IMMERSIVE EDUCATION INITIATIVE

EiED 2014

Vienna
24th-26th November 2014
University of Applied Sciences bfi Vienna

ImmersiveEducation.org
#EiED2014

Virtual Worlds  Learning Games  Simulators
Augmented & Mixed Reality  Full Immersion

Partner:

Organization:
## 2014 Immersive Education Summit, Vienna

### Conference Agenda

| Day 1 | Let’s get started |
| Day 2 | Let the games begin |
| Day 3 | Let’s go to work (Workshops) |

#### SUNDAY, November 23, 2014

**6:45 pm - 8:00 pm** Soft-Opening Social Event I: Ferrywheel Ride (Reservation ahead necessary)  
Meeting at 6:30 pm at: Riesenradplatz 1 (in front of the entry to the Ferrywheel)

**8:00 pm - open end** Soft-Opening Social Event II: Feel free to join us at Riesenrad Café for a get-together

#### MONDAY, November 24, 2014

<table>
<thead>
<tr>
<th>8:30 am - 1:30 pm</th>
<th>Registration</th>
</tr>
</thead>
</table>
| 9:30 am - 10:30 am | Opening Ceremonies  
Keynote Address: Konstantin Mitgutsch |
| 10:30 am - 11:00 am | Coffee Break |
| 11:00 am - 12:00 pm | 1. Allison/Dow/Miller  
Enhancing Assisted Learning with 3D Virtual Environments  
2. Cao/Govaerts/Dikke/Faltin/Gillet  
Helping each other teach: design and realisation of a social tutoring platform |
| 12:00 pm - 1:30 pm | Lunch Break & Poster Session  
Day 1  
Poster Presentation (Short Presentations by Presenters) |
| 1:30 pm - 2:00 pm | 3. Ebner/Kleinleitner  
A Contribution to Collaborative Learning Using iPads for School Children  
4. Scullion/Stansfield/Baxter  
Gender Differences in Self-Efficacy Relating to Collaborative Learning in a 3D Virtual World |
| 2:00 pm - 3:00 pm | Coffee Break |
| 3:00 pm - 3:30 pm | 5. Ehrlich/Munger  
Utilizing Head Mounted Displays as a Learning Tool for Children with Autism  
6. Pero  
How to detect programming skills of students? |
| 3:30 pm - 4:30 pm | Dinner Reception |

#### TUESDAY, November 25, 2014

<table>
<thead>
<tr>
<th>8:30 am - 11:00 am</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 am - 10:30 am</td>
<td>Keynote Address: Mark AM. Kramer</td>
</tr>
<tr>
<td>10:30 am - 11:00 am</td>
<td>Coffee Break</td>
</tr>
</tbody>
</table>
| 11:00 am - 12:30 pm | 7. Miller/McCaffery/Allison  
Immersive installation: “A Virtual St Kilda”  
8. Beaubois  
Immersive Education and Architecture  
9. Hödl/Fitzpatrick  
UniCoMP - An Approach Towards Flexibility, Versatility and Liberty of Action on Stage |
| 12:30 pm - 1:30 pm | Lunch Break & Poster Session |
| 1:30 pm - 3:00 pm | 10. Tabuenca/Kalz/Specht  
Seamless support for lifelong learners with mobile and sensor technology  
11. Al-Smadi  
GAMEDUCATION: Using Game Mechanics and Dynamics to Enhance Online Learning  
12. Miller  
Mobile Exploration of Medieval St Andrews |
| 3:15 pm - 4:45 pm | 13. Erenli  
Immersive Sightseeing Game (Voluntarily):  
Vienna Film Quiz (Innercity) |
<p>| 4:45 pm - 5:00 pm | Sightseeing Game Award ceremony |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45 am - 10:00 pm</td>
<td>Registration</td>
</tr>
</tbody>
</table>
| 9:00 am - 11:45 am | **Workshop: Immersive Virtual Learning Environments and Advanced (Mobile) Technologies in Education (K-12) (IVLEATE14)**  
  - Taraghi/Frey/Saranti/Ebner/Müller/Großmann  
    Determining the Causing Factors of Errors for Multiplication Problems  
  - Softic/Taraghi/Ebner  
    Mining and Visualization of Usage Trends in a Personal Learning Environment using Linked Data  
  - Strasser/Greller  
    Towards immersive digital language learning  
  - Franco  
    Stimulating Students Use Web3D-based Technology for Producing Digital Content at K-12 Levels  
  - Ryymin/Rantakokko/Mattila/Arhippainen  
    Developing Future 3D Virtual Learning Environments for High School and Vocational Education  
| 11:45 am - 12:00 pm | **Workshop: Gaming, Serious Games & Gamification (GSG-EDU14)**  
  - Binder/Breitfuss: Data Goggles in practice (Hands-on)  
  - Hödl: Trombosonic (Hands-on)  
|              | **Closing Ceremonies**                                               |

