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Jerry P Suits
University of Northern Colorado, USA

Conceptual assessment of learning outcomes from animations and simulations

Chemistry students have difficulty learning chemistry for a variety of reasons. For example, many of them tend to fragment knowledge and then memorize those fragments or math algorithms; also, they tend to focus on the surface features of a visual representation. Conversely, when chemists study a complex research problem, they tend to engage in meaningful and productive learning strategies. Chemists tend to use mental images and to use multiple representations of phenomena when solving complex problems and they can switch from one representation to another. Animations and simulations are dynamic visualizations as opposed to static visualizations (e.g. diagrams, etc.). Thus, the goal of dynamic visualizations is to get chemistry students to visualize on the computer screen (i.e., external representations) the same types of representations of chemical phenomena that chemists mentally envision (i.e., internal representations). The question then arises: How can we gauge? what students understand after they have interacted with animations and simulations? My research group has found that their understanding (or 'mental models') can be probed when students draw and explain their conceptions of chemical phenomena. This talk is useful for anyone who needs to recognize how students learn from good multimedia software in chemistry.

Biography

Jerry P Suits has completed his MS in Biochemistry from Texas State University (1976) and PhD in Science Education at the University of Texas at Austin (1985). He has been the Editor of a book "*Pedagogic Roles of Animations and Simulations in Chemistry Courses*" (2013). He has published more than 20 papers in peer-reviewed journals and book chapters. He and his graduate students have presented more than 100 papers at national (USA) and international conferences. He has been serving as an Editorial Board Member of the *Journal of Computers in Mathematics and Science Teaching*.

Jerry.Suits@unco.edu

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