

5.7 Virtual Worlds; Real Learning: Design Principles for Engaging Immersive Environments

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Abstract: The EMDT master's program at Full Sail University embarked on a small project to use a virtual environment to teach graduate students. The property used for this project has evolved over several iterations and has yielded some basic design principles and pedagogy for virtual spaces. As a result, students are emerging from the program with a better grasp of future possibilities.

1.0 INTRODUCTION

The start of this project was simple. For students entering their first month of graduate work in the education program at Full Sail University, the goal was to introduce them to what a virtual environment was, get them to explore a little and see how they could use a virtual environment in their own teaching. The faculty along with the program director deemed it necessary to introduce students to a virtual environment. Herrington (2010) pointed out the virtual environments were particularly important for teacher education programs as a way to help teachers meet the standards set in the International Society of Technology in Education (ISTE) published NETS standards for education. Specifically, Herrington thought that virtual environments met the first two standards of inspiring creativity and using digital age experiences. This aligned with program goals, as well.

The students entering this program were approximately 80% public school teachers ranging from kindergarten through high school educators including public school technical staff. The remaining class was primarily higher education employees. Frequently, in an incoming class that ranged from fifteen to fifty, there were one or two corporate training specialists. All students entering the program were given a new Mac Book Pro to work on. Most of the students, particularly those who were public school teachers, were not sophisticated in their use

of technology; many had never used a Macintosh computer at all. Any use of a virtual environment needed to be easy to maneuver.

The virtual environment chosen was Second Life due to the fact that it had a large educational presence already in it, including ISTE and The New Media Consortium (NMC). Another important factor was that Second Life was stable on the Macintosh platform; not all virtual environments run on this platform. Also, as Foss (2009) noted, the global use and the strong economy provided a support that other virtual environments did not. Finally, Second Life had a simple download and installation procedure that was easy for students to follow, even for the ones who were not technologically accomplished.

Many institutions have a site in Second Life and the faculty members visited different campuses trying to find what worked in Second Life. Depressingly, many campuses seemed empty; it was rare to encounter another avatar. The most frequent design concept seemed to be to replicate the physical look of the campus, which was great for orienting people to what the physical campus would look like but did not seem to attract much use based on the empty spaces seen. Even the Full Sail campus was a replica of the real campus. The spaces encountered seemed cold and unappealing. Was there a better way to create a university campus in virtual space? Castronova (2007) referred to a *fungineer*

as a person who designed virtual spaces that were compelling and highly social using techniques pulled from psychology and game theory. This was the approach that the faculty was most interested in, and it lined up with the course within the program that taught game theory for education as well as other courses in learning theory and motivation.

2.0 ITERATIONS OF THE PROJECT

In June of 2009, the Educational Media and Design Technology (EMDT) began a new class in the master's program that was designed to be a front door course. The program is held totally online. As such, one of the desired outcomes was to introduce Second Life to the graduate students because it was used in several other courses throughout the program. Even though this was an accelerated course with month-long terms, it was decided that it was necessary to introduce students to a virtual environment early in the program.

In the third week of this new course students were asked to sign up for a Second Life account and to create an avatar. The students then met their instructor in an assembly in Second Life that was held in a public area. Since the class size ranged from fifteen to fifty students, it was a considerable crowd. Furthermore, since students created a Second Life account with whatever avatar name they preferred, the instructor had no clear idea of who was actually a student. This proved to be a difficult situation as anyone in the area could and did attempt to join in with the class trying to find out what was going on. The result was a disruptive environment that left both instructor and students unhappy. It was clear that the class needed a private place to gather. The following term, a more private place was sought but it still proved to be too public for a class. People outside of the class were attracted to the group and interrupted, in attempts to discover what was happening. The situation was not conducive to good pedagogical practices.

2.1 First Iteration

Due to the problems of being in a public space two months in a row, one faculty member made a decision to purchase a piece of land with the hopes that students from any course in the program would be permitted to use it. In order to own land, an account holder must have a premium account. Linden dollars, the Second Life currency, is exchanged on the world monetary exchange and the price in United States dollars varies. Prices reported here are in United States dollars and given the flexibility of the currency market, subject to vary. Most often, the exchange rate hovers around 200 Lindens per dollar. The lowest monthly charge for a premium account is \$14.95 per month and rises, based on the amount of land owned; however, the account holder also is granted an allowance of 200 Linden dollars per week, paid back into the in-world account.