**Venue:** FH des bfi Wien  
Wohlmuthstrasse 22  
A-1020 Wien
Extended Abstracts & Agenda

**Sunday, November 23rd:**

Soft-Opening Social Event I: Ferrywheel Ride (Reservation ahead necessary)
Meeting at **6:30 pm** at: **Riesenradplatz 1** (in front of the entry to the Ferrywheel)

We have reserved a few tables at the Riesenradcafe afterwards (to be paid individually)

**Monday, November 24th:**

<table>
<thead>
<tr>
<th>Authors / Affiliation</th>
<th>Title</th>
<th>Time &amp; Room / Paper ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colin Allison, Lisa Dow, Alan Miller / University of St. Andrews</td>
<td>Enhancing Assisted Learning with 3D Virtual Environments</td>
<td>11:00 am - 11:30 am / E 01 / #1</td>
</tr>
</tbody>
</table>

**Abstract**

3D virtual environments (3DVE), also referred to as virtual worlds or the immersive web, are networked multi-user client-server software systems designed so that the natural human perception of the world is represented using 3D objects. Avatars represent users, allowing them to interact with other avatars, non-player characters and objects within the environment. 3DVE are used in gaming, reconstructions, business and education. This study investigates 3DVE as a tool for assisted learning. A prototype of a 3DVE for assisted learning was developed to provide learners with disabilities educational resources supporting life skills. The research was carried out in a secondary school in Scotland where participants were learners within the Department of Assisted Support. The case study focuses on learning about safety in the kitchen and carrying out basic everyday tasks. This paper discusses different learning scenarios, the physical and virtual environment and the usability of a 3DVE for learners with special educational needs. The results demonstrate that 3D virtual environments can be used to enhance the learning process in four main areas: social interaction, collaborative working, self-directed learning and exploration.
### Helping each other teach: design and realisation of a social tutoring platform

**Authors:** Yiwei Cao, Sten Govaerts, Diana Dikke, Nils Faltin, Denis Gillet

**Title:** Helping each other teach: design and realisation of a social tutoring platform

**Time & Room:** 11:30 am - 12:00 pm / E 01 / #2

**Abstract:**

Within the Go-Lab project, we aim to engage school pupils with STEM topics by bringing online laboratory experiments into the classroom. Since it can be a hurdle for teachers to use such technical software and implement these experiments into the pedagogical flow of their courses, we have identified the need to support and tutor teachers on using online laboratories and their pedagogical implementation in the classroom. The Go-Lab Tutoring Platform offers teachers peer assistance for expertise sharing related to online labs, pedagogy, the Go-Lab learning system and portal. Teachers, lab owners and scientists can help each other and share their skills and knowledge. To sustain this tutoring platform, we aim to build a community of practice and apply various social media techniques. This paper elaborates on the design, the first prototype and an early evaluation of the Go-Lab social tutoring platform. Furthermore, the business model is discussed and realisable via a credit system, ranging from social rating to payment mechanisms.

