Virtual Reality Environments for Learning and for Community: An Opportunity and My Challenge to OpenSUNY

(Empire State College)

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This presentation visually presents some experiences, but the best way to understand this is to become "immersed." See my suggestions for a 4-week, 1 hr-per-week mini course for SUNY (in the submission form).

In the meantime, *please read the notes to better understand what the images are illustrating.*

Is built upon I work in various virtual reality environments over the past 10 years. I often use the slides to illustrate points in various applications and to various conferences and communities. In this situation I want to illustrate to the Open SUNY community the work that I have done in an environment that is very hard to portray through text, image, and even video. I would like to have others join me someday. Two over the initial bumps and bruises of learning how to get if you were, how to get an avatar, how to navigate and then later participate in the joys of meeting across great distance in what seems to be the same space. Please take the time to look at the notes I've added because the pictures are important but they really don't tell the whole story. Until we meet on a virtual island, thank you for taking the time to view this presentation. Eileen

What this slide show covers

- Brief intro to instructor & Empire State College involvement
- Highlights of a design overview – *would like "live" engagement here eventually*
- Brief overview of recent course with published results on community and knowledge building – a *case study*
- Examples of instructor activities; selected examples of student islands
- Resource links
- selected publications and presentations

Overview of what will be covered

Virtual Reality Environments at Empire State College

- Second Life - 2006; cost became prohibitive (up to $600 per month for 2 islands)
- Since around 2012, open source islands – less expensive / free materials too:
    - *Free islands and programmer community; could be hosted on institutional servers*
    - *Vendor rentals: $20 per month for 4 island and 40 avatars visiting at one time*
        - **Can be preconfigure and/or custom developed**
        - Island rental includes the server space
- Students / visitors
    - *Download a free avatar*
    - *Get a free avatar*
    - *Follow directions for speech and text*

Highlights the design and context of virtual-reality environments and review ESC's history with these spaces.   Gives overview of how The islands are acquired and how they work.

Although participating in virtual reality was initially quite expensive and was dependent on either having or procuring 3-D development skills, today with the open source movement you can either get islands for free and host them from your own servers or you can rent islands from other developers at very reasonable cost. Another thing that went along with the open source movement was the access of many more free materials that gender is 3-D developers have made available to the public. Also 3-D developers often offer very low cost ways to improve your islands or get interactive devices.

Rich designs for learning

- **Community / Context**
  - Presence & collaboration
  - Simulates reality & known communication needs
- **Integrating / Scheduling**
  - Extend a course or activity
  - Thread with meetings
  - Info and items can remain
- **Assessment / Evaluation**
  - Similar to classroom or a conference review, examine the content and the process
- **The "experience" / motivation**
  - Predesign location, "curriculum" or meeting plan
  - Secure immersive buy-in
  - What makes this interaction important?

Place / location

Instructor creates a learning experience – from meetings to role playing to shared activities – as in any learning environment

Indicate that the instructional design around using an immersive virtual-reality environment addresses the same issues as when you design any learning environment, face-to-face, online or blended.

Creating a virtual reality environment is very much like designing a complete and comprehensive rich classroom environment. Although you can use in very limited ways, if you think about it as a learning experience that can even have place and interactions you can start to utilize some of the power of this environment.

A startup example: Course Objectives, from syllabus (Teaching & Curriculum)

"The *overall* learning objectives of this course address the need to:

- extend the educational practices begun during Teaching and Learning, allowing you to develop inquiry-based lessons and practices and to reflect on your implementation;
- develop successful uses of the Next Generation Science Standards, the Framework for K 12 Science Education, NYS Core Curriculum, the NYS Common Core, and high-stakes assessments for your classroom practice;
- familiarize you, through lesson development and commentary writing, with the processes and practices that will be required by edTPA;
- enable you to develop a *network of colleagues* with whom you can share advice, lessons, projects, and support – during the course and hopefully during your professional career;
- provide you with opportunities to learn, use, and share-with technologies that allow and support 21st century learning for both K12 operations and for communications within this course."

Here's an example from the course that I recently ran and that I then studied and published about. This study is coming out in the Journal of Educational Technology Systems in spring 2018 Here are the objectives for the course and you can see that the areas that I've highlighted are the ones most relevant to the points would be making. The students had to get ready for a portfolio that they must submit to NYS to become licensed teachers. This portfolio is NOT reviewed by faculty that they've worked with; it's reviewed by external evaluators. And the requirements of the portfolio are very strict. The documentation alone on what needs to be done takes up more than 50 pages of single spaced directions. What I looked at in my course was how was a get my students ready for this portfolio (known as Ed TPA) within my class without it overtaking the class; it was not the primary objective of the class. The primary objective of the class was to get students to be good science teachers. That goes completely aligned with the goal of the portfolio but there were different considerations for both. So I put into my course objectives and getting ready for this test was an important consideration but it also made it clear that they're going to be networked with colleagues and that they were going to be using technologies to share with these colleagues to improve their own learning and to have a truly 21st-century experience.

