores were listed under cost of goods sold in the buying students' profit-and-loss statement as unsold inventory. Otherwise it was not possible to take inventory of individual unsold items because of the unlimited licenses of virtual goods

Figure 10. Examples of vendor box tutorial and student vendor boxes

bought by each retail buyer instead of a limited quantity of goods assigned to each wholesale purchase. Grades were assigned to students based on completion of all necessary tasks and quality of work, with bonus points awarded to the students and student groups with the highest sales.

Results

Evaluation of the Project Design

Sulbaran and Marcum (2004) give four components for effective VR implementation: educational, interaction, navigation, and fidelity. The current project effectively implemented the four components and added a fifth consideration, a component addressing course design and learning objectives. A comprehensive summary of each component implementation can be found in Tables 1 to 5. Student feedback further supports the success of the project.

Student feedback. VR enhanced the two courses by requiring students to recall previous and current curriculum material and apply it to lifelike situations. The simulation also forced students to make challenging decisions, which enabled them to make decisions and learn from both successes and failures without real-world consequences. Student feedback from the course appears to support these assumptions. As one student put it,

> I have to say that this is the neatest project that I have ever done. At first I was really upset because I know that I do not know a lot about computers and I was scared that I would not be able to take on this project. Little by little I was starting to get the hang of doing certain things. For example how to create a store sign and upload it into the store or saving pictures to this Wiki page. In the end I had so much fun completing this project and I would definitely do it again. I only suggest that the project be broken down into sections for the next class. Overall it was an excellent project and great learning experience.

Her response illustrates a typical progression from novice to experienced learner. Her recommendations are also well received and will be considered for future implementation.

For buying students, the aim of the project was to have the largest profit margin over the other "retailers." To do this, several strategies were designed and used by the individual buyers. One buying student noted in her evaluation of her store that

> My strategy . . . was to offer a good variety of quality clothing at good prices. . . . This project was tricky but the lessons learned were valuable. I think that my strategy was a good one and that using this program

Table 1. Summary of Educational Component Implementation

Component	Subcharacteristic	Summary of Implementation	Summary of Achievement
Educational component			
	Learning goal is important	Simulation goal was to teach students how members of the buying and product development industries interact to bring consumer products to the retail floor.	Achieved
	Learning goal is hard	The assignments required students to work in groups to solve real-world problems involved in buying and assortment planning.	Achieved
	Learning goal is enhanced	The simulation forced students to make challenging decisions, allowing them to make mistakes and learn without real-world consequences.	Achieved
	Grounded in educational practice	The simulation replaces internship experiences when not available, or can prepare students for professional internships.	Achieved
	Collaboration	Collaboration in the environment enhanced students' soft skills, making them better communicators, task delegators, and overall team players.	Achieved

Table 2. Summary of Interaction Component Implementation

Component	Subcharacteristic	Summary of Implementation	Summary of Achievement
Interaction			
	Object selection	Objects, such as vendor boxes, were successfully selected and queried for information by each student.	Achieved
	Object manipulation	Students were able to create and manipulate virtual content in order to expedite the simulation.	Achieved

Table 3. Summary of Navigation Component Implementation

Component	Subcharacteristic	Summary of Implementation	Summary of Achievement
Navigation			
	Layout of the environment	The layout of the island was designed based on the criteria set forth that included wide spaces, consistent layouts, and having large environments divided into smaller segments. Some student shells were poorly planned therefore hindering others' ability to move around wholesale and retail facilities.	Partially achieved
	Directional cues	Several signs were included in the design of the island layout to signal places of interest such as a prominent sign used to mark the entrance of the simulation environment.	Achieved
	Key location points	Shell locations were considered to be important in competing with other retailers or wholesalers; therefore, key location points were not used in the simulation.	Achieved

helped me understand the relationship between wholesale and retail prices.

