Transforming the classroom with active learning technology... to connect minds and creating the future

Colin Montpetit
Transforming the classroom with active learning technology….to connect minds and creating the future

Colin Montpetit, Assistant Professor
Department of Biology, University of Ottawa
Defined Learning Outcomes, 5E Learning Cycle

Modules (self-paced)
- Targeted readings
- Interactive act./Videos
- Reflective act.
- Module quiz

Online
BlackBoard LMS
Initial exposure

Assessments
65%

Summative
- Two-Stage Collaborative Exams (2 midterms + 1 final)

F2F-class
Echo360-ALP

F2F-Labs
20%

Labs
- Experiments
- Worksheets, reports
- Quizzes

Class
- Clicker case studies
- Peer-Instruction
- Just-in-Time Teaching

Engage, Explore, Extend, Evaluation

Engage, Explore, Explain, Extend, Evaluation

Engage, Explore, Evaluation
Echo360- Active Learning Platform
Question everything!

– Multiple choice questions
– Short Answer
– Ordered list
– Image quiz
– Numerical response
– Multimedia
Student Engagement

Setting up instruction
- Assess prior knowledge
- Provoke thinking
- Stimulate discussion
- Predict- and show-
- Induce cognitive conflict

Develop Knowledge
- Tackle misconceptions
- Exercise skills
- Conceptual understanding

Assess Learning
- Exit poll
- Probe limits of understanding
- Demonstrate success
- Review

Communication
- Q and As
- Community
Peer Instruction

Peer Instruction Process

Instructor Asks a Question (ConcepTest)

Students Respond Individually

Did They Get It?

Revisit Concept

None/Few

Some

Most/All

Explain & Move On

Using a classroom response system

Don’t show the results of their responses yet

Walk around the classroom listening and assisting

After this, you can show the results

You can ask a group to share & justify their answer

Turn to Your Neighbor and Discuss

Students Respond Again

Instructor or Group Explanation


http://dbctle.erau.edu/news/gateway/
Make it about the game!

Success
Curiosity
Originality
Relationships
Feedback
Peek inside their minds
OBSERVATIONS

Attendance
~90%

Participation rate
~99%

Presentation views
100% Ss viewed 1
~90% Ss /LEC
Avg – 6 views/LEC
Class: 64,000 total views
106 views /Ss

Word count
Avg – 65% / LEC
91% have taken notes
Avg – 2100 words/Ss
Avg – 200 words/Ss/LEC
Class: 1,703,000 total words

Video views
Avg – 14 views /Ss
Class: 15232 total views
Length of video viewed – 60%

3 Sections, ~225 Students each
Blended learning format
Distribution of Learning Gains

- 2011: 30%
- 2014: 60%
- 2015: 50%

Proportion of Class (%)

- Distribution of Learning Gains (ranges)
Final Exam Grades

Class Proportion (%)

Final Grade
A+ A A- B+ B C+ C D+ D E F


2016
## Summary - Learning Outcomes

(2011 versus 2012-2016)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student performance on exams</strong></td>
<td>7-10%</td>
</tr>
<tr>
<td><strong>Final grades</strong></td>
<td>~10%</td>
</tr>
<tr>
<td><strong>Learning gains</strong></td>
<td>50-90%</td>
</tr>
<tr>
<td><strong>pre/post assessments</strong></td>
<td>(Smith et al., 2008)</td>
</tr>
</tbody>
</table>

2012-2016 – eInstruction, LectureTools and Echo360-ALP enabled classrooms
Three-legged community
Scientific Teaching

Teaching and learning is approached with the same rigour as science itself

<table>
<thead>
<tr>
<th>Active Learning</th>
<th>Actively engage students in learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>Measure student progress towards learning goals</td>
</tr>
<tr>
<td>Diversity</td>
<td>Differences that make students, cohorts, teaching unique</td>
</tr>
</tbody>
</table>

These elements underlie educational and pedagogical decisions in the classroom

Involves building a community of teachers.

Handelsman et al., Science 304: 521-522