

Integrating Second Life as a Pedagogical Tool for Interactive Instruction

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Abstract

Technology advances at such a rapid pace that its effective application in higher education is often overlooked and poorly researched prior to its implementation in teaching strategies. The union of technology and pedagogical relevance is a developmental process requiring a review of course goals and objectives and a consideration of whether the technological applications serve to enhance the delivery of instruction. It also requires a well-developed system for delivery of technology instruction that is integrated into the curricular schedule. A strong support staff must be available to facilitate the use of technical applications and to solve problems. This paper provides a case study of the process of designing an innovative curriculum for an introductory lab course in interior design. The course, titled *Interior Design Fundamentals Laboratory*, provides a conceptual and skills foundation for future interior design professionals. The pedagogy is structured as a collaborative service-learning model incorporating Second Life virtual reality as a delivery mechanism for enhancing the depth of instruction. Relevancy to the millennial generation is considered in the context of the culture of the contemporary teaching and learning environment. The potential for extending applications for global communication and professional exchange is explored. Second Life supports self-directed learning by providing product review, peer interaction, and opportunities for research and critical analysis. The practical, systematic integration of Second Life into a pedagogical framework is feasible and relevant for a wide variety of applications.

Keywords: Virtual Learning, Interior Design, Service-Learning

Introduction

Technology is used extensively in education. Its use has evolved throughout history, from chalkboard to computers, and meaningful applications have permitted adaptation to the changing needs of learners. The transformation of technology now permits pedagogical relevance for various media and virtual learning environments. Progressive educational philosophy acknowledges that learning is a developmental process and proposes that the teacher's role as a designer of the learning environment has been altered. Designing effective learning environments requires a review of course goals and objectives and a consideration of whether the technological applications enhance the delivery of instruction. It also requires a system for delivering technology instruction that is well integrated into the scheduled chronology of class activities. Findings from this case study provide evidence that technological support staff should be available to facilitate applications, assist in development of virtual

learning environments, and support teacher/learner needs. Further, this case study describes the process of designing an innovative curriculum for an introductory course in interior design that began integrating technology in 2008 and bringing it to present-day 2011.

The pedagogical framework for this interior design case study is structured as a collaborative service-learning model incorporating Second Life virtual reality as a vehicle for enhancing the depth of instructional delivery. The transformation from traditional interior design classroom instruction, occurring in lecture and laboratory settings, to that of a progressive learning environment, is a result of a distinctive technological coaching program sponsored during a summer semester by the university.

Exploring Technologies

The university's Information Technology and Computing Services (ITCS) Department is responsible for testing new technologies and assisting faculty in integrating these innovations into learning environments. Integration of these technologies can be achieved through an online course, a hybrid course with both traditional and distance education components, or a traditional course with enhanced technologies to actively engage students. Academic Outreach, a part of Information Technology Computer Services (within Administration and Finance), sponsored a summer-long distance education workshop based on a "mentoring model." Faculty members who were considered educational innovators in the application of technology into designs of learner environments were selected by the department on the basis of their technological skills and demonstrated expertise. In this case study, the interior design faculty was enrolled in the summer workshop with a small group of interdisciplinary faculty from allied health, nursing, medicine, and public health. Faculty members set individual learning goals specific to their identified needs to reconstruct their learning environments. Most of the faculty had limited experience in blending online technologies with traditional face-to-face learning environments.

The faculty "coach" conducted workshops in and evaluated several university-sponsored technology applications, including Blackboard and Centra, with the faculty in a small-group format using the online technologies. All faculty participants were able to view the learning environments from the student and teacher perspective and engage in social interactions using features of the technology. Faculty members shared how they would integrate the technology into their designs of learning environments to augment students' learning styles. Each faculty member was also provided one-on-one coaching to explore technologies that were specifically adaptable to her or his discipline. The interior design faculty decided to explore Second Life (or SL) and found that the technology offered through this application was uniquely suited to the interior design course learning goals and objectives. The following section describes what was learned about SL and how the faculty integrated it into the framework of the foundations in interior design learning environment.

