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3D PRINTING NEUROGAMES CYBERNETICS  
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# PRESENTATIONS

## **Immersive Education: A View From Silicon Valley for 2015 and beyond**

Terry A. Beaubois  
Stanford University

Silicon Valley is a global center of technology advances including The Internet of Things (IoT), Virtual Reality, mobile cell phones and tablets. How does this advancing technology relate to Immersive Education? This presentation includes a brief history of path of Silicon Valley technology that is today taking a leading role in many fields and shows how and where Silicon Valley -- and Immersive Education -- is heading.

Since architecture is one of the biggest "things" in the Internet of Things, architecture gives us a framework in which to base an ecosystem approach to the Internet of things that includes immersive education. This presentation shows examples of projects that begin to build immersive education into the very fabric of our lives as we work, play, and learn. Future projects such as the Immersive California Gold Rush (building on the Immersive Santa Fe Trail project) will be discussed, as well as some of the latest advances from Silicon Valley from VR, auto, phone, buildings and wearables and how they relate to Immersive Education.

## **Feature Analysis as a Simulation and Game Design and Evaluation Tool**

Eva L. Baker  
UCLA (University of California, Los Angeles) / CRESST

The objective of this presentation is to describe the process of feature analysis, and illustrate its use in the design, improvement, and evaluation of learning interventions such as computer games and immersive simulations. We have undertaken a qualitative analysis of features to determine those that should be included in a technology implementation or assessment to support effectiveness or validity inferences. The features have been drawn from ontologies of content standards and cognitive demands. We applied this feature analysis to a game whose objective was to teach middle school physics to third grade children. The administration of the game to children resulted in student learning as indicated by a moderate effect size. We have also tested this approach in the U.S. statewide testing program. The results indicated that our features predicted 50-60% of the variability in test scores. The presentation will conclude with a discussion of the use of feature analysis used either as specifications or in post hoc analyses of instruction or assessment in games and simulations.

**Combining Low Tech (printed cards) and High Tech (mobile assignment) to  
Enhance the Learning Experience and Engagement of Undergraduate Non-major Art  
History Students**

Amir Bar, Jessica Lockheed  
University of Houston

*The Menil Collection Mobile Assignment* was developed to allow undergraduate students to engage with the art in the renowned Menil Collection in Houston by taking advantage of mobile technology (having students use their own mobile devices) and by using a more traditional learning strategy of providing tangible printed information cards. In the assignment, students were guided to visit the Menil Collection and were given a set of 11 cards. Each full-color printed card provided information on one aspect of an artwork's design such as line, shape, light, color, texture, etc. The cards provided explanations of the terms and several examples. Students could review the cards prior to the assignment without using any technology.

Once the students arrived at the museum, they scanned a QR code that was placed on one of their cards. The QR code directed them to the mobile assignment. In the assignment, students were asked to choose three different works of art (choosing anything they liked) and to analyze the art based on two out of the 11 cards, choosing the design aspects that affected them most. After the students entered the name of the artwork and the cards they were interested in, the mobile app directed them to the right questions. They answered the questions in front of the artwork using their mobile device.

The assignment results showed several significant details that we will reveal during this presentation. The presentation of this project will include a live demo of the product (mobile and cards). The presentation will also present the design approach and will show some of the feedback from the students.

**Methods Of Enhancing The Role Of Education Through Use Of VR  
As Developed And Applied By EON Reality**

Y. Froger, M. Dautricourt  
EON Reality France Hub

Interactive 3D solutions have shown to increase students' attention levels by 92% and increase test scores by 35% – while at the same time creating a new level of engagement for students and staff. EON Reality's Virtual 3D Learning solutions are transforming education by bringing interactive 3D technologies to classrooms of all levels. Our customers include Carnegie Mellon University (US), Imperial College (UK), Nanyang Technological University (Singapore) and hundreds of academic institutions worldwide.

We have solutions that address two fundamental sides of the educational experience on one hand helping teachers and educators tailor their teaching material by creating exciting 3D real time content and easily developing a full lesson content, on the other providing a VR common space where the teaching experience can be shared. Create: teachers can develop complete, blended learning environments with EON Creator, an interactive tool that allows for combining 3D content with videos, sound effects, annotations, Wikipedia, PowerPoint, YouTube, and more. Explore: teachers and students can upload their work to the EON Experience portal, an interactive online library that is home to thousands of 3D objects, avatars, scenes, and applications. Collaborate: students and teachers can meet virtually via EON Coliseum, a multi-user 3D environment that makes collaboration possible, anytime and anywhere.