Virtual-reality - start off with whole class –
slide show & posters too; started in an easily-navigable open space with relaxing seating

Here is an example of the way I conducted the virtual reality meetings. We started in an open space — because I don't like to have them navigating through buildings if they're not that good with moving their avatar — and I went over the topics they're going to be discussing and the ways they would be grouped during the meetings. So on the left you can see the poster board that I was using and on the right you can see students assembled in my idea of a comfortable looking lecture. The introductory lecture lasted for about 10 minutes and I tape-recorded and then later sent the tape to the students

Meeting w/ the different groups – peer discussions w/ periodic instructor visits

Empowering the students to have their own voice and perspectives – NOT just instructor led

The students then went to different parts of the island to break into their discussion groups that I had assigned them. This gave them time to talk about the topics for that particular meeting and to work out any areas that were problematic to them. Remember they were getting ready for a very high stakes portfolio test that would require them also to create good videos of their students **in the actual K12 classroom.** Teachers were very concerned as to how they could get appropriate, educationally, sound interactions from their middle school and high school students to show well on the cameras that they had to use to tape their own teaching as required by the portfolio assignments. So the students were very concerned about understanding the process and they worked hard among themselves. I came around to the different groups and address questions. I also was taping my interactions with the different groups of that they could hear any comments that I had made other groups later. Remember this is a very high state test for them and they wanted to be as prepared as possible.

Virtual-reality and loop-back data: findings –
looking for learning; topics that surfaced

Topics Raised by Students:	
Making the tape	Camera movement & placement
Misunderstanding – video content	Student must be center / not teacher
Misunderstanding – video process	Planning / staging students for the camera; getting students camera comfortable
Types of assessment that can be used	Regents? Other?
Group disagreements	Interpreting handbook differently
Instructor concern	Are all reading students reading instructor comments and corrections in discussion boards?

Dialog fallacy

Now I was able to hear everybody just by going to the different groups area; I also had them have a note taker for each group and they took notes about the topics and then looped them back into the online discussion board. Each group posted their comments and concerns about the topic of the day — which revolved around the portfolio — and they then went back into the discussion board, read each other's work, and then inputted comments or questions.

Later I was able to go back and look at these combination of videos of the classroom, virtual reality experience and look at what the students were saying in the loopback session. And I categorized the type of comments and statements that the students are making about getting ready for the portfolio process. You can see here they were concerned about making the videotape (and who wouldn't be if you had to have 20 to 30 high school students sounding scientifically smart on the tape that is going to an external reviewer). There are also some outright mistakes that were being made that would actually have gotten the portfolio disqualified. Some of the student groups had disagreements about how they were going to interpret the directions and handouts that came along with the portfolio process. Though there are lots of areas that surfaced during the simultaneous discussions in the virtual reality environment and the subsequent discussion boards. My contention is that the students went a lot

further with their thinking because they were able to interact synchronously with other colleagues without just the teacher being there all the time. I was able to find out a lot of the genuine concern to the students that might've been hard for me to find just in assignments and assignments that might've been academically focus but not procedurally focused.

Familiarity – and its nurturing and role

- Type of discussion – from the lit / what they are to serve (community, content, analysis)
- Terms that appear – enjoy (with videos) / you guys – learning from – (find chart on community attributes) / acknowledging the peers and not the instructor
- More honest revelations then if just to instructor (the real pulse) – inquiry confession by student (not using)
- Bringing in concerns from other courses (MT into T&C) – new teachers
- Holding students responsible to the class – more timely postings (anecdotal – less nagging and point penalties)

Here I'm just pointing to some the things that came out from my having the experience with the students themselves in a facsimile of a face-to-face meeting that you might have in your own classroom. I did see that the community was evolving among the students and I could see that as a went around to the different groups. I think that the students were a whole lot more honest among their peers and when I showed up to talk to them they were able to bring forth some of the concerns in ways that they might not have if they were just putting a note in the course or having a discussion with me after class. Students are able to confess they really had trouble with the type of teaching practice that's now required in science education — teachers aren't supposed to just lecture and have students taking notes; teachers are supposed to students doing real investigations. So I felt that I was able to get a lot more important information from the students in this quasi-protected environment.

