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Adapting RealTime Physics for Distance Learning with IOLab - A Final Report

Monday, 1 October 2018 10:00 (1 hour)

The IOLab is a versatile, relatively inexpensive data acquisition device developed by Mats Selen and his colleagues at University of Illinois (1). It is self-contained in a cart that can roll on its own wheels, and it includes an optical encoder that measures motion quantities and a force sensor. It also contains sensors to measure a variety of other physical quantities. With a current cost of around $100, students can purchase their own individual device (like a clicker) and can-in theory-use it to do hands-on laboratory, pre-lecture (flipped classroom) and homework activities at home. We report on the results of a project (2) to develop distance-learning (DL) laboratories using the IOLab. We have adapted RealTime Physics Mechanics (3,4) labs for use with the IOLab and tested them in supervised laboratory environments and in distance learning mode at Portland State University and Chemeketa Community College. We will describe the labs and lab environments, and the significant FMCE (5) conceptual learning gains.

References
(1) See http://www.iolab.science/.
(2) Funded under U.S. National Science Foundation grant DUE – 1505086, July 1, 2015-June 30, 2017.
(3) David R. Sokoloff, Ronald K. Thornton and Priscilla W. Laws, "RealTime Physics: Active Learning Labs Transforming the Introductory Laboratory," Eur. J. of Phys.: 28 (2007), S83- S94.
(4) David R. Sokoloff, Ronald K. Thornton and Priscilla W. Laws, RealTime Physics: Active Learning Laboratories, Module 1: Mechanics, 3rd Edition (Hoboken, NJ, John Wiley and Sons, 2011).
(5) Ronald K. Thornton and David R. Sokoloff, "Assessing student learning of Newton39;s laws:
The Force and Motion Conceptual Evaluation and the Evaluation of Active Learning Laboratory and Lecture Curricula", Am. J. Phys.: 66, 338-352 (1998).

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No

Level for award
 (Hons, MSc,
   PhD, N/A)?

N/A

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