We are extending these capabilities into the field of mobile devices, thus creating a tool to allow the effective access of all to more compelling and efficient ways of learning. We firmly believe that knowledge is a human right.

### **Engaged Pedagogies Through Virtual Worlds**

Meredith E. Abarca, Janet Hill, Jalaine Weller  
The University of Texas at El Paso (UTEP)

Much of the current discourse in education is exploring ways to develop the best pedagogy for teaching the twenty-first-century student. One mode that has become an increasingly common approach is that of the flipped-classroom where the focus is to shift from an instructor-centered to a student-centered classroom in which technology is central, whether it be via online teaching, Virtual Worlds, or various other means. The center of this discussion generally focuses on students. Effective learning, however, takes place only in a community that encourages critical, reflective, and collaborative dialogue between its members: instructors, students, and, ideally, beyond. Making the classroom a place for critical dialectical exchange is key to English professor bell hook's "engaged pedagogy." [1] hook's model sees education as "progressive and holistic." [2] This engaged pedagogy connects "the will to know with the will to become" which leads to "a process of self-actualization" [3] for both students and instructors—not merely one or the other. An "engaged pedagogy" also allow students to assume responsibility for the process of learning inside and outside the physical classroom experience.

Meredith's food-centered pedagogy follows these guidelines. The combination of hook's "engaged pedagogy" and my scholarly interest in exploring the power that food holds in shaping, recording, and transmitting our humanity has guided my approach to teaching literary and cultural studies courses for the last 15 years. A commitment to this teaching and learning paradigm and my passion for food studies come together in this particular collaborative presentation. Together we, professor, instructional technologist, and graduate student, will describe how a graduate literature course cohort at the University of Texas at El Paso (UTEP) approached food studies through an engagement with immersive education technology in the creation of a Virtual World learning community.

## **Disruptive Enabling Technologies and Immersive Education**

D. Wortley

GAETSS – Gamification and Enabling Technologies Strategic Solutions

Disruptive enabling technologies in the form of wearable sensors and ambient intelligent interface devices are set to totally transform immersive education practices. This presentation focuses on the latest developments in wearable lifestyle sensor technologies such as Neurosky's consumer brainwave and body sensing devices to describe how measuring and visualising physical and mental states can be used to deliver quantum changes in education practices. These devices and their associated applications that provide real time analysis of attention and emotional states provide new opportunities to provide more personalised and adaptive education experiences.

## **Immersion Idaho: An Undergraduate Research Program for Immersive Virtual Reality Development**

Steve Cutchin

Department of Computer Science, Boise State University

Immersion Idaho is an educational project for teaching undergraduates how to use and develop immersive virtual reality technology to capture historical sites throughout the state of Idaho. Material is captured at a resolution of 100 Megapixel per eye in stereoscopic spherical panorama and tools are being developed to provide immersion at photo-realistic quality. Digital reconstruction and recreation of historical sites produces results that are sufficiently realistic to appear as if you are viewing them through a large window. Web delivery to HMD systems is a core component of the activity.

## **Measurement of Domain-Specific Creative Thinking in an Immersive Team Training Simulation**

Harold F. O'Neil Jr.  
USC (University of Southern California) / CRESST

Creative thinking is required in both organizations and people. The current military and industrial operating environment has become extremely complex. For example, in some cases there are complex, unpredictable, and undefined tasks, and there is no acceptable solution that one has been trained for. Thus one must invent or create a solution (creative thinking) and monitor its progress. Creative thinking was long considered domain-general, e.g., Torrance Test of Creative Thinking. We investigated the role of creative thinking using this measure in the Multi-Mission Team Trainer (MMTT) environments. This simulation trains and assesses Navy Surface Warfare Officers in offensive and defensive tactics, thus the context can be conceptualized as a collaborative problem solving task. We found some support for the impact of the simulation on creative thinking. However, the effect size was very small. Our current creative thinking research is building on our prior work in the Multi-Mission Team Trainer and new measures have been designed to assess domain-specific creative thinking in a team trainer immersive maintenance simulation. We will present the results of a usability study and provide lessons learned for immersion simulation.