Some challenge questions for instructors and instructional designers

- How do you avoid student isolation in online course?
- What role / voice does the instructor have in directing discourse and structuring authority and interactions?
- How might synchronous virtual-reality meetings bring to avoid the hierarchical constraints of instructor-led webinars and streamed-video sessions?
- How do you work on supporting knowledge-building that can extend beyond the timeframe, and assessment, of the course?

Now I'm asking you to think about your own courses at you either teach or that you design and ask yourself these questions about avoiding the isolation that can come about in online courses. Remember, the instructor gets to read everybody but the students themselves only get to read a small portion of what's happening in an online course. So find out where you might be able to strengthen your course by having interactions that you can design in such ways to build knowledge, to develop a sense of community; of course you want to be assessing these experiences to be sure the students really are getting value out of the interactions — which you should be doing with any interactions that you have with in your courses.

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Here is some of the literature that supported the study that I did on the students in the portfolio class.

Using Virtual Reality – in education & how I have used them

- Affordable / use premade or customize – open-source movement
- Uses for educators:
  - Meetings, classes, lectures, presentations, poster sessions
  - Moves beyond the instructor domination of webinars / Skype
  - Shared experiences & visits to other locations
  - Study social / cultural interactions
  - Create a personal / professional / custom environment
  - Create community via telepresence in online environments
- View some applications & ideas

Startup – all class gatherings

As you can see, I am a big fan of the open design when you first bring newbies onto your islands. Yes, I do have some very nice looking "formal" buildings but I think we are all the most comfortable in this open landscape environment. I populated it with informal looking chairs and students easily figure out how to sit down. This group is actually looking at some startup posters that show them how to navigate the island. I begin my initial meetings with having some exercises on how to use the virtual space. But he also point out that I am not there to evaluate their skills as 3-D avatars. We are here for other instructional purposes. I share how my own experience with navigation is still rather sophomoric even though I've been doing this for 10 years. My goal is to set up learning environments rather than to become a gamer or particularly adept in the 3-D spaces themselves. You can also see that around this room — and I like to palm trees and evergreens and all sorts of mixed and fantastical settings (I am no artist I am a STEM person by background, obviously) — I have placed some of my better students works as a type of gallery for past events. This happens to be a science of an education class and so you'll see around it materials from past science-education presentations.

Breakout meetings

Here are some shots of a small group of three students (you see the man in the green chair appears twice) who were discussing their work with K-12 students and getting them ready for the high-stakes video that the teachers would soon be taking. When I showed up to visit the group, they already had a lot of questions and ideas and we reviewed them together

Breakout meeting

This was another group that I met on the same night. I had them moved to the Western building (which I got for free) and I just happen to have put in more formal seating here. This group had been involved in real controversy by the time I got here and had some very different perspectives on what was going to be required by NYS for their portfolio exam. They were ready with some tough questions for me when I got there. I was actually taping the session as they went through and come although you couldn't hear everybody's comments because I went one group at a time, I made a YouTube of the tape and then resubmitted it to the entire class so they could all hear the questions that had come forward from the different groups. Each of the groups also had designated the document who kept notes about the group and posted the notes back into the discussion board area of the course. I call that a loop back. It's been very effective in allowing individual groups to develop their own questions and perspectives and then shared with other groups. This is something you might do in a face-to-face class rather easily but in an online environment it's less easily done — although you can set up groups within many of the learning management systems. I have found though that getting the groups together synchronously creates a more active and engaging environment.

Briefings & discussions

This is a class within the MALET program which is designed for creating emerging-technology applications to different learning scenarios. Here this group has very different backgrounds and comes in with different perspectives. Actually one of the women works for SUNY Maritime and she was discussing the use of 360 cameras at this point. There was also an English teacher joining us from China at the time and there was a gentleman who works for a utility company and was creating instructional environments for preparing utility workers for emergency scenarios. They had a lively discussion. And you'll see my tendency to put posters, schematics, and directions right into the "physical" environment as the students are working and meeting. I happen to have been here to catch up on this discussion but there were other groups meeting in different parts of the islands. Although you can set up sound isolation areas, I have found they don't work as well as I'd like so I tend to spread my students out across the different sections of my virtual islands

Student Presentations

, You can see here that I am still a big advocate of the outdoor design. This particular student has also designed her own virtual reality environment and she's presenting on it in the background. I paid six dollars in the marketplace for this particular server company that I use (Kitely - $20 per month for up to 40 avatars & four islands) that actually has put this slide show that the student is presenting into an "slide turner." If you look at the bottom of her slide, which is explaining to the audience who were seated in front of her, you see there are directional arrows and thumbnail images that let her move through the different slides in her presentation. Actually, the audience can also turn the slides. I have set up the slide turners around the island with information that I would like an avatar to see when they come to a particular location. It served as directions and information even when there is no support or guide person available

