Technology-Infused Teaching for Better Engagement & Student Success
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Wall of COOL Presentation
Cal Poly Pomona, 3/1/18

Goal: deep, sustained learning
Challenge: how do we...

• Keep our students coming to class?
• Keep our students AWAKE in class?
• Maintain communication with our students?
• Know where our students are struggling?
• Help students identify where they are struggling?
• Provide help when students need it? (24/7?)
• Help students who can’t come to class?
• Provide abundant and timely feedback?
• Stay excited about teaching the same class year after year?

Teaching with TECHNOLOGY can help!

Skeptical Philosophy: I don’t use technology for the sake of technology

• PowerPoint presentations can be boring and passive; a “chalk” talk is much more engaging! (when I write, they write)
• Teaching with Technology, my personal journey
  - 1996 Website www.cpp.edu/~lstarkey, course homespages
  - 2000 Distillation image map (Photoshop)
  - 2001 Online pre-lab quizzes (WebCT/Bb)
  - 2002 Calibrated Peer Review (CPR)
  - 2007 Online pre-lab tutorials
  - 2008 Classroom Response System (iClicker)
  - 2014 Online homework in Organic Chem Classes...
  - 2017+ Online office hours, shared docs/surveys, iPad/Camtasia videos
  Kahoot!, lightboard, active learning repositories, Bb journals, etc.

Tech-Assisted Student Learning

Online homework from publisher
(24/7 and immediate feedback, auto-grading)

• Skill-building, drill-type quizzes
  (can create in Blackboard)
• Adaptive learning
  • measures competency level for each SLO and customizes assignments
  • Ideal for students with weak pre-requisite skills

Online Homework = Favorable Feedback

CHM 315 Online Homework Feedback (n = 55)

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<th>Rating</th>
<th>Number</th>
<th>Percentage</th>
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<tr>
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<td>Somewhat disagree</td>
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<tr>
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<td>36%</td>
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Technology for Lab Preparation

• Online Quizzes (Blackboard):
  27/7, instant feedback, formative assessment
• Animations (with worksheet) TLC | Extraction
Technology for Lab Preparation
http://www.cpp.edu/~lsstarkey/ochemlab

Online Tutorials
- Adobe Presenter (Pp plug-in)
- Flash/HTML5 animations
- filming of demos
- over 37,500 worldwide visitors to website since 2008

Benefits: unlimited time, asynchronous, reviewable, available in the future (website/YouTube vs. LMS)

Assessment of Technology
Prelab Quiz: Sketch Distillation Apparatus

Percent of Students at each Score (Max Score = 10 points)

Tech-Assisted Lab Preparation:
Student comment

“I have never before taken a lab course at this university where so much help was provided for preparing for the lab. Between the Blackboard quizzes and online tutorials I always felt I had enough preparation for the lab, and this helped me perform better and understand the actual experiment.”
CHM 317L, Fall 2012

Tech-Enabled Classroom Engagement

Assessment of Technology
Prelab Survey: Confidence in Running Distillation Experiment

Mean = 5.0

Mean = 7.6

Tech-Enabled Classroom Engagement

YouTube demos, simulations, animations CHM 315
- free, no hazards, can pause/watch later, etc.
- find resources: PhET, MERLOT.org

iClicker (CRS)

- transition/wrap-up
- formative assessment
- exam review

Which of the oxygen in glucose was involved in the cyclization to the furanose form shown?

Clicker Questions:

Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10
-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
121.6 | 121.5 | 121.5 | 121.5 | 121.5 | 121.5 | 112.6 | 123.4 | 124.5 | 124.5

Final Review Practice: 121.5 | 123.4 | 131.6 | 123.4 | 124.5 | 124.5 | 124.5 | 124.5 | 124.5 | 124.5
Tech-Enabled Classroom Engagement

Kahoot – game show-style M/C questions using mobile devices getkahoot.com

How many quizzes and exams are in CHM 2107?

