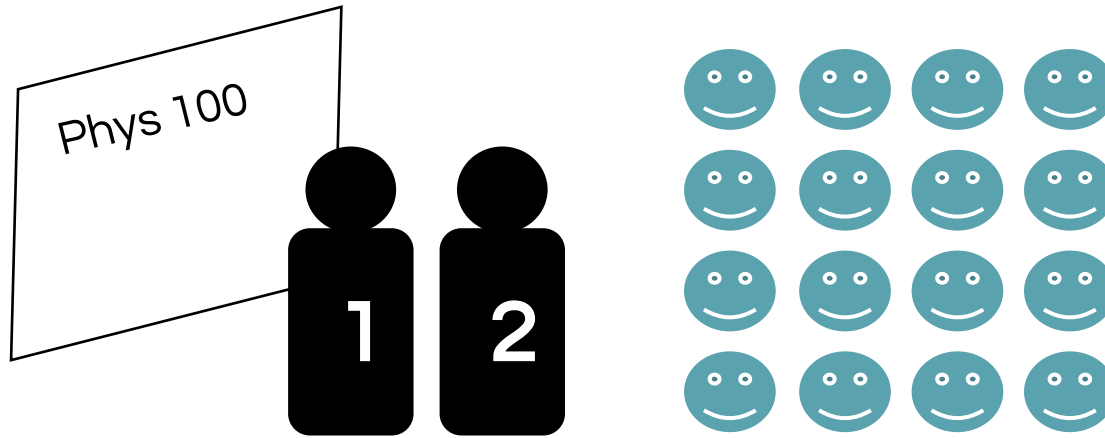


Paired teaching for faculty professional development



**Tara Holland, Sarah Bean Sherman,
Jared Stang, Linda Strubbe**

Acknowledgement: This extension of CWSEI work is funded by John and Deb Harris, the UBC Faculty of Science, the UBC Department of Physics and Astronomy, and the UBC Department of Earth, Ocean, and Atmospheric Science.

How have you worked together while teaching?

