



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)
- ~78% participation rate for EOAS instructing faculty.
- 25 grad. & 10 u-grad. project contributors; 4 u-grad. Theses; 6 STLFs, 2 for 7yrs.
- **Other projects** including: >Attitudes about Earth Sciences >two-stage testing; >concept tests; >TA development; >multiple instructors; >survey & 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 experience
Instructors	- TPI; teaching practices inventory ² - Evaluations, etc.
Teaching assist’s	- Pedagogic expertise - Contributions to development
Dep’t / FoS / UBC	- Changes in program management
SoTL and H.Q.P. (eg. STLFs)	- Research project output - Highly qualified at DBER and development

Focus for this poster

Data sets in EOAS

Data	When	Size
SLES¹	Fall 2013, spring’14; ~2600 students taking 57 of 63 suitable classes	Response rates: ~80% in classes < 140 ~20% in classes > 200
TPI²	2006w & 2012w 40 courses in both years	58 & 69 responses from ... 47 & 41 instructors teaching in ... 54 & 62 courses.
COPUS³	Spring/Fall 2012 Fall 2013 Spring 2014	22 classes (pre – COPUS) 27 classes; 24 instructors ~25 classes; ~25 instructors
Grad. Exit Survey	2009 – 2014	47 - 65 students / year 48% -75% of graduates
Workloads and Enthusiasm	Time on tasks Relative course workloads	2009-2011; various 2009-2013; various 2013-2014; All SLES

Student Learning Experiences Survey (SLES)¹

Questions: “How much did the following help you learn in this course?”	
Information provided to students ...	9 items
Classroom strategies ...	13 items
Homework assigned and feedback ...	18 items
Were multiple instructors an advantage or disadvantage ...	As per Jones & Harris ⁴ (2012)
Opinions (Labs, “could learn alone”, etc.) ...	6 items
Workloads and Enthusiasm for THIS course compared to EACH of your other courses.	Up to 5 per student.

Most questions use answer options ...

- a) Extremely helpful b) Very helpful c) Moderately helpful d) Little or not help e) Not applicable
- **Derived** from SALGsite.org , multiple instructors, workloads, and other surveys used previously in EOAS.
 - **Data quantified** by adding % respondents choosing “extremely” + “very” helpful.
 - **This poster** represents some of our explorations of the Fall 2013 SLES data set.

1. SLES: see <http://eos.ubc.ca/research/cwsei/resources/studentsurvey-v9.pdf>
 2. TPI: Teaching Practices Inventory: <http://www.cwsei.ubc.ca/resources/TeachingPracticesInventory.htm>
 3. COPUS: Classroom Observation Protocol for Undergraduate STEM <http://www.cwsei.ubc.ca/resources/COPUS.htm>
 4. Jones, F., S. Harris, 2012, “Benefits and Drawbacks of Using Multiple Instructors to Teach Single Courses”, College Teaching, Vol. 60, No. 4, pp. 132-139.