---

### A Contribution to Collaborative Learning Using iPads for School Children

**Authors:** Martin Ebner, Benedikt Kienleitner

**Affiliation:** Graz University of Technology

**Title:** A Contribution to Collaborative Learning Using iPads for School Children

**Time & Room:** 02:00 pm - 02:30 pm / E 01 / #3

**Abstract:**

Collaboration has a very positive effect on students’ learning experiences as well as their social interactions. Our research study aims towards enhancing the learning experience, stimulating communication and cooperative behavior to improve learning. Making use of recent technological advancements (tablets) and gaming as a motivational factor, a prototype application in form of a multiplayer learning game for iPads was designed and developed. In a face-to-face setting, connecting up to four devices, the players (learners) have to solve word puzzles in a collaborative way. Furthermore, a web-interface for teachers provides the possibility to create custom content as well as to receive feedback of the children’s performance. A first field study at two primary schools in Graz showed promising results for the learning behavior of school children.
<table>
<thead>
<tr>
<th>Author(s) / Affiliation</th>
<th>Title</th>
<th>Time &amp; Room / Paper ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Scullion, Mark Stansfield, Gavin Baxter / University of the West of Scotland</td>
<td>Gender Differences in Self-Efficacy Relating to Collaborative Learning in a 3D Virtual World</td>
<td>02:30 pm - 03:00 pm / E 01 / #4</td>
</tr>
<tr>
<td></td>
<td>This paper reports the findings of an empirical study involving 257 participants into the effects on self-efficacy resulting from the use of a 3D virtual world for communication and collaboration. Participants used the virtual world as part of team-based formal learning in tertiary education. The results suggest that use of the virtual world had a significant effect in enhancing self-efficacy in a range of collaborative tasks, and that in relation to gender there was no significant difference between male and female participants.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s) / Affiliation</th>
<th>Title</th>
<th>Time &amp; Room / Paper ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justin Ehrlich, James Munger / Western Illinois University</td>
<td>Utilizing Head Mounted Displays as a Learning Tool for Children with Autism</td>
<td>03:30 pm - 04:00 pm / E 01 / #5</td>
</tr>
<tr>
<td></td>
<td>It is now estimated that 1 in 50 children are afflicted with Autism Spectrum Disorder (ASD), so it is more important than ever to find effective treatments. Some of the most promising treatments involve Virtual Reality (VR), with its high level of immersion, to simulate and teach social skills in Virtual Environments (VE). One of the most immersive technologies available, the head mounted display (HMD), was recently advanced as the next generation of the device was released. In the past head-mounted displays had poor viewing angles, high latency, caused eyestrain and headaches, and were cumbersome, which caused the HMDs to be rejected by the community to treat those with developmental disabilities. The new HMDs fix all of these problems and seem to be poised as a perfect platform for next generation interventions, but first researchers must determine if individuals with ASD will accept the use of the new HMD, as problems with the old HMDs caused rejection by those with ASD. Unfortunately the research is nonexistent when it comes to studying this next generation of HMDs, therefore the purpose of this research is to answer two questions: to what extent do those with ASD or those with general developmental disabilities accept and follow instructions using the HMD and to what extent do these individuals feel presence, induced by the device, while using the HMD when compared to neurotypicals. To answer these questions, a between-group study was conducted between those with ASD and those that are neurotypicals. The ages of the subjects ranged between 6-11 and were selected from a local school. A virtual environment was developed in which subjects were required to perform simple tasks such as recognizing various objects and maneuvering through an environment. Scores were recorded based on the ability to complete the tasks within the virtual environment successfully as well as their acceptance of the head-mounted display itself. This work finds that while there is a difference between what is experienced between those with ASD and those neurotypicals, those with ASD still enthusiastically take the new generation of HMDs. This work contributes to the field of computer graphics and special education by answering important questions concerning the next generation HMDs as tools for special education.</td>
<td></td>
</tr>
<tr>
<td>Authors / Affiliation</td>
<td>Stefan Pero / Pavol Jozef Safarik University in Kosice</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>How to detect programming skills of students?</td>
<td></td>
</tr>
<tr>
<td>Time &amp; Room / Paper ID</td>
<td>04:00 pm - 04:30 pm / E 01 / #6</td>
<td></td>
</tr>
</tbody>
</table>

We present a technique to detect patterns in student's program source codes. First, we describe a source code in the form of an Abstract Syntax Tree (AST). The detection of patterns is done with the SLEUTH algorithm for frequent subgraph mining on trees. We provide experiments using real data from a programming course at our university. In the paper, we discuss the relation between patterns and skills as well as some use cases and further directions of our research.

