The studio and the stadium

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Outline

• A little bit about me
• The stuff that makes teaching
• Where stuff goes
• The standard model at UBC
• The small class model at UBC
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• Outcomes
A little bit about me

- Faculty member and Undergraduate Chair of UBC Math
- UBC: a public, research-oriented university in Vancouver, Canada with roughly 45000 undergraduates
- UBC Math: roughly 23000 enrollments in 130 courses, 70 faculty, 40 postdocs, 80 grad students
The stuff that makes teaching

Activity: *come up* with an answer to the following question, *condense* it to 1-3 words, and *write* it in the chat

- **Question 1:** What is a thing that you might observe happening in a “typical” math lecture?
- **Question 2:** What is a thing that you might observe happening when *you* learn math?
- **Question 3:** Think of a non-math thing that you learned or are learning – a language, breadmaking, how to taunt effectively in Dota 2. What is a thing that you might observe there?
Where stuff goes

Student-lecturer discussion

Lecturer writing on board
Watch Youtube
Examples presented
Students taking notes
Statements of definitions

Student pointing out errors

Testing edge cases

Doing computations

Doodling

Student-student discussion

Playing around with an example

Iterate/experiment/trial-and-error

Reading

STUDIO

NOVICES OKAY

EXPERTS NEEDED

STADIUM
The standard model at UBC

- Enrollment in first-year calculus has jumped 50% in 10 years – from 3250 to 5000
- The number of available instructors has *not* jumped 50%
- All sections have gotten larger
- There are more faculty-taught sections
  (due to a commitment to capping novice instructor section size)
- The novice instructor experience is still overwhelming
The standard model at UBC
The small class model at UBC

- bridges the stadium (lecture) and studio (homework) experiences
- 2-hour lecture and 1-hour *small class*
- 2-hour lectures
  - large (up to 480), faculty-taught
  - theory and canonical examples
  - a “view of the landscape”
  - new material (*e.g.* the Chain Rule)
  - 80% passive, 20% active
- 1-hour small classes
  - small (up to 60), novice-taught
  - active, group-based, problem-based
  - new material (*e.g.* related rates)
  - 20% passive, 80% active
The small class model at UBC
The small class model at UBC

- stadium: see [www.math.ubc.ca/~fsl/olsumel.pdf](http://www.math.ubc.ca/~fsl/olsumel.pdf)
- small class: see [www.math.ubc.ca/~fsl/olsumesc.pdf](http://www.math.ubc.ca/~fsl/olsumesc.pdf)
- studio: see [www.math.ubc.ca/~fsl/olsumehw.pdf](http://www.math.ubc.ca/~fsl/olsumehw.pdf)
Goals

- For students
  - active and authentic learning, mainly in groups
  - close connection with an instructor and a TA
- For novice instructors
  - more structure, more support
- For experienced instructors
  - more teaching, less wrangling
- Overall
  - resource neutral
  - more stuff in its proper place
Outcomes

- This is in-progress
- Published work (2019) indicates significant effects
  - in learning (common final exam scores)
  - in attitudes and perceptions (Math Attitudes and Perceptions Survey)
  - most pronounced in the top and bottom quartiles
- There are challenges
  - it is slow: what is covered may be “stickier”, but there is less of it
  - working in groups is hard – for both students and instructors
  - novice instructors connect much more, but experienced instructors connect less
- Overall
  - it addresses an issue of resources
  - it is *principled*: students do what *looks like math*