

***Undergraduate education in EOAS: a snapshot of unprecedented detail, with thanks to everyone for support, enthusiasm and collaboration.***

As the Department's seven year, Wieman-funded science education initiative winds down and new initiatives emerge, we are gathering evidence related to the learning and experiences of EOAS students, instructors and teaching assistants. Because of the support and enthusiasm of all EOAS teaching faculty, this is being done with a completeness rarely seen in the Discipline Based Education Research<sup>1</sup> community. Virtually all instructors, all courses, all students and many teaching assistants are contributing!

We are measuring effectiveness and efficiency of learning and teaching strategies by gathering data from three complementary perspectives: (i) measures of learning, (ii) student & instructor perceptions, and (iii) course observations. Each perspective is being examined in terms of both **current** practices and **changes** in practices since 2007.

Data currently being gathered include the following. Live links to references are in the online version of this "Times" (URL above).

	Data types	Some example data sets
measures of learning	Pre-post concept tests <sup>2</sup> , including u.grad. honors thesis work <sup>3</sup> .	- Climate science: 1st year level, 8 terms; 3rd/4th year level, 6 terms. - Model-based reasoning: 5 terms - Mineralogy / petrology: 6 or 7 years
	Re-used test / exam questions	- Natural Disasters: questions database with analytics; 7yrs, 21 terms.
	Two stage tests / exams <sup>4</sup>	- 15 courses in 2013, up from 3 courses in 2007.
	Presentations, projects & peer assessm's.	- Approximately 20 of nearly 80 undergraduate courses. - Earth history & paleontology, EOAS 116, 326, 425; both face2face & dist. ed.
Student/ instructor perceptions	TPS: Teaching Practices Survey <sup>5</sup>	- 2007: 58 respondents, 54 courses, - 2013: 60 respondents, 62 courses. > Directly comparable: 40 courses.
	SLES: Student Learning Experiences Survey <sup>6</sup>	- Dec. 2013: 76% of courses (26 / 34). - Response rates of 48%-100%; avg 86% (~2000 of 2600 students). - In April 2014 we will complete this coverage of EOAS u.grad. courses.
	Exit Survey <sup>7</sup> : EOAS graduating students	- 2009-2013, response rates of 48%-75%, avg. 60%
	TA perspectives	- Contributions to development of RBIS* <sup>3</sup> . - Feedback from EOAS 516. - Interviews planned for Spring 2014.
	Interviews with instructors	- Pre-post transformation interviews by an external education researcher. - Post project perceptions: planned for Spring 2014
	Student workloads <sup>8</sup>	- General, specific or relative workloads from 26 courses; (mixed since 2008).
Obsrv'ns	COPUS - Classroom Observations <sup>9</sup> .	- 16 courses in 2012w; pre-copus protocol - 22 courses in 2013w, total of 29 observations using COPUS
	Matrix of RBIS* use in EOAS	- Poster from in 2010 <sup>10</sup> . - 2013W version in preparation.

\*RBIS; Research Based Instructional Strategies.

**This ongoing gathering and synthesis of data is possible because of the collaborative, collegial attitudes of EOAS teaching faculty. We all owe a huge thank you to everyone in EOAS for their continued support and enthusiasm.**

Data gathered in specific classes will be prepared and presented to individual instructors, and we look forward to answering questions or having some discussions about results and / or implications. Please stay tuned!

<sup>1</sup> S.R. Singer, N.R. Nielsen, H.A. Schweingruber, *Discipline-Based Education Research Understanding and Improving Learning in Undergraduate Science and Engineering*. Washington, D.C.: National Academies Press, 2012. [http://www.nap.edu/catalog.php?record\\_id=13362](http://www.nap.edu/catalog.php?record_id=13362).

<sup>2</sup> Concept tests: <http://eos.ubc.ca/research/cwsei/resources/research/EOAS%20Concept%20Inventory%20Outcomes%20V5.pdf>

<sup>3</sup> Student contributors list at <http://eos.ubc.ca/research/cwsei/resources/Students-in-eossei.pdf>

<sup>4</sup> Gilley, B. and B. Clarkston, "Collaborative testing: evidence of learning in a controlled in-class study of undergraduate students", Accepted for publication in *Journal of College Science Teaching*, January, 2014.

<sup>5</sup> CWSEI Teaching Practices Survey: <http://cwsei.ubc.ca/resources/TeachPracticeSurvey.htm>

<sup>6</sup> Student Learning Experiences Survey: <http://eos.ubc.ca/research/cwsei/resources/studentsurvey-v3.pdf>