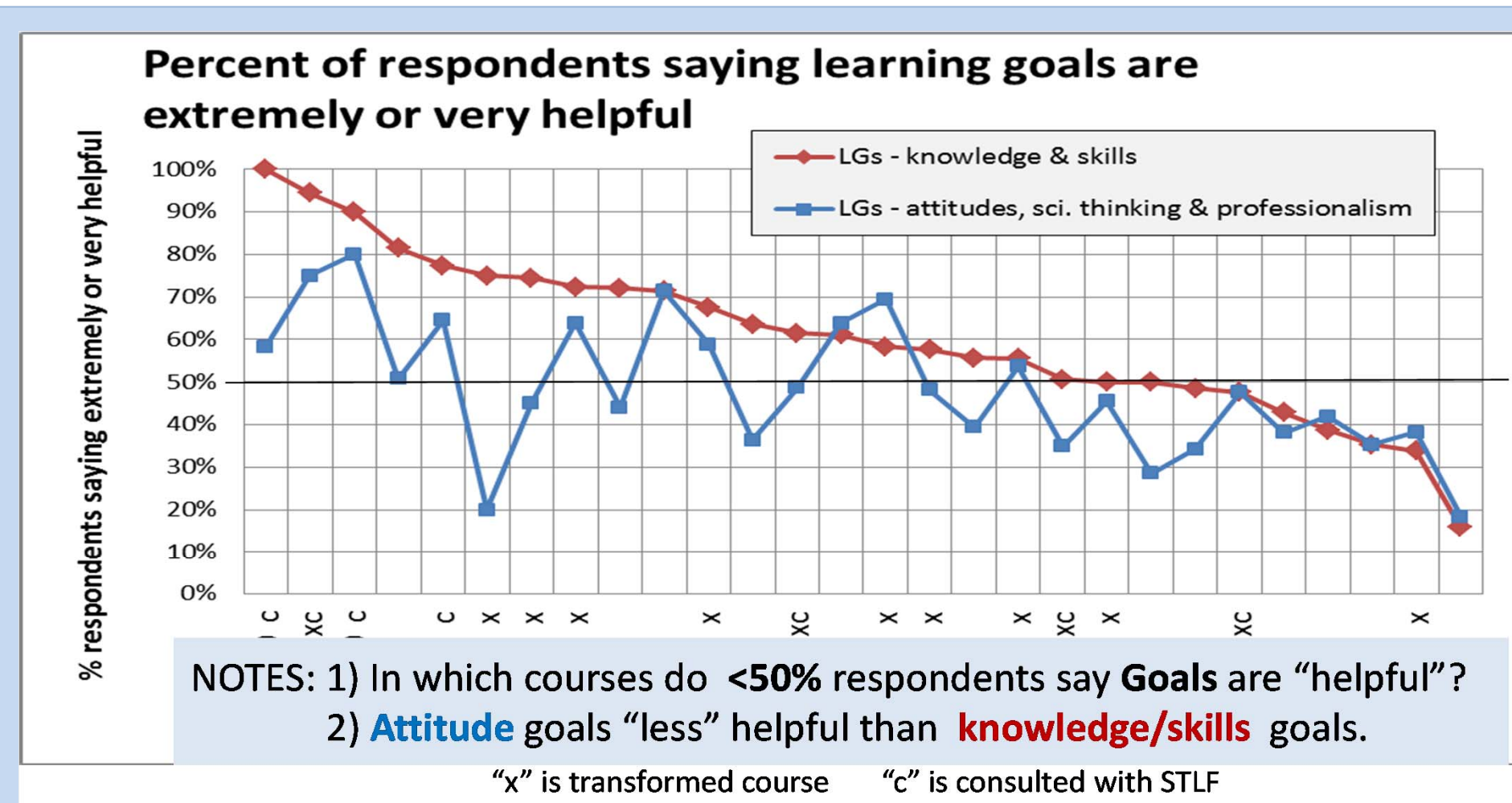
Selected examples of SLES results

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

Eg: Learning Goals

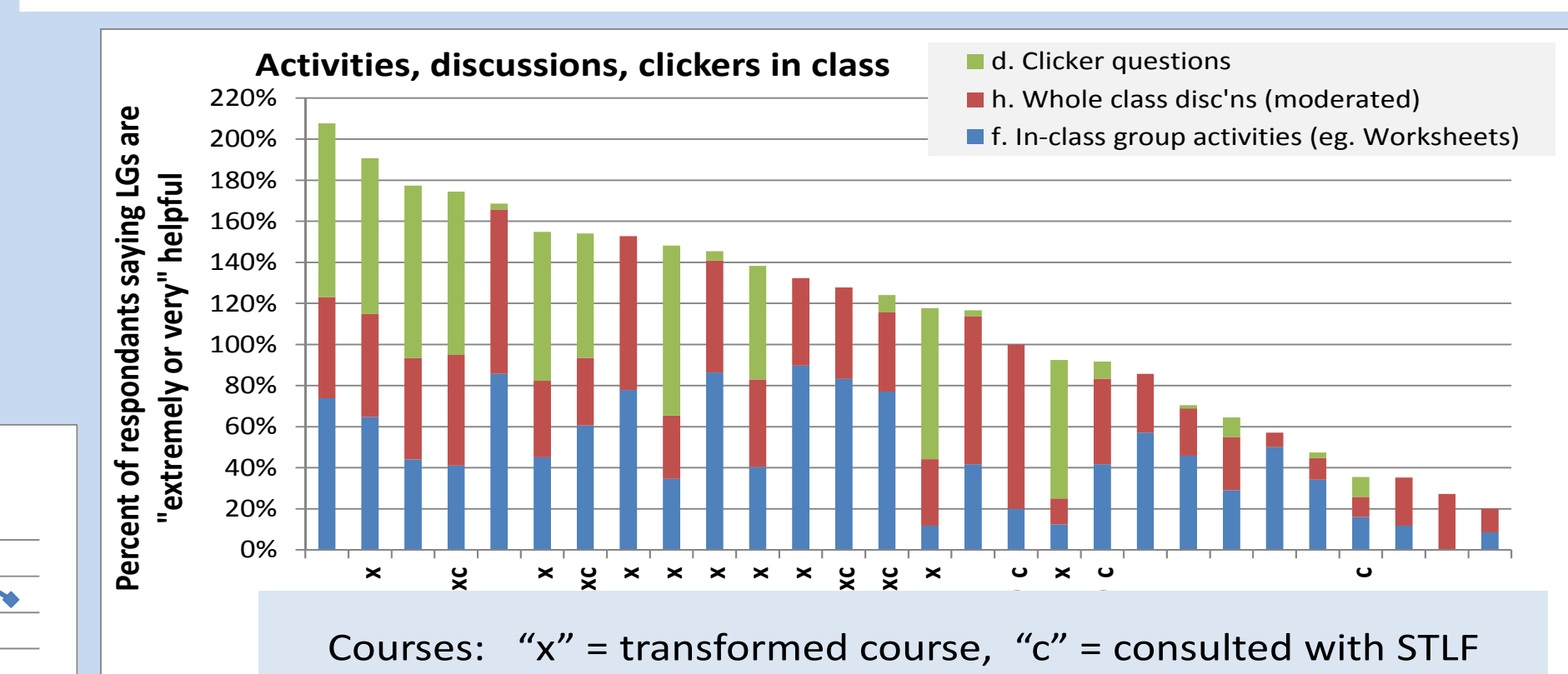
- In most courses, students say both LG types are “extremely” or “very” helpful. →
- Knowledge/skills LGs more helpful than attitude LGs.



