

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

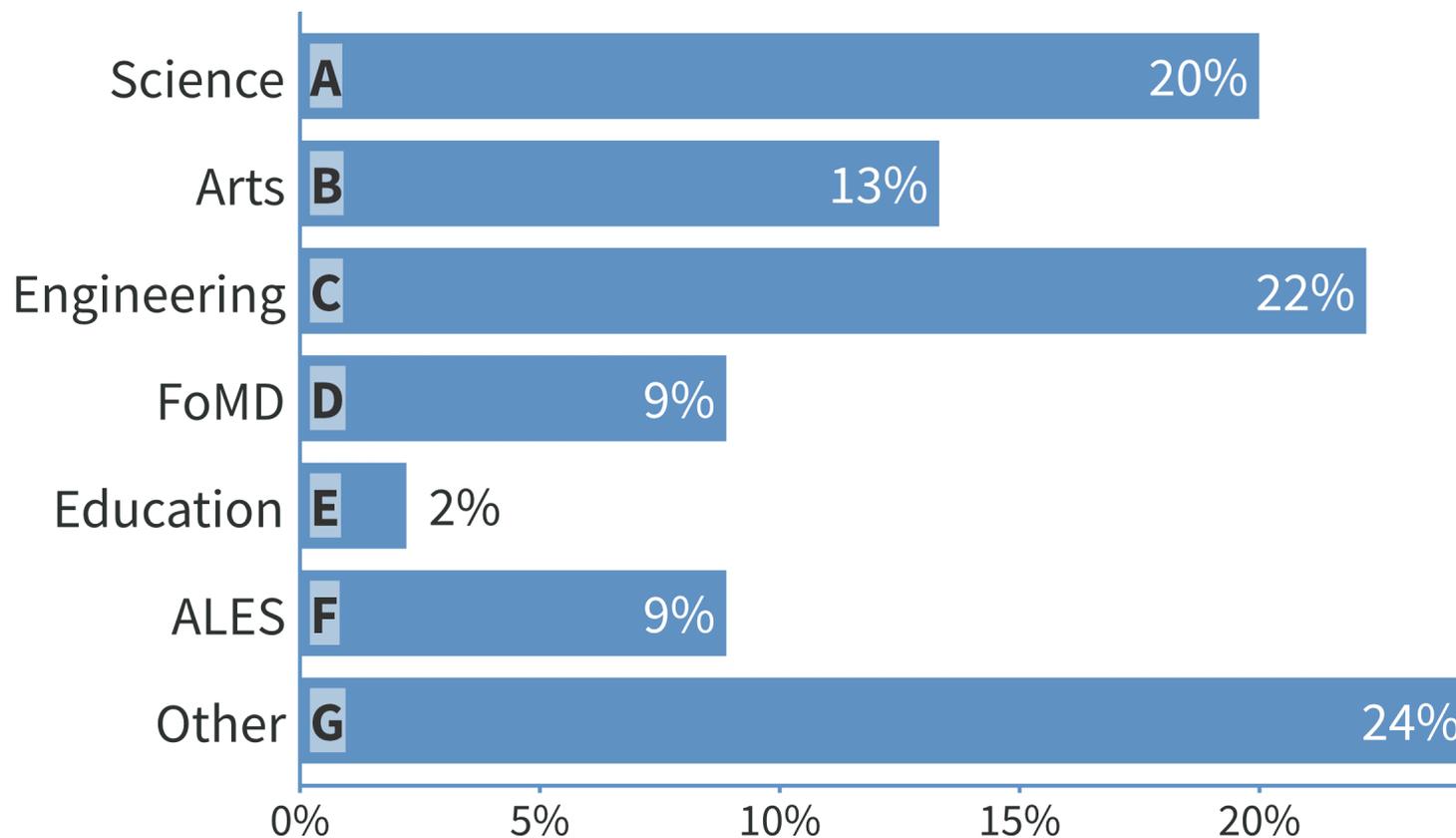
3rd year Physical Chemistry (CHEM 371): 100-140 students

Graduate Quantum Chemistry (CHEM 681): 5-10 students

What is your home faculty?