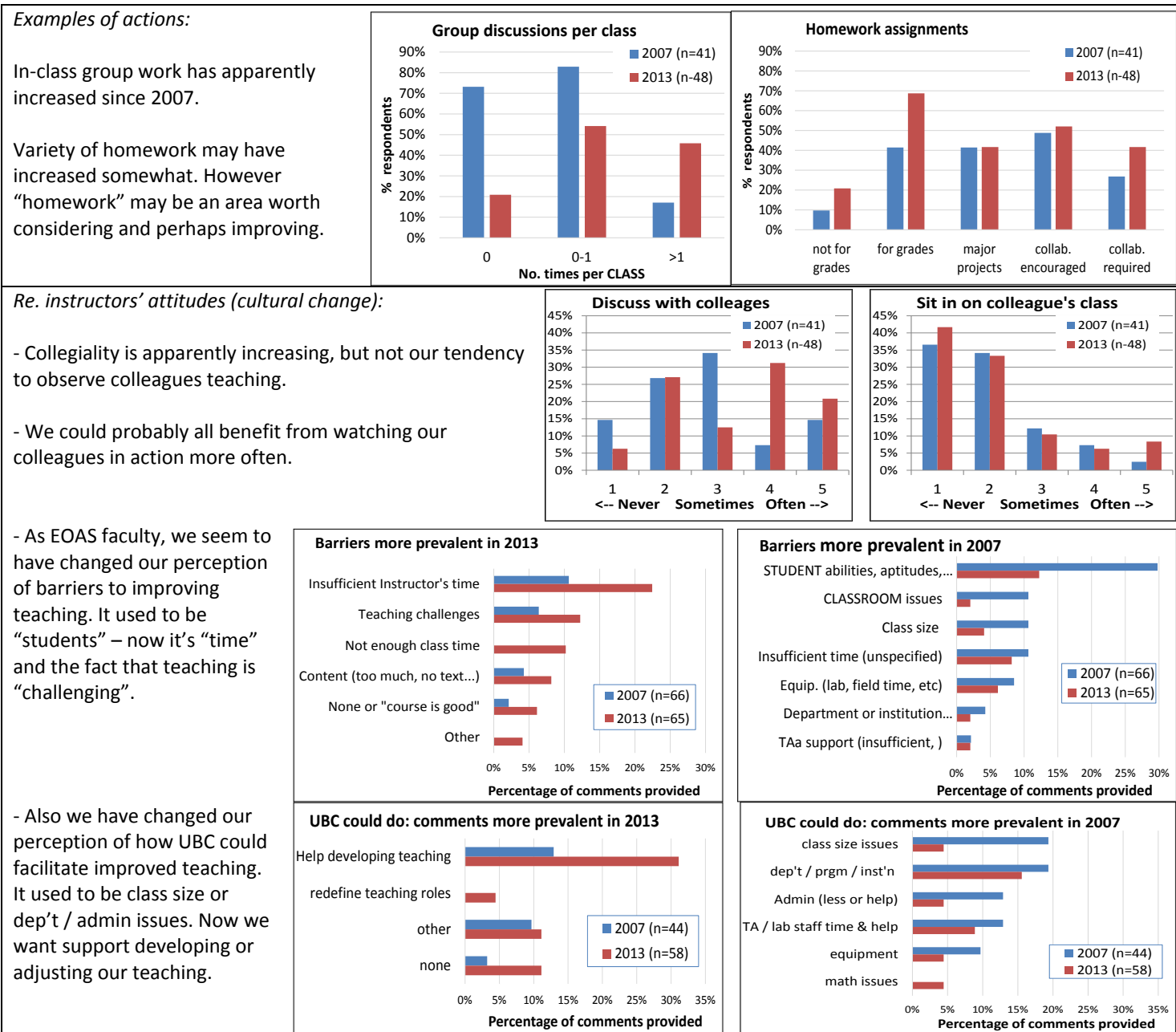
<sup>7</sup> EOAS graduation exit survey: <http://www.eos.ubc.ca/scripts/courses/eosexit/eos-exitsurvey.html>

<sup>8</sup> See [http://eos.ubc.ca/research/cwsei/eossei-times/EOSEITimes\\_6.07-workloads-v2.pdf](http://eos.ubc.ca/research/cwsei/eossei-times/EOSEITimes_6.07-workloads-v2.pdf)

<sup>9</sup> Classroom Observation Protocol for Undergraduate STEM class. Published Dec. 2013 - see <http://cwsei.ubc.ca/resources/COPUS.htm>

<sup>10</sup> Five years of SEI in Earth and Ocean Sciences: <http://www.cwsei.ubc.ca/Files/EOY/EOY2012/Posters/EOAS-SEI-progress2012.pdf>

A few examples of TPS results<sup>5</sup> from “Changing The Teaching Culture In A Large Research Oriented Department”, 2013<sup>11</sup>.



Also, resources being developed for helping promote, improve and sustain best practices include:

- Videos with resources for teacher professional development: - 3 done, ~5 in preparation at <http://blogs.ubc.ca/wpvc/>. Also several others in preparation across the Faculty of Science.
- Website – documenting project actions and results, including a growing collection of succinct guidelines for using strategies based on experiences of EOAS teaching faculty in our own courses. <http://eos.ubc.ca/research/cwsei/>
- Research and scholarly productivity is summarized at <http://eos.ubc.ca/research/cwsei/research.html> and <http://eos.ubc.ca/research/cwsei/resources/research/eossei-ResearchList.pdf>.



THANK YOU ALL – AND BEST WISHES FOR 2014 FROM THE EOS-SEI CREW. ☺



CWSEI: <http://www.cwsei.ubc.ca/resources/index.html> EOS-SEI: <http://www.eos.ubc.ca/research/cwsei/>  
 COMMENTS? F. Jones ([fjones@eos.ubc.ca](mailto:fjones@eos.ubc.ca)), B. Gilley ([bgilley@eos.ubc.ca](mailto:bgilley@eos.ubc.ca)) or S. Harris ([sharris@eos.ubc.ca](mailto:sharris@eos.ubc.ca)). EOS-S. rm361.

<sup>11</sup> “Changing teaching culture ...”: Poster at GSA 2013: <http://eos.ubc.ca/research/cwsei/resources/GSA-131021.pdf>