

Investigative Science Learning Environment (ISLE): Making your students collaborative participants in the practice of physics

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Success in the 21st century is determined by one's ability to pose problems and seek multiple solutions, to evaluate assumptions, and to cope with uncertainty in the answer. People who can work in a team, critically evaluate and communicate will be more successful than those who know a lot of information. The above skills are naturally developed in those who do authentic science or engineering but historically they were not the goals of school education. Next Generation Science Standards are a response to the new needs of the world. They put student engagement in authentic scientific practices on equal footing with understanding the concepts and applying mathematical relations.

How do we help our students succeed in both? In this talk I will describe a learning system for physics courses that naturally and seamlessly engages students in the science practices while they are learning the “content” of physics. In fact, in this system there is no distinction between the content and the process as there is none in real physics.

The learning system, called Investigative Science Learning Environment (ISLE)¹, helps student learn physics by systematically engaging them in the processes that mirror the practice of physics. It is based on the findings of brain research and physics education research and is supported by a set of comprehensive curriculum materials and numerous studies of student learning. In my talk I will describe the system and provide specific examples and suggestions for implementation.

¹ Etkina, E. (2015). Millikan award lecture: Students of physics—Listeners, observers, or collaborative participants in physics scientific practices? *American Journal of Physics*, 83(8), 669-679.