Tips & Tricks for Active Learning in Your Classroom

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Workshop slides will be available at http://ls-cwsei.biology.ubc.ca

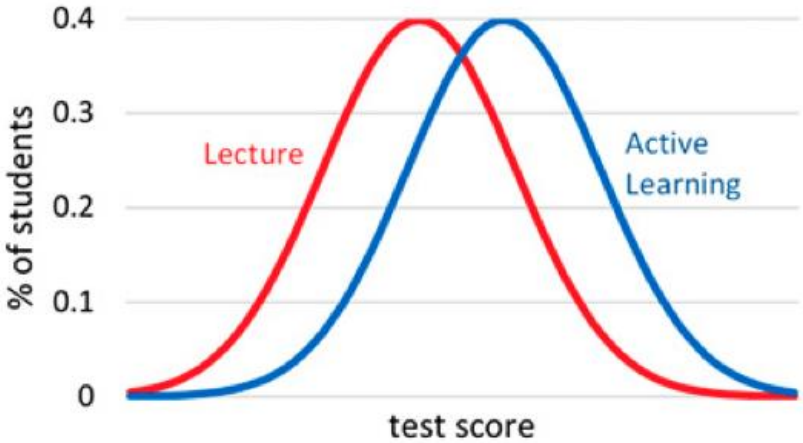
Agenda & Goals

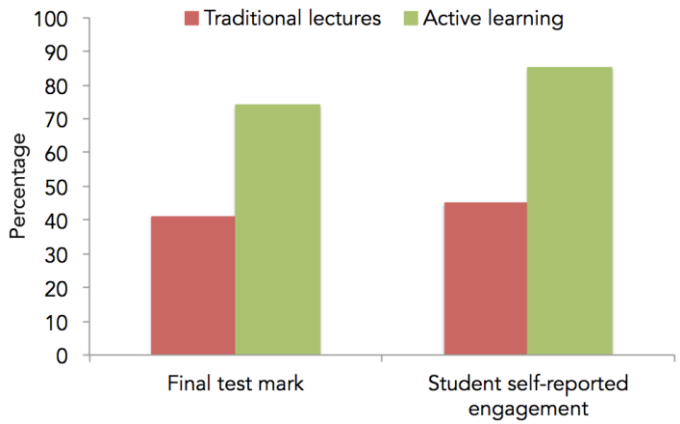
Time (mins)	Activity Description:
20	Identify challenges of active learning
20	Describe some examples of active learning approaches
20	Solve a problem in your course!
10	Wrap-up & Questions

What is active learning?

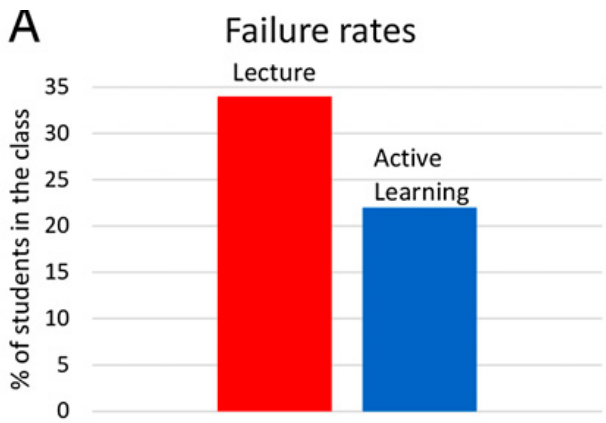
- For us it means providing opportunities for students to:
  - Engage in practice (thinking, doing, applying knowledge)
  - Receiving feedback on their thinking (from peers and/or instructor)

The evidence is overwhelming: **Active learning improves student performance and attitudes**