## **Drones, 3D Printing, and Project-Based Learning**

Oscar Delgado, Steven T. Varela, Swapnali Colaco, Alejandro Miramontes  
The University of Texas at El Paso

What if educators could lead the way in technological innovations such as reliable unmanned aerial vehicles (UAV) technology and 3D printing, guiding students through the dissemination of design, programming, functionality and the ethical ramifications involved—from concept to implementation? This presentation will demonstrate and discuss a project-based learning (PBL) learning experience where students created their own autonomous terrestrial and quadcopter drones using 3D printed parts. From design, to programming, to implementation, PBL encouraged the active and engaged learning that inspired students to obtain a deeper knowledge of the technology they were using—with real world application. The artifacts created through these student projects are currently being used by Geology field researchers at The University of Texas at El Paso (UTEP) to capture visuals, in order to 3D map using point cloud technology. The technology is being used for reconnaissance, to quantify water resources, establish baselines of plants, animals, air quality, temperatures, and other factors that would be influenced by changing climate. The students are also currently designing their own propellers and other key components using 3D printing to keep costs low and provide additional custom design and functionality. The results obtained from this project will provide sufficient process data analysis to understand the benefits of utilizing additive manufacturing technologies for 3D structural electronics fabrication in building robust, reliable, UAV's as part of field research ecosystem.

## **Operations Training Using Immersive Technologies, A Development Experience**

A. Aman, E. Tang, K. AlBalushi, B. Allamki and H. AlYorbyi  
ASM Technologies Limited Liability Company

Training personnel to be competent oil and gas operators and technicians is a difficult task in a complex reservoir structures in Oman using highly advanced and sophisticated extracting processes. Coupled with the drive towards Omanisation which aim at introducing more nationals into the oil and gas sector so as to create sustainable employment for the local population, the challenge to churn out competent manpower became a daunting task. A pilot phase is done for 6 months to develop two virtual applications for training in equipment and process engineering; turbine application and the mechanical vapour compressor (MVC) water recycling plant in order to enhance the competency level of the trainees. Concurrently, these applications are developed by local Omanis resources within the country. Hence, it also contributes to the creation of a digital media sector in the sultanate.

### **HauntedYYC**

Stefan Rasporich  
AMP

HauntedYYC is an interdisciplinary field trip that puts students in the role of both paranormal investigator and historian. Using Sesame Snap as a QR-code content delivery system, students unlock clues in real time to follow an epic battle between inter-dimensional beings in a local neighborhood.

They learn about local history, meet local business owners and develop critical and creative thinking skills as they work collaboratively towards a goal.

I was inspired to attempt his project when I met Neal Edelstein filming his innovative horror movie "Haunting Melissa" delivered as an app. He took the time to describe to me how this gripping story would be made available at unknown intervals to a mobile audience.

**See also the keynotes, featured speakers, and panels in the  
*Immersive Education* and *Business and Law* modules:**

<http://summit.ImmersiveEducation.org>

# PAPERS

## **Immersive Virtual Environments In Design Education: A Situated Model Of The Learning Process**

Hadas Sopher<sup>1\*</sup> and Yehuda E. Kalay<sup>2</sup>

<sup>1,2</sup>Faculty of Architecture and Town Planning  
Technion – Israel Institute of Technology, Haifa, Israel

The products of architectural design differ from other designed artifacts due to the fact that buildings are *environments*, rather than *objects*. Built environments surround the user and are dynamically perceived by all senses. Yet, in the course of Architectural Education, the spatial perception of students is often restricted to the use of objects such as models and scaled drawings, thereby limiting their ability to acquire the proper design knowledge and skills. We argue that Immersive Virtual Environments (IVEs) may potentially overcome this limitation by affording students virtual "presence" in their non-built environments, offering them a better comprehension of their designs, thereby facilitating the architectural learning process. To assess the impact of IVEs on the architectural learning process, compared to conventional architectural learning environments, we developed a methodology comprised of measurable Knowledge Construction Activities (KCAs). It was applied to an architectural design studio course, which was alternately held in an IVE and in a conventional Studio classroom. The course's learning sessions were observed and recorded. Protocol and Design analysis were used to glean the learning environment's influence on students' KCAs. It revealed that IVE enhances corporal sensations, emphasizing their contribution to perceptual skill improvement, leading us to conclude that IVEs can serve as an important tool for enhancing the educational learning process of architecture students.

