Setting and resources

What conditions enabled cultural change?

Contributing Factors
- Consistent leadership: UBC, Fac. of Sci, CWSEI, Dep’t head, Project director
- CWSEI: Funding, oversight, expertise, support, training, research guidance
- Framework: use Research Based Instructional Strategies (RBIS)
- Focus: Faculty and teaching assistants first, courses second.
- Emphasis: "Visible thinking", student centered, evidence oriented.
- Engage grad. AND undergraduate students in education development.

CWSEI Model for change:
- Use, Generate, Disseminate research on learning, & avoid re-invention.
- Sustainability: Changes to best practices must persist into the future.
- Time / resources for scholarly practice. Buyout choice: teaching or 1n rep.
- Community development: Regular STLF meetings, consult for research faculty, use Solid literature, bring in expert visitors, run events and workshops, publish our research and presentations, collaborate with STLFs and other colleagues –

Science Teaching and Learning Fellows (STLFs):
- Background: Geosci. PhD or MSc with Sci. Ed. expertise & interests
- Buildup of staff and expertise over time. Then long term consistency of personnel.
- Facilitate: communication, consensus building, professional development of RBIS
- Collaborate with faculty to develop materials and teaching approaches
- Serve as a local resource for faculty
- Collect / distill / communicate data to support and guide faculty efforts
- Ensure sustainability by archiving and disseminating
- Consulting model:
  - Work with instructors to enhance education, on an as-needed basis.
  - Support experienced TAs to refine needs and develop activities (2-5 per term)
  - STLF supervises TA, and liaises with instructor.
- Conduct & publish: Discipline Based Education Research (DBER)

Course transformations and project timelines

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<th>Course</th>
<th>Term</th>
<th>Project</th>
<th>Faculty</th>
<th>TA</th>
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Accomplishments
What was done? What was produced?

The Aim: to dramatically improve undergraduate education in our Department
- 23 courses underwent 2-3 year “transformations”.
- ~15 other courses improved using the consulting model.
- 35 instructors initially incorporated RBIS in their teaching. ~80% retain RBIS.
- 11 instructors supported for 1 course; 14 for 2 courses; 5 for 3 courses; 3 for 4.
- Two stage exams introduced – figure right.
  - Faculty continue improving and transfer RBIS to other courses.
  - Increase active learning in classes & using technology.
  - Peer-to-peer and group interaction.
  - Skills development and critical thinking are emphasized.
  - Formative / summative assessments improved.
  - Increased opportunities for experts to engage with students.

Evidence of change
Demonstrable changes in geoscience education & teaching culture

- Instructors self-reported for each course they taught:
  - Raw data presented here: 40 courses reported in both years.
  - Data presented here: 40 courses reported in both years.
- Nearly all questions were essentially identical in both years; some additions for 2013.

Compare results of Teaching Practices Survey in both 2007 and 2013

Examples of actions

- Use Research Based Instructional Strategies
  - Focus: Faculty and teaching assistants first, courses second.
  - Two stage exams introduced – figure right
  - Increase active learning in classes & using technology.
  - Group class any topic

Coded answers to two open-ended questions:
1. “What is the biggest BARRIAR to achieving more effective student learning in your course?”
2. “What CHANGES could be made at UBC to help you teach more effectively?”