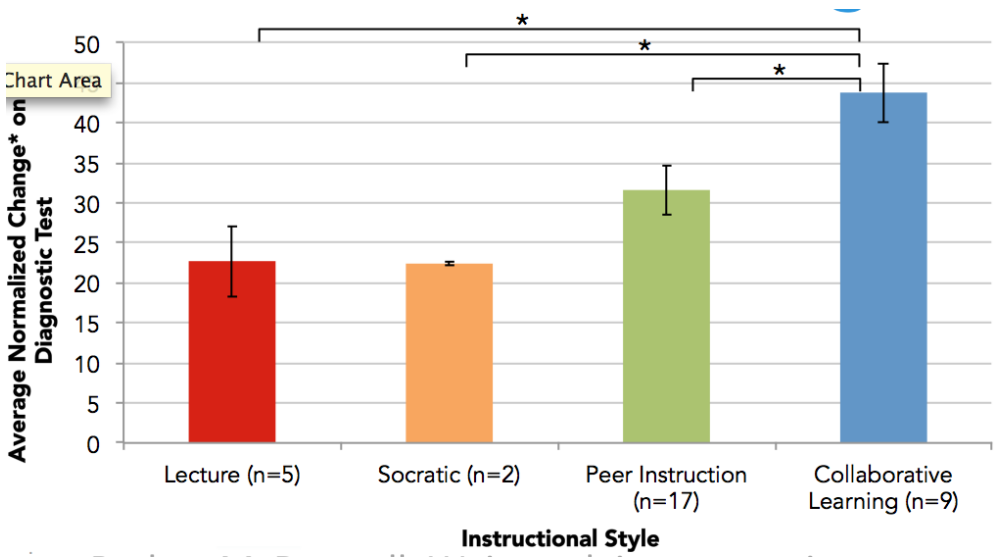




Deslauriers et al, 2011



Freeman et al, 2014



Barker, McDonnell, Weir et al, in preparation

So, if active learning works…

Why isn’t everyone, in every institution,

using active learning approaches?

What are the challenges?

Write down ONE idea per page.

Popcorn activity:
What ideas do you have?

How might we overcome this challenge?

What could you do in the classroom?

Challenge	Idea
Hard to learn new tricks	Support from someone else;
No time for extra prep	Start small and build on it over time; reuse; less slide prep
Uneven participation among students	Assign jobs, call on them by name; individual contribution before group; redefine what participation means; games; hold each person accountable
Time for all the content	Are there other ways to deliver some of the content? Activity can help reinforce the content; use activity to tackle new content; find ways to make students more receptive to the material

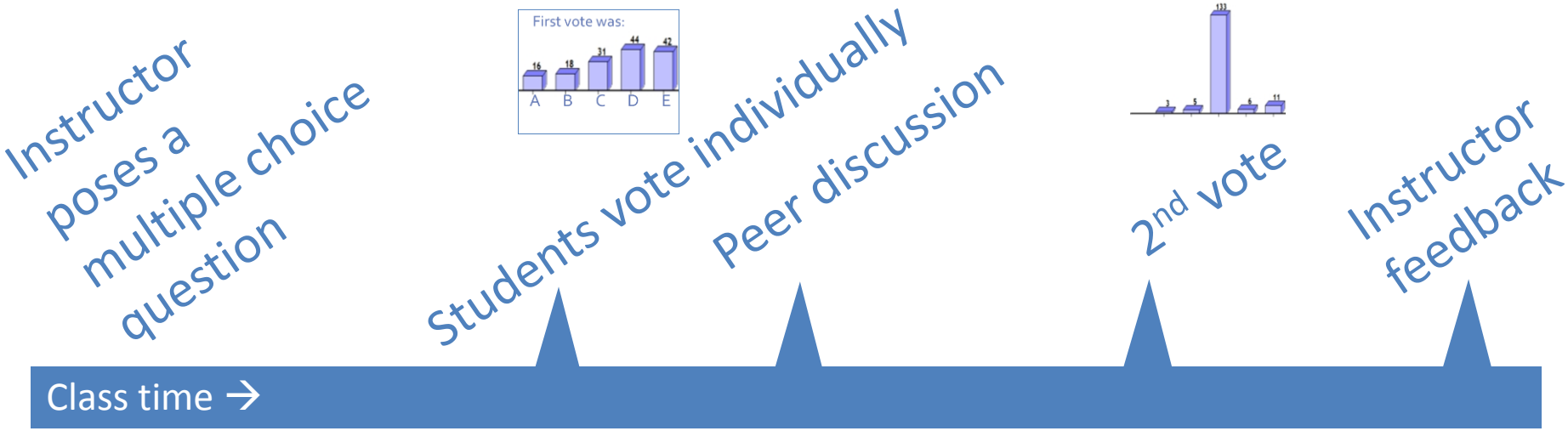
Challenge	Idea
How to make connections to the real word	Field trips, partnerships with other groups
Time consuming	Redefine your goals
Difficult to design activity for a particular concept	
Fear loss of control of classroom	Let students help, think of the benefits, facilitate group work and discussion, use presence, maybe we aren’t loosing control but creating opportunities

A review of a few approaches

(Certainly not an exhaustive list!)

