Deep, Sustained Learning Comes from Building Relationships

Deep, Sustained Learning

Teacher ↔ Student

Subject

Transfer of Information

Relationships

Content

How can use of TECHNOLOGY promote learning?

<table>
<thead>
<tr>
<th>Well-organized professor makes material accessible</th>
<th>Engaging lecture presentation keeps students active and focused</th>
<th>Variety of teaching methods employed (audio, visual, hands-on)</th>
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<tbody>
<tr>
<td>Well-defined learning outcomes and clear expectations know what the goal is and how to achieve it</td>
<td>Professor cares about student’s learning Should this matter? Why does it? Affective Domain</td>
<td></td>
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<tr>
<td>Student has interest in subject matter easier to make the needed commitment</td>
<td>Reasonable work/academic schedule time available to dedicate to class work</td>
<td>Student is healthy: sleep/diet/exercise (receptive mind/body)</td>
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Technology for Lab Preparation

- Online Quizzes (WebCT, Blackboard): instant feedback, assessment
- Online Tutorials (Adobe Presenter, Flash/HTML5 animations, filming of demos, captioning) http://www.cpp.edu/~lsstarkey/ochemlab
  over 35,000 worldwide visitors to website since 2008
- Benefits: unlimited time, asynchronous, reviewable, available in the future (website/YouTube vs. LMS)

Assessment of Technology

Prelab Quiz: Overall Score

Spring 2007: 29 students watched entire video; 7 watched some

Mean = 30/65

Pre-tutorial

Post-tutorial

Mean = 50/65

Technology for Lab Preparation

Wiley EdTech Forum

Dana Point, CA, March 2017

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!
- Teaching with Technology, my personal journey:
  - 1996 Website www.cpp.edu/~lsstarkey
  - 2000 Distillation image map (Photoshop)
  - 2001 Online pre-lab quizzes (WebCT/Bb)
  - 2002 Calibrated Peer Review (CPR)
  - 2007 Pre-lab online tutorial videos
  - 2008 Classroom Response System (iClicker)
  - 2014 Using online homework in Organic Chem Classes...
Assessment of Technology
Prelab Quiz: Sketch Distillation Apparatus

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

Assessment of Technology
Prelab Survey: Confidence in Running Distillation Experiment

Mean = 5.0

Mean = 7.6

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

• STEM demos, simulations and animations on YouTube CHM 45 (free, no hazards, can pause/watch later, etc.) to find resources: MERLOT.org

• “Clickers” (CRS) www.clickerquestions.com

• Kahoot – gameshow-style M/C questions using mobile devices getkahoot.com

• TodaysMeet – smart phone chat tool todaysmeet.com/wileyedtech

• Class participation resources, including low-tech! www.stephenbrookfield.com (Workshop Materials link)

Tech-Enabled Communication

• Public course home page (vs. LMS) is not restricted to current students: handouts, sample exams, answer keys, clicker questions, links to tutorials/resources, etc.

• Virtual office hours the night before an exam (via LMS or Adobe Connect)

• broader participation than f2f office hours, chat, Q&A, whiteboard, encourages supervised peer-to-peer learning, sessions can be recorded

• Calibrated Peer Review (CPR) writing assignments

• Wikis - sharing resources for research students, extra credit assignment

Teaching Innovation Inspired by Faculty Learning Community (CPP FCPD)

Old-school approach

• Handout from ~1997

• Previous goal: revise handout

Tech-assisted approach

• Make a wiki!

• Extra credit assignment PBWorks.com
Asbestos warning on nanotubes (By Jonathan Fildes Science and technology reporter, BBC News) As a Biology major, I thought that looking and researching about nanotechnology would be dull and boring. It proved to be really interesting. There are so many wonderful things being written about nanotubes and how they can make a huge impact despite their "nano" size. I was wondering if there were any sort of risks that came along with this new technology. I came across an article that was put out by BBC News about the possible negative effects of nanotubes. The researches compared the molecular structure to that of asbestos, which earlier cause a pandemic of lung disease in the 20th century….

As a bio major, it’s interesting and exciting to see the worlds of Ochem and Bio clash. Here is the link to the article. I found it really interesting. :)

Tech-based teaching supplements to improve student success
- Skill-building, drill-type quizzes (create in LMS or available from publisher)
- Online homework system - immediate feedback, autograding
- Adaptive learning (e.g., ORION) – measures competency level for each SLO and customizes assignments to be strategically focused
- Collection of Mobile learning resources

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) + sketch (reagent table)
- Latest technology: transparent lightboard! (Biology example)
- Record and edit videos with Camtasia (screen capture/voice) Tutorials: http://tiny.cc/CreatingPedagogicalVideos
- 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 365,000 views and over 750 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 technology is 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
• Institutional $upport: workshops, summer institutes, release time, mini-grants, free iPads (!), Faculty Learning Communities (clicker, SoTL, technology)

Variety in Teaching = Engaged Students

• Audiovisual presentations blows away text
• Interactive lessons exercise different "muscles"
• Teaching to learning styles is a “neuromyth,” but captioning benefits 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

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)
• How the teacher feels about the class affects teaching!
  (technology-infused teaching can be fun, interesting, engaging, invigorating, efficient, shiny and new)
• Students learn better if they feel the instructor cares about their learning. Students appreciate the effort you put in to support their learning.
  Does a better attitude about you, about the class, about the subject = better learning? Encourages productive persistence!

Support & Acknowledgments

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Summer Institute + Course Release + Stipend

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Summer stipend to create pre-lab tutorials

References

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