## **Post-Fukushima 3D Virtual Collaboration and Communication for Active Learning**

M. Vallance<sup>1</sup>, K. Ibayashi<sup>2</sup>

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<sup>2</sup>Hokkaido University, Japan

In any task design it is important to consider its difficulty for the intended learners. Task designers such as school teachers and Higher Education practitioners need to provide tasks commensurate with the expected successful outcomes that will, it is anticipated, be developed by the learners. Task Fidelity is a useful indicator of the complexity of a task, and a cognitive determiner of Task Fidelity is immersion or flow. The aim of this research therefore is to determine quantitative metrics of tasks and learner solutions by calculating task complexity and learner immersion. Implementating increasingly complex 3D virtual world telerobotic operations together with the collaborative programming of LEGO Mindstorms robots by remotely located students in Japan and UK to solve realistic problems allows researchers to acquire data of circuit task complexity, programmed robot task complexity, and learner immersion. Students participating in international 3D virtual tele-collaboration challenges utilizing multi-modal communication tools within a simulated disaster zone will consequently enable educators to quantify the impact of active learning in 3D virtual worlds.

## **Using Web3D Based Technology as a Lifelong Learning Companion Tool: a Use Case**

Jorge Ferreira Franco <sup>1, 2, 3</sup>

<sup>1</sup>Federal University of Bahia — UFBA

<sup>2</sup>Polytechnic School of the University of Sao Paulo – LSI/EPUSP

<sup>3</sup>Municipal Education Secretary of Sao Paulo Council – ESB/SME/PMSP

Advances in research and development related to computing in the web age, information and visualization technology, including an increase on accessibility to advanced digital resources have allowed to setting up an exploratory knowledge based learning process aiming to stimulate children's researching and acquiring scientific knowledge since K-12 levels. Individuals' engagement in this learning process has impacted on ones' lifelong learning, digital literacy and creative computing skills enhancements through using Web3D based information and visualization resources as learning companions and for supporting scholars' understanding primary school's scientific concepts. A combination of child-driven learning, computational thinking, creative computing, constructionism and immersive education concepts has supported this exploratory learning process sustainability. In this paper, the impacts cited above are

presented and discussed. The discussion is done through describing a use case, which is a real life example of how to using Web3D based technologies as open educational resources have been applied for sustaining human computer interactions. Including that Web3D technologies have served as lifelong learning companions and stimulated young children to become creative content producers through using an interdisciplinary combination among school curriculum's scientific concepts, computer science and computer graphics principles.

### **Development of a Virtual Learning Environment: Hittites Empire**

S. Kilis<sup>1\*</sup>, Y. Alkis<sup>1</sup>, Z. Kadirhan<sup>1</sup>, C. F. Ozgenel<sup>2</sup>, H. H. Cetinkaya<sup>3</sup>, S. T. Tokel<sup>1</sup>

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Virtual worlds are internet-based simulated environments that emulate the real world and are intended for its users to inhabit and interact through avatars. They create a new opportunity to enrich the educational experience through media-rich immersive learning. Therefore, they are frequently used in education due to the benefits that they offer for the learners – thus, the demand for virtual learning environments has increased. This study explains the development process of a three dimensional virtual learning environment Hittites Empire for 9<sup>th</sup> grade students in the scope of History course. In the environment, students can find information about magic, kitchen, agriculture and stockbreeding, kingdom, marriage ceremony, religion, etc. about Hittites Empire. The students are guided with a tour to learn general information about the Hittites Empire. In short, they can obtain information and activities about general life and any special issues of Hittites Empire. The aim of developing this environment is to make the topic more attractive and enjoyable for the students. Overall, the developed virtual learning environment is expected to make the History classes more enjoyable and to be visualized. In this way, it prevents students being bored in the History course. Some suggestions for the teachers and designers are also offered.

## **Appropriating The Cyberspace: An Immersive Experience For College Applicants**

F.J. Fernández, D. Gómez, J.A. Soto, V. Proust

Pontificia Universidad Católica de Chile

The development of new devices capable of playing virtual reality and high quality stereoscopic video have made possible the creation of new audiovisual proposals to deliver information and give the user more interaction with the content. This paper presents an application for smartphones that allows the user an immersive 3D and 360° tour of an existing building, in order the people that eventually use its facilities will visit and learn about it. The conceptual frame used is the concept of cyberspace as a place where users get a better immersion if they do some activity inside. Also, we consider the increasing availability of devices capable of playing 3D videos, as the framework for the audiovisual and software production model adopted. The application was assessed using a quasi-experimental design, through user survey. The results hinted at the elements that must be improved in the future design of immersive audiovisual experience, and also highlighted the attributes that has the use of a smartphone as a new technology with high availability.