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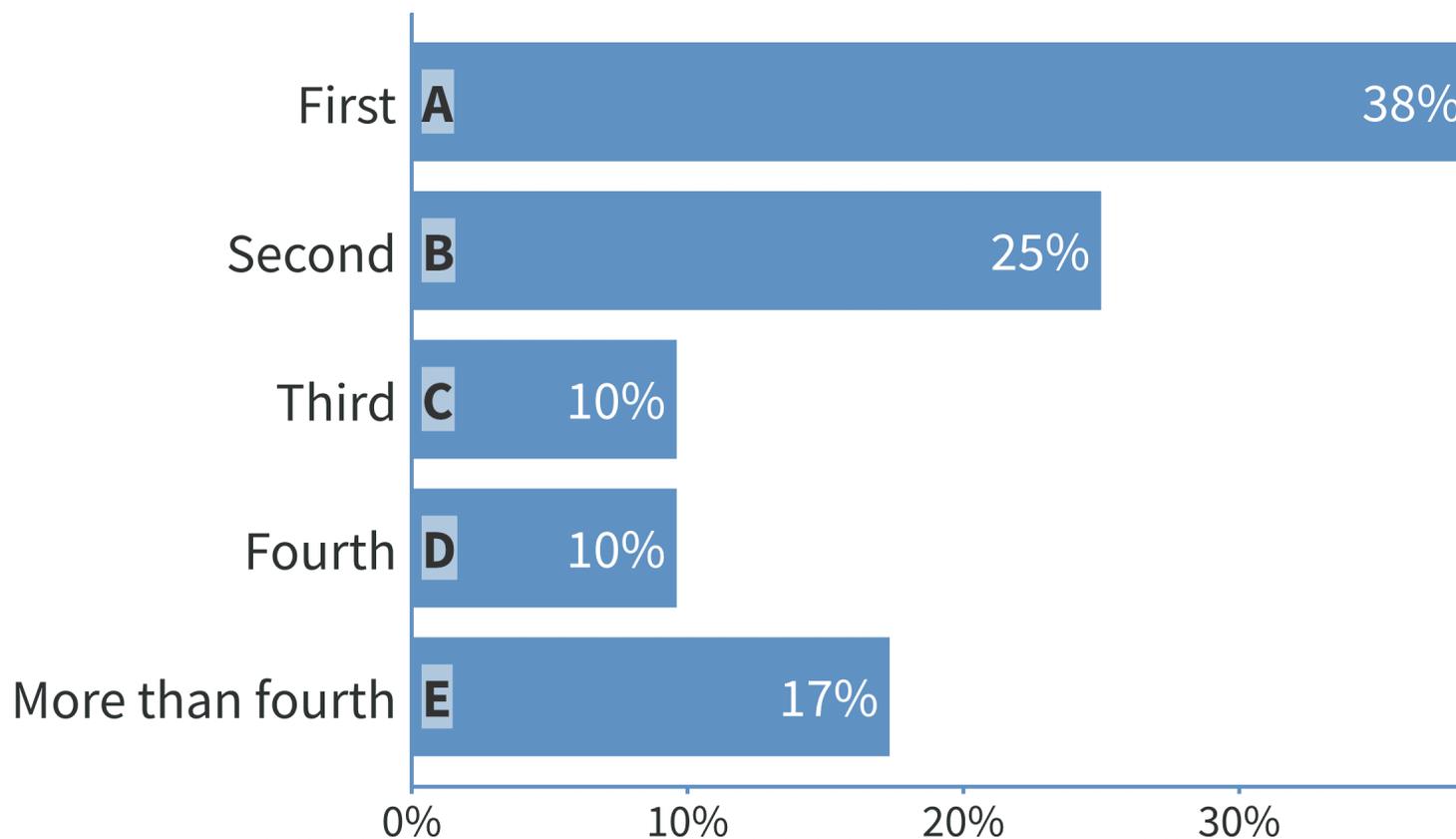
What year of graduate school are you in?



