Overcoming Barriers, Finding Solutions, Creating Incentives & Rewards

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NC State context

- “All spheres” geoscience department at R1 institution
  - 31 tenured/tenure track faculty (2 searches in progress)
    - all but 1 research active (grad students & grants)
  - Very limited use of provisional faculty
  - 2 faculty in GeoEd

- Majors
  - Geology – 80 (increasing)
  - Marine Sciences (mostly biological) – 67 (flat)
  - Meteorology – 88 (decreasing)
Geology major*

- **Major courses**
  - Earth System Science
  - Physical
  - Historical
  - Min/pet
  - Sed/pet/strat
  - Structure
  - Marine sed, coastal field camp, or geomorph
  - Geo electives (2)
  - Field camp

- **Cognate courses**
  - Chem & lab (2 terms)
  - Calc (2 terms)
  - Physics (calc-based, 2 terms)

*focus of today’s remarks*
How “reformed” are we?

- *Not very* – most courses still taught using instructor-centric formats & methods
- But there *has* been progress
  - *Earth-system science* required for all geosci majors redesigned with significant use of think-pair-share, in-class exercises, clickers, inquiry based labs
  - *Physical geology* redesigned (including on-line version) using reformed methods
  - *Exploration and Engineering Geophysics* converted to flipped model
  - Spotty infiltration of reformed methods throughout curriculum
Embraced curricular focus on competencies?

- No
  - Included in learning outcomes for institution/accreditation mandated assessment
  - A “go through the motions” exercise
What are the barriers to progress?

“Good” barriers

- Happy students: geology majors express greatest satisfaction among departments programs
- Dedicated faculty: relatively effective teaching in traditional formats
  - *Le Bourgeois gentilhomme* effect: Senior faculty who discover and employ reformed methods without labeling them as such

“Bad” barriers

- Denialism: faculty rejection of evidence from DBER
- Patriarchy: students most comfortable in authoritarian setting
- Resources: faculty lack time & energy

* who was amazed to learn he had been speaking in prose all along
What helps?

- Training for new faculty
  - Cutting Edge Early Career Workshop (2 faculty in 2015)
  - NC State new faculty workshop (all recent hires)
- GeoEd faculty (2)
  - Resource for faculty wanting to improve teaching
  - Teaching by them and their groups
  - Educating & training graduate students
- Participation in the GeoEd Rendezvous
  - Last year sent 2 non-GeoEd faculty; 2 non-GeoEd grad students
- Expectations for quality of instruction in job ads

*Foster a normative culture of excellent, learner-centric instruction*

Grad students are key
Incentives & rewards? (meh)

- Effective instruction is its own reward
  - If it ain’t, find another job
  - Teaching awards tend to be a lottery
- *Enable* reforms
  - Respond to faculty requests
    - TA support, technology, etc.
  - Not inclined to lay out incentives & rewards *a priori*
- Discuss instruction during annual evaluations
Curricular reform

- Harder than instructional reform
- Experience with only incremental reforms
  - 3rd-year seminar
  - Required 1st-year Earth system course
  - Eliminated Geology B.A./ changed reqs for B.S.
    - Even small changes have complex consequences
- Goals of this Summit demand systemic changes
  - Require persistent collaboration among faculty
    - R1 faculty commit collaboration time to research
    - Retreats are (or can be) fun, but how to maintain momentum?
Better/reformed instruction slowly becoming part departmental culture
  - Many small steps
  - One course at a time
  - Grad students and GeoEd faculty are key

Curricular change is needed
  - I look forward to learning how to do it