

Abstract Submitted  
for the DFD14 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 Puget Sound, STEPHANIE V. CHASTEEN, STEVEN J. POLLOCK, KATHERINE K. PERKINS, University of Colorado Boulder — The physics faculty at the University of Colorado have transformed four upper-division courses: Classical Mechanics/Math Methods, Electricity and Magnetism (E&M) I and II, and Quantum Mechanics. We discuss these 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 <http://per.colorado.edu/sei>.

Rachel E. Pepper  
University of Puget Sound

Date submitted: 31 Jul 2014

Electronic form version 1.4