7 pm, Dinner Reception at Heuriger: Hengl-Haselbrunner, Iglaseegasse 10, 1190 Wien

Website: [http://www.hengl-haselbrunner.at/](http://www.hengl-haselbrunner.at/)

Can be reached by:
- Taxi (around EUR 20,- from Downtown)
- Public Transportation: 2 (Direction “Karlsplatz” to “Schottentor, switch to 38 (Direction “Grinzing” to “Siveringer Strasse”) followed by a 3 Minute Walk
**Immersive installation: “A Virtual St Kilda”**

**Authors/Affiliation:** Alan Miller, John McCaffery / University of St. Andrews

**Time & Room / Paper ID:** 11:00 am - 11:30 am / E 01 / #7

**Abstract:** This paper discusses a Virtual Histories project, which developed a digital reconstruction of St Kilda. St Kilda is the most remote and western part of the United Kingdom. It was evacuated in the 1930s and lay empty for several decades. It is a world heritage site for both built and natural environment. The Virtual St Kilda acted as a focus for the collection and presentation of tangible and intangible cultural heritage. It was on show as an exhibition in the Taigh Chearsabah museum located in North Uist Scotland. The exhibition is built around the OpenSimulator Open Virtual World server using commodity hardware. The simulation covers some 4 square km of virtual space, and models both tangible and intangible culture. It is integrated into an exhibition and articulates an interpretation of the St Kilda legacy through the prism of contemporary North Uist life.

---

**Immersive Education and Architecture**

**Authors/Affiliation:** Terry Beaubois / Stanford University

**Time & Room / Paper ID:** 11:30 am - 12:00 pm / E 01 / #8

---

**UniCoMP - An Approach Towards Flexibility, Versatility and Liberty of Action on Stage**

**Authors/Affiliation:** Oliver Hödl, Geraldine Fitzpatrick / Vienna University of Technology

**Time & Room / Paper ID:** 12:00 pm - 12:30 pm / E 01 / #9

**Abstract:** Musicians have been exploring new ways of making music using different custom-built and modified instruments and additional devices during performances. However, these can increase the learning effort and reduce flexibility for the performer on stage. In this paper we present “UniCoMP” (Universal Control for Musical Performances), a wireless, easy-to-use and versatile system using off-the-shelf hardware and software to more flexibly play instruments and control devices during a performance. We describe the design of UniCoMP and the results of a pilot video-based evaluation to test its use during a live concert. We found that UniCoMP increased flexibility regarding playing instruments and controlling sound effects on stage and at the same time offered the artist freedom of movement for dramaturgic purposes. We also identified deficiencies in the user.
Seamless support for lifelong learners with mobile and sensor technology

Bernardo Tabuenca, Marco Kalz, Marcus Specht / Open University of The Netherlands

01:30 pm - 2:00 pm / E 01 / #10

Lifelong learners learning activities are scattered along the day in different locations and they make use of multiple devices. Most of the times adults have to merge learning, work and everyday life making it difficult to have an account on how much time is devoted to learning activities and learning goals. Learning experiences are disrupted and mobile seamless learning technology provides new solutions to integrate daily life activities and learning in the same process. Hence, there is a need to provide tools that are smoothly integrated into adults’ daily life. This manuscript presents the LifeLong Learning Hub (3LHub), a mobile seamless tool proposing users to immerse within their autobiography as a learner to identify successful physical learning environments, mark them with sensor tags, bind them to self-defined learning goals, keep track of the time invested on each goal with a natural interface, and monitor the learning analytics. This work implies a suitable tool for lifelong learners to bind scattered activities keeping them in a continuing learning flow. The 3LHub project has been released under open access licence with the aim to foster adaptation to further communities as well as to facilitate the extension to the increasing number of sensor (NFC) tags existent in the market.