Instructor lecture – to start discussion

Here is just an example of how an instructor who really wants to provide start up instructions or even a whole lecture can use the different features to his or her advantage. What I do is make my slides in PowerPoint, download them as JPEG's, and then upload the pictures into the virtual space — I can slide in the different pictures to illustrate the points that I want to make during my opening lecture statements. Students are sitting in their seats. The research and my experience has shown that students are less apt to be off checking their emails or searching the web while you are working within a virtual space than they are when you are in a classic webinar. Also to they feel a lot less uncomfortable when you aren't staring into their home or their office through a WebCam placed on their computer. I have to admit that myself I like the fact that I don't have to go and tidy up my office and that I can be sipping my coffee without anybody seeing it (and you can send whatever you like to drink).

Shared development experience with student

I put in the slide to illustrate that the use the virtual environment doesn't have to just be for what we might call classic educational experiences. This particular student was looking at how she might work some of the amusement park artifacts (that are available for free) for her own particular use on a virtual island that she was creating. The blue lines so you see around this swan like ride actually shows that I was editing the right and I was moving the object up-and-down as I then snapped the picture. I have a lot of tutorials that I give my students so they can develop on their own but I do like to meet with them periodically to help expedite the process of their developing their own islands. Actually, my virtual reality development course has the students developing their own work and sharing them through Screencast-O-Matic (or whatever computer screen capture program they choose) and sharing that development work with one another. I have found in a very Vygotskian way, that students sharing with students becomes a lot more effective then my sharing or even my documentation. The fact that we can work together though is a real benefit when you're making something at a distance — this particular student actually in the state of Oregon so is particularly grateful that we can work together in this type of environment.

Instructor – real & virtual (have fun too!)

Email me questions at
eileen.oconnor@esc.edu

Of course, in my pretend world I like to have the avatar that it wish I was. I was given the option to of having a lovely looking more elderly looking avatar but I decided to stay with the fun and wishful me. But I don't like to carry out the deception too long with my students. I make a lot of short videos to explain what I want them to do and as you can see I often put the real me talking during the video creation. There are quite a number of studies coming out about the use of identity, different looks, different weights and shapes and clothes, and even different behaviors. I have some students making islands right now for autistic individuals and for students with special needs. Some researchers suggested that being able to have an avatar presence can create some freedom and spontaneity that might not be as readily available to people in different groups. Lots you can play with here if you want to test out different role-playing and persona scenarios. I just use this to have some fun with my students and to remind everyone that were all human albeit in our virtual getups and that I want them to share their experiences much as they might do in an actual classroom meeting space

Exhibit area at an International Virtual Conference

http://conference.opensimulator.org/2017/

The open source movement which spurred the affordable access of educational institutions to these 2-D/3-D virtual environments has a community conference that is sponsored by a number of educational institutions and by some commercial developers. UC Irvine in California is one of the leading educational sponsors. Empire State College has been a supporter and through a nominal donation is a given space to promote their own efforts. I wish I could say I had a very elegant display, but I had a functional presentation booth where I post up posters with some of the work my students were doing. I wish I had some good shots of the previous year when one of my student developers actually set up a very nice booth that she supported and coordinated. She was a developer for AARP and was very comfortable with setting up conferences and she then went and set up a lovely booth for us that year. She went on to developing her own virtual islands to train older individuals as to how to learn how to use avatars and the like. I have some students right now open working on environments for senior citizens who have the time to learn new skills and often are very challenged with getting around physically. I'll let you know how that works out.

Student – brought 30 customers to her virtual island; ESC presented

This was a very exciting opportunity for me. My students was at the podium actually has a technology training business and she has a Customer Appreciation Day where she brings her clients into her physical office and provides them with some extra learning opportunities. Well Lisa got very adventuresome and she developed a virtual island (actually she downloaded one of the very nice redesign virtual islands and customized it) and she brought her clients into the space. To get over any hurdles with their learning how to sign on and getting their avatars, she had that all set up. So what you see here is the virtual component and this group is actually also sitting in labs throughout Lisa's office building. It was very exciting. She had invited me (I'm sitting at one of the chairs behind the podium) and several of her other classmates to come and speak about our perspective on using virtual environments

Student – informal meeting area

Here's another one of my students who actually hails from Texas and she wanted to create an environment that simulated the cattle drives back in the late 1800s. But she also felt that she needed to have engaging and relaxing start up experience so she put her how-to-use instructional materials into a large setting. Here John is explaining her work to her academic advisor and to me