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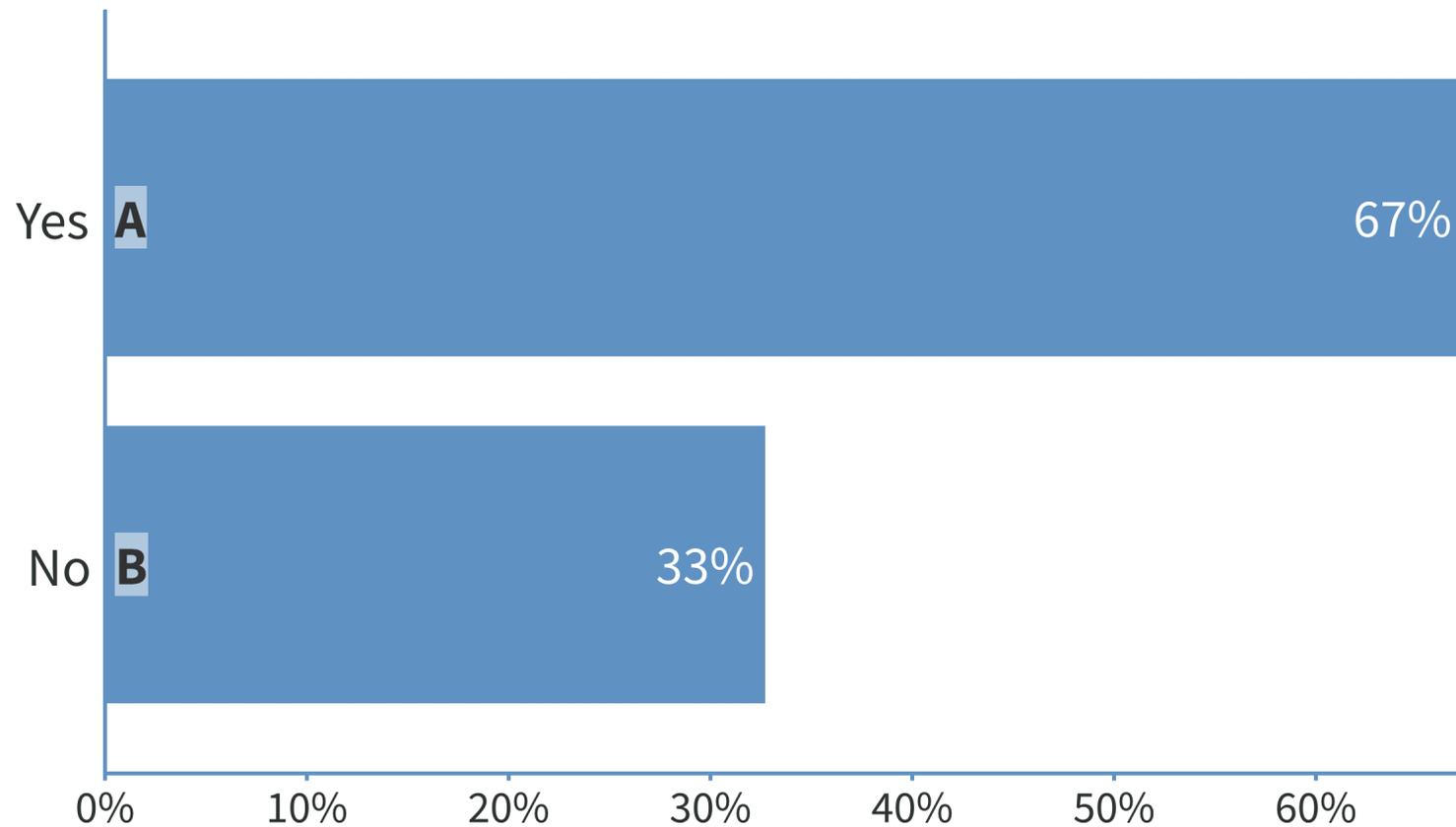
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I have TAed a course/seminar/tutorial before?

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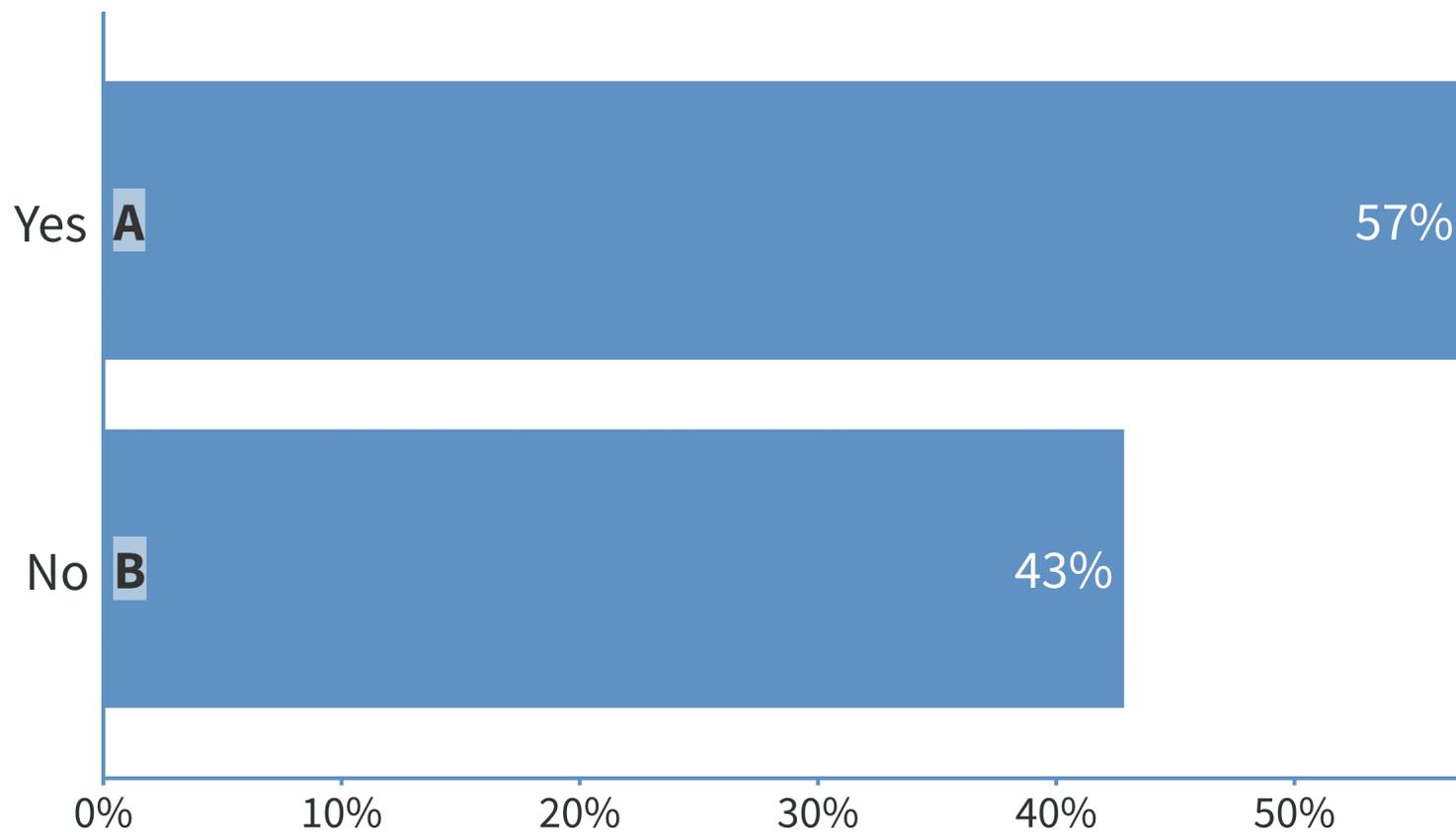
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I have taught a "lecture" before (1 class to an entire course).

