FGSR Graduate Teaching and Learning Week

Session 3: Teaching in the Large Classroom

Please take out a device and go to: PollEV.com/alexbrown108

OR

Text: Alexbrown108 to 37607
About Me
alex.brown@ualberta.ca

Have been at the University of Alberta since 2003
Professor in the Department of Chemistry

Have Taught

First year chemistry (CHEM 102/105): 250-350 students
2nd year Quantum Chemistry (CHEM 282): 40-60 students
3rd year Physical Chemistry (CHEM 371): 100-140 students
Graduate Quantum Chemistry (CHEM 681): 5-10 students
What is your home faculty?

- Science: A, 20%
- Arts: B, 13%
- Engineering: C, 22%
- FoMD: D, 9%
- Education: E, 2%
- ALES: F, 9%
- Other: G, 24%

Respond at PollEv.com/alexbrown108
Text ALEXBROWN108 to 37607 once to join, then A, B, C, D, E...
What year of graduate school are you in?

- First (A): 38%
- Second (B): 25%
- Third (C): 10%
- Fourth (D): 10%
- More than fourth (E): 17%

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I have TAed a course/seminar/tutorial before?

- Yes (A) 67%
- No (B) 33%

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I have taught a "lecture" before (1 class to an entire course).

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- Yes (A) 57%
- No (B) 43%
What is a “large class”?

Is it simply defined by number of students?

Does the nature of the “class” matter?
   Lecture, seminar, lab, practical, performance, …

Is it defined by the teaching space?

Is it defined by the ability to interact?

Is it defined by your experience?
What is a large class?

- 1 to 25 students: A
- 26 to 50 students: B (15%)
- 51 to 100 students: C (64%)
- More than 100 students: D (20%)

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What makes teaching large classes "hard" or different from teaching small classes?

Respond at PollEv.com/alexbrown108
Text ALEXBROWN108 to 37607 once to join, then text your message
What makes teaching large classes “different” from teaching small classes?

Numbers of students (> 50 up to 450 or more)

Physical space for instruction

Diversity of backgrounds (often introductory courses)

Format for delivery (electronic, e.g., powerpoint, doc camera)

Communication with students (email overload?!)

Feedback (harder for students to ask questions, harder for you to assess student comprehension)

Personal connection to the students

Dealing with Course coordinators/other section instructors/TAs
Physical Space for Instruction
Lecture Venue: Auditorium-style

CCIS 1 430/40

Photo by Bill Burris from Faculty of Science website
Lecture Venue: Table-style

CCIS 1-140/60

Photo by Bill Burris from Faculty of Science website
Lecture Venue

• Be comfortable with your lecture room

Rehearse using the equipment and setting up computer/document camera/microphone/lights.

Carry spare microphone batteries

Carry a cell phone and classroom support number

How will it guide/constrain any planned activities?
Diversity of Backgrounds/Interests
Introductory Course: Winter term

I am in:

A) 1\textsuperscript{st} year = 62%
B) 2\textsuperscript{nd} year = 33%
C) 3\textsuperscript{rd} year = 3%
D) 4\textsuperscript{th} year = 0%
E) Greater than 4\textsuperscript{th} year = 3%

University experience
I am from
A) Alberta = 71%
B) Another Canadian province = 4%
C) Asia = 15%
D) Europe = 6%
E) Somewhere else = 4%

Education/cultural background
I am from

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Alberta A 30%
Another Canadian province B 12%
Asia C 20%
Europe D 9%
South America E 18%
Somewhere else F 11%
When I grow up I would like to be
A) A health care professional (doctor, dentist, nurse, pharmacist…) = 61%
B) A teacher/professor = 3%
C) A research scientist = 18%
D) A salesperson/business-person = 0%
E) Other (professional athlete, unemployed, actor/actress, musician,…) = 18%

Motivations/goals
You **cannot** control diversity of backgrounds

Be aware of it.

Control what you can directly influence
Student Expectations (USRI’s)

- The goals and objectives of the course were clear.
- In-class time was used effectively.
- I am motivated to learn more about these subject areas.
- I increased my knowledge of the subject areas in this course.
- Overall, the quality of the course content was excellent.
- The instructor spoke clearly.
- The instructor was well prepared.
- The instructor treated the students with respect.
- The instructor provided constructive feedback throughout this course.
- Overall, this instructor was excellent.
Course Organization

• eClass is your friend
  Post announcements using News Forum
  Use a Discussion Board
  Build online assessments
  Post skeleton notes/full notes
  Link websites/documents/videos of interest

  Blended Learning!
Lectures

• Organization is critical and it takes a lot of time

Lecture Prep

  Takes anywhere from 3-10 hours/lecture

Lecture (50min/80min)

  Be efficient: arrive ten minutes prior, don’t let them out early.