Second Life and How it is Used

Second Life, developed by Philip Rosedale of Linden Lab, is a 3-D virtual world created by the residents who inhabit it. Similar to "gaming," SL is a structured virtual reality where an individual can purchase "space" that appears as land available for construction of buildings or pre-existing virtual infrastructure such as houses, hospitals, and universities. SL differs from most "gaming" venues in that a user can create a persona, represented by an "avatar," that moves throughout the SL environment by use of computer commands. In addition, avatar mobility is enhanced with perspective views of SL accessible through mouse controls. Communication within SL is conducted through a chat screen where dynamic text is allowed between individuals in a given space or through vocal sounds made using microphone and speaker connections to the computer.

Hodge, Collins, and Giordano (2009) note that SL is a unique environment that allows for educational discovery employing live music, games, exhibits, conferences, and even shopping. SL is used by industry, business, private entrepreneurs, community colleges, universities, and private institutions. The university conducting this case study has been actively using SL since the fall of 2007. Courses taught in SL include computer classes, sociology, Web design, interior design, recreation and leisure studies, networking, nursing, and social work. Simulations are an everyday occurrence, and the virtual world allows for practical application of most knowledge for an assessment of knowledge utility and learner ability. As stated earlier, SL is a form of virtual reality. Various forms of virtual reality are used in education from K-12 through higher education (Neely J., Bowers, K., and Ragas, M., 2009; Calongne and Hiles, 2007). "Virtual reality (VR) is typically defined in terms of technological hardware" (Steuer, 1992, p. 3).

However, Steuer and others (Bowers, Davis, & Neely, 2009; Gibson, 1979) have pointed out that virtual reality is more than hardware; it is software which creates a simulated reality. VR allows for a highly dynamic experience utilizing an interactive form of communication media. "Communication media can also be classified in terms of interactivity. Interactivity is the extent to which users can participate in modifying the form and content of a mediated environment in real time" (Steuer, 1992, p. 84). It is this communication modality, allowing for real-time visual and auditory discourse that empowers SL to serve as a valuable tool for education.

In this case study, SL was found to overcome barriers of space and time, facilitating instructional practices that allowed for experiential activities which would not have been otherwise available. Use of SL or VR as an educational environment can enhance learning engagement, especially for students already accustomed to mobile devices and instant communication (Gardner, 2006). SL and other forms of virtual reality can be designed to address a variety of learning styles, especially for visual and bodily-kinesthetic learners (Gardner, 2006). SL, as a 3-D VR form, provides an opportunity to change the way content is delivered to meet the demands of those learning styles and is thus a factor that faculty should consider when planning educational strategies (Hodge & Collins, 2010). In the experience of the presented case study for this paper, faculty noted the need for financial and technical support to redesign curricula for the virtual learning environments. Institutions must help faculty members succeed by providing technical support, course design, and instructional practice with the medium. The University of Texas recently purchased 60 virtual properties to create a virtual learning community which allowed the connection of students, faculty, researchers, and administrators (*University of Texas at Austin Division of Instructional Innovation and Assessment*, 2010). Such a massive transition in learning environments, from traditional to virtual environments, calls for commitment of institutional resources (Brodie, 2011; Diaz, 2010; Masoumi, 2008).

Academic Outreach, a division of ITCS at East Carolina University, is the entity tasked with providing the requisite institutional support to faculty for integration of technology including VR into the curricula. SL is just one framework of VR used for this purpose. Some examples of how SL has been integrated at the case institution include a hotel which is designed, constructed, and managed within the virtual environment as part of the hospitality management program where simulations and role playing are conducted, and role-playing scenarios for sociology classes. Business and educational courses stretch the boundaries of conventional classrooms by providing team exercises and financial planning, while interior design classes actually "walk" students through constructed environments in visits that are more than two-dimensional. At other educational institutions, virtual reality permits safe practice in simulated flight instruction and surgical procedures. Hospitals, complete with interior furnishings, have been designed and constructed in SL to test the effectiveness of designs prior to actual production in reality (Dunston, Arns, & McGlothlin, 2007).

Virtual environments are challenging to design and construct (Potkonjak, Vukobratović, Jovanović, & Medenica, 2010). Faculty members rarely possess the vital skills or the time it takes to build the environment, unless they are from a mechanical, engineering, or computer discipline. Then too, technology experts cannot design learner environments without knowing what is needed relative to the content and context in specific disciplines. Therefore, partnership is essential between faculty and technology experts (Keengwe, Kidd, & Kyei-Blankson, 2009).