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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?

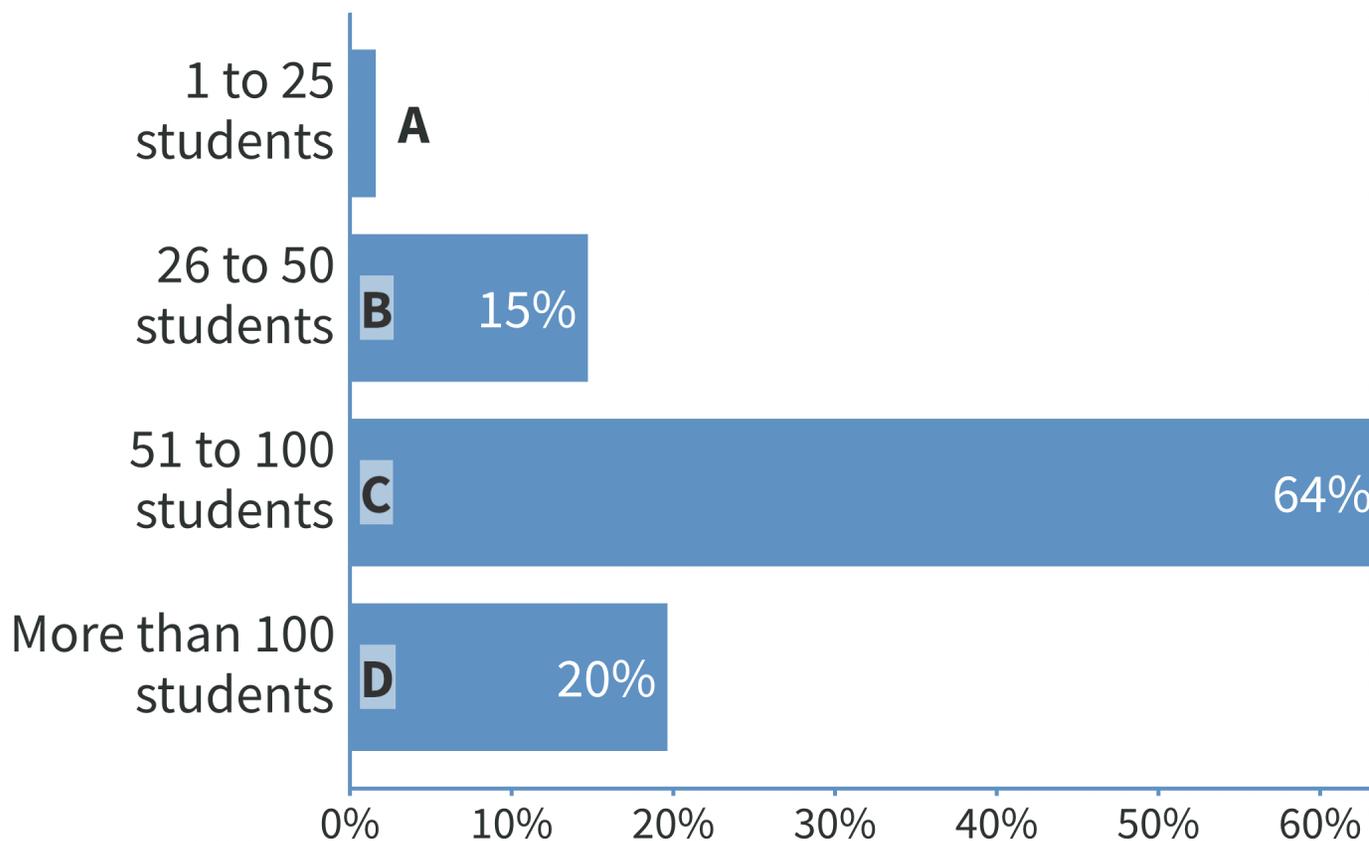
What is a large class?