1. Peer instruction (with personal response systems, or low-tech)
2. Targeted pre-class reading and assignments
3. Case studies
4. Worksheets
5. Two-stage review (and tests)

1. Peer instruction (with personal response systems)



Effective peer instruction:

- students teach each other immediately, discussing concepts in their own language
- students learn and practice how to think and communicate like experts
- instructor finds out what the students (don't) know, and provides opportunity for feedback

Different types of questions for different roles, at different times:

BEFORE LEARNING:
setting up instruction

AFTER:
assessing learning

assess prior knowledge

provoke thinking

predict

motivate

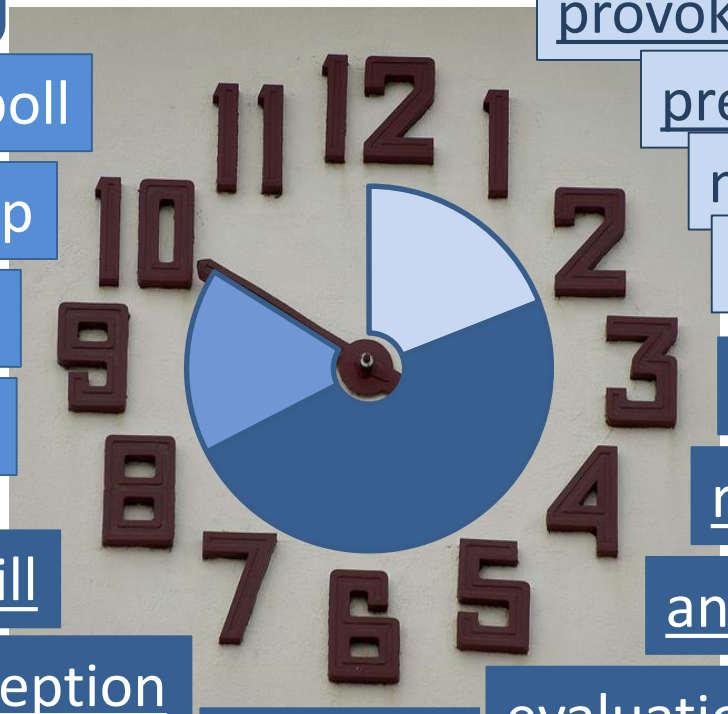
discover

exit poll

review / recap

"big picture"