Another buying student explained how mistakes made during the class simulation helped her understand the big

Table 4. Summary of Fidelity Component Implementation

Component	Subcharacteristic	Summary of Implementation	Summary of Achievement
Fidelity			
	Frame rate	Lag was a frustrating distraction and hindered student navigation.	Not achieved
	Point of view	Both camera controls and mouse-look views were available to students allowing for first- and third-person points of view.	Achieved
	Avatars and agents	Agents in the simulation included faculty avatars that were available to direct or advise students working in the environment. Students were able to effectively use avatars to perform simulation tasks; however, some student avatars had distracting appearances.	Partially achieved
	Colors and textures	Store layouts, promotion materials, island and shell layouts were vivid and lifelike lending to the realistic feel of the environment.	Achieved
	Sound	No sounds were programmed into the environment as these were seen as potential distractions for students.	Achieved
	Temporal change	Students were able to adjust environmental day-and-night phase changes according to taste.	Achieved

Table 5. Summary of Course Design/Learning Objectives Component Implementation

Component	Subcharacteristic	Summary of Implementation	Summary of Achievement
Course design and learning objectives			
	Classroom implementation	The courses took an unintended change in usual administration including needed flexibility in due dates, scheduling, and allowing extra time needed to attend to and expedite the simulation.	Not applicable—Exploratory
	Appropriate learning objectives	Expanded objectives enhancing current course goals needed to be added to acknowledge new learning outcomes and technical skills needed to participate in simulation tasks.	Not applicable—Exploratory
	Active learning concepts	Once basic concepts and technical tasks were taught, students had to be left on their own to expedite the simulation causing students to make strategic decisions on their own with only the information on hand.	Not applicable—Exploratory

picture. She wrote, "choosing the products to carry in the store was challenging. This (simulation) freed me to think about wholesale costs and what items to carry in order to make a profit." One student mentioned that her,

> retail store was successful. . . . Most all of the items in the store sold at least once except one. Having the pictures of the clothing on my boxes helped the consumers be able to see what they are purchasing; therefore, it helped my items to be purchased because I noticed it was hard to see what some of the clothing looked liked in many of the competitor's stores. I learned not to place the markup more than 50% on the clothes because the target market was women just entering the workforce and looking for professional dress at a low cost.

Based on her response, this student has learned lessons in the virtual world that can be directly applied to her professional real-world career.

A group of product development students showed how thoughtful planning and strategy helped make their sales competitive:

> Our concept worked very well in that it was full of functional pieces. Our pieces could and were easily mixed and matched with various other garments which allowed them broader appeal to a consumer market which the buyers loved. We tried to work with as many solids as possible and mixing in textured pieces rather than patterns so as not to limit the use of our pieces. The strategy worked well as a substantial number of our pieces were purchased at market. Buyers recognized

> the appeal of our product and the benefit to their stores if purchased.

When asked what went well for her in the project, a product development student answered, "Learning more about mark up prices, selling goods and the hard work it takes to produce goods. It was neat to set prices and watch the goods I created sell." Simply put, one student confessed, "I can plan a balanced product offering and my group sold many items."

Many students expressed excitement over learning new computer skills in particular. One student reaction sums up the general attitude of the students:

> This project not only allowed me to develop an understanding of merchandising a store, it gave me a chance to improve my computer skills. . . . Although at first I may have been frustrated at my inability to understand the necessary steps to create what was required, in the end I understood and came to appreciate the lessons I was learning.

The unique computer skills should serve her well in the retail industry.

Discussion and Recommendations

Student Learning Curve

"Newbie" obstacles. As the technology is still relatively new, any course incorporating Second Life should take into account students' need to get accommodated to the new learning environment as much as understanding the learning objectives of the assignment. The learning curve was an area of concern that required special consideration. Students are somewhat accustomed to the task of reading and understanding requirements given in assignments, but many may still be "illiterate" when it comes to identifying and accomplishing the tasks set out in a virtual-world setting. For many, this may be their first experience using virtual technology. The instructor would be well advised to hold sessions in the virtual world that make no mention of the specific assignment but do incorporate tutorials on basic tasks such as walking, flying, teleporting, finding inventory items, inventory management, taking snapshots, and so on. Simple assignments with checklists for the students may also be helpful in acclimating students to the virtual world. It is recommended that the faculty member create his or her own orientation to using the virtual world tailored to student needs and assignment requirements instead of using the in-world orientation facilities offered.

Lessening the learning curve with Wikis. To combat the learning curve inherent to operating in a virtual world for the first time, relevant resources are required (Wood et al., 2008), sometimes calling for the use of more than one technology (Calongne, 2008). In the current project a Wiki page was used by both the instructors and the students. A Wiki page was created that allowed students to better equip themselves to complete the project including YouTube tutorials, step-by-step illustrated directions, question submission pages, and detailed instructions on the requirements of the assignments (see Figure 11).