Classroom strategies

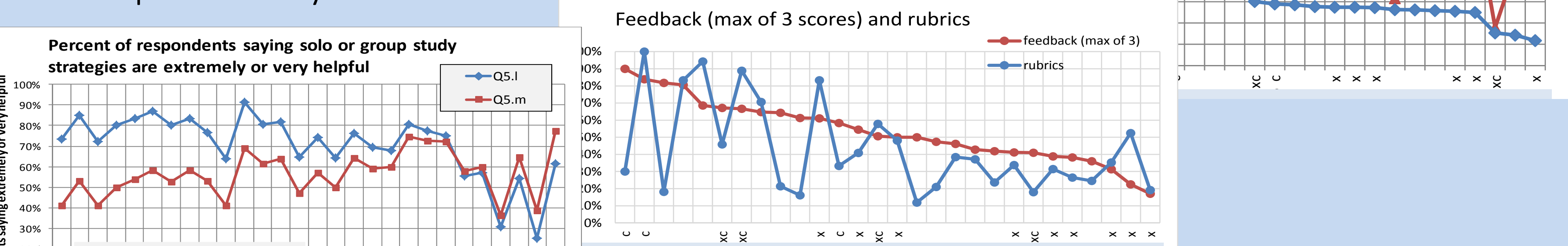
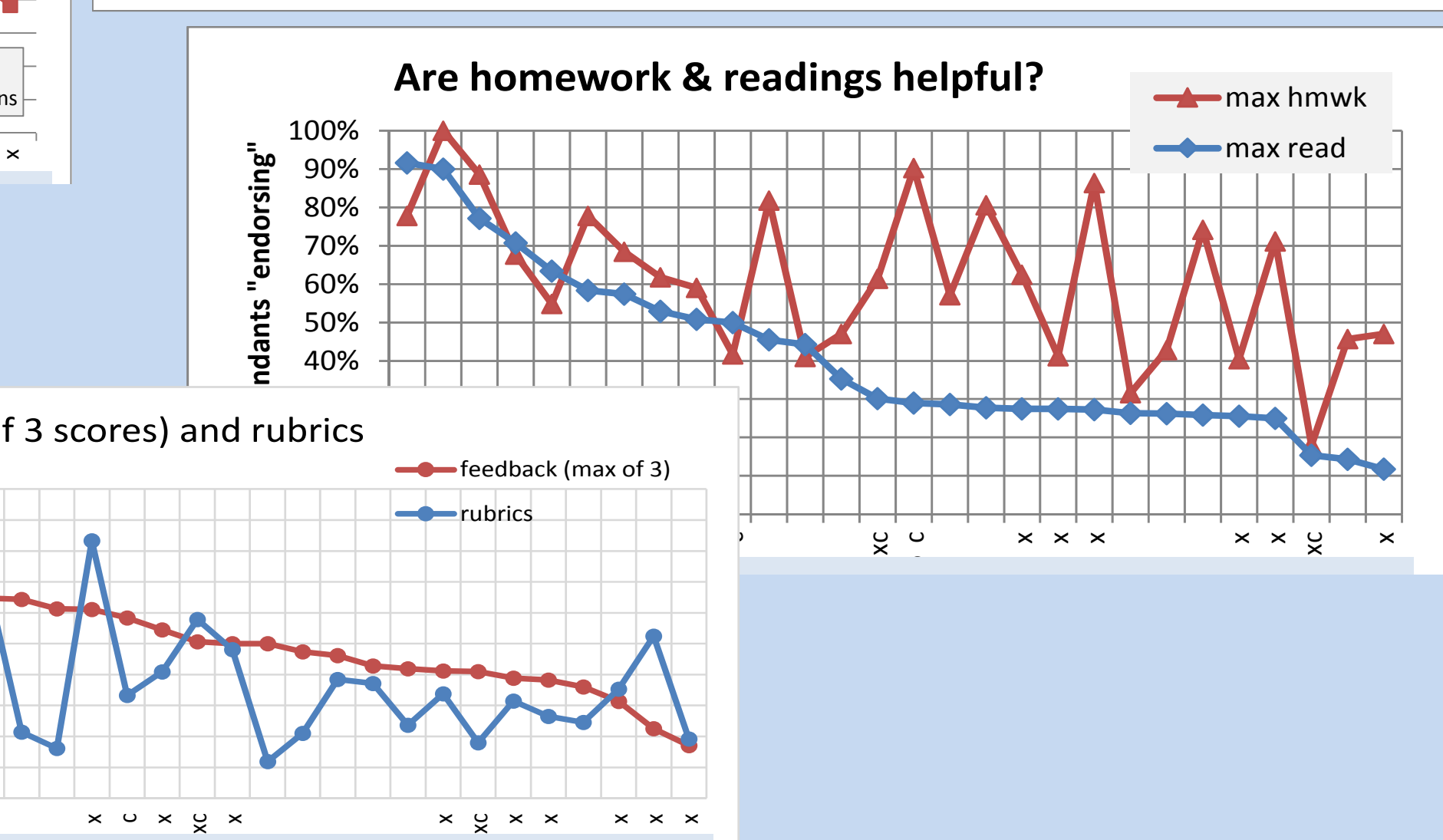
Eg: Class activities, discussions & clickers:

- 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

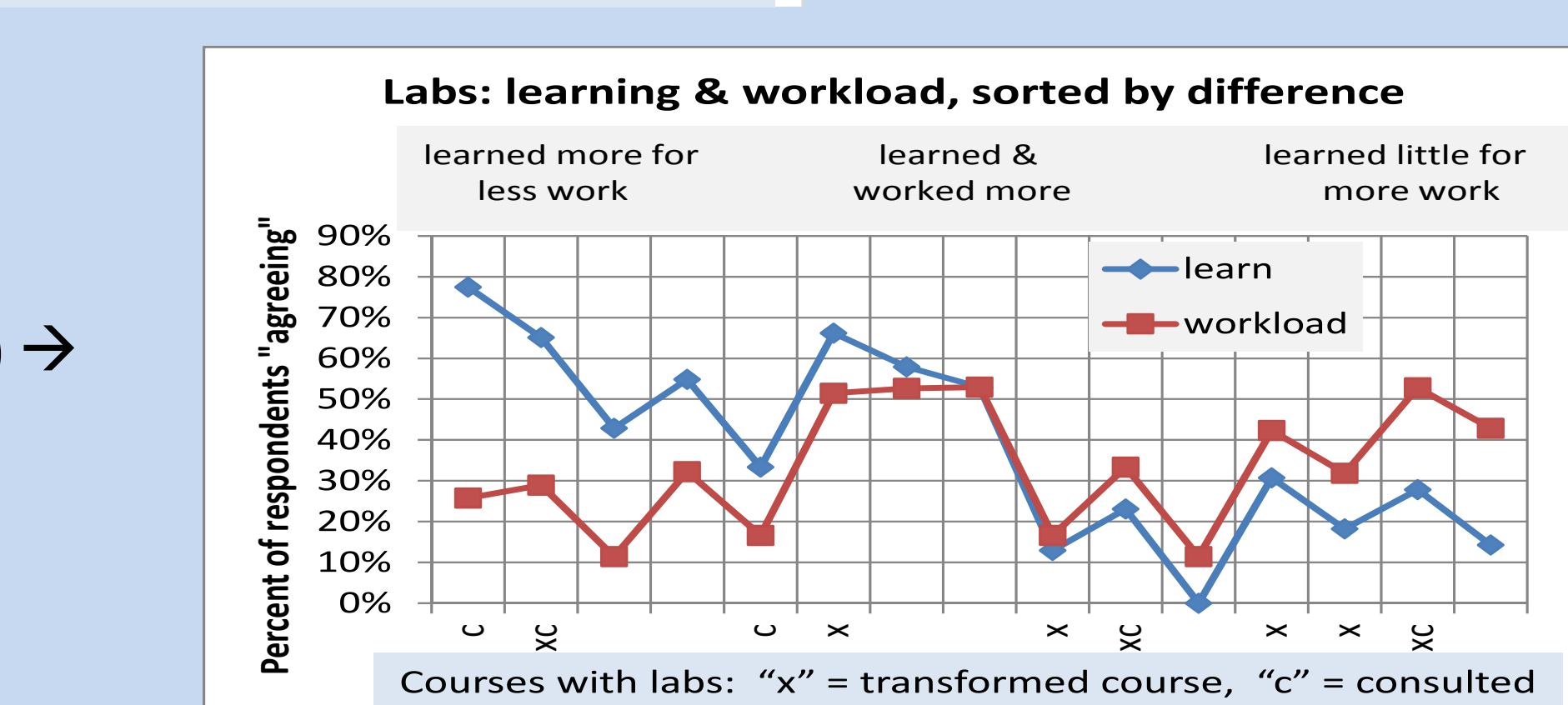
- Homework usually more helpful than readings →
- Feedback usually more helpful than rubrics. ↘
- Group vs solo study habits ↘



