MIND, TECHNOLOGY, AND SOCIETY

Seminar Series

UC MERCED, Fall 2016

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University of California, Merced — School of Engineering

Expanding Nanoscience Research: Adaptation of Immersive 3D Environments for Effective Visualization and Learning

Spatial intelligence has proven to be a determining factor in the success of nanoscience students specific to their visual ability to perceive nanoscale structures in three dimensions. The IDEAS project involves the use of a specialized display, sensors, computers and equipment based on immersive environment technology; it is a fully interactive system that will be utilized for education and research in Materials Science and Engineering at UC Merced. In order to determine the effectiveness of immersive systems on nanoscience learning, a pilot project was conducted for several weeks with undergraduate students, which showed the success of immersive systems in the nanoscience learning process. Overall, immersive environments provided complete control in the building and analysis of nanostructures, providing more task relevant information and facilitating depth perception. Task completion and success depended on an individual's reasoning, planning and execution of motor actions. To offer a better understanding of nanomaterials, the IDEAS project was later expanded to allow accelerated simulations for materials science research. It is important to integrate these new applications into materials science courses at the undergraduate level to strengthen materials science education, recruit and retain future science and engineering students, and adapt modern technologies for future materials science educators. The expansion of the IDEAS project relied on the flexibility of this system to serve as a research tool as well as an innovative resource for science education. To adapt the system and help engage students early in engineering research, our research group gathered concise and accessible technical documentation geared towards education of novice users, based on past cognitive science research. In particular, further research work involved developing educational resources for effective nanoscience learning. For this purpose, audio/visual manuals were created using commercial software to produce interactive electronic books that will be accessible to students through E-book readers. These educational materials will serve as learning and training resources directed to teach undergraduate students for research purposes. During the design of the audio/visual manuals, it was found that it is important to provide adequate educational tools as well as efficient guiding principles for the large number of visual, inductive, and active learners in general engineering education. This research project is interdisciplinary, combining fundamental concepts from materials science, computer science and cognitive science, particularly relying on project-based learning, active processing, overloading, and the unreliability of natural language among other topics.

MONDAY,

November 21, 2016

3:00 PM - 4:30 PM

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Please contact Jeff Yoshimi (jyoshimi@ucmerced.edu) for more information.