Relative to this case study, the focus is an introductory course for beginning students in interior design. The faculty must design the learning environment with acute consideration of the level of learner. The ability to experience the interactive quality of the built environment, including its spatial considerations as well as the visualization of a three-dimensional physical space, is essential for the beginning student. Further applications of SL include developing marketing and communication skills as well as providing visual resources for reference. These SL applications will be discussed further below.

The Context of the Course

Student Profile

Students in the introductory course in interior design are first-semester freshmen, predominantly female. There are no portfolio requirements at this level, nor any prerequisites for the class. Students originate primarily from rural and urban areas of the east coast of the United States. Entering interior design students taking the introductory course exhibit highly diverse levels of skill and experience. Some have

taken secondary-level classes in interior design and art and may be versed in basic CAD or Photoshop. Others have no prior training in any of these areas and some possess only rudimentary computer skills. Although the majority of the incoming students ($n=36$) had utilized Internet programs such as Facebook or Twitter and were adept at searching the Web, an informal survey found none who were familiar with SL or other virtual reality sites.

Course Description

Project-based learning is the basis of this interior design lab course, which represents the practical application of concepts presented in a parallel lecture course. Students develop proficiency in practical manual skills by applying basic design principles to the solution of a sequence of preliminary two- and three-dimensional assignments. After this series of design exercises, the course focuses on an authentic interior design project emphasizing the creation of safe, healthy, barrier-free environments. The curriculum represents a longitudinal pedagogical progression. An innovative model of inter-professional undergraduate pedagogy has been developed that combines the disciplines of interior design and health sciences. Safety, health, and educational issues are addressed through a collaborative service-learning model of instruction to foster the design of education and health facilities serving disparate, rural populations. The social and environmental context of design provides an opportunity for real-world creativity to focus on meeting the aims of clients. The self-limiting parameters of this model reflect a developmental approach appropriate to a fundamental level of instruction. The service-learning design project imbedded in the course gives a broad-based introduction to the process of interior design while addressing real community needs. Again, this case study represents the evolution of one class that was taught each semester from 2008 through 2010.

Goals and Objectives of the Course Relative to SL

The learning outcomes for this course germane to SL specifically enhance the communication, marketing, and organizational skills valuable to an interior designer. The context of a real-life facsimile environment prepared the students by encouraging them to explore its potential as a future operational standard within the design profession.

In the collective dimension of learning, all of the basic goals and objectives of the course were provided a platform for a shared experience that enhanced the acquisition of knowledge and skills. For example, a course objective is stated as follows: *Develop a fundamental level of proficiency in the rendering of drawings and two-dimensional design presentations in a variety of media and materials basic to the interior design profession.* Students posted the design and drawing projects that were assigned during the initial phase of the course in their display boards in the SL gallery. Students were required to analyze and review the work of other students and post comments in the peer review boxes in SL. In so doing, they also engaged in a critical analysis of their own work and gained skills in communicating design concepts. Prior to completing specific assignments, students were able to research previous semesters' products in another display gallery in SL. This clarified the objectives of the assignments and resulted in greater success.

Another course objective is: *Demonstrate skill in the application of the visual elements and principles of two- and three-dimensional design in the solution of design problems.* As the students progress, they begin the service-learning component of the course with an interior design project that requires the application of the elements and principles of design learned in the initial weeks of the course. All phases of the project are posted in SL for review. Additional course objectives are supported by SL in other ways. Again, the products—both two- and three-dimensional—are posted for display and review by peer, faculty, and professional evaluators. In addition, SL support staff builds three-dimensional environments from representative student designs.

Each student experiences the visual and functional results of a design via his or her *avatar*, a graphic persona or character formed through SL from a menu of choices or uniquely created to represent the individual (PC Magazine, 2009).

Course Stakeholders and Collaborators: Service Learning Model

Course development integrated multiple interdisciplinary partnerships using a service-learning model. The primary collaborators were the course instructor, an interdisciplinary service-learning collaborator from the

Health Sciences division of the university, the director of the technical support staff for SL, and the client or a client representative of the semester project.