Opinions (agree / disagree)

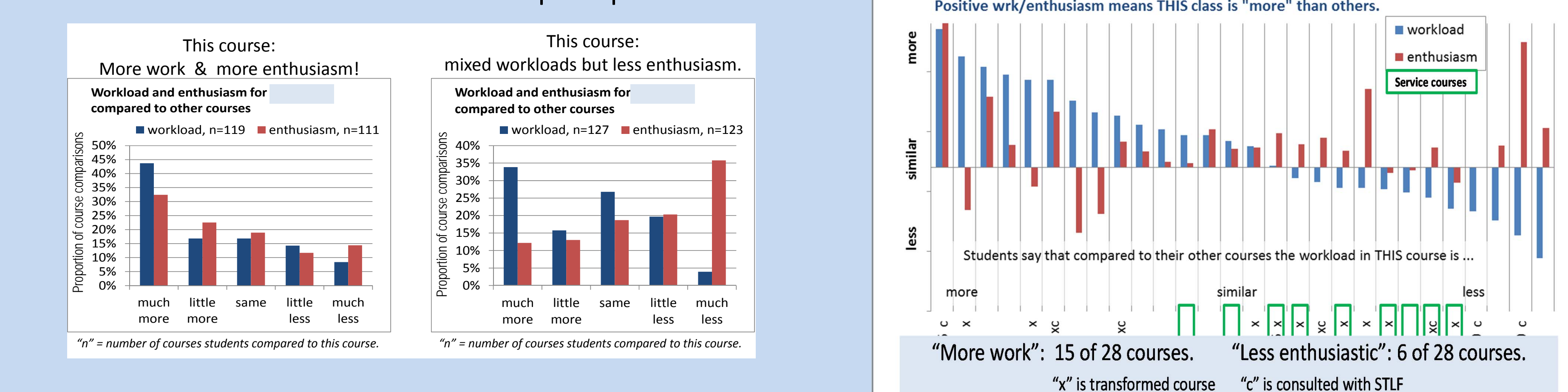
Eg: Learning and workloads in Labs (sorted by difference) →