The faculty member purchased an account and then paid for the initial investment in the land, house, landscaping and furniture. Total cost for all was under \$50.00. The original land purchased in Second Life was a fairly small parcel, about 1,024 square meters. The parcel was set high on a hill and, in the distance, the Linden Ocean could be seen. A small house was placed on the land surrounded by landscaping to create a pleasant environment. Included in the landscaping were a small pond and a butterfly garden. Inside the house, on the first floor, were a living room area and a dining room area. The upstairs level of the house was set up as an office. Some outdoor furniture was placed around the land and on an upstairs deck (Fig. 1).



Figure 1: First property – upstairs deck

Students in the first month of the program gathered here on one designated evening of the term. Signs were placed on the property to answer questions about the team assignment associated with Second Life. Students were to join with their teammates, read the signs and select a topic from the short list provided. The instructor then gave a representative from each group a note card with two locations on it that related to the chosen topic. Students then left as a team to begin exploring Second Life. Students were told that they could come back to the land at any time but records for the land showed very little involvement outside of this one class meeting.

2.2 Second Iteration

About three months later, after considerable thought, the land was redesigned. The house, which had only infrequently been used, was removed. A waterfall and stream were placed on the land so they flowed down to the pond with the only building a small gazebo on a bridge over the stream. This opened up the land and provided a more spacious look. It was easier for the instructor to visually track students without any walls impeding view but it was still not satisfactory. While the students expressed appreciation for the space, there was no reason for students to stay there, to talk, to be together. Also with twenty to fifty students on the land at one time, the place was crowded. It seemed to be time to move.

One factor in the decision to move was an expression by many of the students that

they wished they could go visit the ocean seen in the distance. Since the physical campus is located in Florida, although not near the ocean, students associated the university with Florida and Florida with the beach. Interestingly, this coincided with Theodore's (2009) exploration of Second Life where he found himself being drawn to areas that had water on them. So a search for an oceanfront property began.

2.3 Third Iteration

Early in 2010, a piece of property on an inlet close to the ocean was purchased. This new land was significantly larger (over 4,000 square meters) compared to the previous piece. Again, this purchase was funded privately, mainly with the account holder's allowance as the price for the property was well over \$100 just for the land. The property was also surrounded by other, very small pieces of land. In the ocean, were several small parcels that had tiny islands on them. This land carried a Linden Labs rating of G, which meant general use, and reduced the chance that neighboring lands would have any objectionable material on them.

Another change was made, this one to the assignment associated with Second Life. The initial assignment was for students to explore Second Life and report back on how a virtual environment might be useful to them. The outcome which was to make a multimedia presentation about Second Life was not in alignment with the purpose of the assignment which was to understand the how students could use a virtual environment to enrich their own teaching. Mayrath, Traphagan, Jarmon, Trivedi and Resta (2010) reported that relevance between the activity and the objective were a key factor in instructional design especially in virtual worlds. Students needed to see how virtual environments could enrich education environments. The assignment, therefore, changed to require students to conceptualize what a perfect learning environment for a selected lesson

would look like and to discover examples in Second Life that fit their view.

Mayrath et al also spoke to the time factor needed to be proficient in Second Life. Indeed, Falloon (2010) also found the same issue when he noted that the time needed to learn a new technology had to fit into the amount of time available. In an accelerated program, this was a challenge. The introduction to Second Life was moved from the third week of the program to the first week of the program to give the students more time to learn how to maneuver through the world. This meant that almost immediately, students were told that they needed to create a Second Life account and to begin thinking of educational spaces very different from the ones that they were currently teaching in.

The beach property was prepared for class use by placing a new house on the property, well back from the water. This house didn't have the rooms that the previous house had but rather was basically a one-story roofed platform. The entire house set up on stilts. Underneath the house, a small patio was placed and furnished with casual furniture (Fig. 2). This proved to be a favorite among students and was usually the first place students sat when the class started.



Figure 2: Casual sitting area

Down by the water, more casual furniture was placed in keeping with a general theme of a beach house. Tiki torches lit the area. This property also contained some space that was in the water, so the property was waterscaped as well with coral, plants and

fish. A small dock led out into the water and the landing point for the property was fixed there so as students arrived, they could see the entire property before them. Because of all this detail, the total budget for this move was close to \$200.