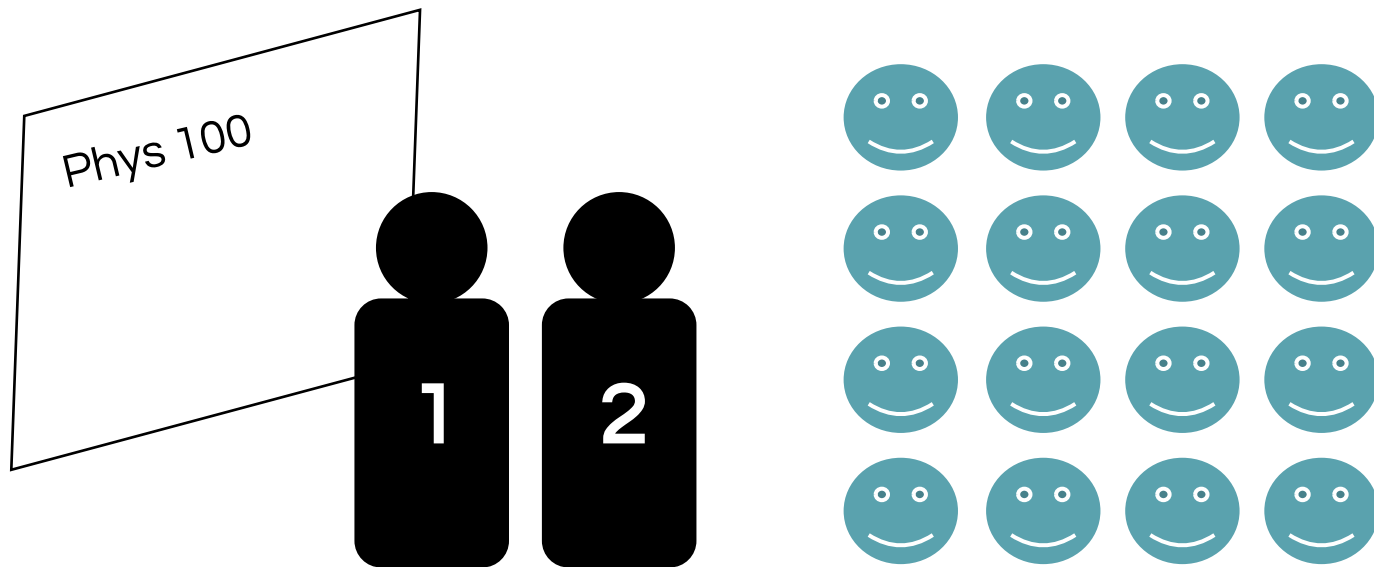
A: Never

B: Taught one section of a multi-section course

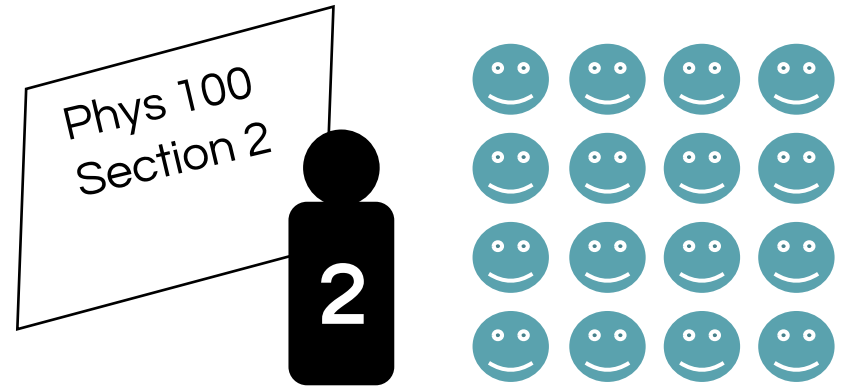
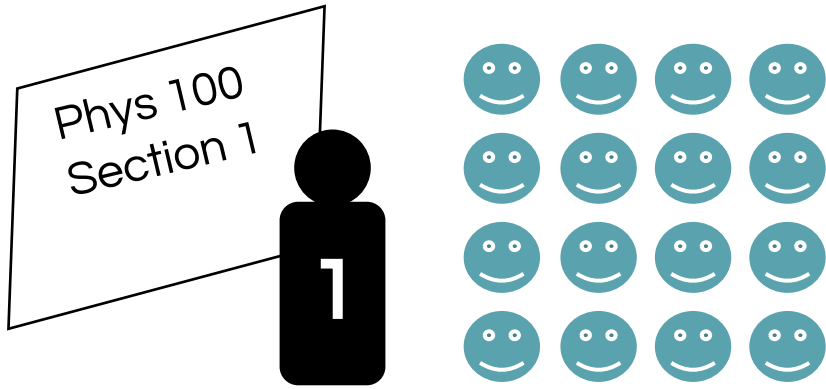
C: Taught part of a course while another colleague taught another part

D: Shared responsibility with colleague for all aspects of a course

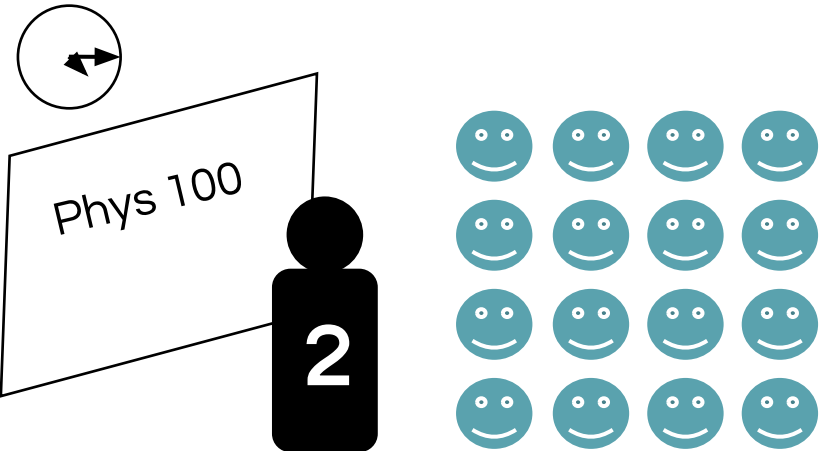
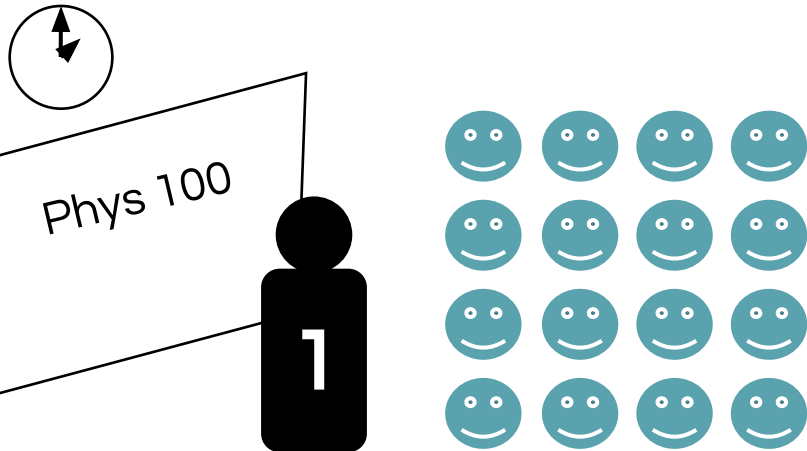
Paired Teaching Program in PHAS and EOAS at UBC