- 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: ↘

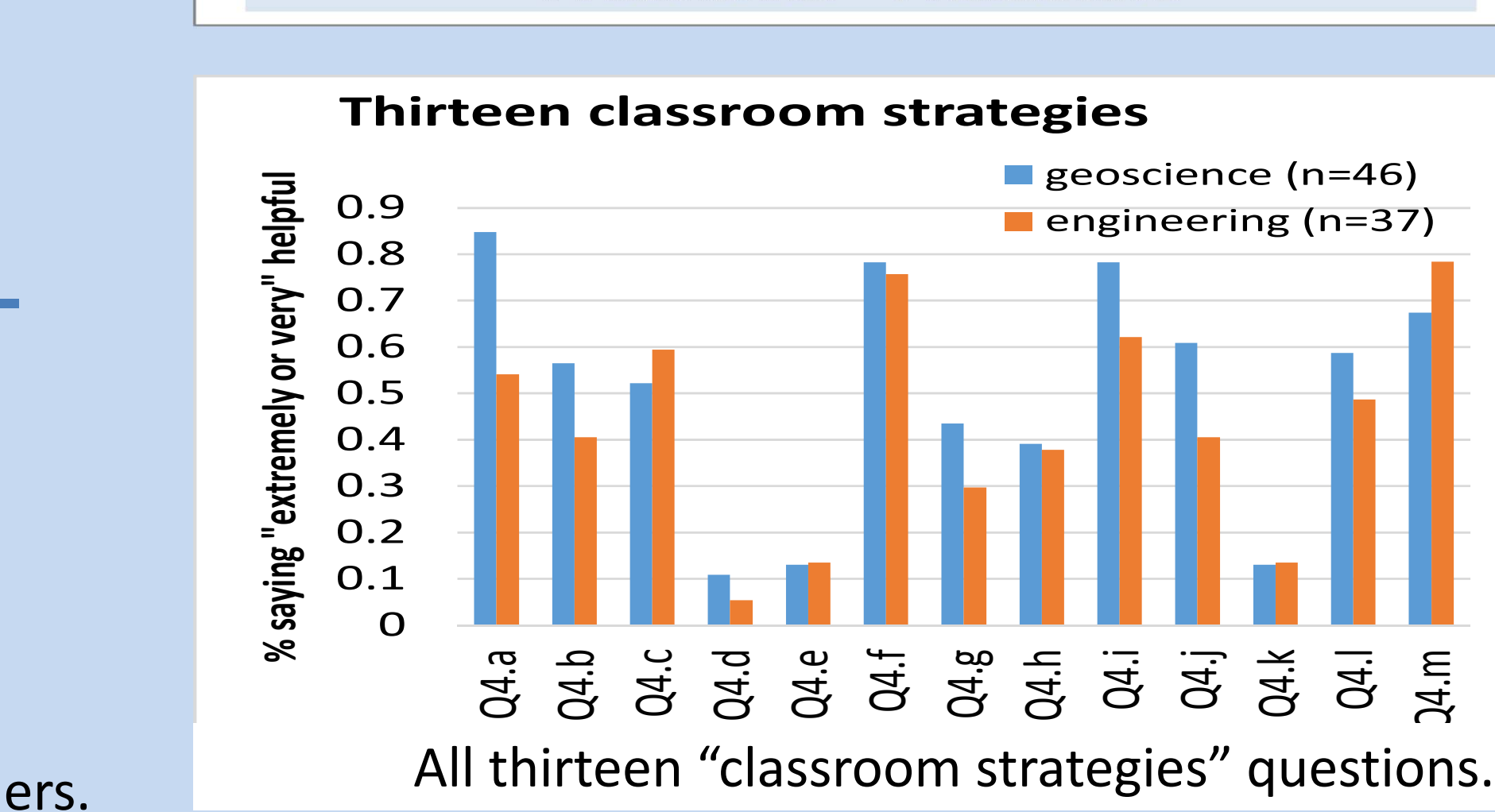


Engineering vs. geoscience students in 1 course:

- 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/feedback etc. ...
- “Could learn everything on my own” ... and many others.



