

Abstract Submitted
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Labs with a purpose: Understanding the effect of lab purpose on students' attitudes and skills¹ COLE WALSH, Laboratory of Atomic and Solid State Physics, Cornell University, JOHN AIKEN, Center for Computing in Science Education Department of Physics, University of Oslo, HEATHER LEWANDOWSKI, JILA and Department of Physics, University of Colorado, Boulder, NATASHA HOLMES, Laboratory of Atomic and Solid State Physics, Cornell University — There have been recent calls to shift the focus of undergraduate physics labs towards developing students' experimentation and critical thinking skills. Making these changes successfully at a large scale will require that we understand what features of lab curricula are most important for developing these skills and fostering students' attitudes about experimental physics. To address these questions, we analyzed data collected using the Colorado Learning Attitudes about Science Survey for Experimental Physics (E-CLASS) and the Physics Lab Inventory of Critical thinking (PLIC). We administered these surveys to more than 20,000 students from over 100 institutions in the United States and internationally. Our results from this large dataset indicate that labs designed explicitly to develop lab skills are most effective for improving students' critical thinking skills and attitudes about experimental physics. We further find that this effect is consistent across various subpopulations of students (i.e., gender, race/ethnicity) and can be partially explained by the increased opportunities for decision-making that students face in labs designed to develop their experimentation skills.

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