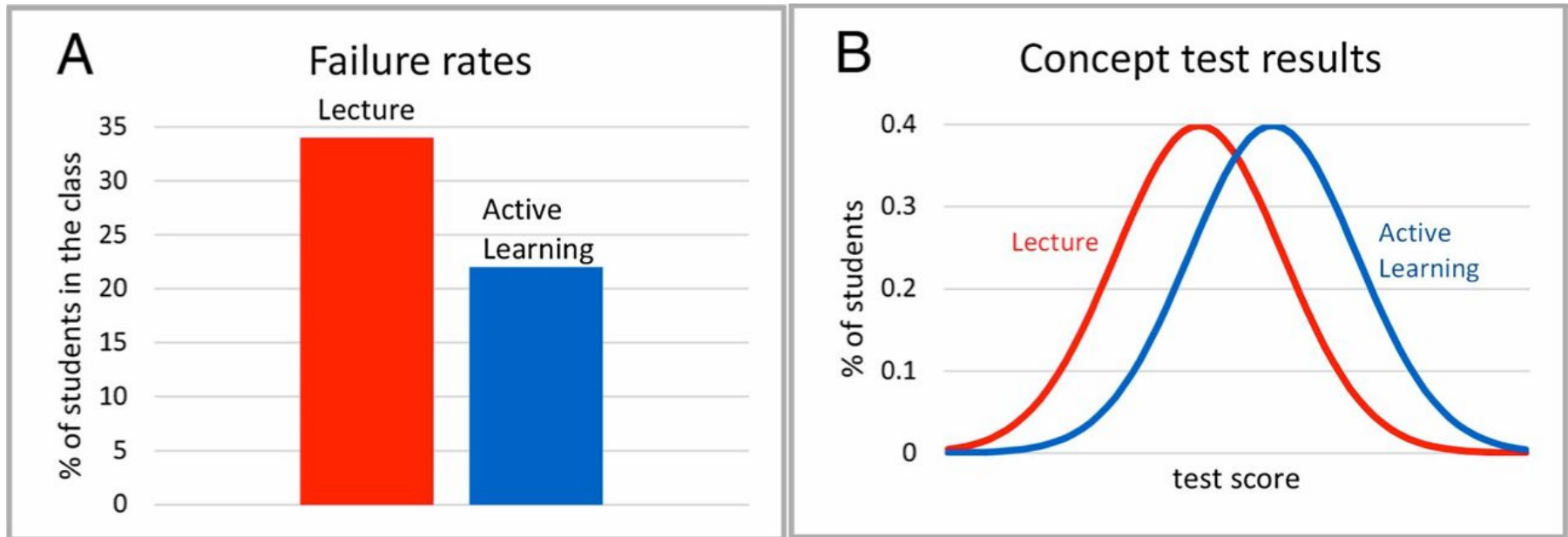
Not team teaching



Not "serial monogamy"



Active learning techniques significantly improve student learning.



Freeman et al. 2014, "Active learning increases student performance in science, engineering, and mathematics", *PNAS*, 111(23), 8410-8415
Wieman, Carl E. 2014. "Large-scale comparison of science teaching methods sends clear message." *PNAS*, 111(23) 8319-8320.

Why paired teaching

Challenge: Most faculty aren't familiar with active learning techniques.

→ **Short-term goal: Help faculty adopt active learning techniques**

-- by teaching together with another instructor who is experienced in using these techniques

→ **Long-term goal: Improve student learning**

EOAS & PHAS have special funding:

Paired teachers both get full teaching credit for semester.