The property, which was used to host student meetings starting in July of 2010, was popular with students. During class, many students wandered around exploring the property and frequently used the beach area to stage scenes to be used in the class project. But once the initial class was over, few of them revisited the beach and subsequent Second Life assignments in more advanced classes did not generate any interest in going back to the property. Land records showed that most weeks, outside of the class meeting week, only two or three people visited the land. Some of these were, no doubt, neighbors who were wandering or who crossed over in their way to somewhere else. So, very few students were interested in coming back to use the property.

2.4 Fourth Iteration

In December of 2010, Linden Labs, the parent company of Second Life, closed the teen grid and moved those customers to the regular grid. At about the same time, Linden Labs changed the ratings on land to G (general use), M (moderate use) and A (adult use). At the same time, Linden Labs began to permit people as young as thirteen to sign up for accounts, but these accounts were restricted to G lands only. This helped to clarify the purpose of the property and to move adult sites off into areas of their own, which shielded younger users from stumbling onto questionable content.

This changed the way that educators interacted with the environment. Since previously some teachers had established places in the Teen Grid, they were now forced to move to the main grid or to move to different virtual environments. This actually made the decision to use Second

Life easier, since there was no longer a separation between the Teen Grid and the main areas. The faculty contemplated a move to a newer virtual environment but again, after a brief exploration, Second Life proved to be the choice because of the stability on the Macintosh platform and the simplicity of installing and starting. Another factor that weighed heavily in Second Life's favor was the in-world marketplace. Most of the faculty as well as the students were not able to build and script complex objects, so the marketplace allowed users to purchase or find for free any elements needed for projects such as chairs, trees or ducks.

At about this same time, changes needed to be made to the way the land was used. The beach property was a good start but the one drawback was that there was no room for multiple groups to meet at one time. Also, the land was getting full and it was difficult to add anything new. Since the property was surrounded by small plots of land that were for sale, it seemed to be a good time to expand (Fig. 3). The changes in Linden Lab's ratings actually meant that many people moved to the newly opened areas and that resulted in falling land prices. Some of the smaller pieces of land (512 square meters) were selling for only 1,400 Linden dollars (roughly \$7.00).



Figure 3: Land for sale

As pieces of land were put up for sale around the beach property, they were purchased and added into the main property. These smaller pieces of land were generally about 512 square meters, an ideal

size for a small group of four to six students to gather.

Gradually, land and ocean around the project came up for sale and was purchased and incorporated into the whole (Fig. 4) until the entire property contained more than 40,000 square meters. This increased the amount of items that could be placed on the land but raised land use fees for the account holder to \$195 dollars per month.

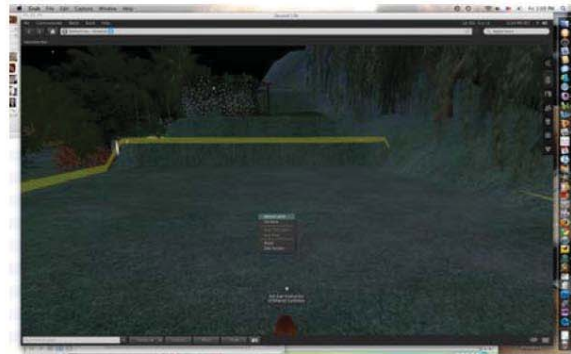


Figure 4: New land

The property was then re-broken up into smaller pieces of land that were used as collaboration spaces. This was necessary in order to create separate sound zones. This way, people could be working into two adjacent areas and not be able to hear each other.

In order to facilitate students finding their way around the property, small areas of land were given names and the landscaping and soundscaping was appropriately themed. For example, the Orchid Room (Fig. 5) had orchids all around the area, a small fountain and wicker furniture. Bird sounds were used in this area. Immediately adjacent was the Fern Room with a small waterfall and past that, the Crane Room had free moving crowned cranes and bird of paradise plants.



Figure 5: Orchid Room

Students could easily find an area to work in and the names also served for groups to use as a landmark to set up meetings.

As students progressed through the program, they began to use the land for multiple projects and for collaboration. Land use counts began to rise. It became more common to see weekly land use to be somewhere around twenty people.

Other faculty members within the program began to express an interest in using the Second Life land as well. Initially, one faculty member staked out a section as his virtual office and began to hold office hours there. More faculty members wanted to do the same but conflicts arose because students would anticipate that spaces would be open for their use only to find faculty members in there. A schedule for the land was rejected because there was a desire to keep the land as open and the use as fluid as possible.