demonstrate success



check knowledge

real world application

exercise skill

analysis

probe misconception

evaluation

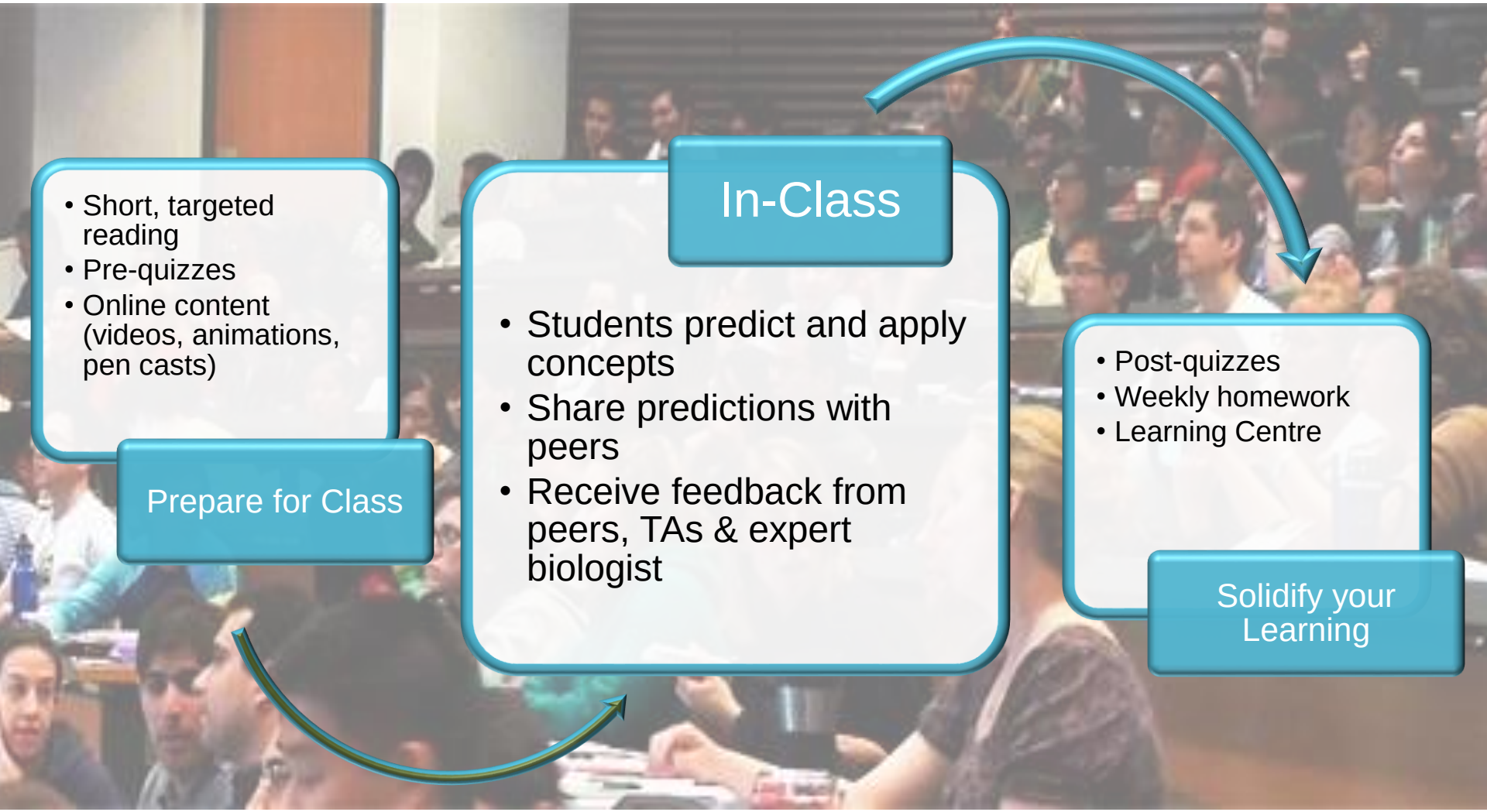
synthesis

DURING:
developing knowledge

2. Targeted & Assessed Pre-class Prep

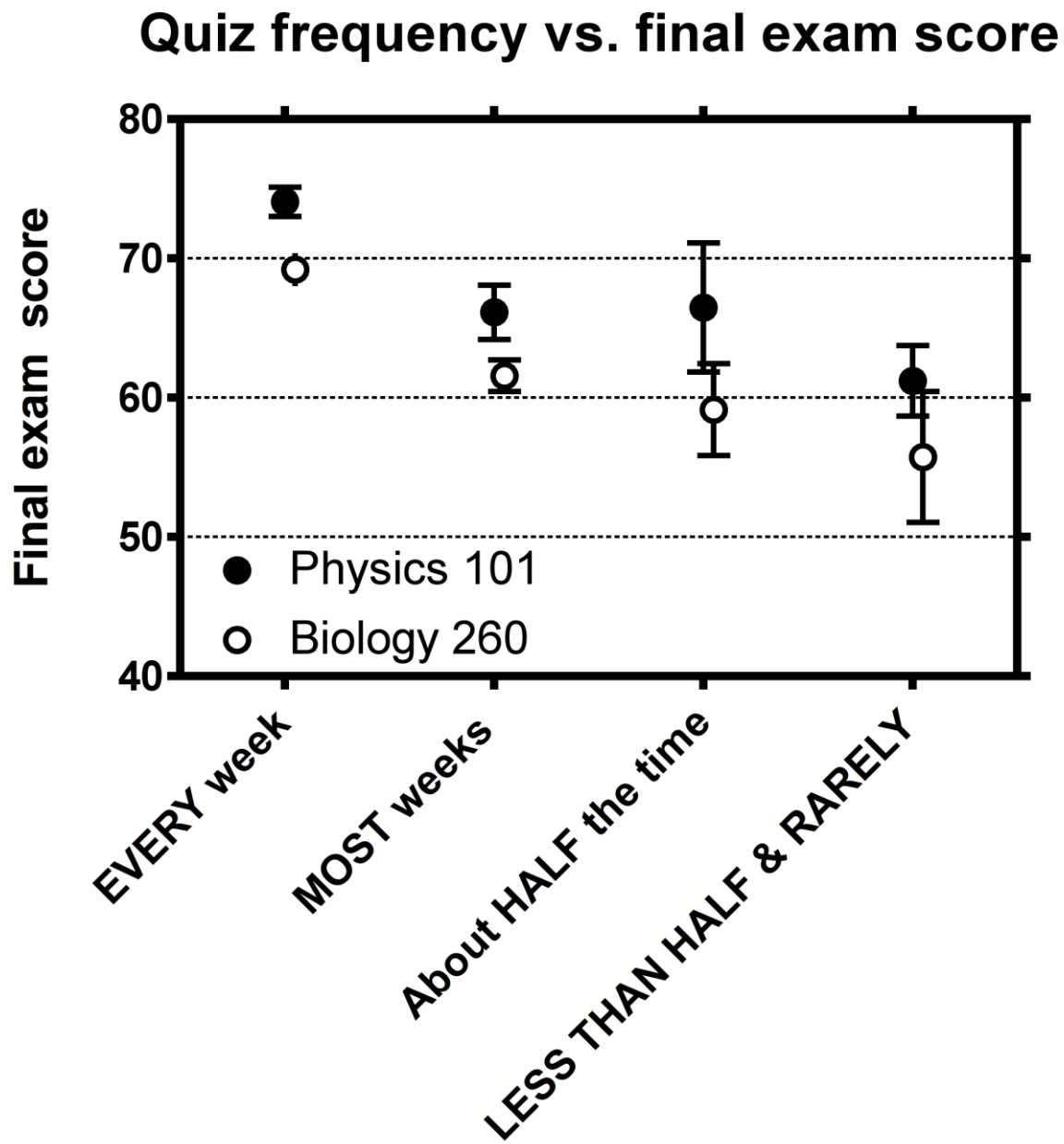
