Virtual Reality Design for Palliative Care

Syllabus: ILLUS 3342-01

Prof. Fritz Drury

Illustration Department

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*Note: dates on this syllabus are for the pilot iteration in the Spring semester of AY 2018-1919. Should the course be offered again in 2019-20, the dates will be updated to reflect identical timing in the Spring of AY 2019-2020.*

Course Description

Virtual Reality Design for Palliative Care is a pilot course designed to allow students to experiment purposefully in the creation of virtual reality environments. We will measure the success of our work against a goal of providing comforting and liberating experiences for hospital patients with limited mobility, psychological or pain-management problems.

The course proceeds from the assumption that the artistic sensitivity and life experience of the students, reinforced or modified by input from medical professionals, patients and directed readings, can provide empathetic insight into visual, spatial and narrative elements that will prove positively reinforcing, uplifting and exciting to others, particularly those who are be facing significant medical challenges.

We will learn about the medium of immersive virtual reality: interactive 3-d computer graphics viewed through a head-mounted stereoscopic display. The course will be designed to address the limitations of this medium as well as its exciting possibilities. We will seek to understand the nature of virtual space, points of similarity and difference with everyday experience. Various themes and templates will be the basis of our projects, exploring design metaphors and seeking insight and connection with the imagined experience of our prospective users.

In preparation for our work in VR design, we will examine various visual and structural components of the world, and of art and literature, that might prove useful in building emotional and psychological resonance into our designs: color, texture, 2-d shape, 3-d volume, spatial experience, temporal rhythm and various forms of narrative structure. Students will be encouraged to adopt non-traditional approaches to the “scripts” they devise, in keeping with the free-form world of virtual reality. However, this freedom will be tempered by an over-arching concern for the viewer/user’s experience, highlighting familiarity, legibility, comfort and affirmation.

This course is designed to draw on the existing strengths and specialties of RISD Illustration students: imaginative visualization; humor and empathy; connection with a broadly-based audience and knowledge of color environments, narrative significance and visual illusion.

The course will also strengthen and broaden the students’ knowledge of the many design disciplines which must be hybridized to effectively work in virtual reality. Texts on film-making and narrative editing, theatrical set design, the psychology of sculptural form, pattern, texture and color will be included in our readings.

The course will proceed from the notion that human beings are hard-wired to respond positively to visual stimuli that evoke the natural world that we evolved in, and that the empirical study of the experience of daily life and the natural world can afford insight into human psychological reactions to visual and spatial variables that might be useful in constructing virtual spaces that are comforting, reassuring, interesting and uplifting.

Course Goals:

* Explore the visual and interaction design process for immersive virtual reality environments that will serve to provide positive psychological experiences for those in difficult, long term medical situations, including immobilized or traumatized patients;
* Work directly with medical professionals in cross-disciplinary collaboration;
* Familiarize students with immersive virtual reality and with design and implementation in this new medium;
* Develop empathetic insight in young artists and designers;
* Build a hybrid design discipline which includes elements of color design, spatial design, tactile and textural qualities and narrative structure;
* Design navigational and interactive scenarios that allow easy and satisfying engagement by the user;
* Work on collaborative teams, developing openness to the ideas of others and the ability to work as a positive part of a design group.

Course Objectives/ Student Learning Outcomes:

* Gain first-hand insight into the difficulties faced by patients facing a variety of challenges, and the medical professionals who care for them;
* Gain experience in building virtual reality environments that are tailored to gentle and affirmative visual experience and navigation;
* Gain experience in creating 2-dimensional and 3-dimensional digital visual components in various digital programs;
* Gain design experience with complex natural textures, color harmonies, atmospheric effects and other components of the natural world;
* Gain insight into human visual psychology and response to visual stimulation;
* Gain insight into the nature of human psychological stress associated with end-of-life depression or anxiety, phobias, trauma, physical pain and limitations.

Course Organization

Students will work in small collaborative groups.

The course calendar will be based around four multi-week projects. Each project will be introduced by the instructor and visiting medical professionals, with a visual presentation and verbal description of the issues involved, and a basic timetable of milestones for completion of important stages of the project.

Following the introduction, class time will be devoted to critique of in-progress works, to working sessions devoted to solving technical problems, and to further visits from medical professionals for critique and insight. The last week’s class for each project will be devoted to final critique and group discussion.

Prerequisites

Students must have knowledge of basic digital skills, including file organization and sharing, familiarity with 2-D visual editing programs such as Photoshop. Experience with 3-D modeling programs is desirable.

Evaluation of Student Work/Grading Policy

Assessment of each student’s performance in the class will be based on the instructor’s evidence of their interest and involvement in the course and their success on the four course projects listed below, in relation to the course goals. In addition, a student’s active participation in critique and class discussions will have an important effect on the assessment of their performance and the grade they receive. Attendance at every meeting of the course in mandatory, and also any help sessions, tutorial and field trips which may be scheduled. Two unexcused absences from class will result in a decline in grade of one letter. Three unexcused absences from class will result in a failing grade.

Diversity/Civility

The RISD Community is dedicated to the advancement of knowledge and the development of integrity. In order to thrive and excel, this community must preserve the freedom of thought and expression of all its members. A culture of respect that honors the rights, safety, dignity and work of every individual is essential to preserve such freedom. We affirm our respect for the rights and well-being of all members.

**Course Calendar**

**Project #1**

**Virtual Reality Distraction Therapy for Pediatric Injections**

**1. Goals**

a. Learn about problems with administering pediatric injections, and addressing related anxieties and physical reactions.

b. Introduction to design issues of virtual space.

c. Learn practicalities working in VR with TiltBrush, Masterpiece and Unity: How to get access to the equipment, how to login and store files, basic form creation, importing imagery etc.

**2. Assignment**

Our first assignment will be a relatively simple one, allowing for an introduction to the technical means of creating an environment in virtual reality using real-time drawing tools (TiltBrush, Blocks, and Masterpiece VR.)

The goal of the assignment is to create a short, one minute visual experience in VR that will be presented to a child about to receive an injection, distracting and soothing them from the anticipation of the needle’s “pinprick.” This procedure is already in active medical use and has proven effective.

We will hear directly from physicians and young patients at **Hasbro Children’s Hospital**, who will give us some insight into the nature of their fears, and what kind of environment might help them through.

Our work on this project will set a standard structure for the course’s design process, as detailed below. We will work in collaborative groups of three students each.

**3. Dates**

**Week One, February 14**

* Technical overview of VR design process and procedures
* Introduction of Project #1
* Interview with pediatric patients and physicians from **Hasbro Children’s Hospital**
* Out: Part A, Design Hypothesis. Prepare a short, written explanation of the essential visual qualities in your virtual world and the psychological effect you expect them to have.
* Out: Part B, Sketches. Prepare four exploratory sketches to help describe your design, for class discussion.

**Week Two, February 21**

* Due: Part A,Design Hypothesis
* Due: Part B,Sketches.

**Week Three, February 28**

* Due: Part C,VR Implementation: Create your design in the VR environment. The first half of the class will be a final crit of the designs.
* Out: Project #3. The second half of class will be devoted to the introduction of our second project, detailed below.

**Project # 2**

**Palliative and Cue Exposure Treatment for Substance Abuse and Related Trauma**

**1. Goals**

a. Learn about issues in the treatment of addiction: initial trauma, triggers, cues and compulsion.

b. Learn about therapeutic approaches including Cue Exhaustion Therapy (CET) and creating safe spaces.

c. Experiment with the psychological narrative structure in virtual space.

**2. Assignment**

Our second assignment will address issues involved in the treatment of addiction and other forms of compulsive behavior. We will hear directly from a doctor who works with addictsabout thepsychological dimensions and pain management difficulties her patients face, and the underlying traumas and other life experiences that can lead to or perpetuate addiction. This project will involve an option to address patient psychology through palliative shelter or distraction created in virtual reality.

**3. Dates**

**Week Three, February 28**.

* Assignment Out: Second half of class: Introduction of second project: Presentation and discussion with **Dr. Catherine DeGood** of Care New England Medical   
  Group.
* Out: Part A, Design Hypothesis. Prepare a short, written explanation of the essential visual qualities in your virtual world and the psychological effect you expect them to have.
* Out: Part B, Sketches. Prepare four exploratory sketches to help describe your design, for class discussion.

**Week Four, March 7**

* Due: Part A, Design Hypothesis.
* Due: Part B, Sketches
* Out: Work on Part C, VR Implementation: Create your design in the VR environment.

**Week Five, March 14**

* In-progress crit of Project 2, Part C.
* In-class working session on Project 2 Part C

**Week Six, March 21**

* Due: Project #2, Part C. The first half of the class will be a final crit of the VR designs for Project 2.
* Out: Project #3. The second half of class will be devoted to the introduction of our third project, detailed below.

**Project #3**

**Physical Rehabilitation and Pain Management in VR**

**1. Goals**

a. Work with physical interaction, haptic response, issues of gravity, and balance in VR

b. Learn about mind/body connection in physical rehabilitation.

c. Study design issues for functional therapeutic tools

**2. Assignment**

Project #3 will be centered around the mind’s perception or the body’s physicality in specific relation to issues of physical rehabilitation in patients with problems such as amputation and stroke. We will work in consultation with **Dr. Jeremy McVay PTD**, a physical therapist and lecturer at Brown with offices in Rhode Island**.** We will have the opportunity to design toward actual therapeutic devices that address problems Dr. McVay’s patients are facing. The technical focus of our work will be focused on physical interaction with virtual space, including the creation of physical avatars for the user’s body or body parts, software that allow for simulated physical interaction with virtual objects, and issues of navigation in virtual space.

**3. Dates**

**Week Six, March 21,** **second half of class**

* Assignment Introduction with **Dr. Jeremy McVay PTD**
* Overview of hardware and software for physical interaction and haptic response
* Out: Part A, Design Hypothesis; Part B, Sketches. Prepare four exploratory sketches to help describe your design, for class discussion.

**Week Seven, April 4 (RISD Spring Break is March 28)**

* Due Part A, Design Hypothesis.
* Due: Part B, Sketches
* In-class Work and tutorial on software for virtual physical interaction.
* Out: Part C, VR Implementation. Create your design in the VR environment.

**Week Eight, April 11**

* Work-in-progress crit on Project #3
* In-class work on Project #3

**Week Nine, April 18**

* Due: Project #3, Part C. The first half of the class will be a final crit of the VR designs for Project #3.
* Out: Project #4. The second half of the class will be the introduction of our Final Project #4.

**Project #4 (Final)**

**Virtual Reality Design for Palliative Care for End-of-life Patients**

**1. Goals**

a. Learn about the issues facing terminally ill patients and the medical professionals that care for them.

b. Explore options for emotional narrative to be found in cinema, gaming, novels, poetry, painting, music etc.

c. Consider techniques for visual, spatial and temporal transitions in VR

d. Explore the associative characteristics of abstract visual qualities of color, texture, form and space.

e. Incorporate discoveries from the first three projects into a functional and meaningful virtual reality experience.

**2. Assignment**

Based on the readings and slide show, and on the discoveries you have made in your first three projects, construct an immersive, interactive virtual environment for use in assisting palliative care for immobile, terminally ill patients. The goal of the project is to provide a comforting and seamlessly functional experience that allows for a sense of freedom and exploration, while minimizing frustration in the interactions, unsettling experience or potential “triggers.” Ideally, you will take into account the haptic experience of the user/viewer and their “body space” so that the interaction with the experience is not simply visual, but afford a sense of physical connection as well. Your project should involve a narrative or storyline that unfolds in time and in navigation of the virtual space.

Your plot can be purely poetic (involving sensations that are simply juxtaposed in space, but that have a coherence or narrative outcome based on qualitative connections) or can involve a traditional linear narrative (beginning, middle and end, possibly with a point, message or takeaway) or it can be a metaphorical journey involving a landscape that is traversed with a significance to the character of the transitions.

You should conceive of your project as a virtual world that can be visited repeatedly, with new insights and experiences gained. There might be embedded interactive options that allow your user to adjust and affect their own experience.

We will be working from specific patient profiles provided to us by our medical collaborators from palliative care and hospice organizations. There will also be an opportunity for consultation with patients in a focus group, or by individual interviews.

Collaborators for Project #4:

**Dr. Jennifer Ritzau**, Hope Health Care and Hospice, Providence;

**Dr. Jensy Stafford**, Hope Health Care and Hospice, Providence;

**Dr. Angela Anderson**, Lifespan, Hasbro Children’s Hospital, Providence.

**1. Dates**

**Week Nine, April 18. Second half of class.**

* Assignment Introduction with **Dr, Jennifer Ritzau, Dr. Jensy Stafford and Dr, Angela** **Anderson.**
* Out: Part A, Design Hypothesis. Prepare a short, written explanation of the essential visual qualities in your virtual world and the psychological effect you expect them to have.
* Out: Part B Script and Storyboard (see Appendix below.)

**Week Ten, April 25**

* Due: Part A, Design Hypothesis.
* Due Part B Script and Storyboard (see Appendix below.)
* Work in class on Part C, VR Implementation.
* Out: Part C, VR implementation

**Week Eleven, May 2**

* In-Progress Crit
* Work in class on Project #4
* Interviews with patients/focus group at Hope Health Care/Lifespan

**Week Twelve, May 9**

* In-Progress Crit
* Work in class on Project #4
* Interviews with patients/focus group at Hope Health Care/Lifespan

**Weeks Thirteen & Fourteen. May 10-22**

* Continued work on Projects.
* Group work sessions with TAs and tutorials by appointment.

**May 23**

* Final Review of Projects: 9:00 AM -1:00PM.
* Individual Reviews until 5:00PM.
* Due: Questions (See Appendix below)

**Appendix for Project #4**

**Part B: Script and Storyboard**

Write a script for you project. Your script can include a paragraph describing an overview of the “events” of your narrative followed by more detailed descriptions of the individual stages or scenes, as well as an indication of the “outcome” you would like to provide for your viewer/user. This last might be an emotional state, a way of thinking about the world or human relationships, a perception of beauty in nature, or any other kind of aesthetic experience.

When you have settled on your script, use traditional or digital 2D media to construct a storyboard showing the unfolding of the plot or sequence. Your storyboard should center on what the viewer will see, but can be accompanied by captions, notes, or secondary images that describe interactions with the interface, important points of decision or other aspects of the mechanism of the piece.

A good approach to storyboarding is the use of note cards or other interchangeable frames, so that edits and insertions can be easily made to the narrative thread. The process of making your storyboard may give you new insight into the original idea for your plot, and it is fine to make adjustments to the written script as you work on the storyboard. All storyboards should be scanned or imported into a pdf or other simple means of digital presentation for the crit.

The frames of your storyboard do not have to be visually elaborate images, but they should convey the essence of each step of the viewer’s experience, including a legible role for 2D and 3D elements that will define the psychological feeling of the narrative. It may be useful to import textures and forms from your libraries created for assignments 2 and 3.

The structure of your storyboard should be considered in relation to the temporal and navigational structure of your project. For example, if you intend the project to loop, diverge at the user’s choice, or follow a path through a landscape, you can have the sequences of images in you “board” follow that structure as a circle, fork or serpentine. Alternatively, you can include verbal stage directions that describe the structure.

**Part C: Project Implementation**

We will have four weeks to build these projects in VR. Budget the scope of your project so that it can realistically be completed in this time. It will be better to have a functionally simple and relatively seamless experience for your viewer than to have a world that is complicated and dysfunctional. One of principal goals in this course is to minimize the frustration for the user, who by definition will already be facing substantial personal frustrations and limitations. Your project should be designed to convey a feeling of no limitation, or effortless immersion in a gratifying experience. Four weeks is not a huge amount of time, and good way to think of these projects might be as a model or demo that could later be expanded.

It is fine to alter or simplify your plot/storyboard as you go forward. Some features or experiences you have built in at the beginning may not be feasible, or may seem superfluous. Conversely, you may get some exciting new ideas as you go work. Changes are fine, but be careful that you are managing your overall schedule to allow for completion by our final crit on the last day of class.

Our crit will be centered on the usability and coherent visual and narrative effect of each project, with a priority for the viewer/user’s experience. Continuity, coherence and perceptibility of the metaphorical or narrative content will be high priorities, but interesting or variable pacing, visual excitement and interest, and effective or innovative use of VR space and the immersive interactive possibilities of the medium will also be important. Give some thought to the overall feeling your project might convey. Humor, meditative calm, spectacular or transcendent experience, human empathy and emotional connection, or any combination of these or experiential priorities can inform your project and give direction to the final effect of the piece.

**5. Questions**

1. Were you able to achieve your essential goals of the final project? What would you have changed fi you had had more time?

2. Are there specific physical conditions that would be ideal for a user to experience the world you built, regardless of practicality? For example, would it be ideal if the user could be floating in a warm pool?

3. Are there physical, tactile or aural additions that you would have liked to make to the project?

4. Did the course’s VR resources limit your project in a frustrating way? If so, what would you like to see added to hardware, software, the physical space available for performances, etc?

5. Are there experiential or practical deficiencies in the “world” projected by VR at this point? What would be most important, in your opinion, to work on in the future to extend the viability of VR as an exciting design form, or as a resource for palliative care?