UBC Biology
Classroom Observation Study

CWSEI Life Sciences STLFs:
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And thanks to Trish Schulte, Martha Mullally, Erica Jeffery, and Garrett Huwyler
From our presentation at last year’s biology teaching retreat...

Refining what works: active learning in practice

Our Upcoming Research Questions:

1. Do different active learning techniques contribute more to student learning than others?

2. Is more always better?
Approach and Tools

**Classroom activity**
Tool: COPUS class observations

Objective characterization of classroom practices, over 2-minuted intervals.

For each class section, observed a typical week of class time (~3 hours).

Readout:
% of 2-minute intervals where a given activity takes place.

**Student Performance**
Tool: Concept diagnostics

Multiple choice tests, aligned to each course & developed with instructor feedback.

Deployed at start & end of semester.

Readout:
Average normalized learning change (matched students).
Scope

Three semesters of data;
33 lecture sections in 17 biology classes.

<table>
<thead>
<tr>
<th>Course Year</th>
<th># course sections</th>
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<tbody>
<tr>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
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<tr>
<td>3</td>
<td>5</td>
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<td>4</td>
<td>6</td>
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Diagnostic questions compiled/developed for each class. (~200-300 questions, depending on how you count)

Diagnostic feedback & data collection done with lots of instructor support. Thank you!
Breadth of teaching practices in biology

As a percentage of 2-minute intervals during class, instructor is...

- Giving lecture
- Guiding whole group (e.g. Q&A with whole group, providing feedback on clicker...)
- Facilitating student work (e.g. moving through the group during peer discussion...)
- Admin/other

Individual course sections
Clustering classes & measuring learning changes

Cluster analysis done as in Lund et al (2015) and from personal discussions with Marilyne Stains

Normalized change for a given student:
for gains: \( \frac{(Post - Pre)}{(100 - Pre)} \)
or, for decreases: \( \frac{(Post - Pre)}{(Pre)} \)
(Marx & Cummings 2007)
Large classes: specific practices and learning gains

<table>
<thead>
<tr>
<th>Class level</th>
<th># sections</th>
<th>Section size (+/-SD)</th>
<th>% sections using groupwork</th>
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<tbody>
<tr>
<td>Years 1&amp;2</td>
<td>22</td>
<td>242 +/- 48</td>
<td>100%</td>
</tr>
<tr>
<td>Years 3&amp;4</td>
<td>11</td>
<td>99 +/- 88</td>
<td>64%</td>
</tr>
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Using the 1st/2nd year data:

Use of worksheets, in particular, supports student learning

![Bar chart showing mean normalized learning change (%) for lectures with and without worksheets.](chart.png)
Next steps...

- Further analysis… lots!
- Collect diagnostic data in the fall, on the same courses after some changes?
- Departmental outreach ongoing – workshops in the fall and beyond
- Continuing ‘field notes’ on our blog (http://ls-cwsei.biology.ubc.ca/)