“Using Virtual 3-D Technology to Improve Learners’ Spatial and Science Skills: Teaching VSEPR Theory in Second Life”

Dr. Wendy L. Keeney-Kennicutt, Department of Chemistry,

Collaborators: Ms. Zahira Merchant and Dr. Ernest Goetz from the Department of Educational Psychology, at Texas A&M University.

For more information, please see below for the talk’s abstract and the speaker’s brief bio.

**Abstract**: The virtual 3-D world of Second Life (SL) is a promising place to teach students about VSEPR (Valence Shell Electron Pair Repulsion) theory because this learning module depends on students visualizing molecules in three dimensions. However, no effectiveness studies exist. Our Spring 2011 quasi-experimental pre-posttest control group research design study hypothesized that spatial ability mediated the relationship between SL and chemistry concept learning. Every semester I teach 2 large sections (~250 students each) of general chemistry. The experimental class received additional VSEPR instruction in SL through 3 activities (The Molecule Game, Chemist as Artist and a VSEPR homework set) on TAMU’s 12th Man Island (http://snurl.com/qgh3c); the control class did the same additional assignments using 2-D screen shots from SL. Results indicate no statistical differences between the two groups on content-based assessments. However, the experimental group did show greater statistical improvement on the Card Rotations Test and in their ability to determine bond angles from 2D representations of 3D molecules. This aptitude for translating 2D molecular representations into accessible 3D mental images is critical for success in upper level chemistry classes.

**Brief bio**: Dr. Wendy L. Keeney-Kennicutt earned her bachelor’s and master’s degrees in chemistry from Queen’s University in Canada before earning a Ph.D. in oceanography from Texas A&M University in 1982. After a 2 year postdoctoral fellowship, she joined the TAMU chemistry department in 1984. She now serves as an assistant instructional professor and associate director of the first year chemistry program in the Department of Chemistry and has coordinated the very successful outreach program, Chemistry Open House and Science Exploration Gallery for the last 12 years. Her present chemical education research interests include investigating the use of the virtual world of Second Life in teaching chemistry and improving spatial ability, as well as assessing how her innovative teaching methods are impacting student classroom learning. Wendy has received numerous teaching awards including the Association of Former Students Distinguished Award in Teaching at the college (1991) and university (2001) levels, the titles of Presidential Professor for Teaching Excellence (2009) and the 2010 Piper Professor for Teaching Excellence.

All are welcomed, and we look forward to this opportunity for sharing, collaboration, and generation of innovative ideas and perspectives amongst scholars and scientists.

Best regards,

Jeffrey Liew and Yeping Li