Defining paired teaching

- Both instructors present for ~all teaching activities
- Typically in large first-year lecture courses (in PHAS)
 - Typically in courses that have already been “transformed” to active learning structure
- Interleave teaching through the semester
 - (e.g., topic by topic, first half/second half, or even back and forth throughout each lecture)
- In PHAS: Attend an orientation before school year begins
- Pairs encouraged to meet weekly to discuss and reflect on their teaching (in addition to planning logistical aspects)
- Varying levels of involvement of STLFs:
 - e.g., occasionally observe lectures
 - occasionally attend pair meetings
 - interview each partner before, (maybe during), and after the semester
 - follow up with novice instructor in subsequent teaching

Paired teaching in EOAS

Course (Semester)	# of Instructors
EOSC 220 Introductory Mineralogy (Fall 2014)	3 (1 new)
ENVR 200 Introduction to Environmental Science (Fall 2014)	2
ENVR 300 Introduction to Research in Environmental Science (Spring 2015)	3 (1 new)
EOSC 516 Teaching and Learning in EOAS (Fall 2015)	2
EOSC 112 The Fluid Earth: Atmosphere & Ocean (Fall 2015)	2
ENVR 200 Introduction to Environmental Science (Spring 2016)	2

Paired teaching in PHAS

Course (Semester)	# of Instructors (across all sections)	Common course materials used?
PHYS 101 Energy and Waves (Spring 2013)	4	Yes
PHYS 101 Energy and Waves (Spring 2014)	4	Yes
PHYS 101 Energy and Waves (Spring 2015)	4	Yes
PHYS 102 Electricity, Light and Radiation (Spring 2015)	4	Yes
PHYS 117 Dynamics and Waves (Fall 2015)	2	One section (New course)
PHYS 158 Introductory Physics for Engineers II (Spring 2016)	4	Yes
PHYS 170 Mechanics I (Spring 2016)	4	No
PHYS 101 Energy and Waves (Spring 2016)	4	Yes

Benefits and challenges of paired teaching

1. By yourself, please write possible
2. **benefits**
3. **challenges** of paired teaching.

Benefits and challenges of paired teaching

Benefits

- Different teaching styles
 - Build community
- Support
- Alleviating anxiety (with tech and overall)
- Logistical support
- Ongoing learning for instructors
 - Can model this for students
- Students see collegial collaboration

Challenges

- Different teaching styles
 - If discordant, could be jarring
- Expectations need to be well defined
- \$\$\$; need to articulate value of process

Results and data from EOAS so far

Preliminary results from first three teaching pairs

- Interviews conducted pre- and post-teaching term (both experienced & new instructors), and one year later (new instructors)
- Transcripts coded in an iterative process to ID main themes regarding paired teaching
- Focus here on most effective roles each instructor can play

Results and data from EOAS so far

Roles identified as effective by teaching pairs: Experienced Instructor

- Model teaching practices
- Explain subtleties (choreography, timing of activities, monitoring group work)
- Ask for input from new instructor on classroom material
- Activity/lecture development: model, then guide, then consult
- Provide leadership, but with humility

“By the end, he got the idea and then subbed out an activity in class. He came up with it, and ran it, and then we debriefed about it afterward.”

- Experienced Instructor

“I learned, by example, effective ways to do adaptive teaching, like react to questions posed by students.”

-New Instructor

“I’d explain the activity; what students are doing and what we are trying to get students to get out of it. I’d give him an idea of timing, too.”

-Experienced Instructor

Results and data from EOAS so far

Roles identified as effective by teaching pairs: New Instructor

- Start as active observer. Reflect on class and ask questions of experienced instructor

“At the beginning, I always just followed her lead, or asked for help.”

- New Instructor

- Take equal ownership of class; don't be the “TA++”

“I learned an effective (to me) way to organize the teaching of the basics of [subject X].”

- Experienced Instructor

- Develop some materials/activities independently, ask for feedback

“I needed to do a whole class, with an activity, on my own to realize how hard it is. It's different than just using someone else's materials.”

