CTSI ACUE-Certified Faculty Lunchtime Series: Jan 27, 2022

Assessing to Inform Instruction & Promote Learning

UNIVERSITY OF TORONTO

CENTRE FOR TEACHING SUPPORT & INNOVATION

ACUE Association of College and University Educators

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Using Targeted Assessments to Improve a Course Redesign

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January 27, 2022

Joint work with Jaimal Thind, Micheal Pawliuk, Parker Glynn-Adey (and many others)

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Department of Mathematical & Computational Sciences

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Background

MAT223 (Linear Algebra I)

- 400-500 students/sem; multiple coordinated LECs
- Students in MAT, CSC, STA + other STEM
- Prerequisite for various programs/courses
- Pre-Fall 2019 delivery was ‘standard’
  - Little to no active learning
  - No LOs
  - Materials not coordinated
  - Marks & DWF lower (resp higher) than could be

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Summer 2019 Redesign

Everything, and the kitchen sink...

- Incorporated lessons from previous course redesigns
- Centred around **active learning**
- **Coordinated materials** across sections
- **Learning outcomes** at various levels
  - Course/Curriculum
  - Cumulative
  - **Reading**
- Paired with an (ongoing) **study** of its effectiveness

Image credits: Pixabay

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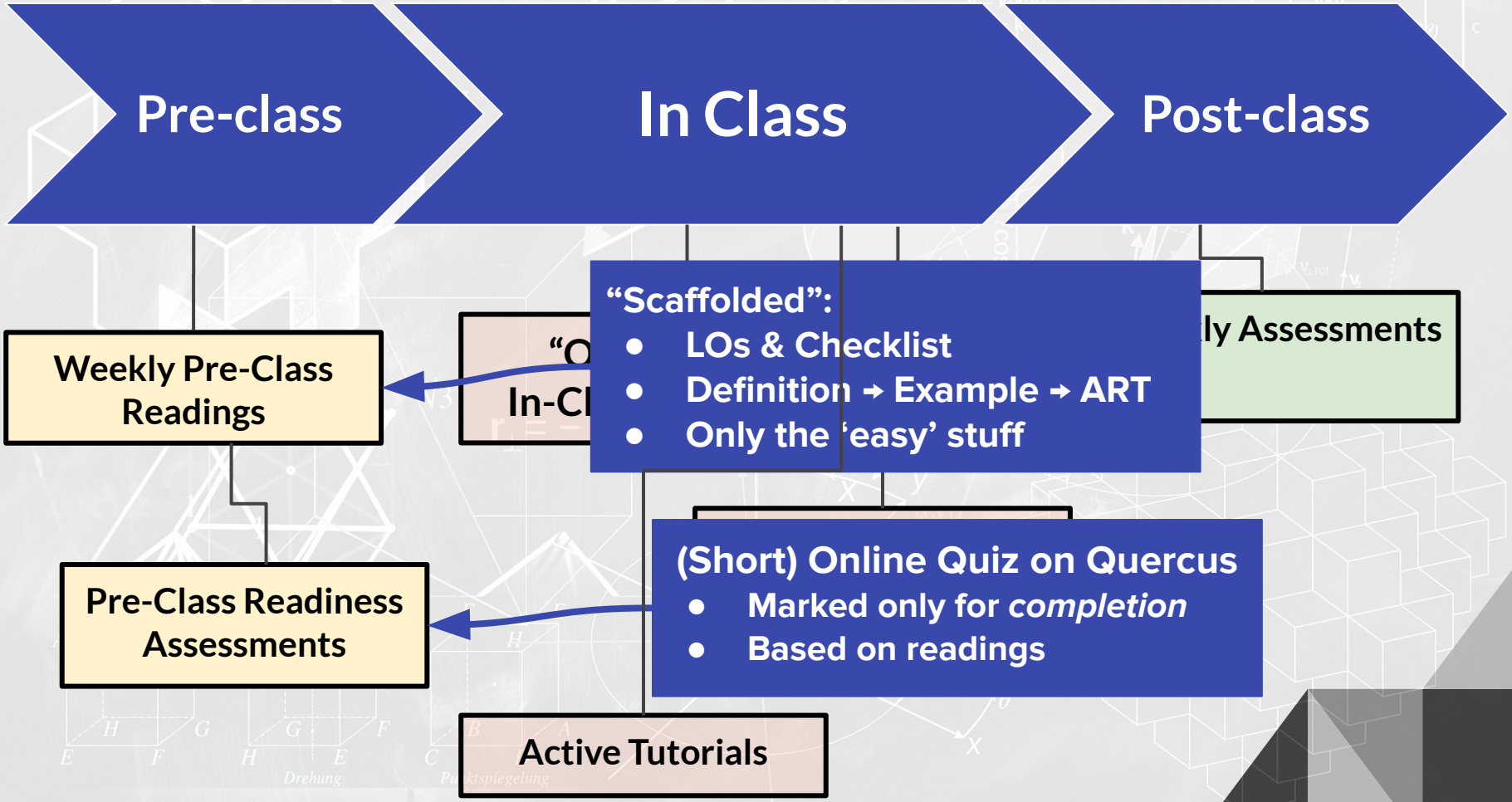
Active Learning, Week-by-Week



A typical MAT223 redesign meeting, circa Summer 2019...

Image credit: https://imgur.com/gallery/ZESV9

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Course (re)Design

Have you redesigned a course? Implemented active learning of one type or another?

Successes? Failures? Anecdotes? Questions?