## **Statland, an OpenSim-based Way To Teach Statistical Sciences In Middle And High Schools**

Michelina Occhioni  
Istituto Comprensivo San Cesario di Lecce (LE)

This work explores how statistical science for middle school and high school students can be set up in a virtual world. In the present society citizens are called to play an active role, using data to solve problems in a wide variety of fields and applying statistical knowledge to social, economic, and ecological problems, in order to make decisions in situations of uncertainty. Therefore it is important to begin the quantitative study of collective phenomena since the first years of compulsory education and, consequently, to provide an adequate teacher training. Statland has begun as a part of a project for the dissemination of statistical literacy in schools, in collaboration with the Italian National Institute of Statistics. It is an island of the grid Techland, an OpenSim-based virtual world, where log in as an avatar. By exploring Statland and interacting with learning objects it is possible to learn steps and methodologies to perform statistical surveys. Statland has been set up to be a virtual meeting place for students and teachers who want to try out new approaches to the statistical sciences.

# **A Virtual Reality System For An Immersive Archaeological Experience Using Real Data From The Roman site of Piazza Leoni, Verona, Italy**

Eros Pedron<sup>1,2</sup>

<sup>1</sup>VirtualEyes Srl, Italy

<sup>2</sup>IUAV – University of Venice, Italy

Porta Leoni is an ancient Roman gate in Verona, northern Italy. Site and landscape were digitally captured with an equipped air-drone (UAV). Photogrammetry allowed the building 3D-model of the archaeological ruins in real-scale dimensions, with real-world textures and with a realistic physical system; so the interaction and the feelings are almost as the real one. In order to obtain a “real” immersive virtual experience the project was made usable with head-mounted displays, both the more expensive and high-end Oculus Rift DK2 and the cheaper and user-friendlier Android/Google Cardboard; furthermore, starting from the same data, it was created a 3D printed model of the site. This project has enabled us to create and optimize a work flow that permits the 3d digital copy using various techniques (photogrammetry, laser scanning, etc) and the creation of objects in 3D which can then be viewed and / or give rise to immersive virtual environments. The final porting to Oculus Rift HMD state of the art today, and to the mobile world (Google Cardboard), represents a huge and innovative potential and the core of the project. These techniques allow the creation of immersive virtual-reality's environments both on-site desktop pc, both on mobile or remotely.

## **Games Development Using Brain Computer Interface**

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F. Rebelo<sup>2</sup>, T. Oliveira<sup>2</sup>, E. Jensen<sup>1</sup>

<sup>1</sup> Feevale University, Office of the Dean of Research and Graduate Studies – PROPP

<sup>2</sup> Lisbon University, Faculty of Human Kinetics

This paper presents a study on the games applied in the education of people with cerebral palsy using as interface, Brain Computer Interface (BCI). It also looks at the advantages of using games in the learning process. The methodology used was that of qualitative approach and case study. The results presented were the construction of a virtual simulation environment for the application to be developed using the game development tool, Unity3D. At the end we presented the game screens for the teaching of mathematics, which is called NeuroNavegática.

## **Developing Spatial Ability and Digital Fluency via 3D Game Programming and 3D Printing**

T. Tchoubar  
Stony Brook University

Spatial ability has been found to condition the choice of the science majors, on one hand, and to differentiate between the genders, on the other hand. Mental rotation tests demonstrated the relation of spatial ability to digital fluency, still influenced, in its turn, by digital divide. This research allows us to create DigitPrep, a method based on 3D game programming and 3D printing, for training spatial ability and developing digital fluency of middle school girls from underserved school districts during a summer program introducing subjects to STEM fields. We explore the impact of such fun kinesthetic activities as 3D selfie production using mixed reality app and 3D printing, on improving spatial ability of the students. Non-computer based 3D activities are compared to and combined with the impact of surrogate embodiment in Alice 3D game programming environment on spatial ability and digital fluency of the students. Digital fluency is essential for access to online resources. We demonstrate by means of logistic regression that students with higher scores in digital fluency find educational virtual environments easy to use, and useful, more often than less digitally fluent subjects do. Thus, we recommend DigitPrep method for orientation training preceding any educational programs that require usage of online learning materials.

