Musings on SEMINAL at Loyola Chicago.

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Loyola University Chicago

AMS meeting, Virtual Omaha, Oct 8, 2021
Outline

Setting

What we’ve done

A revisionist interpretation of our philosophy

Mechanics

Our standard “training” activity
Environment

- The department:
  - A department of 38 full time faculty, about half tenure track, plus some part timers.
  - Wide variety of opinions on teaching, in particular lecture vs. active learning, but some appetite for experimentation.
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- Our classes:
  - Capped at 40 students.
  - Meet MWF for 50 minutes, or TTh for 75 minutes.
  - P2C2 classes have common textbook, syllabus, core homework problems, and some common exam problems. (Recently added common finals in P2C1).
  - Many sections have an undergraduate “supplemental instructor” available during class.
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- Aaron Greicius
- Karin Lange
- Emily Peters
- Adam Spiegler
- Peter Tingley

- Matt Bourque - joined summer 2018
- Laurie Jordan - joined Spring 2018
- Tim Stoelinga - joined fall 2019
- Alec Krueger - joined Fall 2021

Wave of departures (math: 5 of 16 TT) Spring 2020 (incentivized)

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Hire 9 FT faculty (3TT, 3Lec, 3Inst) out of 38 total Fall 2021

Additional turmoil due to building issues resulting in people avoiding campus and in scattered offices.
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Our successes - a far view

- Created Loyola specific active learning materials for at least 5 classes (PC1, PC2, C1, C2, C3, AC1, AC2) so far - seems to take several years of beta testing, some classes are really still in beta.
- Drastically increased proportion of active learning sections (sections that spend ≥ 1/3 of class time with students doing not listening). Rough estimate is we went from 10% to 60%, and still increasing.
- Increased course support and common elements (PC1, PC2, C1, AC1 now have common finals). Note: we don't use the term coordination.
- Students don't hate our active learning classes, perhaps on balance slightly prefer them (there are exceptions). Most people seem agreed that students are learning more.
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Participation

- Participation is fully voluntary.
- Pre-seminal: About half a dozen active learning sections a semester (4 or 5 instructors involved, but teaching other classes as well).
- Fall 2018: 12 sections.
- Spring 2019: 16 sections.
- Fall 2019: 16 sections
- Spring 2020: 19 sections
- Fall 2020: Online, very unclear who should count.
- Spring 2021: Online, very unclear who should count.
- Fall 2021: Approx. 30 (out of 48 possible).

Around half of our faculty has taught a class meeting our criteria, and more have done at least some active learning.
Our philosophy (as reconstructed from what we did)

▶ A “big but easy” approach:

▶ Classes are re-oriented so that a lot of time is spent on investigation - investigation is an integrated part of how material is presented.

▶ Explorations are just group worksheets - math as mathematicians see it.

▶ Everything is voluntary - we recruit by trying to demonstrate the success of active learning ourselves, and having people want in.

▶ Groundwork was there: several of us were already having success teaching this way. Perhaps importantly, we were using active learning in 200 and 300 level math classes, and students spread the word that they were good classes.

▶ I fight ferociously against any claim that active learning trades quantity for quality - I can teach more with active learning, as well as teach it better, and will show anyone who argues my exams.
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Mechanics

Participants commit to using active learning for most of their class time - this is now looser. Guide: 15 min lecture, 30 min active learning, 5 min wrap up (usually more like 25 - 20 - 5 at entry level).

We support instructors and provide material, but leave as much freedom as possible. Support is a half day before the year, and some meetings throughout the year, plus some observations and individual feedback where it seems appropriate.

Created about 20 “investigations” per course. Instructors are free to deviate. Experienced instructors are encouraged to deviate, our materials are entry-level. Materials were created with input from many people.
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Our investigations

Just worksheets, but designed to encourage conversations, and to be explorative.

Some questions develop ideas not all of which have been lectured on, or read about ahead of time.

All contain some computational/procedural questions, and some conceptual/application questions, and ideally a mix of difficulties.

Should be conversation starters.

Worksheets depend on some prior knowledge, we leave decisions on that to individual instructors.

Designed for small group work, with instructor constantly circulating, answering questions, and initiating discussion.
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Discussion and reflection activity

We use versions of this at most of our trainings, with faculty and SIs:

- What prior knowledge should students have? How might that be supported in an initial lecture?
- What ideas could the students develop themselves - i.e. what doesn’t have to be lectured on?
- What are some key ideas students should take away? How might you highlight these?
- Where might students get stuck, and what might be good hints/supports?

Share out.
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In small groups, review sample worksheets, keeping the following discussion questions in mind:

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