

Summary: 2017 IEEE Virtual Reality Second Workshop on K-12 Embodied Learning through Virtual & Augmented Reality (KELVAR)

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1 WORKSHOP DESCRIPTION

K-12 education is currently undergoing a technological revolution creating opportunities for Virtual-, Augmented-, and Mixed-Reality based learning. Technology integration will continue to increase as mobile devices penetrate all socioeconomic strata, and as new VR/AR/MR technologies become affordable to schools. These technologies have the potential to facilitate effective learning by leveraging the affordances this unique media including: the ability to engage students with interactive 3D simulations of real-life phenomena, presenting information that is spatially- and temporally- integrated with real objects, leveraging whole-body motions to depict and reinforce learning content, etc.

One unique strength of these technologies is their ability to deliver educational content through embodied learning. Embodied learning can take many forms, such as when a student moves their body around an augmented-reality plant in order to explore photosynthesis and plant structure. Embodied learning could occur in a CS programming course in which student creations are projected onto the classroom surfaces and where students collaborate by physically interacting with each other's programs. Or, embodied learning can occur in an HMD-based virtual-reality experience where the student solves mathematical equations by using their hands to physically move numbers from one side of the equal sign to the other.

Technology developers, HCI researchers and cognitive and learning scientists are beginning to understand the mechanisms and benefits of embodied learning, as well as other unique affordances which make VR/AR/MR suited for education. But there are many questions about the integration of such experiences into the classroom, such as: What curriculum topics might be addressed through such technologies?; What psychological and physiological mechanisms underlie embodied cognition?; How can we design experiences that are age appropriate?; How will pedagogical approaches be influenced by such technologies?

In this workshop we aim to bring together developers and researchers who are interested in creating educational experiences for the classroom of the future. The workshop will enable participants to discuss and be exposed to different approaches for integrating virtual-, augmented- and mixed-reality technologies, specifically focusing on the challenges and potential for embodied learning in the classroom.

2 AUDIENCE

The audience will be attendees to the IEEE Virtual Reality 2017 conference, specifically those interested in educational technology:

- Academic researchers in augmented / virtual / mixed reality
- Learning psychologists
- Industry organizations for children's education
- Teachers and educational researchers
- Informal education technology designers

3 SUBMISSION TOPICS

We welcome thought-provoking position papers and preliminary research results, on topics related to VR/AR/MR learning:

- VR, AR & MR Technologies and Applications for the Classroom
- Embodied Cognition and Learning
- User Experience Design for Children
- Curriculum-based Educational Applications
- Student-Teacher Relationships and Pedagogical Implications
- Classroom Integration of Technology

4 DEADLINES AND SUBMISSION FORMAT

Paper submission deadline: February 7, 2017

Notification of acceptance: February 13, 2017

Camera ready paper deadline: February 20, 2017

The organizing committee will select submissions based on the quality and contribution of the work relating to embodied learning in education. We seek contributions in the following formats:

- Empirical Papers: Early Research and Work In Progress (4-6 pages) - Empirical results and contributions to the field.
- Position Papers (2-4 pages) - Interesting and possibly controversial points of view, and approaches to foster a discussion at the event.

Papers must be written in English and follow the IEEE Computer Society format found at:

<http://www.cs.sfu.ca/~vis/Tasks/camera.html>

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5 ACCEPTED PAPERS AND SCHEDULE

8:30 – Introduction

8:35 – Keynote (30min presentation + 15min discussion)

- Matthew Kam - Research Lead, Google's Education Products Team
- Jinghua Zhang - Research Lead, Google's VR/AR Research Initiatives

9:20 – Papers 1

- "Virtual Reality Mediated Instruction and Learning" (Michael Melatti, Kyle Johnsen)
- "iVR for the Geosciences" (Jiayan Zhao, Peter LaFemina, Jan Oliver Wallgrün, Danielle Oprean, Alexander Klippel)
- "Towards a 3D Virtual Programming Language to Increase Number of Women in Computer Science Education" (Francisco R. Ortega, Santiago Bolivar, Jonathan Bernal, Alain Galvan, Katherine Tarre, Naphtali Rische, Armando Barreto)
- "Virtual Humans for Temperature Visualization in a Tangible Augmented Reality Educational Game" (Vicente Ferrer, Alex Perdomo, Hazem Rashid Ali, Carmen Fies, John Quarles)

9:55 – Break

10:15 – Papers 2

- "Embodied Experiment of Levitation in Microgravity in a Simulated Virtual Reality Environment for Science Learning" (Kiarash Tamaddon, Dirk Stiefs)
- "Embodied Learning Mechanics and Their Relationship to Usability of Handheld Augmented Reality" (Julian Radu, Alissa Antle)
- "Considerations on the use of Virtual and Augmented Reality Technologies in Music Education" (Stefania Serafin, Ali Adjorlu, Niels Nilsson, Lui Thomsen, Rolf Nordahl)
- "Mixed-Reality Barriers: Person-Tracking in K-12 Schools" (Randy Illum, Maggie Dahn)
- "Designing and conducting research using immersive technologies in schools: Seven observations" (Erica Southgate, Shamus P. Smith)

11:00 Group Discussion

12:00 Lunch

6 CONTINUE THE CONVERSATION

Please join our "Education and Learning with Virtual and Augmented Reality" groups on LinkedIn and Facebook:

<https://www.linkedin.com/groups/12021434>

<https://www.facebook.com/groups/1178589018874446>