- Students read a targeted potion of the textbook (or watch a video, or do an activity) before coming to class
- They then complete a short multiple choice (online) quiz on the reading
- These provide a first exposure to basic vocabulary and concepts: build on these (but do not re-teach) in class!
- Targeted reading results in greater than 80% of biology and physics students completing the readings

Students come to class prepared to apply



Want to get student buy-in?

Students who write pre-quizzes get higher grades



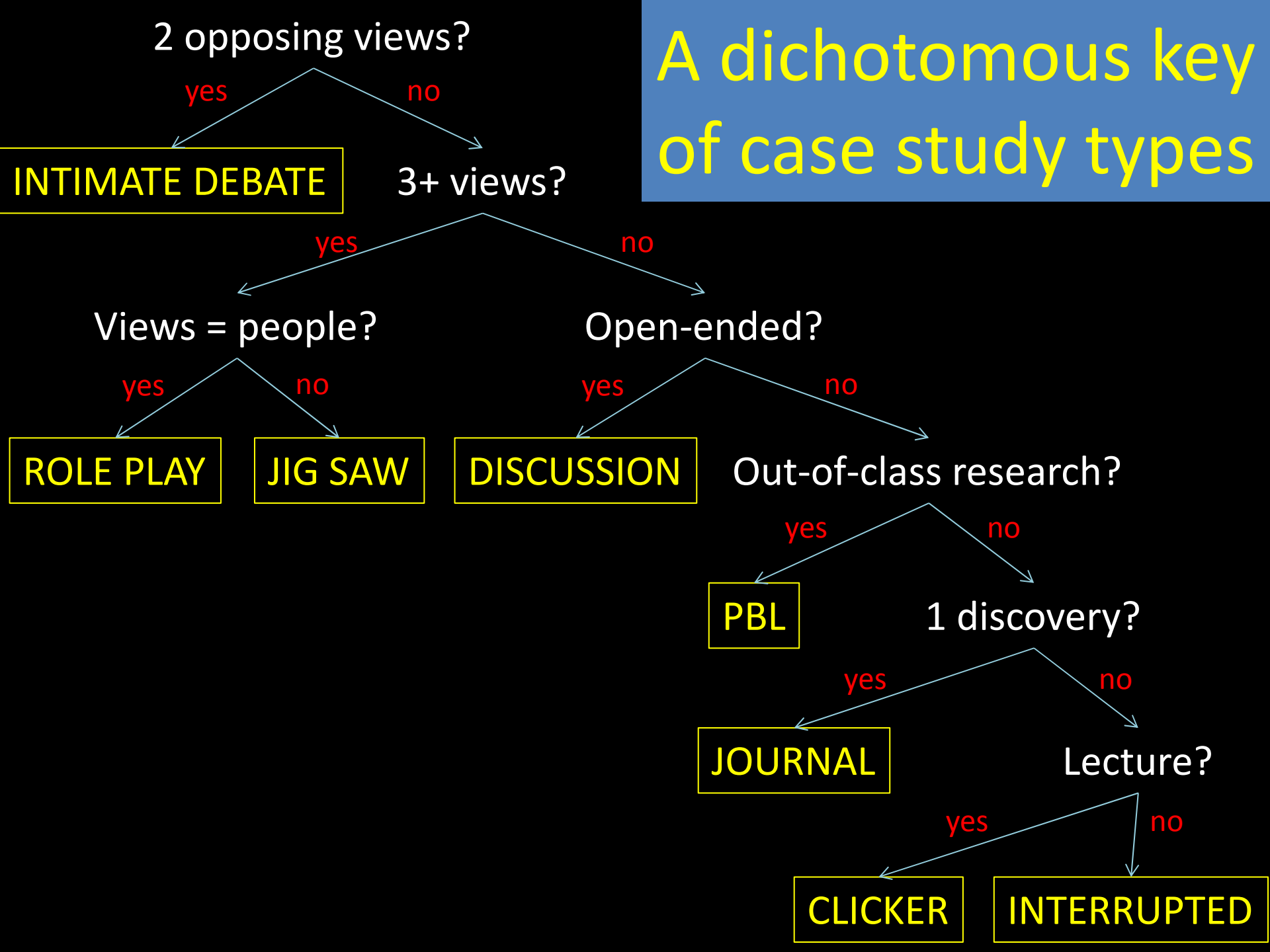
Student response to
"How often did you complete the pre-quiz?"