GAMEDUCACTION: Using Game Mechanics and Dynamics to Enhance Online Learning

Mohammad Al-Smadi / Jordan University of Science and Technology

02:00 pm - 2:30 pm / E 01 / #11

In today’s “information age”, learners grow up with technology dominating most of their life activities. They use technology anywhere, anytime, and they are faced with the challenge of needing to be engaged and motivated in their learning. The emergence of Web 2.0 and the influence of Information and Communication Technology (ICT) have fostered learning to be provided online. However, e-learning solutions lack to some extent learner motivation and engagement. Engaging learners long enough to see them through to the end of a course has become one of the most significant problems faced by e-learning developers. This lack of engagement in e-learning can be attributed to three main issues: interaction, challenge and context. Therefore, learning types with high level of interaction and challenge - such as game-based learning - have become widely used. In order to gain the power of games - represented by interaction, motivation, and challenge - e-learning developers started thinking of using game thinking and game mechanics to enhance e-Learning. Gamification of education is still new trend of research and lacks frameworks and guidelines of how to develop ‘gamified’ learning tools enabling new forms of learning that are engaging. This paper focuses on these aspects and aims at providing guidelines of how to use game design and mechanics to design units of learning. Moreover,
proposing an innovative GAMEDUCATION model for e-learning able to address the challenge of having an interactive, challenging and contextualized learning while enabling learners’ demand of empowerment, social identity, and authentic learning experience.

<table>
<thead>
<tr>
<th>Authors / Affiliation</th>
<th>Alan Miller / University of St. Andrews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Mobile Exploration of Medieval St Andrews</td>
</tr>
<tr>
<td>Time &amp; Room / Paper ID</td>
<td>02:30 pm - 3:00 pm / E 01 / #12</td>
</tr>
</tbody>
</table>

**Abstract**

Saint Andrews is a town with a rich history. It was the religious centre of Scotland for close to a millennium. The Cathedral was strongly associated with the wars of Independence and Robert the Bruce. The castle was the scene of pivotal revolt leading to the reformation and hosted the first Scottish protestant congregation. St Salvators chapel was the religious centre of Scotland's first University. This presents work which explores using mobile technologies to support investigation, learning and appreciation of the past. It builds on tradition and world class scholarship into the history of this important town and makes them available to school students, researchers and tourists using mobile technologies. From text based quests, through mobile apps to location aware stereoscopic 3D experiences the gamut of available commodity hardware is used to enable the past to be explored in new ways.
<table>
<thead>
<tr>
<th>Workshop Chair</th>
<th>Martin Ebner, Pasi Mattila</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Immersive Virtual Learning Environments and Advanced (Mobile) Technologies in Education (K-12) (IVLEATE14)</td>
</tr>
<tr>
<td>Time &amp; Room</td>
<td>09:00 am - 12:00 pm / E 08</td>
</tr>
</tbody>
</table>
| Abstract      | • Taraghi/Frey/Saranti/Ebner/Müller/Großmann Determining the Causing Factors of Errors for Multiplication Problems  
• Softic/Taraghi/Ebner Mining and Visualization of Usage Trends in a Personal Learning Environment using Linked Data  
• Strasser/Greller Towards immersive digital language learning  
• Franco Stimulating Students Use Web3D-based Technology for Producing Digital Content at K-12 Levels  
• Ryymin/Rantakokko/Mattila/Arhippainen Developing Future 3D Virtual Learning Environments for High School and Vocational Education |

<table>
<thead>
<tr>
<th>Workshop Chair</th>
<th>Kai Erenli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>GSG-EDU14</td>
</tr>
<tr>
<td>Time &amp; Room</td>
<td>09:00 am - 12:00 pm / E 01</td>
</tr>
</tbody>
</table>
| Abstract      | • Taraghi/Frey/Saranti/Ebner/Müller/Großmann Determining the Causing Factors of Errors for Multiplication Problems  
• Softic/Taraghi/Ebner Mining and Visualization of Usage Trends in a Personal Learning Environment using Linked Data  
• Strasser/Greller Towards immersive digital language learning  
• Franco Stimulating Students Use Web3D-based Technology for Producing Digital Content at K-12 Levels  
• Ryymin/Rantakokko/Mattila/Arhippainen Developing Future 3D Virtual Learning Environments for High School and Vocational Education |