## **Evaluation of Learning Techniques in Immersive Settings**

P. H. Reiff<sup>1†</sup>, C. T. Sumners<sup>2</sup>

<sup>1</sup>Rice University

<sup>2</sup>Houston Museum of Natural Science, Houston, TX.

Our research has shown that learning in a planetarium dome can be measured quantitatively and is proven to result in greater content retention than watching the same experience, but in flatscreen mode on a computer screen. Concept acquisition in the planetarium is measured in several pre-post assessment studies annually at the Houston Museum of Natural Science's planetarium with random sampling of fourth grade students from over 15,000 attending from the Houston Independent School District each year. The results of these on-going required and rigorous evaluations are summarized, focusing on successful practices in planetarium teaching and concepts most effectively learned. In a second study, two hundred middle school students were pretested, then shown the same experience on either a computer screen or in a Discovery Dome portable planetarium. When tested immediately after viewing, both groups showed significant content gains. However, when retested six weeks later, the group who watched on a computer screen had lost most of their gains, whereas the group, which had watched in a dome, lost none of their gains. We suggest that the immersive environment provides a more active learning experience that leads to longer lasting learning.

## **Impact of Immersive Education on Workforce Behavior**

Joanna Schneier  
Cognotion, Inc.

Over 60% of the workforce in the United States alone are hourly wage workers whom lack the basic skills needed to succeed in their careers. These students generally did not succeed in didactic, formal learning settings. For these underserved populations training is their last hope of remediation and a productive economic life, but new pedagogies that will best engage them must be applied. We have begun to apply immersive education and are garnering some success based on multiple measures. We believe that education must become immersive (Oculus Rift, interactive video, gaming) and driven by Big Data that responds to their needs (IBM Watson and facial recognition software). We are harnessing technology to close the skills gap.

## **Live Conformal Scaling Of Full-Body Immersion Environments In The Case Of Augmented Reality Systems And Internet Of Things**

Nikolai Suslov

Fund for Supporting Development of Russian Technology, Vologda, Russia

Virtual and augmented reality systems and robotics are the novel technologies of today. They let artists and teachers develop real-time performances and immersive lessons by themselves. Thus, end-users and non-programmers get the full-featured connected virtual-real space to manipulate. They can use these technologies anywhere in a school, theatre, art gallery or learning lab. However, the scaling of the created full-body immersion environments is still a complex task and is connected with the process of live programming. Existing software for building immersive environments are huge sets of extensions and tools. Virtual worlds provide all-in-one solution and the ability for the programming code to be delivered in a lightweight manner through the network. The virtual worlds support easy synchronization for many users to interact with common objects and environments. These objects can be programmed on quite different languages. In addition, they can coexist alongside each other in the same replicated virtual world and holding the same simulation. That allows scaling a full-body immersion environment in mixed scenarios alongside augmented reality systems, cave automatic virtual environments and internet of things. This paper describes the prototypes of one such full-body immersion environment, which is being developed using the open source project Krestianstvo software development kit.

## **Virtual Agents' Support For Practical Laboratory Activities**

Fabiana Santiago Sgobbi<sup>1</sup>, Liane M. K. Tarouco<sup>1</sup>, Andreia Rosangela Kessler Muhlbeier<sup>2</sup>

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Although education has always been present in people's lives, it has changed over time. Centuries ago children had a tutor to guide them in learning the arts of science, philosophy and war, but population growth has made this difficult to maintain. Today, virtual worlds (VW) provide new teaching and learning possibilities through creation, immersion in and manipulation of 3D worlds. Interaction with objects, other humans (avatars) and virtual agents (non-player characters or NPCs) in these 3D worlds can expand educational capabilities to provide one tutor per student. This study discusses the use of virtual agents to provide specific support for students in practical laboratory activities.

# DEMONSTRATIONS (DEMOS)

## **Floating in the Middle of the Soccer Field. An Immersive Education Initiative for Being Present into the Scene**

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The aim of this paper is to propose a method to experience a free-viewpoint video and image with a head mounted display (HMD) and a game controller that enables to interact intuitively. The free-viewpoint video is generated by multiple 4K resolution cameras in sport games such as soccer or American football. This method provides the user a player's perspective as if they were in the middle of the field.