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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 st year | = 62% |
| B) 2 nd year | = 33% |
| C) 3 rd year | = 3% |
| D) 4 th year | = 0% |
| E) Greater than 4 th year | = 3% |

University experience

I am from

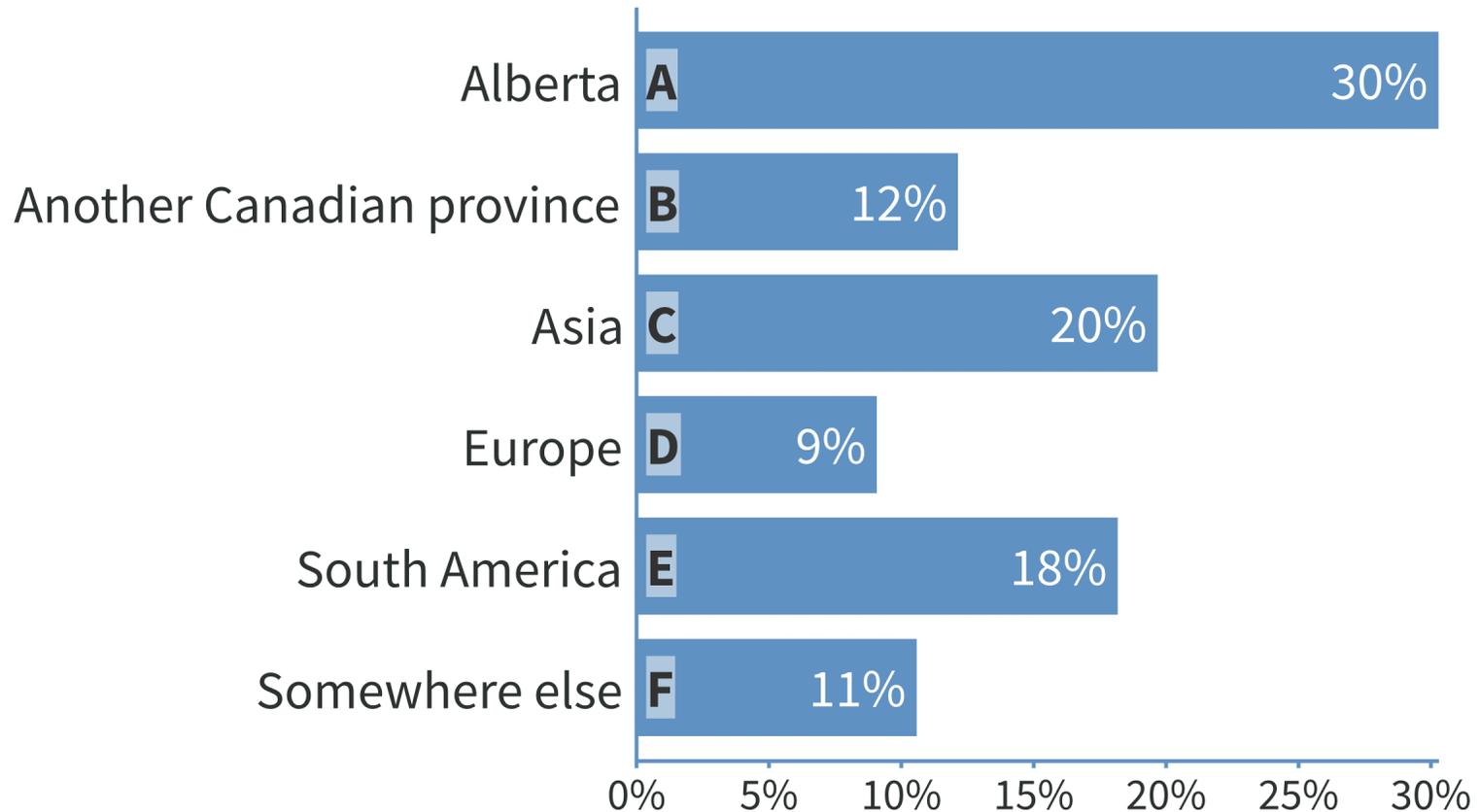
- A) Alberta = 71%
- B) Another Canadian province = 4%
- C) Asia = 15%
- D) Europe = 6%
- E) Somewhere else = 4%

Education/cultural background

I am from

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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)

Question
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:

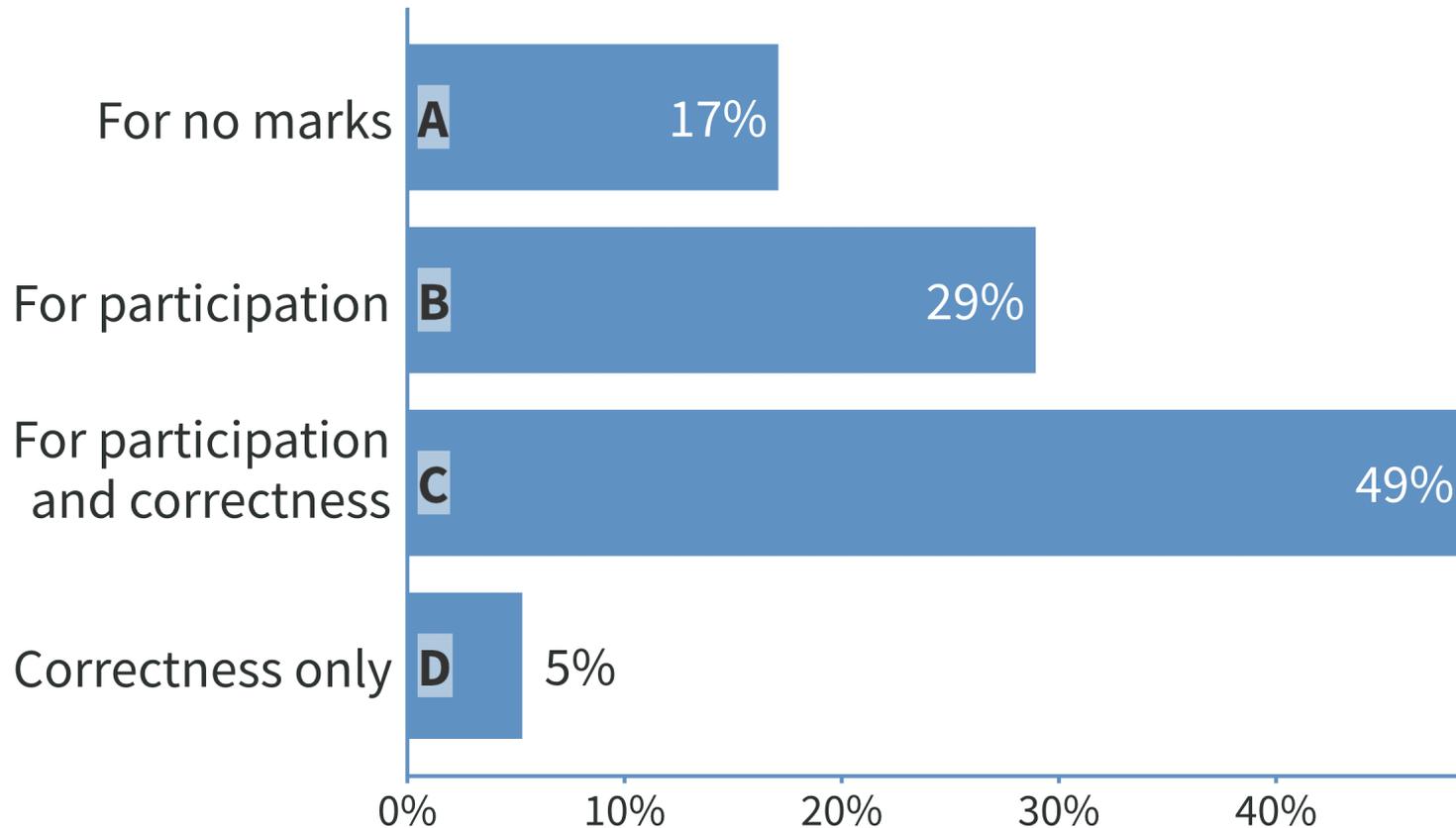
- (i) improve your learning
- (ii) build understanding of concepts
- (iii) identify misunderstandings & areas to study
- (iv) demonstrate progress in learning the material

Therefore, bring to class: paper, pen, i>clicker, calculator, Equation/Data sheet

Should student responses be evaluated?

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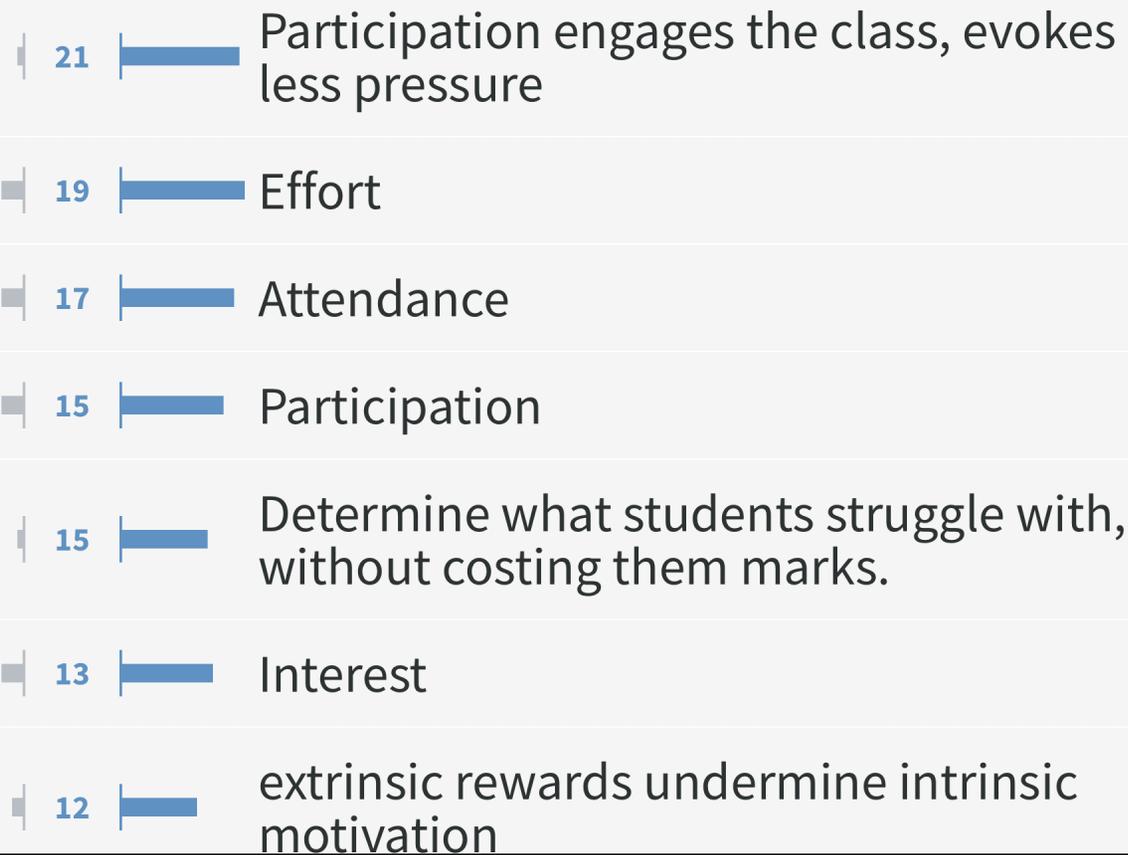