Over time, many collaborators have contributed to the learning process in this partnership: physicians and other health experts, architects, professional interior designers, a nutritionist, an expert on early childhood education, and other educational consultants. Individuals with expertise pertinent to the particular project assignment have also contributed. The client or client representative brings not only a vested interest but experience and knowledge of project parameters and requirements.

Evolution of Pedagogical Structure

Initial Structure Integrating Second Life

In the fall of 2008, a virtual environment was built in SL in partnership with the university's instructional technology support to accommodate student interactions, professional development, and peer evaluation for the interior design fundamentals course. The SL environment was constructed as a virtual representation of the actual building that houses the college's department, all within a virtual replication of the university campus. The interior of the virtual building was designed to specifications of the course instructor to meet the needs of the curriculum and did not adhere to the configuration of the actual interior. Since no other instructor housed in this building was utilizing SL, there was no need to accommodate other classes. Students were trained by the technology specialists to build their identities in SL via the use of avatars during each semester from 2008 to 2011. It is necessary to obtain an avatar in order to enter the SL environment. Avatars are created through the auspices of the university, which is able to control access to the environment as well as the content posted and viewed there. Students were trained during various sessions to navigate and operate their avatars.

The design initially consisted of an open gallery of extended height to allow for three levels of exhibit space in a 180° panorama. Individual course sections were designated via color-coded, circular forms on the virtual floor.

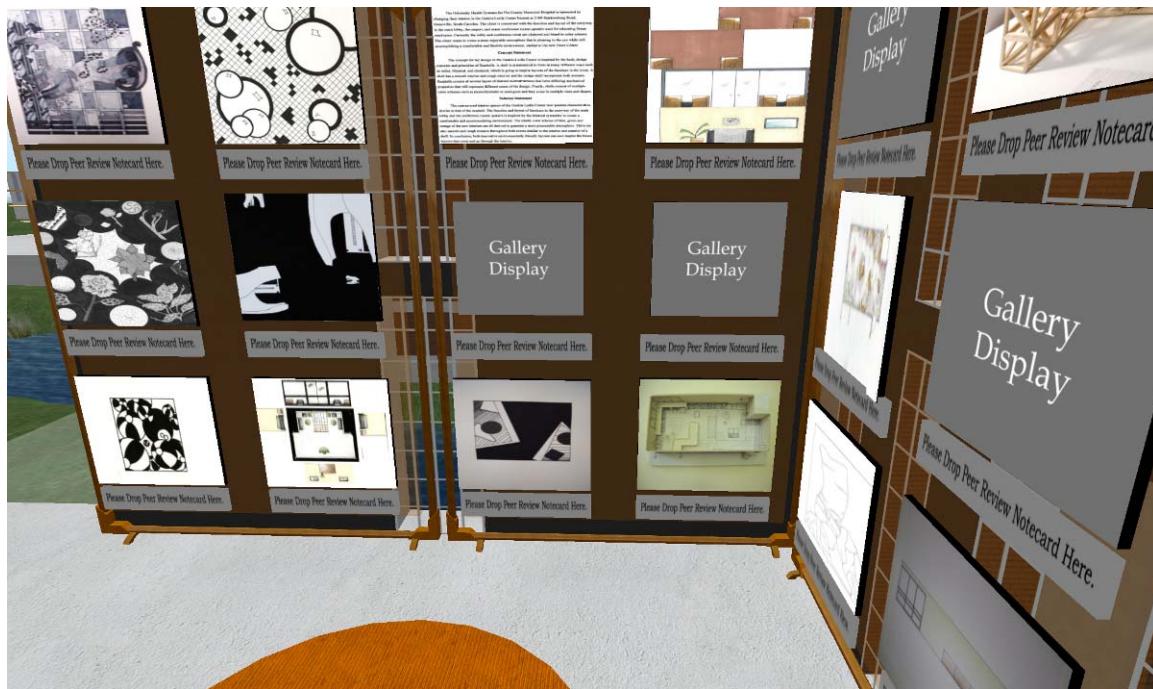


Figure 1. Color-coded gallery view.

Each semester, as students completed assignments, they were directed to digitally record images of their work and to upload and post the images in assigned spaces within their color-coded gallery section. Each display board in the virtual galleries represents an individual student's work. Clicking on the image causes

a series of examples of that student's projects to be displayed. Students were trained to post peer-review reflections on *note cards* located under each student's space in the gallery using their avatar and their inventory. (Inventory to an avatar is much like a file folder to an office.) Access to the note cards is restricted to the student under review. The assigned display sites in the gallery are layered with multiple images stacked sequentially. An avatar, via a computer mouse, can point to the individual's assigned site to change the images for viewing.

