

"Applying the results of education research to help students learn more: peer instruction and clicker questions in upper-division courses." APS DFD 11/25/14. Rachel Pepper (rpepper@pugetsound.edu).

## RESOURCES TO START USING EDUCATION RESEARCH:

Confessions of a Converted Lecturer: Eric Mazur -

Search YouTube for the above phrase to get a video of Eric Mazur, a physicist at Harvard, explaining why he switched to using interactive engagement in his courses.

[http://www.cwsei.ubc.ca/resources/instructor\\_guidance.htm](http://www.cwsei.ubc.ca/resources/instructor_guidance.htm) -

Several 2-page documents about using different research based tools + links to other resources (clicker use, learning goals, course materials...).

[STEMclickers.colorado.edu](http://stemclickers.colorado.edu) -

Booklet and videos about best practices in clicker use. Links to clicker question collections.

<http://www.flaguide.org/> -

The Field-tested Learning Assessment Guide has self-contained modular classroom assessment techniques and tools (including clicker questions, and other class activities).

<http://www.ncsu.edu/per/TestInfo.html> -

Collection of conceptual assessments in many content areas.

### **If you teach Physics:**

For introductory physics: *Peer Instruction: A User's Manual* by Eric Mazur

<http://www.colorado.edu/sei/departments/physics.htm> -

Course resources (clicker questions, homework, learning goals...) for many physics courses

<http://www.compadre.org/portal/> -

ComPADRE: Physics and Astronomy Pathway. A portal to lots of resources.

### **If you teach Engineering or Applied Math:**

<http://www.learncheme.com/> -

ConceptTests (clicker-based questions) and video ScreenCasts for core chemical engineering courses, including fluid mechanics. Requires free registration for ConceptTests.

<http://www.foundationcoalition.org> -

Links to lots of information, resources, and conceptual assessments.

Fluid mechanics conceptual assessments:

<http://www.thermalinventory.com/>

<http://www.foundationcoalition.org/home/keycomponents/concept/fluid.html>

“Applying the results of education research to help students learn more: peer instruction and clicker questions in upper-division courses.” APS DFD 11/25/14. Rachel Pepper (rpepper@pugetsound.edu).

## DISCIPLINE-SPECIFIC PEER INSTRUCTION RESOURCES:

<http://mathquest.carroll.edu/resources.tml> -

Links to banks of questions as well as publications about peer instruction in **Mathematics**.

<http://www.sei.ubc.ca/materials/Welcome.do> -

Links to transformed course materials in many disciplines including **Chemistry, Geology, Biology, Computer Science, Earth and Ocean Sciences**, and others.

<http://www.peerinstruction4cs.org/> -

Lots of peer instruction info, including banks of questions for **Computer Science** courses.

<http://www.learncheme.com/> -

Questions banks as well as and video ScreenCasts for core **Chemical Engineering** courses, including **Fluid Mechanics**. Requires free registration for ConceptTests (the Clicker questions).

<http://www.jce.divched.org/JCEDLib/QBank/collection/ConceptTests/>

**Chemistry** peer-instruction questions.

## RESOURCES FOR UPPER DIVISION PHYSICS MENTIONED IN THIS TALK:

[A longer version of this talk given to the Global Physics Department](#) -

More concrete examples of the changes that we made, more data about student and faculty opinions of the changes. Also links to a handout that has the full list of course-scale learning goals, and examples of clicker questions, tutorials, and homework questions.

<http://globalphysicsdept.org/2012/06/14/rachel-pepper-per-in-upper-division-courses/>

[Course materials for upper division courses](#) -

Includes learning goals, student difficulties, clicker questions, in-class activities, tutorials, lecture notes, exams, and homeworks.

<http://www.colorado.edu/sei/fac-resources/course-archives.htm>



Scan for a digital copy of this document with active links at [goo.gl/zc3HfV](http://goo.gl/zc3HfV)