The Wiki is helpful when students are working outside the classroom but may be an uncomfortable change from asking faculty questions directly. Class time would be well invested in thoroughly explaining to students the resources available on the Wiki page and exactly how to access them when they are working on their own.

Motivating students. The researchers found, like others (Calongne, 2008; Kelton, 2008), that once the basics were mastered, students became free to create content for the environment. Initially, however, working in virtual worlds may frustrate some students as learning new skills may be required. A key element of virtual learning for the student is taking a step from passive to active learning (Calongne, 2008). Motivating students to take an active approach to the project is a major challenge, but it is vital to the success of the project. One of the biggest challenges for the current project was getting students interested in using the format. Virtual tours and demonstrations can show students the possibilities afforded by VR, possibly creating an interest for students to get started. To inspire students, faculty should create objectives that effectively reflect new learning outcomes made possible by VR. Finally, setting small goals at first may increase students' confidence in working in virtual worlds.

Faculty Learning Curve

VR holds the promise of improving any course if implemented effectively. But like students, faculty members new to using virtual worlds may also face setbacks when working in the virtual environment. Although sometimes time-consuming for students and faculty, exciting outcomes can be the result of virtual-based projects. Key to the success of any virtual simulation is thorough planning and consideration of potential obstacles.

Planning materials. Some consideration of facilities and a realistic examination of one's own capacities, as well as those of the students, may determine the feasibility of launching a successful plan. Faculty, especially those encountering VR for the first time, should be aware of the time commitment in helping students understand how to operate in VR—many for the first time. Faculty must also consider their own experience and potential learning curve. It is possible to use VR without the considerable time requirements or technological expertise. Even using existing resources in a virtual world may improve student comprehension or create excitement in the