An adjoining space served to illustrate the formative outcomes of student learning that mimic authentic professional marketing formats.



Figure 2. A student's avatar regards her work.

Portfolios were housed on three open floor levels that were accessed by the avatars "flying up" to the multiple spaces. The portfolio pages were similarly turned via pointing, but in this case they imitated a horizontal book format. In addition, three-dimensional learning environments allowed a virtual experience that tested design solutions for spatial relationships and pathways. The students moved through the constructed virtual environments using their avatars. The constructed three-dimensional capability of the interiors learning environment was intended as a resource for experiential learning. It used an avatar as a proxy test subject capable of moving through the space and viewing the environment from multiple points of view, which could include a variety of physical facsimiles of heights and sizes. The avatar could pass through openings, reach for objects, sit on furniture, alter speed, make gestures and other types of movement, or test interactions among a variety of avatar proxies. Students could manipulate their avatars to sit in chairs, open doors, turn, or fly above the space for an overview of the design. Flying above a space in SL is an aside from actualizing the experience of the constructed learning environment. But the value of viewing the SL space from above at differing angles approximates the viewing of an accurate, built presentation model, which provides a gestalt concept of the design solution. Thus, the avatars provided a sensible experience of the interiors that replicated a physical presence.

Design Modifications

As the environment was utilized, it became evident over the course of the three-year period that revisions and modifications were needed; hence, significant changes were made beginning in 2009. Over the next two years, formative changes were applied to the space for the methods of training and for the particular logistics pertaining to access and manipulation of elements within the environment. The virtual space represented a redesign of the interior of the college's building to accommodate the revised goals of the curricular design. The space has evolved to make room for more course sections. The portfolio area was found to be redundant, so it was converted to a library similar to a permanent exhibit gallery of past students' work that could be seen by incoming students and external evaluators.

The conversion allowed space for additional built environments representing student design solutions. Exemplary models from subsequent semesters are added by the technology support staff who work from student designs. Using the technical expertise of the support staff enables the faculty and students to focus on the objective at hand, which is their content and course material. They are not expected to be experts in SL.

The student designers and instructor meet with the technology support staff to aid in interpreting floor plans, elevations, and models, as well as the selection and design of furnishings for the interiors. The additional models serve to further test the manipulation of the environment in the design solutions for a variety of built spaces. They also supplement exemplary resources, allowing students to study effective design solutions that are within the scope of class expectations and experience.



Figure 3. An avatar awaits feedback.

Multiple strategies had to be pursued to integrate technology as a relevant vehicle for improving student outcomes. During the first trial introduction of SL, students were trained by the lead technical support expert during a single computer lab session. All of the points of information were covered verbally. It was found that not all students were able to absorb the material and apply the new skills. Consequently, incremental training was instituted in a lab environment used exclusively by interior design students. A technology specialist, an undergraduate computer science major who worked for the tech support center, contributed consistent and reliable training and support. Three separate SL training sessions were designed and embedded in the course. The first training session in 2008 lasted one hour. This session included an introduction to SL, the creation of an avatar, and access to the university's virtual campus. Basic instruction in photography and Photoshop (an image editing tool) was provided by another faculty collaborator. This facilitated digitizing student work for display in the virtual gallery. The second session in 2008 took a half-hour and covered uploading images to the student's assigned display panel in the gallery space, and purchasing Linden Dollars. (Linden dollars are the exchange money of SL. As of 2010, the rate was \$4.08 for every 1,000 Linden dollars.) Consequently, students were able to execute this procedure with no need for intervention by the support staff as had been previously required. The third and final session only took 15 minutes and taught students how to post peer review comments in the drop boxes. This session was scheduled after the due date for uploading images, so students were usually able to complete this task within the constraints of the lab session.

In 2008, students e-mailed their files to the technical experts, who then uploaded them into the virtual world and assisted in placing each image in the galleries under the appropriate student name. This again required some explanation because when images are uploaded into SL, an avatar must pay \$10 Lindens per image. This proved somewhat unwieldy as e-mails flew with many images attached, creating confusion for the individuals involved.

