

## **Houston, We have a Problem: Effects of Technical Frustration on Student Learning in Laboratories**

Kayla Kutz, Dan Kenning

*Departmental Affiliation:* Education  
College of Arts and Sciences

This study investigates the effect of the signature technical difficulties of laboratory work on student learning in the physical science classroom. Certainly the educational strategies of text and lecture are sorely lacking. But do laboratories in physical science frustrate students more than they teach them? If so, why? To investigate this phenomenon, the study involved differentiating instruction for three classes of freshmen, sophomore, junior, and senior students enrolled in an introductory physical science course at a local high school. Two classes participated in a physical laboratory on DC circuits, while a third class instead participated in a simulation counterpart – that is, an electronic experimental setup that by design cannot have inherent technical difficulties. Results show that the simulation laboratory had a more significant impact on students' post-test responses, though not always for the better. These results are enlightened by observations of student interaction with each laboratory activity.

### *Information about the Authors:*

Kayla Kutz is a senior physics and secondary education double major planning to either begin a career in teaching high school physics or pursuing a master's degree in a related field following graduation. This research question was sparked when, as a student teacher at a local high school, Kayla witnessed students frustrated and struggling through laboratories in the science classroom. It is her hope that just as continued research uncovers new knowledge in the hard sciences, continued research in how students understand and learn science will open doors for new and improved teaching practices as well.

*Faculty Sponsor:* Dr. Del Gillispie

*Student Contact:* [kayla.kutz@valpo.edu](mailto:kayla.kutz@valpo.edu)