As a result, it became even more important for the property to have some flexibility so that students had as many options as possible in order to explore and create.

2.5 Fifth Iteration

In order to have other faculty members fully participate in the Second Life experience, it was necessary to give them a space of their own. By this time, with all the land purchases, the property extended in a giant L shape and stretched down to a second beach area. The EMDT program director

owned a Second Life account for years and had been accumulating the allowance, so she donated 80,000 Linden dollars (about \$400) to the expansion. In March of 2011, a nine-unit apartment building was built on the second beach (Fig. 6) with a price of 10,000 Linden dollars (about \$50). The nine units each had two floors. The top unit was the penthouse and was substantially larger than the other units and included an outdoor pool and deck area.



Figure 6: Faculty Offices

This space was set-aside as a student collaboration area (Fig. 7). The decision was partially practical, to avoid having to make a decision as to which faculty member would get the penthouse but more importantly, as a symbolic reminder of how important the students were in this project. The penthouse was decorated with furniture and art; additionally, the property was landscaped to complete a modern tropical theme.



Figure 7: Penthouse

A lottery was held and, in numeric draw order, faculty members selected a unit. Initially, there were four faculty members. Each of the original four faculty members

received two thousand Linden dollars (about \$10) in order to purchase furniture. Three stores within Second Life were suggested, but the faculty members were free to buy wherever they wanted. This budget was enough for most of them to furnish their first floor but left the second floor of most units empty. Given all of the free items available in Second Life, many of the people were able to find things to fill up that space as well. Within a few months, though, two more faculty members signed on and another unit was set aside as a machinima studio. Students frequently has expressed interest in having a place to shoot like looked like a home environment. On the first floor of the unit, the machinima studio was furnished with a dining room set, a kitchen set and a living room set, in order to facilitate the creation of video projects within Second Life. The second floor of the unit was left empty so students could bring in whatever they wanted to make the place look like what they needed.

Not all of the faculty members liked the idea of having a space in the faculty building. Similar to the students, they expressed a desire to be outdoors. So, for one faculty member, Beth's Beach (Fig. 8) was built so she could have a space that reflected her personality. The area was designed to be an open yet defined office. One faculty member even contributed a photograph that was hung as art work on the wall.



Figure 8: Beth's Beach

Faculty members were free to use their space however they deemed. Some used it to hold virtual office hours; some explored

what a virtual environment was like and, still others used the space to create video materials (machinima) for their class.

With this final building, the land was essentially complete. Land use rose to about thirty to forty people per week, a considerable number for a program that has approximately 250 students enrolled.

3.0 DESIGN PRINCIPLES

Along the way in this project, several design principles evolved and were subsequently followed in designing new spaces and redesigning older spaces.

The first principle was openness. No walls were to be used whenever possible. Visually, the land was to be expansive as possible. The only building on the entire property with solid walls was the faculty office building.

The next principle was natural elements. People enjoyed being outside. Even when an interior area was provided, people gathered in outdoor sites. So as much as possible, any construction was avoided on the property and natural elements like plants or even fish tanks were placed inside whenever possible. Water was used throughout the property to provide a relaxing element.

The third principle was soundscaping. From the start of the project, sound was important. Linden lands come without any sound. In many ways, this was ideal because it allows for personalization. The first property had bird sounds and a slight wind noise. The move to the beachfront property meant adding in wave noises. Different collaboration rooms had slightly different soundscapes. In some places, elements such as a woodpecker that hammered on a tree have been added to enrich the environment.

The fourth principle was to encourage exploration. This was accomplished by

using small elements that were not easy to see with a quick glance. For example, down under the dock on the first beach, there was an octopus that moved around under the dock. Students had to wait for it to emerge or jump into the water and swim down to see it. This type of small detail meant that the longer one looked around the land, the more there was to see.

These principles clearly came into play when the designer of the Full Sail University Second Life campus entered the EMDT master's program. Kris Newton, a computer-programming professor at the university, was asked by the Marketing department to create a Second Life presence. His initial build replicated the campus (Fig. 9).



Figure 9: Full Sail campus – initial build

This was exactly what had been requested and Newton duplicated it right down to the rows of chairs in generic classrooms (Fig. 10).