In its most current version (2010) the students are provided some Linden dollars by the distance education division, so they may submit their work by a deadline date after which they would have to purchase their own Linden dollars to complete their submissions. A great variety of items can be purchased in-world, and some students used their funds for items not associated with the class. In particular, students used Linden dollars to modify their avatars and to add multiple views of three-dimensional products. If students have to pay all costs, they lose incentive to upload images on time. It was thus decided that there would be a limit on the number of projects students would be required to submit. Exercises deemed non-essential were dropped. A list of specific images which had to be submitted was promulgated and shared with the technical support partner. It was then possible to appraise the total cost and determine the feasibility of underwriting that amount.

A complex, collaborative curriculum of this nature demands constant modification. The issue of managing the budget for Linden dollars remains under discussion. To motivate students, clear guidelines must be established that support rather than frustrate the learning process. In reviewing functional details in the administration of SL protocols, it is essential to focus on instructional objectives. In the case of the allotment of Linden dollars, for example, operational efficiency and appropriate allocation of funds provided a lesson in managerial and marketing skills. Students were motivated to learn time management skills in order to meet deadlines as well as to produce marketable images within specific budget constraints.

During this time (2008-2010) all funding was paid by the university division responsible for distance-education support. Rental of virtual land was also supplied by this division at no charge to the units. As long as this practice continues, funding will not be an issue. However, if this arrangement were ended, the departments would be responsible for purchasing Linden dollars for the faculty and students, but this is a modest burden in any case. As previously stated, the Linden dollar exchange is very reasonable, and owing to small class sizes, it would be manageable.

Extensions of Learning

Use of the environment eventually broadened in scope. SL provides a forum for wide collaboration with the potential to link students to the professional world of interior design. It became apparent as course design progressed that there was a need to educate peer faculty and department advisory board members in this innovative curricular design. SL affords these additional individuals opportunities for interactive, virtual reality-based evaluation and professional exchange and guidance. The first such opportunity arose on the occasion of the annual advisory board meeting (2009). Time was set aside for training of the faculty and board members in the use of their avatars, and in how to leave comments on student designs via virtual note cards. This feedback aided students in making corrections and furthered understanding of the design process. It was theorized that these outside expert evaluators could manage their time commitment for participation because of the flexibility of entering the environment at their convenience. This particular cohort had a vested interest in tracking student progress given their declared responsibility to the program.

Building Resource Tools

In addition to professional support and peer intervention, extensive supplemental materials were made available, so that if students missed any session, these resources proved adequate for the students to accomplish their tasks. Information for each session was provided in written hand-out format, in Blackboard, and as instruction in a *Self-Help Island* created in SL.

Figure 4 presents an image of the self-help island where avatars can walk around accessing online tutorials and assistance by support avatars. They can also assist and chat with one another by voice or regular text chat.

The handouts given during the three training sessions per semester were further replicated within the course for universal student access. Thus, gaining knowledge of the tools for participation in SL was a developmental process addressing multiple learning styles by sequentially presenting visual, verbal, and kinesthetic learning experiences. Students were able to apply immediately the skills they had learned, helping them retain the information with significantly fewer subsequent problems.



Figure 4. *Self Help Island tutorials.*

Indicators of Success

Student Response

During the pilot semester of fall 2008, students experienced frustration with technical issues and difficulties in resolving them. In particular, if a student missed the single training session, it proved difficult to accommodate instruction on an individual basis. Written materials were not available and tutoring was difficult to schedule. There was not as much access to university computers with SL as there would be in subsequent semesters. Students inundated the instructor and tech support staff with complaints and inquiries. The general response indicated that students perceived SL as an added burden rather than a comfortable and supportive learning tool. When the structure was redesigned as a series of developmental lessons, each of them taking little time and providing clear information easily retained, students' opinions changed significantly.

Support from a collaborative partner for the photographic recording of products and manipulation of images reinforced students' understanding of the intent of the process to effect professional goals for a digital record of products for marketing purposes. Interaction among students in the SL environment occurred spontaneously and deadlines were met. Students began to utilize SL as a research tool to view successful products from previous semesters as well as to search professional sites within SL for design ideas. The epidemic of e-mails requesting additional support ceased. Students, by and large, became more confident and self-reliant.