- New Instructor

Results and data from PHAS so far

Preliminary results from first four teaching pairs

- Taught intro physics courses in 2013-2015, that had already been “transformed”
- “Experienced” instructor paired with “new” (less experienced in evidence-based teaching practices)
- Interviewed after pair-teaching; in some cases also before

Results and data from PHAS so far

Four areas which may influence effectiveness of paired teaching:

- Approach / goals of novices towards paired teaching
 - Likely related to prior teaching experience
- Prior (good) materials for the course make it easier to start using active learning techniques
- Sequence of teaching assignments
- Relationship between teaching partners

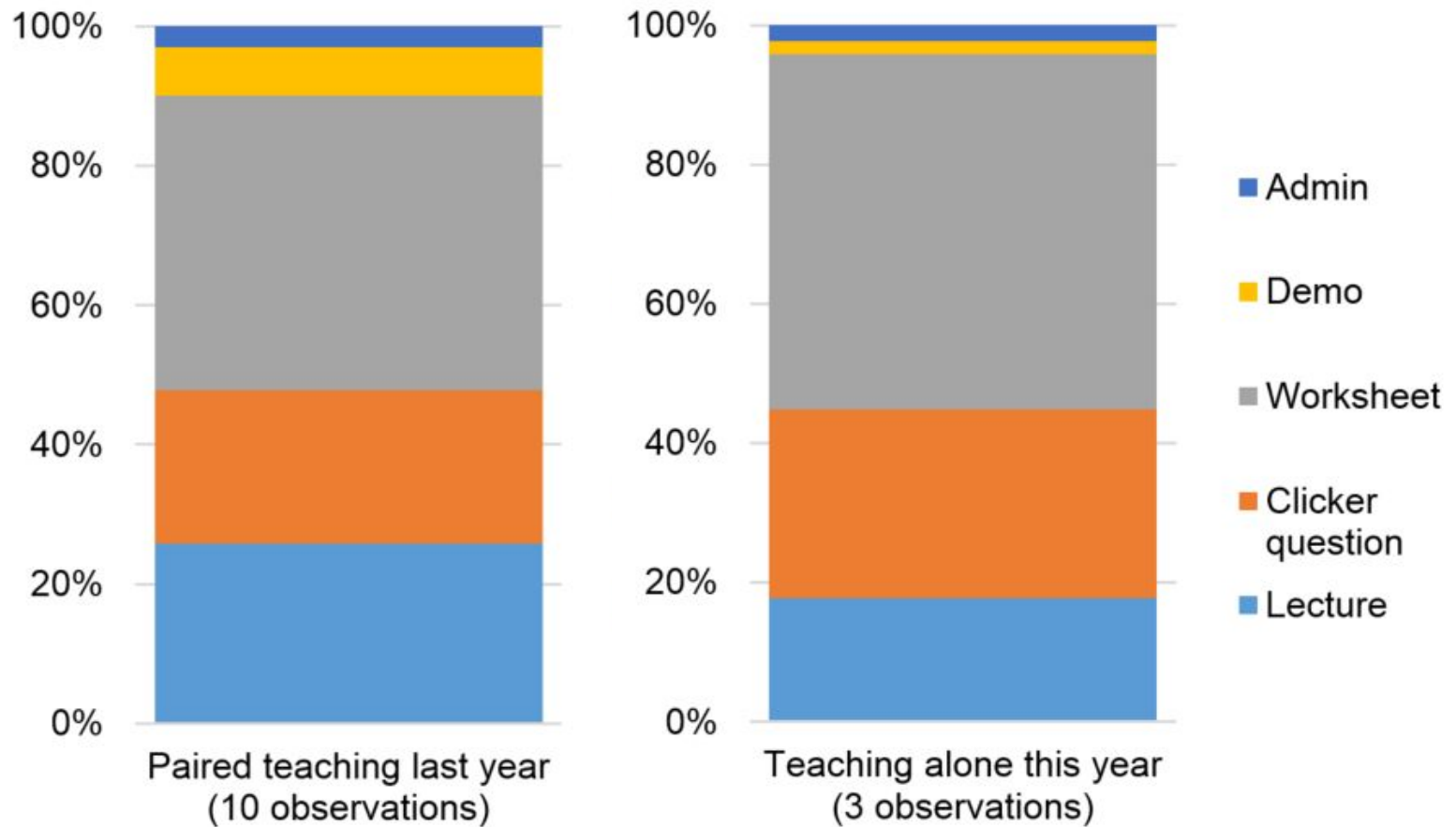
Results and data from PHAS so far

Preliminary recommendations to department:

- Ask instructors to volunteer (or even apply) to pair-teach
- Place teaching pairs in courses where interactive materials already exist
- Think carefully about future teaching assignments
- Hold an orientation for teaching pairs:
 - Clarify expectations
 - Support deciding on professional development goals
 - Encourage informal interaction before course starts
 - Encourage weekly reflection meetings