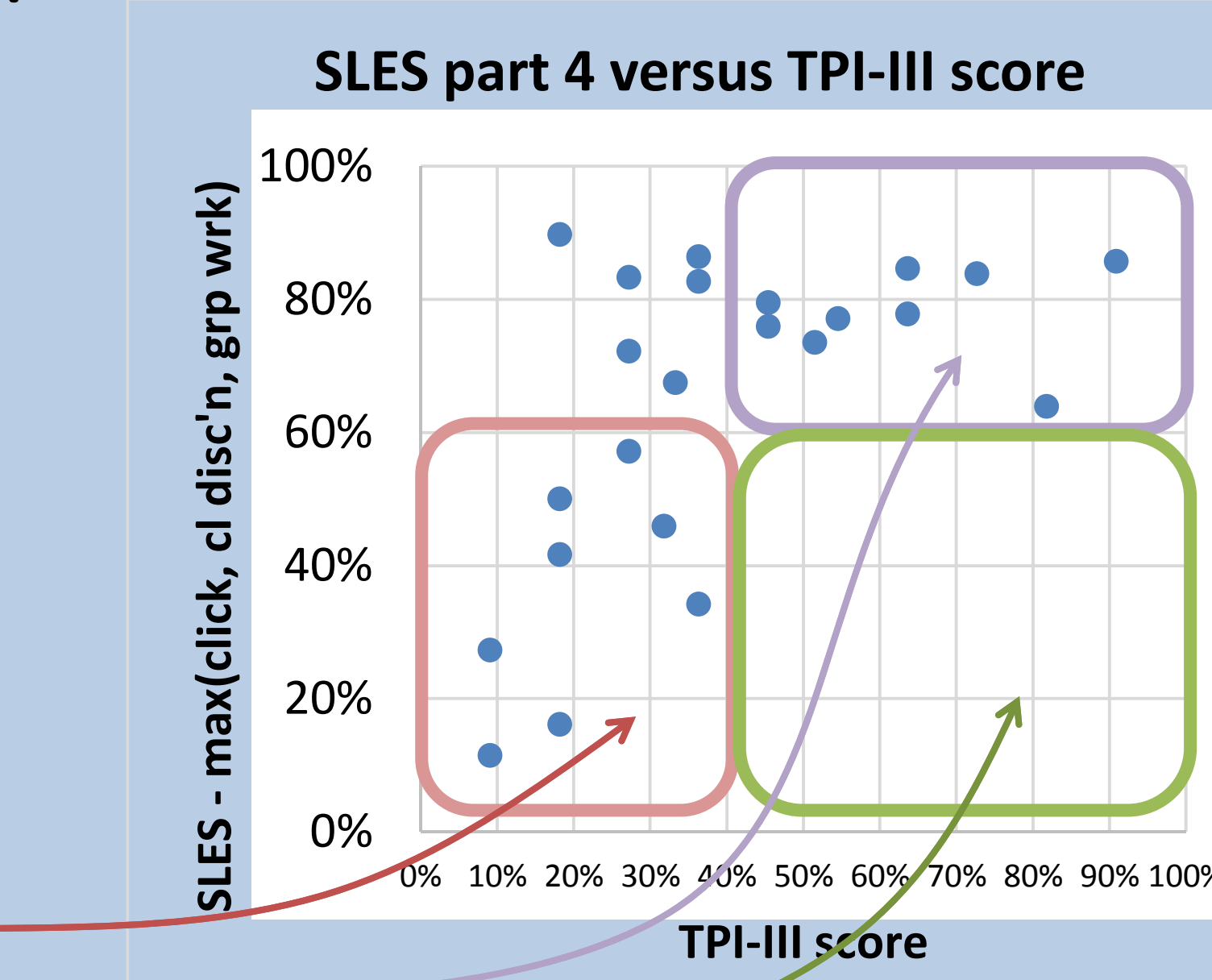
Comparing SLES data to other sources

Teaching practices and 3rd party classroom observations

Correlating TPI² and SLES (28 courses Fall 2013)

- High score for TPI part III: instructors say class is “active”.
- **Do students (SLES) say this is “helpful”?**

- SLES parameter = max (d. Clicker questions e. Clicker discussions f. In-class group activities h. Whole class discussions); value = ∑ (“extremely”, “very”)
- TPI parameter = “score” for part III.



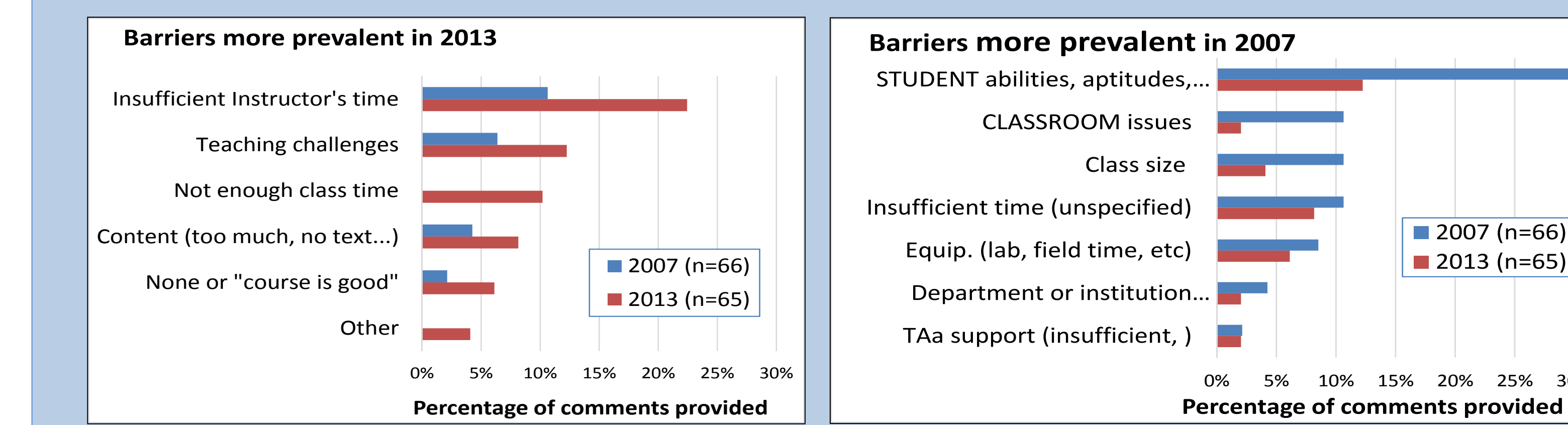
Interpretation:

- Students/ Instructors apparently “agree”.
- Low SLES correlates with low TPI score.
- High TPI score correlates with high SLES.
- NO high TPI with low SLES scores; i.e. instructors say “active” with students saying “NOT helpful”.

