Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Large-scale Assessment Yields Evidence of Minimal Use of Reasoning Skills in Traditionally Taught Classes[1] BETH THACKER, Texas Tech University — Large-scale assessment data from Texas Tech University yielded evidence that most students taught traditionally in large lecture classes with online homework and predominantly multiple choice question exams, when asked to answer free-response (FR) questions, did not support their answers with logical arguments grounded in physics concepts. In addition to a lack of conceptual understanding, incorrect and partially correct answers lacked evidence of the ability to apply even lower level reasoning skills in order to solve a problem. Correct answers, however, did show evidence of at least lower level thinking skills as coded using a rubric based on Bloom's taxonomy. With the introduction of evidence-based instruction into the labs and recitations of the large courses and in a small, completely laboratory-based, hands-on course, the percentage of correct answers with correct explanations increased. The FR format, unlike other assessment formats, allowed assessment of both conceptual understanding and the application of thinking skills, clearly pointing out weaknesses not revealed by other assessment instruments, and providing data on skills beyond conceptual understanding for course and program assessment.

[1]Supported by National Institutes of Health (NIH) Challenge grant 1RC1GM090897-01

Beth Thacker
Texas Tech University

Date submitted: 28 Sep 2016 Electronic form version 1.4