We used a "bill board" and "point cloud" method to produce a free-viewpoint video which consists of multiple textures arranged according to the position of the user in the scene. We used a game development system and a HMD in order to implement and display the images.

Moreover, we used a game controller to allow the user to move in the scene and to change their point of view with a high degree of freedom.

## **3D Language Learning-Live your Language!**

Linda Bradford

V.I.E.W. and FluentWorlds

In spite of the growing popularity of virtual worlds for gaming, recreation, and education, few studies have explored the efficacy of 3D immersive virtual worlds in post-secondary instruction; even fewer discuss the ability of virtual worlds to help young adults develop creative thinking. My PhD study investigated the effect of virtual world education on creative thought for

university level students. Further, I created a 3D company, the V.I.E.W. (Virtual Immersive Educational Worlds, Inc.), that has continued to promote 3D learning in the field of Language Learning. We offer both a broader live, synchronous, multi-player online platform that includes voice and text chat and a more self-contained, asynchronous app that allows for self-paced learning with NPCs. At the conference, I will present a live demonstration of these two offerings with a discussion of their academic, pedagogical underpinnings.

### **Designing a 3D Virtual Reality IES (Imaging, Evaluation and Suggestion) Diagnostic System**

Dr. Tapan Gandhi  
Dept. of Electrical Engineering  
Indian Institute of Technology, Delhi

Kyle Gomboy  
G23D Studios  
Orlando, Florida, USA

Sagar Chandola  
VWision  
New Delhi, India

Thoughts are abstract and difficult to express and even more difficult to portray. This work in progress project, aims at delivering a New Age IES system (Imaging Evaluation and Suggestion system) with a focus on understanding and monitoring neurological processes, inner working of the brain, cognition processes and (visceral) thoughts, in a tangible manner.

Going by the alpha name 'ThoughtTouch', the idea is to build on a customized 3D CAD modeling based tool and interface it with an EEG based wireless input device. Besides a unique machine learning component added to 'ThoughtTouch', will help it to decipher, analyze, visualize & compare better non tangible concepts such as learning using 3D printer integration, and help predict for eg. in a classroom scenario early on which students are having/will have trouble with various courses so that we adjust the lessons and stimuli given to them accordingly

### ***Go for the Glow! – An Entertaining Approach to Training Foundational Life Skills***

V. Ho, D. Glen, A. Bridgewater

Playto

GlowMaster is a highly engaging video game and a training course that helps students master their focus through play. GlowMaster employs a brainwave (EEG) sensing headset to continuously monitor focus levels while onscreen graphics reinforce improvement in focus skills. Students are self-motivated to play the game for its compelling graphics, challenging play mechanics and overall entertainment value. Educators confirm that GlowMaster motivates students to strengthen

their focus by advancing through progressively difficult game levels. Psychologists appreciate that GlowMaster enables students to gain an understanding of what focus feels like and what they need to do to activate that feeling. Teachers and parents are able to track student progress on a separate device. Most importantly, children who play through the entire game tell us that they are able to migrate the skills learned in the game to their everyday lives.

### **Mob Scene Filter — Privacy Protection in Videos by Changing Facial Appearance**

Y. Kawase<sup>1</sup>, H. Shiraishi<sup>1</sup>, S. Yoshida<sup>1</sup>, H. Ito<sup>2</sup>, N. Saito<sup>2</sup>, T. Kawamoto<sup>3</sup>, T. Narumi<sup>1</sup>, T. Tanikawa<sup>1</sup>, M. Hirose<sup>1</sup>

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<sup>2</sup>Nikko Telecommunications Co., LTD.

<sup>3</sup>Chukyo TV Broadcasting Co., LTD.

Mob Scene Filter (MSF) aims to prevent identification of an individual identity by changing one's facial appearance. Currently, image processing techniques, such as the mosaic and the blur, have been used to prevent identification of a person's identity. These techniques, however, make people difficult to understand the context of the video, because the facial expressions of the characters and the background in the video are masked. Thus, there is an inherent need for an advanced privacy protection technique that protects privacy but still maintains the context of the video. So, we focus on changing the facial appearance of characters in videos for protecting their privacy without compromising on the information from facial expressions. Then, we propose a system called MSF that changes not only the facial textures but also the arrangement of the facial regions and their size. The system first identifies a face and facial features in a video. Then, the system superimposes another person's face on those identified faces, and transforms the size of facial regions and the arrangement. Humans mainly use the arrangement of the facial regions to identify others, and so we modify the facial regions for altering face identification effectively.

