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The Role of e-laboratories in Science Education

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Abstract

Laboratory-based courses play a critical role in science education, yet there is disagreement between science and engineering educators about whether and which types of technology-mediated laboratories should be involved to promote better conceptual understanding, better design skills and better professional skills of learners. In this study, we focused on the evaluation of the efficiency of different types of e-labs, using Ma and Nickerson (2006) four-dimensional educational goal models. We found different patterns and enlarged the model to five dimensions. We tried to specify clearly the differences, advantages and disadvantages of all three kinds of e-labs according to educational goals to be achieved. We also tried to investigate which aspects of the laboratory experience are most essential to learners and if those lab characteristics have a relationship to learner characteristics or to prior experience. In the second part of the study, we focused on investigating (not verifying) the hypothesis, that it is not the actual nature of the laboratories, but the beliefs that students and teachers have about them which may determine the effectiveness of different lab types.

Keywords

science education, remote laboratories, virtual laboratories, conceptual understanding, educational research

Biography



Zdena Lustigova is the head of the Laboratory of Distance Education, Faculty of Mathematics and Physics, Charles University in Prague, Czech republic. Her educational work and especially her research and development effort has been concentrated on neurophysiologic aspects of e-learning and computer aided teaching and learning.

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