

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Applying the results of education research to help students learn more: peer instruction and clicker questions in upper-division courses
RACHEL E. PEPPER, University of California Berkeley, STEPHANIE CHASTEEN, STEVEN POLLOCK, KATHERINE PERKINS, University of Colorado Boulder — Over the past 7 years, the physics faculty at the University of Colorado have worked to transform four upper-division courses: Classical Mechanics/Math Methods, Electricity and Magnetism (E&M) I and II, and Quantum Mechanics. We discuss our transformations as a model for other upper-division courses, such as fluid mechanics, focusing on one of the changes made in the transformation effort: the addition of peer instruction (“clicker questions”) to lecture. The goals of our course transformation were to improve student learning and to develop materials and approaches that other faculty could easily adopt or adapt. In this talk, we review the evidence for effectiveness of peer instruction, discuss our implementation, and present evidence of improved student learning in our transformed upper division courses. Tips for effective use of peer instruction and banks of clicker questions available for fluid mechanics will also be discussed. Our curriculum materials are free and available at www.colorado.edu/sei/departments/physics.htm.

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Date submitted: 04 Aug 2013

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