Course Objectives and Outcomes

The streamlining of SL instruction facilitated the meeting of course objectives. Expectations for project outcomes were clarified, especially through the students' ability to view past exemplary projects and peer- and professional-review comments. The independence that students gained from the enhanced support

system for training increased their confidence and understanding of the process of developing a professional presentation. In the peer review note cards, students displayed evidence of the development of critical thinking, the reinforcement of design concepts, and the ability to analyze content using appropriate terminology.

When critiquing a design assignment through anonymous feedback several student comments were collected. One student noted, "The handles of the bag are believable and neatly done. The organic form of the bag makes it more realistic. The use of line quality is good with darker lines in the front and lighter lines in the back promoting depth perception." Another commented, "I like the use of positive spatial relationships. The use of radial symmetry creates movement." Students also engaged in metacognitive thinking as they interfaced observations in series: "I like how you chose a fabric that had a lot of folds" was one comment, followed by, "I like the object the person decided to draw. The complicated folds are very well drawn and I like how the line weight varies from dark in the front to light in the back because it shows where the light source is coming from and accentuates the plasticity of the object."

In the process of preparing an organized, digitally recorded portfolio appropriate for professional review, students learned a procedure for preparation and marketing of their products. They acquired an understanding of professional presentation, marketing skills, and portfolio review. Affording the students the dimensional physical presence of the virtual built environment allowed them to develop an ability to experience three-dimensional solutions in real space.

Active learning-authentic projects, completed through community-campus partnerships, are considered to be an effective means of learning. Active learning is process-driven rather than content-driven and assists development of self-directed and independent learners. Web 2.0 supports this interaction and supports this manner of learning (Committee of Inquiry into the Changing Learner Experience, 2009). It can be said that SL, a compelling element of Web 2.0, is made to order for this "active" learning vision.

Resolution of Challenges

Predictably enough, technical issues arose with the initial integration of SL into the course in fall 2008. Students are informed upon entering the interior design program what kind of computer capabilities they will need, but often they have already purchased computers that are inadequate, and/or students may not have the funds to acquire the type of computer they will need. Consequently, students occasionally report problems with computers crashing, or an inability to log onto SL. The CAD lab designated for the sole use of interior design students and located in the department is often occupied by classes in session.

The number of computer labs that are equipped with SL has increased. These labs are located throughout the campus. However, students prefer to work in their program's building because it is more efficient and convenient for them, especially since interior design students typically spend a great deal of time working on projects in the department's design labs.

Another challenge emerged from success: the designed gallery began to fill after a couple of semesters. There has been discussion about whether to keep the original gallery space for special exhibits. This could be for any faculty members who are currently using SL or perhaps others from the college who would like to showcase student work even though they are not currently using SL. There are special exhibits in display cases in the real building, and a similar space could be utilized within SL. Since the original design of the building and its interior, another instructor in the department has begun using SL in an adjoining dual-level gallery space for the display of student products. Room to expand remains within the confines of the building as it was originally built. Of course, SL is not limited to the parameters of the architecture found in reality. An easy solution to the demand for more space has been proposed: build vertically while retaining the integrity of the design of the exterior shell of the building as it relates to the rest of the campus.

In addition, plans have also been discussed for expanding collaboration to the global community. Since it is not easy to bring individuals from across the globe (or from another part of the country) to be trained on-site, the logistics of global participation are limited to partnering with programs that have a similar capability of providing SL support. An alternative is to develop a method for distance training and support for professional collaborators. Program growth at the introductory level has focused on critical thinking and peer review to increase professional evaluative skills. However, the results of professional feedback have indicated a lack of time in current professional practice to engage with educational entities. To raise

the level of engagement in expressing critical analysis of student work, an appropriate support structure and system of communication must be devised.

Educational Philosophy for Instructional Design

A complex matrix of philosophies informs the faculty in design of a learning environment constructed in SL. First is the philosophy of *progressivism*—for example, a student/learner-centered model where the faculty, as content expert, designs the environment to meet multiple learner styles. SL provides visual, auditory, tactile, and kinesthetic modalities of interaction and social engagement. Students are responsible for learning, using the strategies and technologies available to them within the environment. Therefore, the student interface between the virtual learning environment, the instructor, and peers becomes an existential reality where meaning is awarded through communication with others and animated presence. This relationship equilibrates the power differential in learning, allowing greater self-directedness in accessing learning opportunities within synchronous and asynchronous applications.