What are the benefits/drawbacks of each approach?



Respond at PollEv.com/alexbrown108

Top



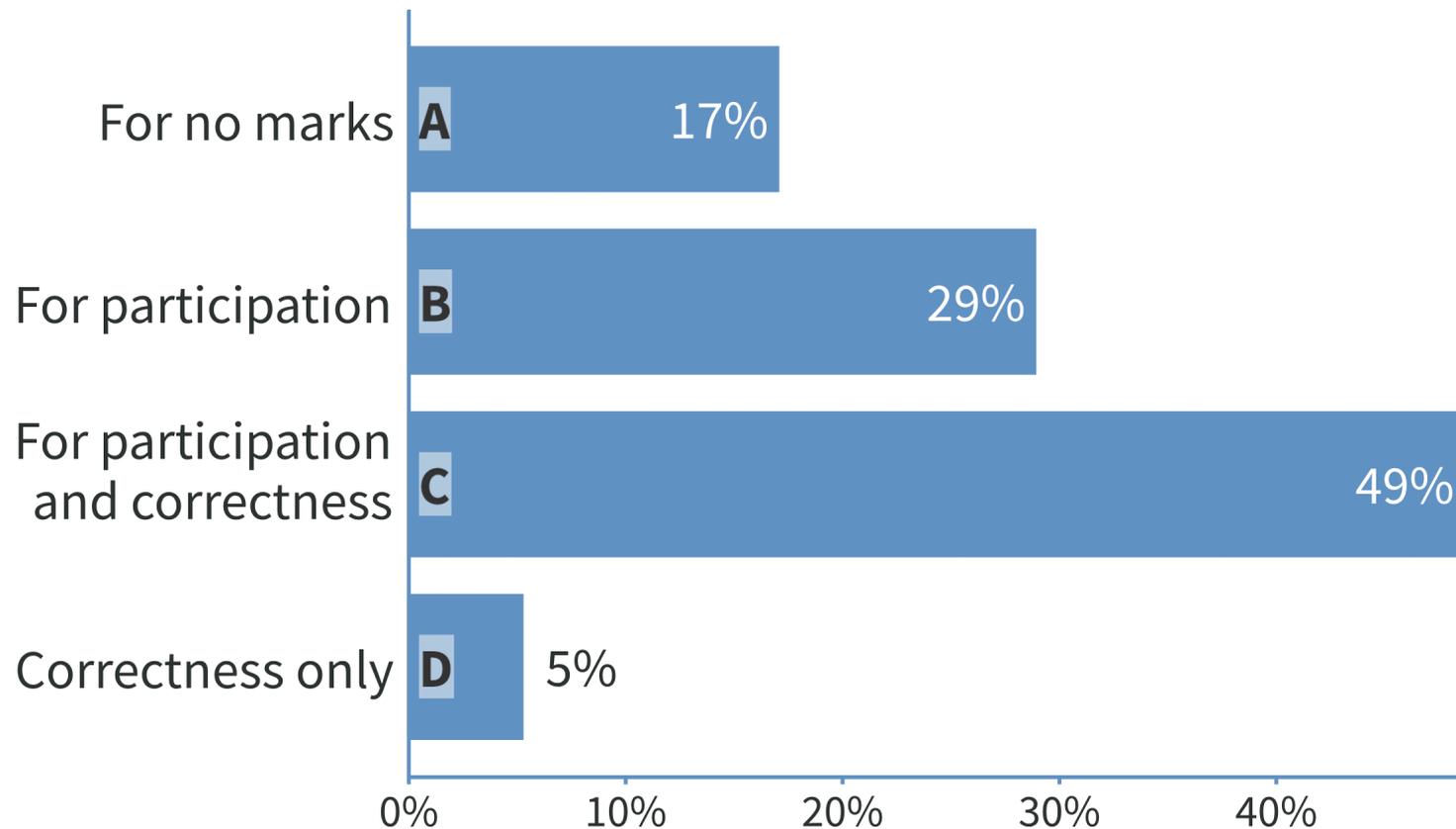
Should student responses be evaluated?



