RECENT DISSERTATIONS

MAIJA KIVIAHDEM, 2005:

Effects of Authentic Learning and e-Learning in an Introductory Chemistry Laboratory Course

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Abstract

Research into memory processes has progressed in recent years through the combined efforts of neuroscientists and cognitive scientists. This is especially aided by modern scientific research methods of the brain such as positron emission tomography and functional magnetic resonance imaging. The learner, through interaction with his environment, must actively create individual cognition; the brain is a dynamic adaptable organ. This research will limit the discussion of authentic learning and e-learning to an introductory chemistry laboratory course. The most popular, and yet the most heavily criticized style of laboratory instruction is the traditional (also termed verification or expository) style with a “cookbook” nature. On the basis of pilot action research, the goal of this study has been the use of e-learning for the purpose of placing more emphasis on the contemplation of chemistry’s theoretical topics for effecting the quality of conceptual understanding. With systems thinking as a background, the qualitative research method was primarily used, but statistics of the external influences in the e-learning process were also improved. In an e-learning environment, the individually supported development of a learner’s conceptual understanding was analyzed by SOLO-taxonomy by comparing the learner’s own outcomes. The results show that e-learning with traditional laboratory activities has the effect of forming chemistry concepts, and results in meaningful learning. The SOLO-taxonomy would be a powerful tool for faculty for analyzing points of difficulty or confusion in students’ understanding of chemistry concepts. To better understand the effectiveness of e-learning, studies have to be directed toward higher-order cognition by collaborative learning in addition to conceptual understanding of individuals.

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