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Facilitating and Assessing the Development of Scientific Abilities and Habits of Mind: Introductory E&M and Modern Physics Course Transformation around ISLE Labs and Measurable Learning Objectives
CHARLES RUGGIERI, DEBBIE ANDRES, EUGENIA ETKINA, Rutgers, The State University of New Jersey, SUZANNE WHITE BRAHMIA, University of Washington — Rutgers University has completed its second year of a transformation of the E&M and Modern Physics portions of its introductory calculus-based physics sequence – involving ˜800 students per semester – from a traditional structure to one that includes Investigative Science Learning Environment (ISLE)-based labs. The lab, which had previously been a separate course, is now central to the course structure, and this happened from a bottom up change strategy. Over 10 faculty and staff members worked together on the transformation. In this talk we discuss the process of developing learning objectives, from which emerged a shared recognition of the central role that ISLE laboratory experiences play in meeting the learning objectives the faculty articulated as being important. We outline the steps we undertook transforming the labs, share student learning data, lessons learned, and future plans. We will discuss the essential features of transformation progress at Rutgers (1) administrative support and PER champion(s), (2) close collaboration of instructors and curriculum designers, (3) weekly professional development, and (4) a flexible grading system which encourages students to revise and resubmit work based on instructor feedback.

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