Heiner et al. 2014. Am. J. Phys. 82 (10)

3. Case studies

- Exploring concepts in an applied context
- Easy to integrate with other active approaches (e.g. jigsaws, peer instruction, etc…)

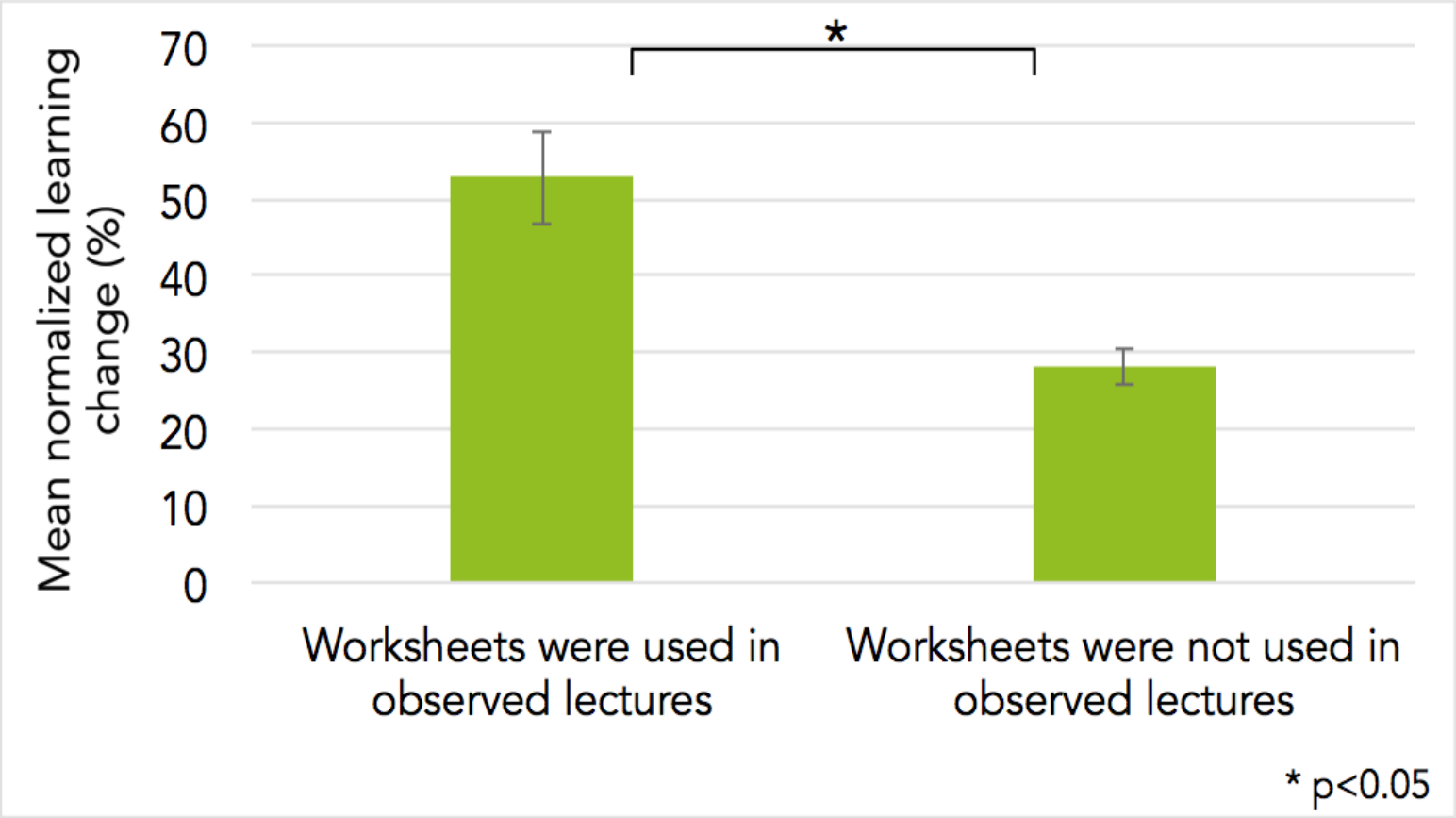
A dichotomous key of case study types



4. Worksheets

- Simple to build from old test Qs and open-ended Qs
- Students practice applying knowledge, writing, articulating.
- Opportunity for instructor to model thinking processes

Data collected at UBC Biology, 2014-2015 academic year.



5. Two-stage Review

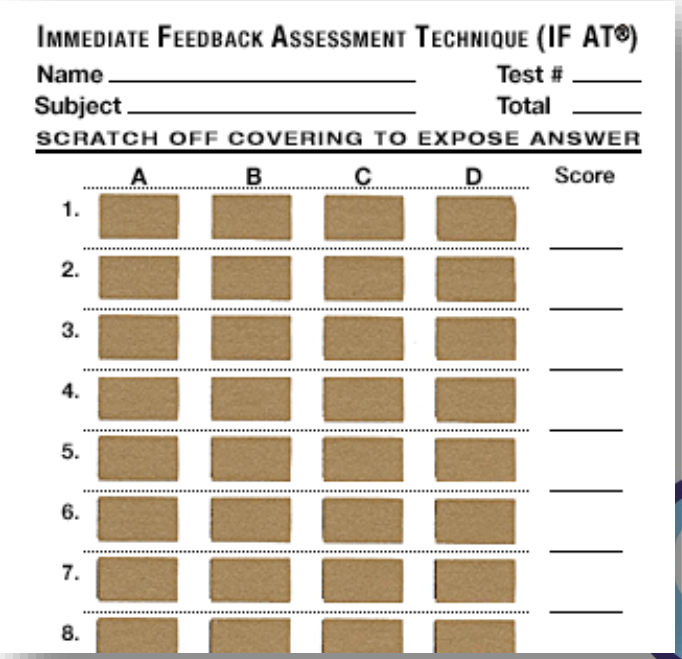
- Traditional review doesn't work
- Instead, run this at the start of a unit or course

Stage 1

Individual assessment (Clicker or on paper)