# POSTERS

## **Art In The New Digital Landscape**

Massimo Vicinanza

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The “Festival del Bacio” is a site specific “relational anthropological sculpture” based on the integration among visitors, technological installations and Web, where people are fully involved and connected by means of aesthetic devices. Each participant becomes the spontaneous and necessary element of a collective artwork and contributes to transform it into a human and digital flux that flows through the Web.

The “site specific” concept comes from the willingness of close relationships between locals, shopkeepers, associations, hikers, tourists and more on, to turn them into protagonists of a collective sculpture, not forced from someone above but born from themselves and from the environment in which the event takes place.

The technologies applied range over interactive sound, video and photography, 3D, augmented reality, apps, all lost into a traditional folk context animated by bands, street art happenings and street food.

## **An Innovative Approach to the History of Science on Unicom Earth Island**

Luigia Palumbo<sup>1</sup>, Annalisa Boniello<sup>2</sup>, Eleonora Paris<sup>2</sup>

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Virtual worlds in education represent an innovative strategy that needs to be experienced in order to bring out the potential and future possibility for use. Virtual worlds are inhabited as an alternative experience to reality, a reality where the value of your presence may influence the efficacy of both education and teaching. These are the theories germane to the experience described in this article, which focuses on the use of virtual worlds for the development of scientific skill. This project develops the virtual Unicom Earth Island within the island, which is

built on the server of the University of Camerino with Open Sim software. The involvement, immersion and collaboration are hallmarks of the experience, which develop via learning through doing, enabling students not only to benefit from the environment in an active way, but also to interact with it and build upon it. The project Unicam Earth Island is part of Annalisa Boniello's PhD regarding the teaching of Earth Sciences. Annalisa Boniello is at present, working on her PhD at the School of Science and Technology, Geology Division, University of Camerino, Italy.

# WORKSHOPS

## **Using Digital, Immersive Multimedia to Engage Faculty in Professional Development Opportunities: A Project for Incorporating Ethics Across Disciplines**

Steven T. Varela, Cira M. Montoya Olson, Mitsumasa Overstreet, Jessica R. Duran

The University of Texas at El Paso

Academic Technologies (AT) at The University of Texas at El Paso (UTEP), in partnership with the Texas Holocaust and Genocide Commission is creating digitized, highly interactive, professional development modules to provide college-level faculty with effective strategies to improve the integration and teaching of ethics into the core curriculum of entry-level courses across disciplines. Entitled “Integrating Ethics: From Thought to Action,” these modules are designed for faculty who may or may not be trained in ethics as a field of study, and can be scaled for use in any class size, and integrated effectively into face-to-face, tech-enhanced, hybrid, or fully online delivery formats. These modules are free and open for any educator to use, with all resources available to share and download. With its expertise in internet-based instructional technology and pedagogy, AT is providing content and technology development, *gamification* interactions, and 1<sup>st</sup> person, augmented videography, into five modules for faculty to learn appropriate teaching strategies to incorporate ethical concepts into their courses. Unlike traditional forms of professional development, this workshop will incorporate activities in a transformative, immersive manner to help faculty broaden their view of professional development possibilities.

**HANDS-ON WORKSHOP : Google Cardboard**

**HANDS-ON WORKSHOP : Immersive Bent's Old Fort (Minecraft)**

**HANDS-ON WORKSHOP : Day of the Dead (Día de Los Muertos)**

**HANDS-ON WORKSHOP : Virtual Harlem**

**HANDS-ON WORKSHOP : Storytelling Through Animation**

**HANDS-ON WORKSHOP : The Process of Designing Immersive Spaces**

**FOCUS WORKSHOP: Copyright, Patents and Intellectual Property Rights in the Age of Immersion**

**FOCUS WORKSHOP: Digital Conservation in the Age of Immersion**

**See the complete list of workshops online at:**

[http://summit.ImmersiveEducation.org/sponsors\\_exhibitors.html](http://summit.ImmersiveEducation.org/sponsors_exhibitors.html)