Student – ancient Japanese simulation

Student – thesis defense of ancient Japanese learning environment for K12 special needs

Another one of my students wanted to create an immersive environment for her special education students who needed to learn about ancient Japanese cultures. Amy had worked with the students in face-to-face classrooms and had seen how disengaged they were with the textbook ways that these cultures were presented. Amy developed an island to represent Japan in the late 1600s. She went to a vendor who had created some Japanese cultural artifacts and she purchased several buildings spending almost $100 in the process. But with those building she was able to create a beautiful and immersive environment. She took my course and learned how she could create the background landscape and use different instructional materials. Actually you see her here right now presenting to her first and second reader her final project. She used one of the slide-turner software packages so that she could give her first and second reader a guided tour of her developments, academic, research, and presentation efforts.

Here's another very creative student. She loves to find new and interesting materiala. This student has made a game board and she has learned how to do the programming to move pieces around. Every item within a virtual reality environment can actually be programmed. These items can have scripts. This allows for programmers and for teachers of programming to use these islands as ways to encourage programming skill development. This student has been looking into making islands that she can design as a virtual game in and of itself. She wants the users to come in and be able to work with the different game components that she's creating. Her ideas to make them available as Open Education Resources which she will be posting in places for other schools and homeschool associations to use. She is keeping up with groups that are looking at more ways to library and store the various islands that are being created. I go to her environment when I want to learn about some new techniques and during my next break I am promising myself that I'm going to get up to speed on some of her 3-D development. The nice thing about open-source work is that — depending on the permission set by the developer — I may be able to look at the coding and learn from that process so that I can make some of my own 3-D interactive devices.

Well, I certainly know since the time of Second Life in the mid-2000's there was a lot of hype about how Second Life is going to take over the educational environment. It has yet to see that promise. It is a complex environment — is not working on simply one dimension. It is requiring imagination, scheduling, development of curriculum, planning for training visitors, looking into assessments, and the like. But it is the most creative and affordable platform that I have found available to me as a higher education academic. I think to as the world starts to embrace things like 3-D headsets and augmented reality, it's going to become more affordable to have these spaces and these open-source environments can grow a bit towards getting a more mobile interface. Also the demand for these 3-D environments that use headsets and the demands for augmented reality are going to require that users upgrade their computers so that they can have the higher-quality displays. That will be good for these low-entry virtual reality environments. I look forward to being able to design environments myself where I can look into creating three-dimensional artifacts that holo-graphically project themselves around an object or in an environment. But since I am looking for something that can build community and shared experiences, always I will have at least one part of me maintaining this 2-D/3-D virtual environment since it will be more accessible to more of my students.

Contributed book chapter to "Virtual Worlds . . . " featured Feb. 2018 by Nova Science Publishers

I have been actively involved in researching and publishing on the different potentials of virtual reality environments in the actual results I have found in my own classroom practices. This action research has allowed me to solidify my valuing of the community-building and creative knowledge-building that can happen within these spaces. This page shows the most recent book chapter that I have published along with Dr. Jelia Domingo from Empire state college and it actually is being featured by the publisher during the month of February 2018 as it actually hits-the-press. This active research group out of the UK is providing opportunities to extend my work into new and more international venues.
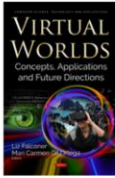
Editors: Liz Falconer (Bournemouth University, Bournemouth, U.K.) and Mari Carmen Gil Ortega (Senior Lecturer/Senior Fellow HEA, Education Innovation Centre, University of the West of England, Bristol, U.K.)

Book Description:

Virtual Worlds: Concepts, Applications and Future Directions explores the rich and fascinating topic of virtual worlds by bringing together research findings and discussion pieces from an international group of leading practitioners in the field. There are many different definitions of virtual worlds, but they all share the characteristic of enabling real-time interaction between users who are present in these worlds in the form of avatars, i.e., digital projections of ourselves into virtual environments. A particular theme of the book is how our activities in virtual worlds continue to develop our understanding of the nature of virtual experience, and particularly what it means to be digitally human. These ideas are explored from a diverse and engaging range of perspectives that include archaeology, languages, teacher training, computing, meditation and well-being, forensic science, performance art and artificial intelligence. Each chapter provides an in-depth discussion and analysis, and practical examples of successful implementations of virtual world technologies are also included. The book will be invaluable to researchers and practitioners in the fields of virtual worlds, virtual reality, augmented reality and artificial intelligence. It presents evidence, discussion and advice on some of the underpinning concepts relating to virtuality, on the application of virtual technologies to our daily lives, and encourages us to ponder the possible futures of these types of technology. (Nova)

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Table of Contents: