

PROGRAMA MECE EDUCACION SUPERIOR UCH0403:

Report summarizing

Visit of **Dr. Tulio Sulbaran** - Associate Professor
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and Virtual Visit of **Dr. Andrew Strelzoff** – Assistant Professor
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“Collaborative Virtual Reality environments for the Improvement of Engineering Education Chile” Workshop

Jan. 24-31, 2008

Overview:

The goal of this workshop was to bring Collaborative Virtual Reality Environments education into the engineering curriculum in Chile to improve the quality of higher education and promote excellence.

Learning Objectives of this Workshop

At the completion of the Workshop the attendees were able to:

- Determine the impact of learning theories on the development of Collaborative Virtual Reality Environments (CVRE) for engineering education
- Participate in Collaborative Virtual Reality Environments
- Examine the latest trends on educational CRVE
- Build 3D models inside of CVRE for Engineering Education
- Create basic scripting of CVRE for Engineering Education
- Reproduce economic forces in a CVRE for Engineering Education
- Produce a plan for continuing efforts to build CVREs for Engineering Education with local and international participation.

Workshop Activities:

- Thursday Jan 24th : Pre-Workshop Meeting with Project Board
During this meeting the elements of the overall project and the possible impact of this workshop to improve engineering curriculum in Chile were discussed.
- Friday Jan 25th : Learning Theories and Collaborative Virtual Reality Environments (CVRE) for Engineering Education
 - Introduction,
Welcome - Universidad de Chile 9:20am- 9:30am Introduction - Dr. Sulbaran and Dr. Strelzoff 9:30am- 9:40am Introduction - Assistants (UCH and USM) 9:40am- 10:00am Introduction – Participants. Figure 1 shows some of the participants of the workshop.



Figure 1 – Workshop Participants

- Workshop Overview,
The participants received the organization and objectives of the workshop.
- Learning Objectives and Theories,
Participants received an overview of bloom's taxonomy to develop learning objects and description of the three main learning theories (Behaviorist, Cognitivist/Constructivist/ Situated) for application in the classroom and in the virtual environments. Figure 2 shows a sample page to develop learning objectives.

I. Learning Objectives: Their Importance and Construction

What is a Learning Objective?

A learning objective is a statement of what students will be able to do when they have completed instruction. A learning objective has three major components:

1. A description of what the student will be able to do
2. The conditions under which the student will perform the task.
3. The criteria for evaluating student performance.

What is the difference between a GOAL and a Learning Objective?

A GOAL is a statement of the intended general outcome of an instructional unit or program. A goal statement describes a more global learning outcome. A learning objective is a statement of one of several specific performances, the achievement of which contributes to the attainment of the goal. A single GOAL may have many specific subordinate learning objectives. For example-

Figure 2 – Sample Page to Develop Learning Objectives

- Virtual Reality Fundamentals,
The participants were provided fundamental definitions and simple examples of Virtual Reality Environments
- Collaborative Virtual reality – Overview,
The participants were provided with capabilities of collaborative virtual reality environments and current trends on the development of CVRE. Figure 3 shows a snapshot of a Collaborative Virtual Reality Environment



Figure 3 – Sample Page to Develop Learning Objectives

- Friday Jan 25th : Tour of Educational Virtual Reality Environment & Introduction to CVRE interaction
 - Hands-On, CVRE Orientation Island
The participants interacted with the Collaborative Virtual Reality Environment (Second Life)
 - Collaborative Computing, “Svarga” – A Fantasy World
The participants received an overview of one of the multiple environments that were visited during the workshop (Svarga - A Fantasy World)
 - Education and Outreach, International Spaceflight Museum
The participants received an overview of another of the multiple environments that were visited during the workshop (International Spaceflight)

- Monday Jan 28th: 3D Modeling in CVRE
 - Inventory and Storage Fundamentals and CVRE Island
The participants brought their Avatars to the Conference Island and were introduced to the workshop staff and information center. The participants learned about Inventory and Storage including: Animations, Body Parts, Clothing, Gestures, Landmarks, Lost and Found, Notecards, Objects, Photo Album, Scripts, Sounds, and Textures.
 - Hands On – Inventory and Storage, Orientation Station
The participants practiced Moving, Voice, and Inventory inside the CVRE.
 - Building Models – Part I – Basic Menu
The participants were introduced to Build, Editing, Texture, and Scripts.
Orientation Station – Steps 31 – 32.c.



Figure 4 – Participants in the Environment Learning

- Building Models – Part II – Menu Options
The participants learned the building of 3D Models including: General, Object, Permissions, Features, Texture, Content, Link, Copy Inventory CVRE Island – Meeting Area.
- Building Models – Part III – Basic Shapes
The participants practiced building basic shapes CVRE Island – Sand Box Area. Figure 5 – Shows the participants creating their own objects.



Figure 5 – Participants Building Their Own Objects in the Environment

- Building Models – Part IV – Take and Inventory
The participant practiced Take, Take Copy and Inventory. CVRE Island – Sand Box Area.
- CVRE Construction Sequencing
The participants interacted with a simple Virtual Construction Sequencing sample CVRE Island.
- Collaborative Development of Participant Models
The participants worked in teams of 2 to 3 people to collaborative build a 3D models that could be used to teach engineering concepts. Figure 6 shows a sample project that was created by the participants.



Figure 6 – Sample Project Created by the Participants

- Monday Jan 28th: Adding Interactivity to CVRE for Engineering Education
 - Scripting Part I – New Script
The participants learned the creation of new scripts including the following elements: IISetText, IISetColor, IISetAlpha, Variables, Functions, and Events
 - Scripting Part II – Loops and Controls
The participants learned the following elements of scripting: If and IISetPrimitiveParams. College Scripting -Floor 2.
 - Scripting Part III – Auto Rotations and Listen
The participants learned IITargetOmega and IIListen. College Scripting -Floor Floor 4 College Scripting -Floor Floor 5.
 - Script Demonstration
The participants were shown a variety of script examples that could be modified and use in their own projects.
- Tuesday Jan. 29: On line Economics, Competition and Collaboration
 - Scripting Part IV – Physics
The participants learned the functionality of the physics engine.
 - Physics - Bridge Challenge
The participants experienced the physic engine capabilities through a Bridge Challenge. Figure 7 shows the participants during the bridge challenge.



Figure 7 – Participants during the Bridge Challenge

- Collaborative Scripting of Participant Models
The participants in teams of 2 or 3 people added scripts to their 3D models.
- On Line economics
The participants learned about the economic forces inside SL and their worldwide influences.
- Shopping experience
The participants were provided L\$ and will have the opportunity to participate in the economy of SL. CVRE Island - Shopping Center
- Multi-Institution Collaboration and Synergy
The participants were exposed to the Multi-Institution collaboration and synergistic effect of CVRE
- Student CVRE Experience and Competition
The participants were exposed to the possibilities of implementing CVRE for student competitions and team assignments.
- Edutainment and Games
The participants had the opportunity to play and experience a variety of games within the CVRE.
- Tuesday Jan. 29: Building a support network to develop CVRE for Engineering Education in Chile
 - CVRE for Engineering Education in Chile
The participants discussed the possible areas in which CVRE could be implemented for Engineering Education Chile.
 - Solution for Chile/Brainstorming

The participants will brainstorm possible solutions/approaches to address the educational problems in Chile.

- Educational and Other Need Identification in Chile
Participants brainstormed about the engineering educational needs in Chile.
- Solution / Approach in Chile Brainstorm
Participants brainstormed possible solutions/approaches to address the educational problems in Chile.
- Supporting / Funding Agencies in Chile
Participants talked about possible companies, organizations and institutions that could provide financial support to educational projects in Chile.

Final Remarks:

The organization demonstrated by the UCH and PUC during the preparation and delivery of this workshop was excellent. The faculty actively participated in the workshop. Furthermore, the Chilean faculty are currently implementing the knowledge and skills that they learned during the workshop. Future collaboration among UCH, PUC and the University of Southern Mississippi will certainly extend the benefit and will consolidate the implementation of Collaborative Virtual Reality Environments in the Chilean Education.