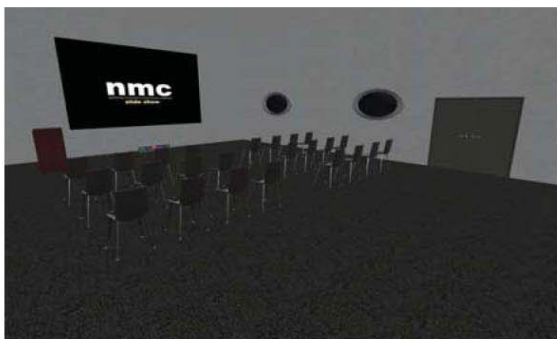


Figure 10: Classroom

As part of completing his master's degree, Newton redesigned the campus using what he had learned throughout the program

about educational spaces and in particular educational spaces in Second Life. The redesign did not resemble the physical campus at all but reflected the spirit of the institution.

Newton's vision was lighter, brighter and seemed more inviting than the previous version (Fig. 11).



Figure 11: Redesigned campus

Furthermore, Newton created a classroom space that could swiftly be reconfigured at the touch of a button. The room could be arranged around a conference table or a desk and chairs or in a more casual open circle (Fig. 12).



Figure 12: Classroom in Conference Setting

4.0 DISCUSSION

As the project has progressed, several things have been learned. First, no one in the EMDT faculty had the expertise to

actually build or script objects. So everything had to be bought. The placement of elements on the property was a much bigger challenge than originally thought. Placing items in a virtual environment so they looked correct from all angles was not an easy task and took many hours of practice.

Another challenge was that the faculty members had various levels of Second Life expertise ranging from mastery to neophyte. Some had never been in Second Life at all. So a series of meetings were held to train everyone on the use of Second Life starting with how to create and dress an avatar and leading up to building objects. This grew within the university to become a series of professional development workshops open to all faculty and staff. Out of those workshops, a permanent round table was established, led by Newton, and open to all faculty and staff through the institution.

The land is always being reformed. Recently a waterfall was added and a new office established on a mountaintop for a faculty member. A request for a grotto underneath the waterfall is under consideration. Some of the students now use the property for their high school classes; other students come to the property just to relax. Recently, the project has been the site of several machinima projects. There is now a second piece of property at 20,000 square meters waiting for the right idea to come along and transform it.

At this time, the 40,000+ square meters between beach one and beach two are at maximum capacity. In order to grow, another move is needed. The options are to purchase a complete mainland sim or to purchase an individual island. Either of these options would yield about 65,000+ square meters. The move will be expensive and every option is being considered. When the next iteration comes, there needs to be a plan in place before the building starts. The current property was expanded bit by

bit and as a result, there has never been a master plan for where to put everything.

Another factor that was raised along the way was one of digital citizenship and ethics. A situation arose where students intruded onto neighboring land, even intruding into someone's Second Life house. When they were seen by a faculty member, their reasoning was that the property owner was there so they had not hurt anything by using this property. This led to many hours of discussion about what constituted fair use of virtual space. Finally, some of the faculty members drafted an acceptable use policy for the students using Second Life and this was shared among the whole program. It also opened up some interesting discussions with students about the issue.

5.0 CONCLUSIONS

This is clearly an example of a small project that grew much larger than the original creator ever thought it could. Starting out on a project like this does require some thought and some planning. The uses of the space need to be considered but the entire space needs to be kept as open as possible to create a dynamic environment that can be used in a variety of ways.

One thing that has been clear was that the vast majority of students enjoyed the Second Life experience. Many preferred to use Second Life to other means of collaboration such as iChat, AIM or Skype. Some students have used the land for relaxation or to unwind. Even after the initial class, students continued to use the property as a meeting spot for discussion and group work within their cohort. Others have brought their own high school classes into Second Life. Two graduates of the program created an immersive experience in Second Life to explain genocide to middle school students and bring their classes through that project. Additionally, one recent graduate reported that he had received and

accepted a job offer to work full-time in Second Life for an education company.

There are two potential pitfalls that can be made in Second Life and both were made by this project. The first is to attempt to define the space very rigidly. Allowing students and other faculty to give feedback along the way can create a property that is more open and flexible. The second is to try to replicate first life. Reality is not the way to go; with infinite possibilities, things that cannot be accomplished in reality should be tried.

The second life of the EMDT program has been a success. The next move will be to even more adventures in virtual environments. Students are passing through the program and going on to use Second Life and other virtual environments in a variety of ways, creating their own immersive environments for their students. The virtual is proving to be a reality in graduate education.

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