Tech-Enabled Communication

Course Homepage: Blackboard vs. Public
- handouts, sample exams, answer keys, clicker questions, links to resources

Organic Chemistry, CHM 314
Dr. Laurie Starkey, Cal Poly Pomona

Course Materials and Announcements:
- Most current Schedules and Lecture Notes available (in order of coverage): Ch. 1 Ch. 2 Ch. 3
- Course Notes and videos on chemistry online. See course site for links.
- Chapter 4: Reaction Mechanism Animations
- Final Exam: May 4, 6-10 pm, see course site for location. The exam covers Chapters 1 - 11. The exam is closed book except for one sheet of printed page of notes. You are not permitted to have a calculator.
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Tech-Enabled Communication

Virtual office hours (Adobe Connect)
- the night before each exam, 930-1030 pm
- can record sessions
- Chat, Q/A
- supervised peer-to-peer learning

Tech-Enabled Communication

Microsoft OneDrive
- Forms: surveys, tracking
- Word docs: study group rosters

End of Quarter CHM 201 Survey
89 responses 04:50 PM Average time to complete 2.3 mn

1. How would you describe your level of commitment to this course this quarter? (Circle one) Not at all Commitment Commitment Commitment Commitment

Making videos for the flipped classroom & beyond
- Online lectures – search YouTube, Educator.com, EdX
- Create your own “Old school-style” recording of narrated homework solutions (iPhone) 3D sketch reagent table
- Latest technology: transparent lightboard! (how it works)
- Record and edit videos with Camtasia (screen capture/voice) Tutorials: http://tiny.cc/CreatingPedagogicalVideos Examples: Engineering tutorial and solved problem
- Lecture-capture w/IPad apps - can export videos to YouTube Explain Everything cyclohexane and Doceri CPP Engineering
Sharing your work
- Private (LMS) or Public (webpage link, MERLOT)
  - Include captioning for accessibility (Hablas Español? Si!)
- Maximum exposure: make a YouTube channel!
- ChemistryConnected, created in 2012, has over 480,000 views and over 970 subscribers
  - Pre-lab tutorials, solved problems, demos of hands-on elementary school science activities
  - Over half the views have come from outside the U.S. (200 different countries)
  http://www.youtube.com/user/ChemistryConnected

Making it Academic – SoTL Research
Turn your innovation into a research project!
- Formulate a question
- Collect data (can be a great “wow” factor)
  - Get IRB approval (Human Subjects)
  - Pre- vs. Post-Intervention
  - Quantitative and Qualitative data
- Perform assessment; analyze data
- Share results with colleagues and the world!
  - Conference paper, Ed. Journal article, RTP

Getting Buy-In and Support from Students, Faculty, Institution
- Poorly implemented interventions unlikely to succeed
  - If you are enthusiastic, students are likely to be too
  - Explain WHY you do what you do – pedagogy matters!
- Share data and testimonials and data with colleagues – encourage a SoTL-supportive culture
- Institutional $upport: workshops, summer institutes, release time, mini-grants, free iPads (!), Faculty Learning Communities (clicker, SoTL, technology)
- Collaborate with research students, other institutions...

Variety in Teaching = Engaged Students
- Audiovisual presentations blows away text
- Interactive lessons exercise different “muscles”
- Teaching to learning styles is a “neuromyth,” but audio & captioning helps ALL learners
- Online tools offer asynchronous and mobile delivery, pause button, unlimited replay, etc.
- Most students need more than textbook support! Online homework and adaptive learning tools enable immediate feedback/formative assessment

Technology to Improve Mindset: Tapping into the Affective Domain
- How the student feels about the class affects learning!
  (technology-infused learning can be fun, interesting, engaging, informative, helpful, shiny and new)
  Our students are digital natives and expect technology.
- How the teacher feels about the class affects teaching!
  (technology-infused teaching can be fun, interesting…)
- Students learn better if they feel the instructor cares about their learning.
  Students appreciate the effort you put in to support their learning. A better attitude about you, about the class, and about the subject can lead to better learning!

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