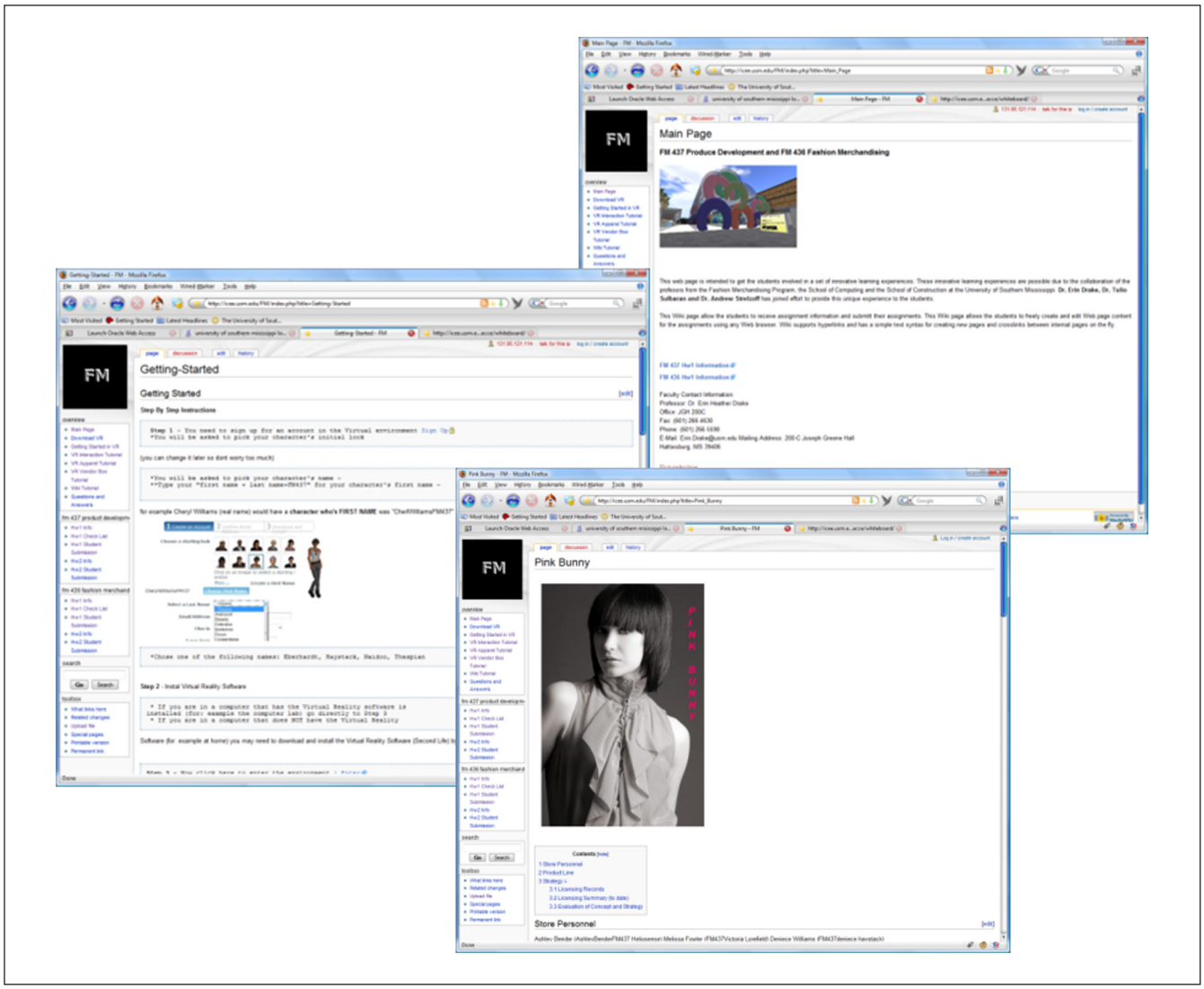

Figure 11. Examples of Wiki screen shots

student for the subject, without having to create one's own simulation.

The first step would be to research different virtual worlds online and determine which virtual software is most appropriate in terms of usability and expense. Some, but not all, virtual worlds require a fee for activities common to creating a virtual course project. Also, some worlds require more technical expertise on the users' part than others. Most important, make sure that the format is interesting enough to justify the time and potential financial commitment needed for a successful project. An instructor's skill may limit the experience (Wood et al., 2008), but with the right attitude, both the instructor and student can learn through the process (Piccoli et al., 2001).

Implementation challenges. Although the design of the project included all aspects of effective VR implementation (Sulbaran & Marcum, 2004), some unforeseen challenges that hindered the students' experiences were found. Students reported that too many technical errors hampered their perceptions of Second Life–based assignments including lag time and interruptions in service. As one student put it, ". . . finding a computer that supported the program was hard. I had to wait for certain computers to open up and even then it was slow."

Accessibility was also an issue. One student noted that she "could only do it on the computers in the library and a lot of time they wouldn't work and I don't live on campus." Unforeseen issues with students unable to download and access Second Life.com using the university's wireless network, or personal computers, were also a problem and due, in part, to firewalls set up by the university. Prior to introducing students to the project, it is important to investigate and present a clear plan to students on where and how the program

can be used. This may include open computer lab hours and a realistic assessment of the amount of time needed to complete the assigned tasks.

Conclusion

According to the criteria presented by Sulbaran and Marcum (2004), the course was successfully implemented. However, obtaining the higher order cognitive skills elicited by VR requires some consideration of new criteria for traditional courses (Ramasundaram et al., 2005). The current project revealed that existing learning objectives needed to be expanded to fit the new learning outcomes afforded by VR. Unexpected revelations regarding the processes behind the two interacting forces proved to enrich the students' learning, therefore calling for additional learning goals. However, this is seen as a positive outcome of the simulation which promises more sophisticated learning in future courses, thus entailing the necessity of expanded course objectives. Therefore, Sulbaran and Marcum's (2004) model should be extended to include aspects of course design as related to those with VR components. To expand Sulbaran and Marcum's (2004) model, it is recommended that effective VR simulation implementation incorporate course design into existing criteria of educational component, interaction, navigation, and fidelity.

Course Design and Guiding Objectives

Classroom implementation. In the case of virtual simulations, a revised course design may be necessary for existing courses. When existing learning goals are to be achieved by new means, some changes in administration are inevitable. For the two courses examined here, flexibility in due dates and changes in scheduling were the norm. Special consideration had to be taken for extra time needed to attend to and expedite the simulation. Also, the overall design of the course changed focus from a traditional lecture format to a hands-on, student-centered approach.