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Research Study, Briefly

Four Components

- Two instruments each done at “Entry” and “Exit”
- Delivered via Quercus (new shell, manually add rosters of students)
  1. Survey
     a. Perceptions (MAPS variation; Likert scale Qs; validated)
     b. Demographics, other information
  2. *Mathematical* Reading Comprehension Test
     a. Home brew
     b. Test ability to read and comprehend ‘new’ mathematics

Warren Code, Sandra Merchant, Wes Maciejewski, Matthew Thomas & Joseph Lo (2016) **The Mathematics Attitudes and Perceptions Survey**: an instrument to assess expert-like views and dispositions among undergraduate mathematics students, International Journal of Mathematical Education in Science and Technology, 47:6, 917-937, DOI

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Research Study, Briefly

Research Questions

Does this implementation of MAT 223...

1. **Improve students' mathematical reading comprehension?**
2. Improve students' conceptual understanding?
3. Improve attrition & performance in MAT223 and MAT224?
4. Bring student attitudes about mathematics more in line with expert thinking?

And, do any results for questions 1-4 differ significantly for particular subpopulations?

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Mathematical Reading

2019-20, 2020-21

- Scaffolded Readings, PCRA
- In-class On-Ramp/Promise, “Read along”
- Interim research results were disappointing

2021-22

- Reading focused questions on assessments (plus tutorial worksheets, practice work, support)
- More discussion
- (= More explicit targeting)

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Disciplinary Reading

Have you tried to get students to "eat their vegetables" (read before class)?

Successes? Failures? Anecdotes? Questions?

Is teaching disciplinary reading skills less relevant/important now?

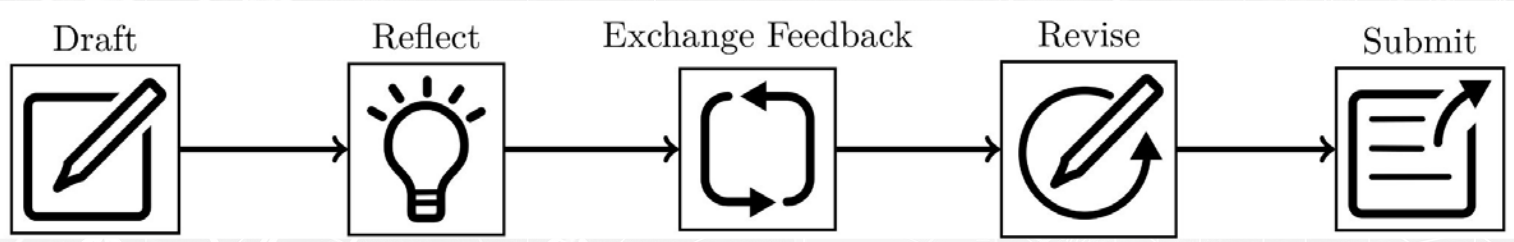
Mathematical Writing

2019-20

- No explicit targeting

2020-21, 2021-22

- PAR = Peer-Assisted Reflection (Online variation)



- Randomly paired; send draft & reflection to partner (deadline 1)
- Send feedback (deadline 2)
- Revise and resubmit (deadline 3)

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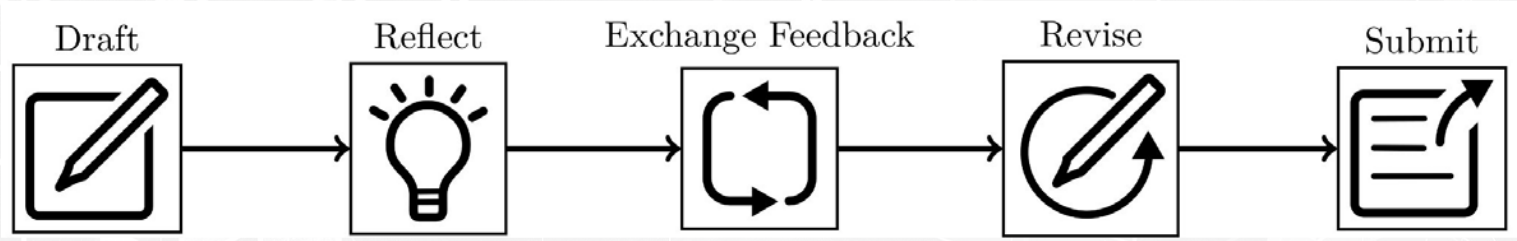
Mathematical Writing

- PAR = Peer-Assisted Reflection (Online variation)



"The findings suggest that the PAR intervention not only increases students' ability to communicate effectively, but also gives them a newfound recognition of the importance of developing communication skills in mathematics."

Susanna Calkins, Sharisse Grannan & **Jason Siefken** (2019): Using Peer-Assisted Reflection in Math to Foster Critical Thinking and Communication Skills, PRIMUS, DOI: 10.1080/10511970.2019.1608608

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Mathematical Writing

Do you explicitly target (disciplinary) writing in your course(s)?

Successes? Failures? Anecdotes? Questions?

How do you feel about generic writing skills development programs for students? Would they could help students in your discipline?

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LOs & Assessments

- Learning about LOs is a **process**:
  - Learn what they are, try yourself
  - Reinvent; spread/dig them into your course;
  - Find ways to make them work for you
- Having clear and relevant learning outcomes can make (re)design more effective
- Assessments (and related support) tied to LOs signals to students the importance of those skills

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Thank you for coming!

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Learn More About ACUE and if it's the right PD for you!

COURSE IN EFFECTIVE ONLINE TEACHING PRACTICES (EOTP)

- **9-month online course (June 2022 – February 2023)**
- **25 self-paced online modules** (each module takes from 2-3 hours to complete and involves both application and reflection)
- Learn a **range of practices** that can be applied in teaching both online and in-person courses
- **Cohort based -** meet at key points in the year with facilitators and colleagues to discuss their experiences implementing strategies and approaches learned through the modules in their own classrooms.

Interested? email ctsi.teaching@utoronto.ca with your questions.

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