Lecture Delivery Style

  Depends on your class size and your preferences
Lecture Delivery

• Break up the lectures with activities.

Examples:

Students pair up to solve a problem. Poll the students on their answers and ask how they got there.

Incorporate polls (Polls Everywhere) or Quick Questions (Socrative)

Demos and videos

Fun, e.g., music, trivia, news items,…
Developing Large Class Activities Takes Time and Experience

Experiment

My experiment: i>clicker

Clearly explain to students purpose of experiment!
Why i>clicker?

Promote active engagement with the material covered in lectures in order to:
(i) improve your learning
(ii) build understanding of concepts
(iii) identify misunderstandings & areas to study
(iv) demonstrate progress in learning the material

Therefore, bring to class: paper, pen, i>clicker, calculator, Equation/Data sheet
Should student responses be evaluated?

- For no marks: 17%
- For participation: 29%
- For participation and correctness: 49%
- Correctness only: 5%

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What are the benefits/drawbacks of each approach?

Respond at PollEv.com/alexbrown108

<table>
<thead>
<tr>
<th>Rank</th>
<th>Benefit</th>
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<tbody>
<tr>
<td>21</td>
<td>Participation engages the class, evokes less pressure</td>
</tr>
<tr>
<td>19</td>
<td>Effort</td>
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<tr>
<td>17</td>
<td>Attendance</td>
</tr>
<tr>
<td>15</td>
<td>Participation</td>
</tr>
<tr>
<td>15</td>
<td>Determine what students struggle with, without costing them marks.</td>
</tr>
<tr>
<td>13</td>
<td>Interest</td>
</tr>
<tr>
<td>12</td>
<td>Extrinsic rewards undermine intrinsic motivation</td>
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Should student responses be evaluated?

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Year 1: CHEM 102 in 2010

Numbers of students: 220

Physical space for instruction: Auditorium-style classroom

Format for delivery: Animated Powerpoint

Feedback: i>clicker
Determine the maximum heat transferable to air at 25.0 °C from
1. 40.0 L of warm water at 40.0 °C
2. 1000.0 g of red-hot iron at 1000.0 °C
Without doing a calculation, which do you think will transfer more heat?
A) Water
B) Iron
C) Equal amounts of heat

Response based on intuition
Determine the maximum heat transferable to air at 25.0 °C from
1. 40.0 L of warm water at 40.0 °C
2. 1000.0 g of red-hot iron at 1000.0 °C
Which do you think will transfer more heat?

A) Water
B) Iron
C) Equal amounts of heat

Response based on intuition Response based on calculating q

Emphasizes that we must consider the nature of the substance, the amount of substance, and temperature change when determining heat transferred
Benefits

Instantaneous feedback: For both students and I

Can motivate topics by asking introductory question(s)

Can guide learning through formative questions

Can assess knowledge through summative questions

Students know what they know and what they do not know (also can compare their knowledge to their peers)
Overall, the i>clickers worked effectively

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<th>SD</th>
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<th>A</th>
<th>SA</th>
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PROBLEMS

15-20% active participation rate
(students already have an “expectation” of what lectures are and are not)

Needed to improve questions to promote higher-level vs. factual learning?

How to strike the right balance in number and type of questions?

How much time is enough time to work on questions?

How do I cover all the “required” content?
i>clicker Year 2: CHEM 102 in 2012

Numbers of students: 320

Physical space for instruction: Classroom with Tables

Format for delivery: Animated Powerpoint

Feedback: i>clicker (participation marks)
i>clicker participation grade

Assigned as follows:
(1) answer 80% or more of the questions during the term = 5/5

(2) answer less than 80%,
    (responses - 0.30) x 0.10 = mark out of 5

(3) Questions do not count on days:
    (i) at beginning of the course (first two lectures),
    (ii) when a substantial number of students cannot attend
    (iii) where there are technological problems.

You must register your i>clicker!
I have used an i>clicker before.
A) Yes
B) No

Total = 77

Problem: Bookstore sold out of i>clickers before all 320 of my students could buy one
Note: ~10% of students transferred out to non-clicker sections
The Good

80-85% participation rate

Student feedback generally positive

Questions improved to promote higher-level vs. factual learning.
Overall, the i>clickers worked effectively

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<td>35</td>
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<td>61</td>
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</table>
PROBLEMS

(Still) Needed to improve questions to promote higher-level vs. factual learning?

How to strike the right balance in number and type of questions?

How much time is enough time to work on questions?

Solution: Provide 1st question to next class at end of class

How do I cover all the “required” content?

Solution: remove content! or move some content online
Take Home Messages

Teaching large classes can be just as fun as teaching small classes

Be willing to try new things!

Register for the session here: tinyurl.com/2018large

Questions/Comments: alex.brown@ualberta.ca