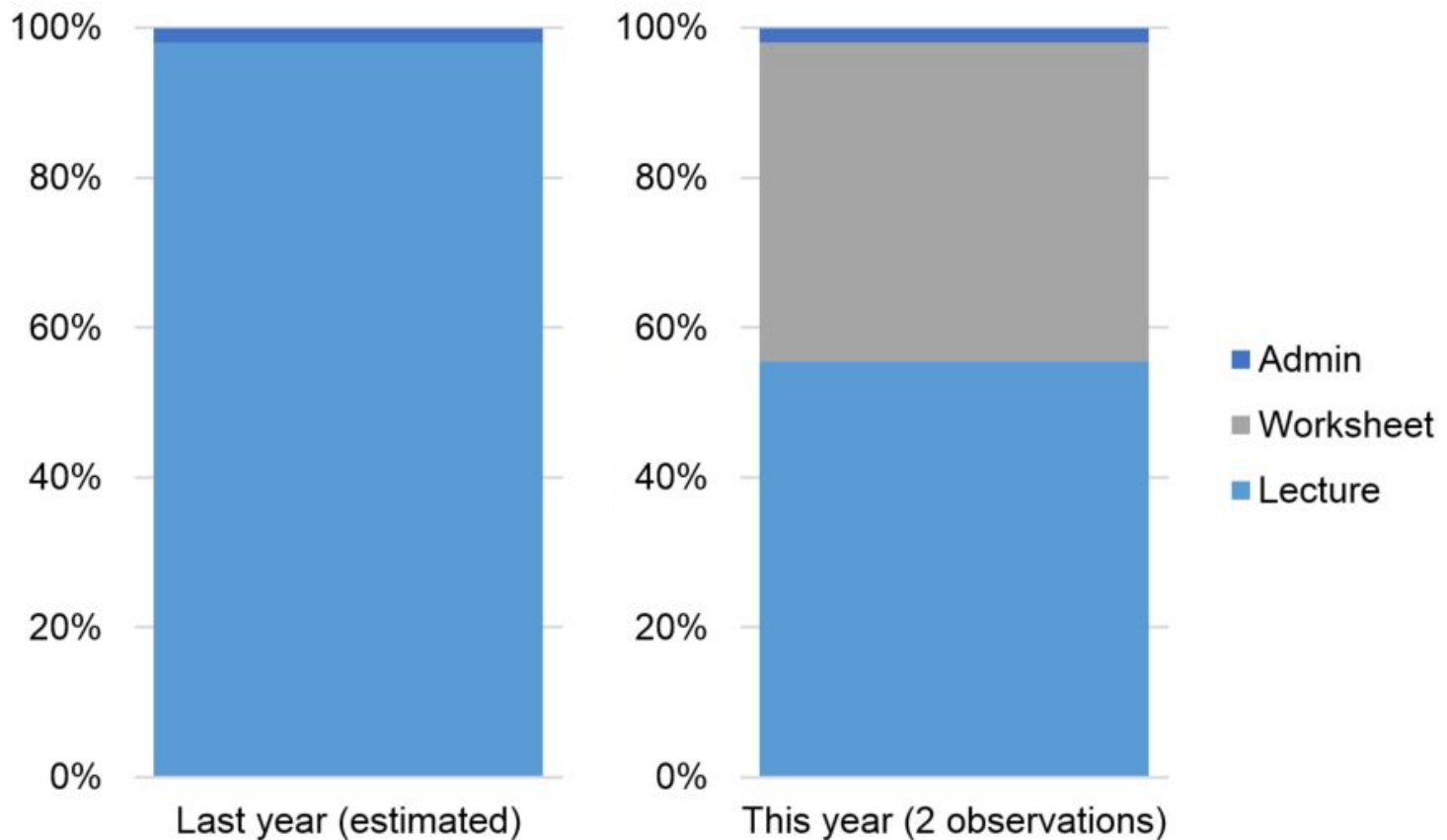
A case study of Professor X: In PHYS 1XX

“When we go in next year, I would advocate to keep the general format... This sort of interplay of elements, between five, ten minutes of lectures, worksheets, some demos, some PhETs.”



A case study of Professor X: In PHYS 3XX

“So I was doing [last] year still more of a traditional lecture.”