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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

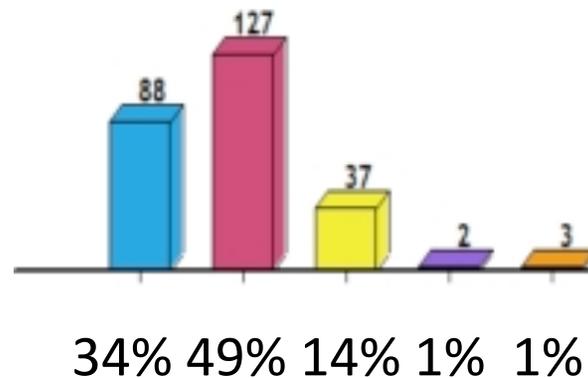
Determine the maximum heat transferable to air at 25.0 °C from

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?

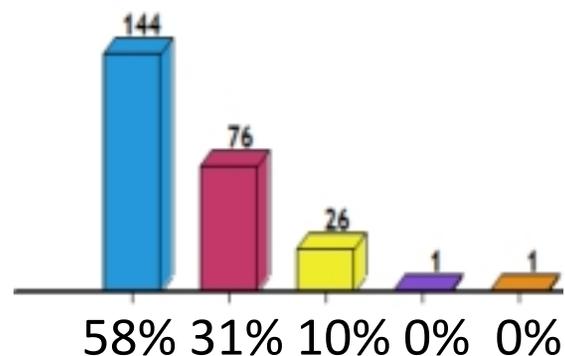
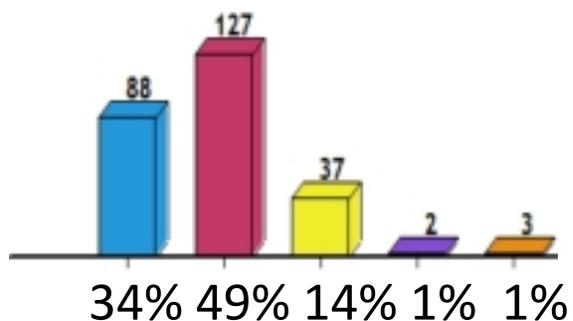
A) Water

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)

Student Response

Overall, the i>clickers worked effectively

SD	D	N	A	SA	Median
12	14	35	48	19	3.6

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.

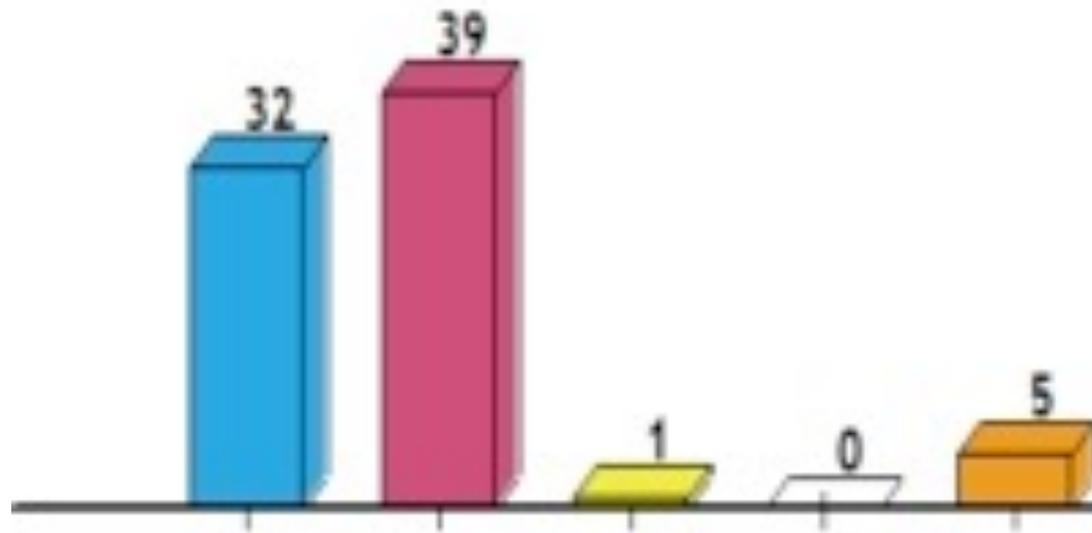
You must register your i>clicker!

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.

Student Response

Overall, the i>clickers worked effectively

SD	D	N	A	SA	Median
11	7	35	108	61	4

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