Student Learning Experiences in EOAS – and other correlated data

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Context: what and why
Data sets gathered to support EOS-SEI final project evaluation

The Earth & Ocean Sciences – Science Education Initiative
- 7 years > 22 courses "transformed" - 25 "consulted" (specific projects)
- >70% participation rate for EOAS instructing faculty
- 25 grad. & 10 u-g. project contributors; 4 u-grad. Theses; 6 SLES, 2 for 7yr.
- Other projects include: "Attitudes about Earth Sciences" two-stage testing, Concept tests; TA development; multiple instructors, surveys & observation instruments; low performer interventions; industry hiring practices and others (9 publications, 40 presentations etc.)

EOAS Education Initiative Affects ...

Who
Data (measures of impact)

- Students
  - Measures of learning
  - SLES: Perceptions of learning experiences
- Instructors
  - TIPI, teaching practices inventory
  - Evaluations, etc.
- Teaching assistant’s
  - Pedagogic expertise
  - Contributions to development
- Dep’t / FoS / UBC
  - Changes in program management
- SUL and H.D.P. (eg. SLES)
  - Research project output
  - Highly qualified OBER and development

Selected examples of SLES results
Student perceptions relate to motivation. By asking specific questions we learn which of our instructing strategies students are most likely to respond to in productive ways.

Information provided
Fq: Learning Goals
- In most courses, students say both LG types are "extremely" or "very" helpful.
- Knowledge/skills LGs more helpful than attitude LGs.

Classroom strategies
Fq: Class activities, discussions & clickers:
- Three types of "active" classes ☐
- In 19 of 28 courses, >50% respondents say Active classes are "extremely or very helpful" ☐
- "Clickers" slightly more helpful than "Clicker discussions" ☐

Homework
- Homework usually more helpful than readings ☐
- Feedback usually more helpful than rubrics ☐
- Group vs solo study habits ☐

Opinions (agree / disagree)
- "Learning and workloads in Labs (sorted by difference) ☐
- Which courses have "significant" labs? ☐
- Are lab workloads are too heavy for benefits gained? ☐

Workloads and enthusiasm
- Sorting courses by workload ☐
- Two different courses with different perceptions ☐

Engineeing vs. geosience students in 1 course:
- Both yield similar patterns, but ...
- Engineers may be slightly less "enthusiastic" ☐

Other parameters:
- Online content and quizzes
- Explicit reflective practices
- Comment or assess the work of peers
- Importance of course to me or my degree
- Help from instructors/TA/focus group etc.
- "Could learn everything on my own" ☐ and many others.

Comparing SLES data to other sources
Teaching practices and 3rd party classroom observations

Correlating TPII & SLES (28 courses Fall 2013)
- High score for TPII part III: instructors say class is "active".
- Do students (SLES) say this is "helpful"?
- SLES parameters:
  - max [ ] Clicker questions ☐
  - e. i. Group discussions ☐
  - in-class group activities ☐
  - Whle class discussions ☐

- TPII parameter = "score" for part III.

Interpretation:
- Students / instructors apparently "agree".
- Low SLES correlates with low TPII score.
- High TPII score correlates with high SLES.
- NO high TPII with low SLES scores, i.e. instructors say "active" with students saying "NOT helpful".

TPI example: Overall change in teaching culture at EOAS
Compare 2006w to 2012w via coded answers to the open-ended question : "What is the biggest BARRIER to achieving more effective student learning in your course?"

Correlating COPUS & SLES (20 courses with both)
- Most students (SLES) say active classes are "helpful".
- Many observed courses had "active count" > 50% of 2-min intervals; i.e. observers see classes are "active".
- N.B. most COPUS observation are 1 class only.

Classroom Observation Protocol for Undergraduate STEM - COPUS
Data for two classes in one course:
- Class "1L" - straight lecture (clicker hardware failed).
- Class "1LS", 40-min group-based work-sheet activity.

- Observation codes and procedures are in Smith etal. 2012, via ref. [3].