Appropriate learning objectives. The simulation provided several unintended learning outcomes that altered the class. This is seen as a positive as the simulation contributed to the richness of the depth of learning to the point that previous objectives were no longer adequate to describe the learning achieved. Appropriate course learning objectives for classes with virtual simulations may actually be the result of a trial run. The current project was designed to enhance existing objectives, but the unforeseen simulation outcomes greatly enhanced learning in unexpected ways not possible by traditional means. Therefore, future courses using the simulation should include learning goals that properly reflect the learning made possible through the use of the virtual simulation. Additionally, objectives should reflect student learning of the technical skills needed for the simulation. Furthermore, outlining the specific steps in the learning objectives can also help the students make sense of a potentially confusing series of steps. Finally, if students understand the intended outcomes of the simulation, they may be more enthusiastic about starting the new endeavor.

Examples of new course objectives include the following:

1. To learn the technical skills needed to operate in a virtual world, therefore, allowing the student to participate in a virtual simulation. Specific technical skills include manipulating virtual objects, building virtual content, maneuvering through the environment using an avatar, and being able to communicate in the environment using the provided chat software.
2. To improve individual soft skills through collaboration among members of a task-based team.
3. To experience potential scenarios experienced in profession interactions within the apparel industry, particularly for product developers and retail buyers.
4. To practice problem-solving skills needed to make educated, professional decisions in the industry after graduation.

In creating course objectives, the idea is to give direction to the student but not dictate specific end products. A major strength of virtual simulations is that they allow for students to be confronted with decisions that need to be made where there is no right or wrong answer.

Active learning concepts. Once basic concepts and technical tasks were taught, students had to be left on their own to expedite the simulation causing them to make strategic decisions on their own with only the information on hand. The use of active learning causes the instructor to become a "co-learner" with the student. The active learning experience found with the virtual simulation is a departure from typical lecture formats and requires both students and faculty to adjust to the new requirements.

Future Practices

Future practices will include the deliberate planning of short, classroom-based assignments where students will be asked to complete tasks pertaining to the final project as a set of skill-building blocks. It is hoped that the assignments will not only better familiarize students with maneuvering in the virtual world but will also help students feel more comfortable with the format and confident in their ability to complete tasks early on. Also, reflection articles will be required of students (Jarmon et al., 2009) as a means for them to process their *experiences* and share them with their peers. Finally, students will be asked to make decisions regarding the design of the final project.

The Future of Virtual Simulations for Classroom Use

In the marketing discipline, little has been done as far as the virtual movement is considered. There appears to be a point in time at which practitioners stopped reporting on VR in the classroom. For some, this may wave a red flag as far as usage is concerned.

Many reports of VR in multiple disciplines have found few differences in learning outcomes in virtual learning environments compared with face-to-face instruction (Wrzesien & Raya, 2010). Other researchers report on exciting ways to use the technology but do not elaborate on actual learning outcomes (Alexander, 2006). However, the reality is that there is still a growing and vast knowledge base of the usability of virtual learning environments. Projects are continuing to evolve from the elementary level to high school and college levels. Much emphasis is placed on using the medium to enhance distance or online learning (Monahan, McArdle, & Bertolotto, 2008).

As a discipline, marketing appears to have shifted interest from virtual worlds but perhaps studies in other disciplines will encourage those in marketing still interested in the format. According to recent studies, the future for virtual environments in higher education is hopeful. Many researchers have gone beyond the exploratory level to actually report on findings related to cognitive processes that differ in virtual and real worlds (Antonietti & Cantoia, 2000; De Lucia, Francese, Passero, & Tortora, 2009; Girvan & Savage, 2010; Hauptman, 2010; Lee, Wong, & Fung, 2010; Limniou et al., 2008; Ong & Mannan, 2004). Applying this knowledge to virtual instruction design provides direction to the realized potential of the virtual world envisioned by its early users.

Limitations

Although the current study is based on previous findings, it can still be considered exploratory in nature. Therefore, several limitations are found for the current work. First, the research only reflects the experience of students in two courses over one semester. Future studies could replicate the current simulation in larger classes, or over multiple semesters to track changes in student learning outcomes. Recruiting the participation of multiple instructors could also give a basis for comparison to determine any real changes in learning outcomes. Also, the current work lacks quantitative data regarding student feedback and achievement of course objectives. Finally, the simulation would have been more effective had a more detailed plan for gathering and analyzing sales figures been implemented.