“Next year I’m going to do Phys 3XX again, and I’ll probably try to transform that... I will try to see if I can develop guided worksheets” in order to “try and let them work things out more directly with their own brains.”

Discussion

Some suggested discussion questions:

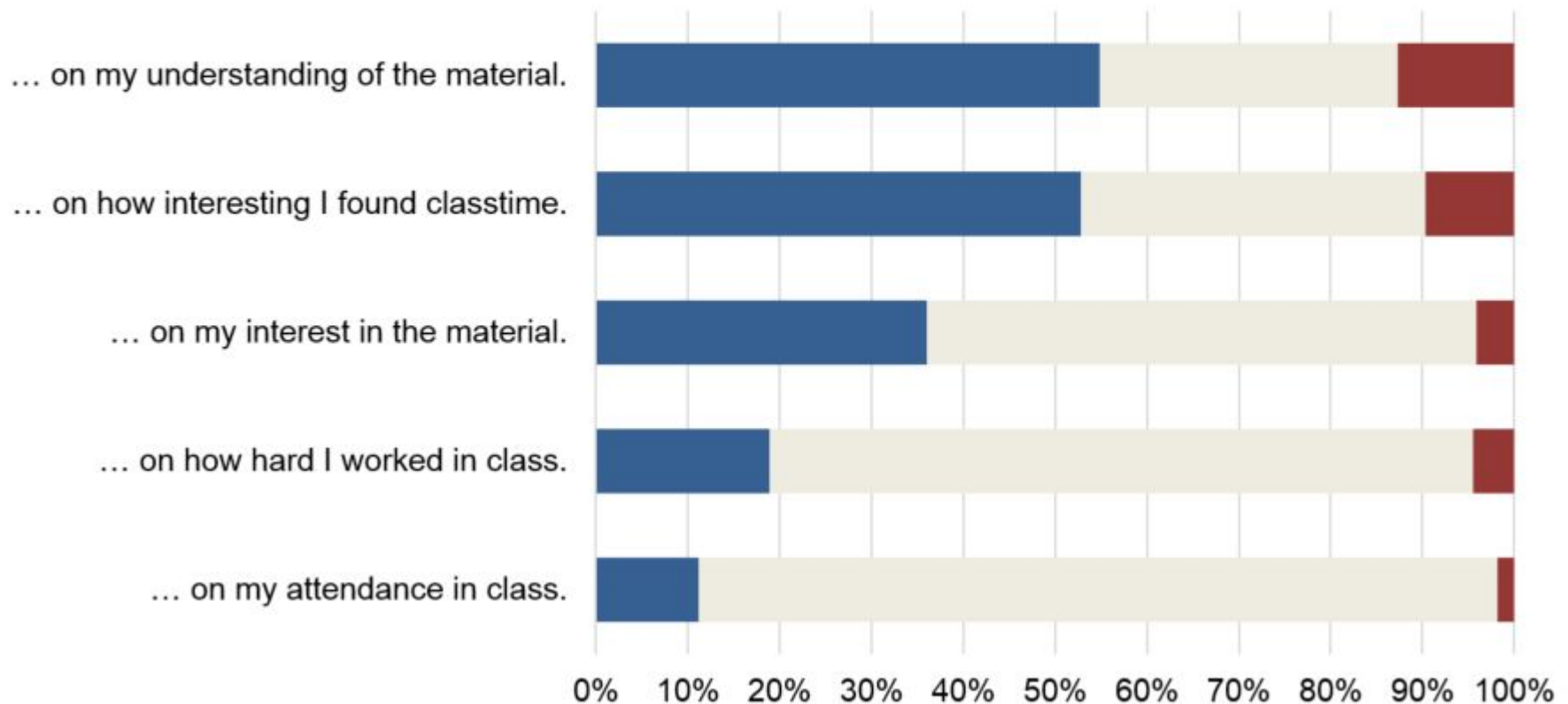
- What would convince you (or a dept head) that paired teaching is worthwhile?
- How to make paired teaching as effective as possible?
- How to evaluate effectiveness of paired teaching?
- How to get some benefits of paired teaching even if you're not paired teaching?

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Student perspective: PHYS 101 and 102

Having two instructors in this course had ...

■ a positive effect ■ no effect ■ a negative effect



Student perspective: PHYS 101 and 102

Overall: Having two instructors in this course was ...

■ a large advantage ■ a small advantage ■ neutral ■ a small disadvantage ■ a large disadvantage