TPI example: Overall change in teaching culture at EOAS

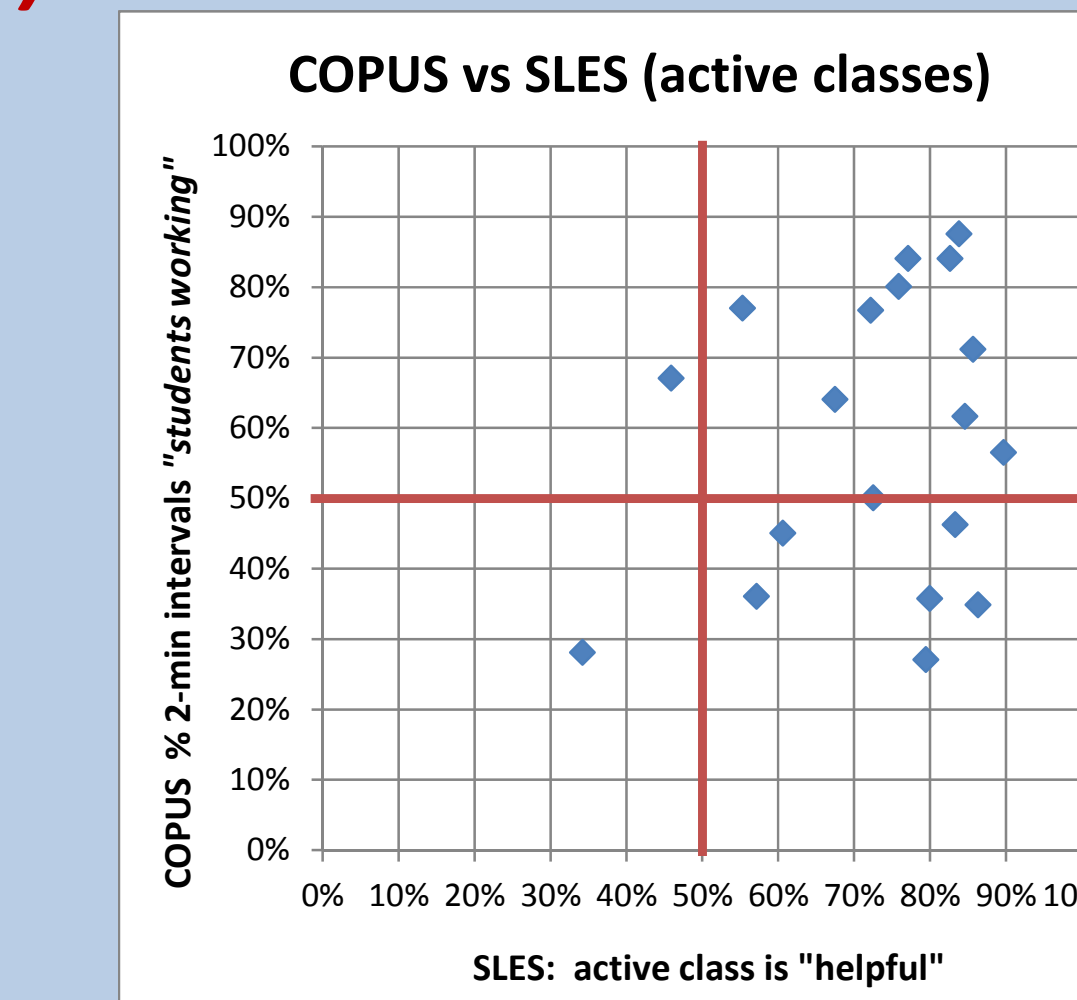
Compare 2006w to 2012w via coded answers to the open-ended question :

“What is the biggest BARRIER to achieving more effective student learning in your course?”



Correlating COPUS³ & 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 session are 1 class only.**



Classroom Observation Protocol for Undergraduate STEM - COPUS

Data for two classes in one course:

- Class “n13”: straight lecture (clicker hardware failed).

- Class “n15”: 40-min group-based worksheet activity.

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