Appendix A: Example of Assignment for Simulation Tasks as Presented on the Course Wiki Page

Product Development

Virtual Reality Assignment 1: Creating Virtual Stock for an Online Boutique

Preamble:

Throughout the semester you have learned (and will learn), ultimately, how to provide goods that sell. This assignment is designed to take what you have learned in class about developing profitable apparel products and apply it to a simulated real-world setting.

You may choose to have a partner, or work on your own.

You are to create apparel products to be sold virtually to retail store buyers using the collaborative virtual environment, Secondlife.com. This will require you to design and create virtual clothing online. However, you must consider who will be buying the goods you create.

Your target consumer is a participant in the Christian Women's Job Corp (CWJC). The participants vary in race, size, and age range, but all have in common the need for practical, inexpensive clothing for both professional and social occasions. The goal is to offer products appropriate to this market, keeping in mind the agency's mission which includes modesty and middle-class values. It may be important for you to "shop" the market by finding out what other products will be offered by the "manufacturers" in the class.

The target market will have a budget of $250 to spend for a week-long professional wardrobe. The "wardrobe" must include the following: two pairs of pants, shorts, skirts, or combination of two, one jacket and/or blazer, three shirts and/or blouses, and accessories. This leaves little variety; therefore, pieces should be very conducive to "mix-and-match." Shoppers may choose to buy more, if their budget allows.

Your job is to produce 12 pieces of apparel and sell your products to retail "buyers" during the showroom week who will then sell the products to the end-consumer (shopper). Be sure the prices you set for the buyers allow for successful pricing strategies on their part.

Goals:

You are (as a group) responsible for

- Performing appropriate research in order to understand and effectively market apparel (shirts, skirts, pants) to your consumer.
- Performing the tasks necessary to create virtual apparel (shirts, skirts, pants) to be sold to retail "buyers."
- Creating profitable wholesale prices for your apparel.
- Setting up goods in the showroom to be sold during the Apparel Market Week.

(continued)

Appendix A (continued)

– Providing virtual snapshots of apparel, market display and fixtures, promotions, etc.
– Submitting your inventory list (including pictures) and brief company description to the class Wiki page prior to the Apparel Market Week.
-Collecting and presenting final sales figures.

Deliverables:

Each student team is required to provide the following:

I. On the WIKI page

1. A list of ACTIVE participants on the assignment with their roles (organized alphabetically by last name).
2. A company description including
   *Name
   *Business strategy
   *Marketing strategy
   *Analysis of target customer
   *Justification for merchandising mix
3. A comprehensive, organized, detailed inventory list **WITH Pictures** price and template file of your apparel.
4. At least 3 pictures of your stand in the showroom. Each picture should have a short description.
5. All showroom sales records (Description, Qty, Price, Total).

II. In the Virtual Environment

1. At least 4 posters and/or other signage to be shown in your stand of the showroom.
2. Each apparel item with selling price placed in individual vendor boxes.
3. An attractive sales booth in the apparel showroom.

Getting Started:

Step 1: Complete the Getting-Started tutorial before the next class.
Step 2: Be in class for instruction on how to create your Virtual Apparel.
Step 3: Complete the vr-vendor-boxes-tutorial to put your apparel for sale **before** the showroom week.

Deliverables Formatting:

All parts of the WIKI page should be formatted CONSISTENTLY (same spacing, margins, text type, text size, writing styles, etc.). Include a lot of pictures on your Wiki page.

Grading:

Your grade will be based on both group and individual work. If a student fails to prepare his or her part, you are (as a group) responsible for indicating such failure in the report (and your grade will not be affected).

Clarifications:

Should you need any clarifications on this assignment, please post your question on the Q&A link of this Wiki page.

Appendix B: Example of Getting Started With Second Life Checklist

Retail Buying

Virtual Reality Assignment 1: Homework One—Getting Started In-Class Checklist

FM436 Getting Started With Second Life Checklist

- Create Your Second Life Character "YourNameFM436 Somelastname"
- Get Invitation to Join RETAIL BUYING group
- Teleport to the BUYING/WHOLESALE CENTER
- Get 300 Linden dollars for licensing wholesale products and upload of pictures
- Practice walking and talking—Scout store locations
- Choose your store's name and get your starting Wiki setup
- Learn how to take snapshots of the environment—Make 1 snap
- Learn how to make product signs—Use the snap to make a sign
- Learn how to make store signs—Make 1 store sign
- Show your completed checklist and select your store (from those not already chosen)

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