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A New E-learning Strategy for Cognition of the Real World in Teaching and Learning Science

Abstract

Computer supported inquiry based learning environments are developing along the lines of integrated learning and combining multiple approaches; but till now, they have rarely included virtual and remote experimental environments to form a unified body of information and knowledge in both collaborative and constructivist way.

With progress in information technologies, the chance to handle real objects by application of remote and virtual experiments across the Internet has emerged. This paper describes how a scientifically exact and problem-solving-oriented remote and virtual science experimental environment might help to build a new strategy for science education. The main features of the new strategy are (1) the observations and control of real world phenomena, possibly materialized in data, their processing and evaluation, (2) verification of hypotheses combined with the development of critical thinking, supported by (3) sophisticated relevant information search, classification and storing tools and (4) collaborative environment, supporting argumentative writing and teamwork, public presentations and defense of achieved results, all either in real presence, in telepresence or in combination of both. Only then real understanding of generalized science laws and their consequences can be developed.

This science learning and teaching environment (called ROL – Remote and Open Laboratory), has been developed and used by Charles University in Prague since 1996, offered to science students in both formal and informal learning, and also to science teachers within their professional development studies, since 2003.

Key words: *inquiry based learning, remote and virtual technologies, science education, remote and open laboratory, e-lab*