Evaluation is experienced as an enhancement of learning as well a technique for measuring learner outcomes. The educational philosopher Dewey noted that problems and truth change, thus there is no eternal reality (Alexander, 1987). This progressive philosophy is indicative of the fact that course content changes as new knowledge in a discipline is created, requiring new learning environments in which to acquire the knowledge. The faculty designer in this case study was intentional in creating a progressive student-centered learning environment.

Next, authentic problem-based learning is drawn from professional realities in the educational philosophy of *social reconstructionism*, which centers instruction around how one can improve society (Trowler & Wareham, 2007). This case study used service-learning pedagogy to strengthen the ability of students to learn from society and augment their skills in designing solutions to societal problems. SL serves as a display in which students can exhibit their solutions and openly reflect on the meaning ascribed to the problem and to the solution for the community with which they partnered. Reflection is a key strategy in the service-learning pedagogy.

However, manual skill sets were also essential to this design course, and the philosophy that fortifies that aspect of learning design is *behaviorism*. Desired behaviors in the form of drawing and learning design skills are key to the interior design professional. The designed learning environment reflects the skills of students as evidenced in their virtual galleries. Hence, a tapestry of interrelated philosophies buttresses the use of advanced virtual technologies into this successful interior design course.

Conclusions

We see that integrating SL into interior design pedagogy is complex and multi-contextual, and that it requires examination of many factors in design, implementation, and evaluation. SL further expands student skills, ensuring their competency in mass communication and marketing platforms.

The technology of Second Life is transformative for both the pedagogy and the curricula. It expands the ability of students to peer-review in a formative fashion throughout the semester. The result is that, by the end of the semester, students are able to demonstrate professional skill in critiquing themselves and others, which provides evidence of summative outcomes. Student course evaluations noted that SL brings curricular strengths, which provide opportunities for “peer feedback/review, visual examples, hands-on demonstrations.”

Furthermore, students acknowledged that the learning process used in SL was valuable to professional preparation: “the course was very demanding but prepared us for the amount and type of work required for our major.” Other student comments provided in this case study in the course objective and outcome section give clear evidence that students are able to demonstrate metacognitive thinking. Significant to this case study is the fact that SL allows for virtual visual interaction among students, external faculty reviewers, and professional clients from the service-learning project—capabilities that neither Blackboard nor Moodle offers.

Second Life becomes an engaging platform that allows a virtual contextualization within created spaces whose pedagogical purpose is the analysis and evaluation of spatial relationships. The educational innovation specifically applicable to SL for interior design is the ability to review class collective designs,

conduct individual and group comparative portfolio reviews, and experience the built environments as three-dimensional models. Our own experience with interdisciplinary collaboration for healthcare design has been multi-layered and in constant need of modification.

Changes to the SL learning environment were facilitated through collaboration with the Information Technology and Computing Services (ITCS) staff from the Academic Outreach division of the institution. The Distance Education coaching experience stimulated the interior design faculty's collaboration with ITCS in creation of the SL environment and the process for instructing students in use of SL. Student SL training evolved from a single session to three smaller sessions. The efficient delivery of technical instruction was refined each semester using reported student difficulties in following directions as a feedback loop for improving the instructional process. ITCS staff continued to improve the SL space after initial design and offered timely response for troubleshooting any technical issues experienced. Investment of ITCS human resources in designing the SL environment has resulted in a formalized protocol for student training and a model for duplication by other institutional units and disciplines. Successful collaboration with ITCS is evidenced by the fact that the resulting SL protocols and models, along with the pedagogical learning strategies, have been widely adopted.

The collaborative educational structure is redefining itself through the process of meeting community needs. The curriculum became a dynamic sculpture that completed the cycle of metamorphosis in response to the interactions of faculty, students, and community. Education advanced with the use of virtual spaces in the design of this interior design learning environment. Intentional faculty design of learning environments should take into consideration the congruency between educational philosophies and pedagogies prior to integrating SL or any advanced technology. This case study showed that success is possible when philosophies of learning and pedagogical frameworks are clearly articulated and carefully integrated.

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