Reading the literature

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Overarching goals

- move the students from textbooks -> primary literature
- relate class material with current research within geology to give them a context for why this course is relevant
- move away from purely lecture-based classes to more discussion-based settings

Sequence of classes

- Mineralogy:
  - one paper a week from Geology
  - each paper deals with a different mineral
  - papers come from a variety of subdisciplines from within geology
  - all papers from within last 10 years
- Petrology:
  - one paper a week; most from Geology, but not all
  - each paper relates to at least one topic from that week's lecture topics
  - emphasis on current methods to address questions
  - all papers from within last 10 years (most within 1 year)

Sequence of classes cont.

- Structure:
  - one paper a week; from GSA Bulletin or Lithos
  - each paper relates to at least one topic from week's lecture
  - trying to highlight methods from geophysics / remote sensing / GIS to solve structure problems
  - all papers from within last 5 years

Format

- discussion occurs at end of the week
- pdf's posted on class site on Monday along with reflection questions
- reflection responses due back to instructor *via* class site at least 30 minutes before discussion starts
  - students can't see other responses
  - grading based on did do / sort of did / didn't do basis
  - worth 5% of overall grade

evolving reflection questions

- mineralogy:
  - very leading questions
  - asked students to focus on specific terms / concepts / diagrams in papers
  - always ended with:
    - terms you didn't understand?
    - concepts that were hard to grasp?
  - move towards broader questions in 2nd half of course, but still explicitly asked
- petrology:
  - questions more open and focused on whether or not data / interpretations matched lecture topics

evolving reflection questions cont.

- always asked about diagrams
- asked "how / where would you use this method elsewhere?"

- structure
  - very open questions
  - focus more on methods -> interpretations as tools to be used elsewhere

discussion format

- responses used to start discussion about papers, but then open to further questions / topics of interest brought up by students
- all students encouraged to participate in discussion
- discussions varied from 15 – 50 minutes depending on topic
- food to aid discussion provided by instructor
- mineralogy:
  - more instructor answering questions / leading discussion
  - questions varied quite a bit into "how does that type of analysis work?" or "what exactly is a _____?"
- petrology:
  - more student discussion with less instructor input

discussion format

- focus more on differences between lecture material & paper read
- fewer "how does that type of analysis work?" or "what exactly is a _____?" but still occurred

- structure
  - beginning of semester, instructor still lead – by end, one student chosen each week to facilitate discussion & keep it rolling
  - students answered other students questions first before instructor spoke up (if needed)

Successes

- mineralogy:
  - our second paper resulted in an NSF-worthy research proposal!
  - students moved away from "what does this word mean?" to "could this method be applied to _____?" type responses
  - instructor spent less time of different analytical methods during normal lecture because we covered many informally during discussions
- petrology:
  - brought current avenues of research into discussion
  - gave context to why the class had a large "how you use _____ to determine _____" focus

Successes

- structure:
  - curriculum lacking GIS / remote sensing / geophysics class, so brought topics up without being "how does ___ work" heavy
  - students became more & more able to answer each others questions

Pitfalls

- mineralogy:
  - some minerals are difficult to find papers about
  - some topics just had no student interest
  - takes time to find papers & write intelligent response prompts
  - papers get retracted
- petrology:
  - metamorphic petrology poorly represented in <5 yrs of Geology
  - questions at beginning were too vague
  - could use a few more weeks for a few more topics…
- structure:
  - long papers were a struggle for some students