Stage 2

Group assessment



IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name _____ Test # _____

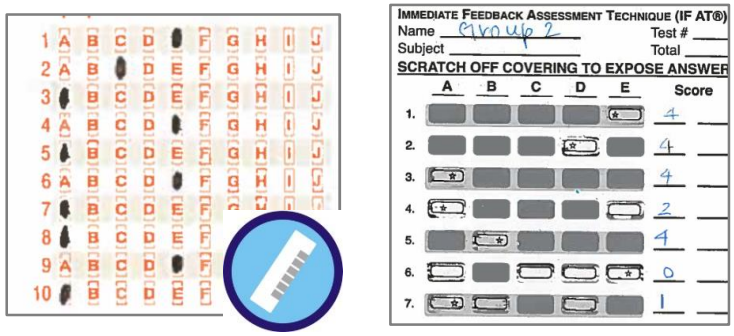
Subject _____ Total _____

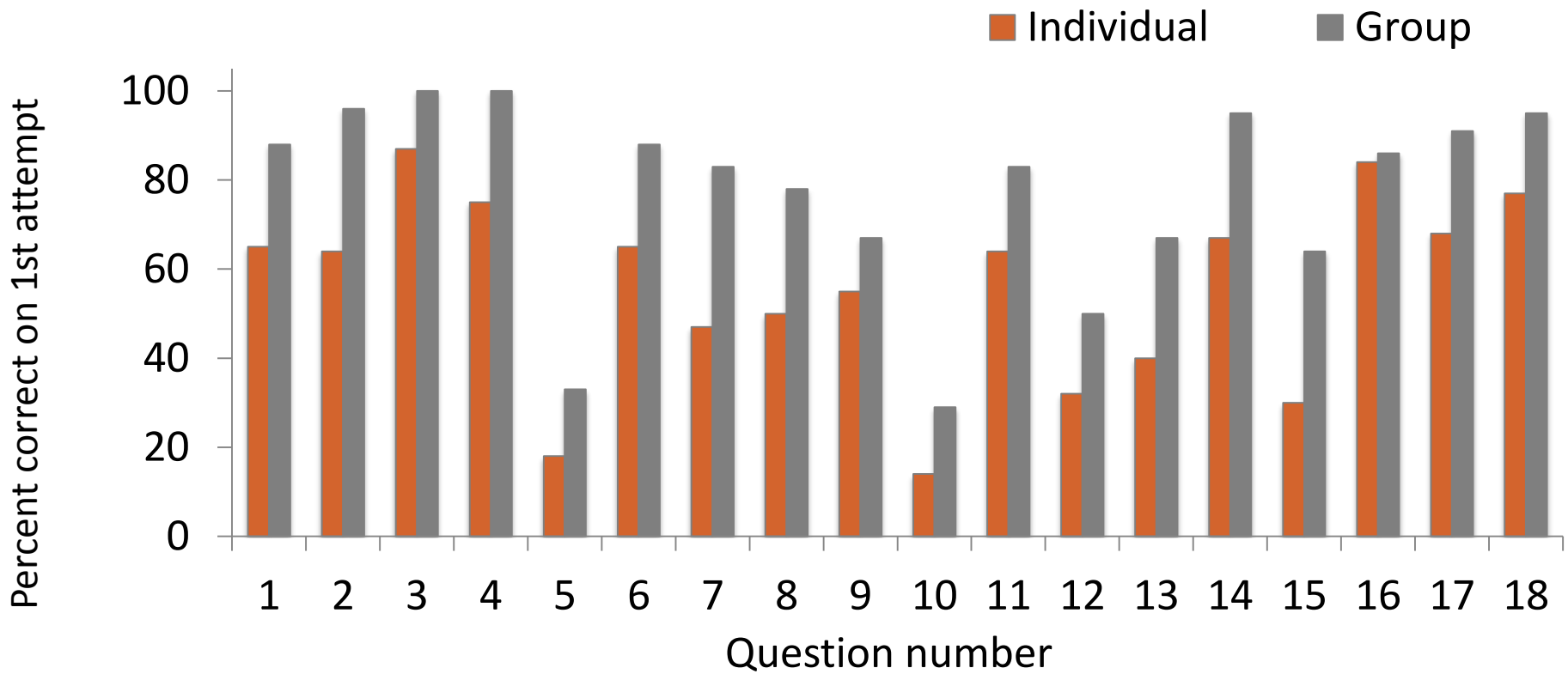
SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Details in Maxwell, McDonnell, Wieman 2015

Example data: Feedback for students & instructor





Interpret the data:

I can see <u>three</u> major take-home messages from this data. What are they?

Feedback for students and instructor

Stage	Student Benefits	Instructor Benefits
1. Individual Students answer multiple-choice questions individually	Students engage deeply with questions	Clearly communicates prerequisite expectations
	Opportunity to gauge preparation	**Results can be used to tailor instruction**
2. Group Students answer the same questions in groups of 3-4 using IF-AT cards	Immediate, corrective feedback & clarification from group members	Group results reveal stickiness of misconceptions, areas of greatest concern
	Groups receive additional feedback from IF-AT card	

Two-stage exams for formal assessment

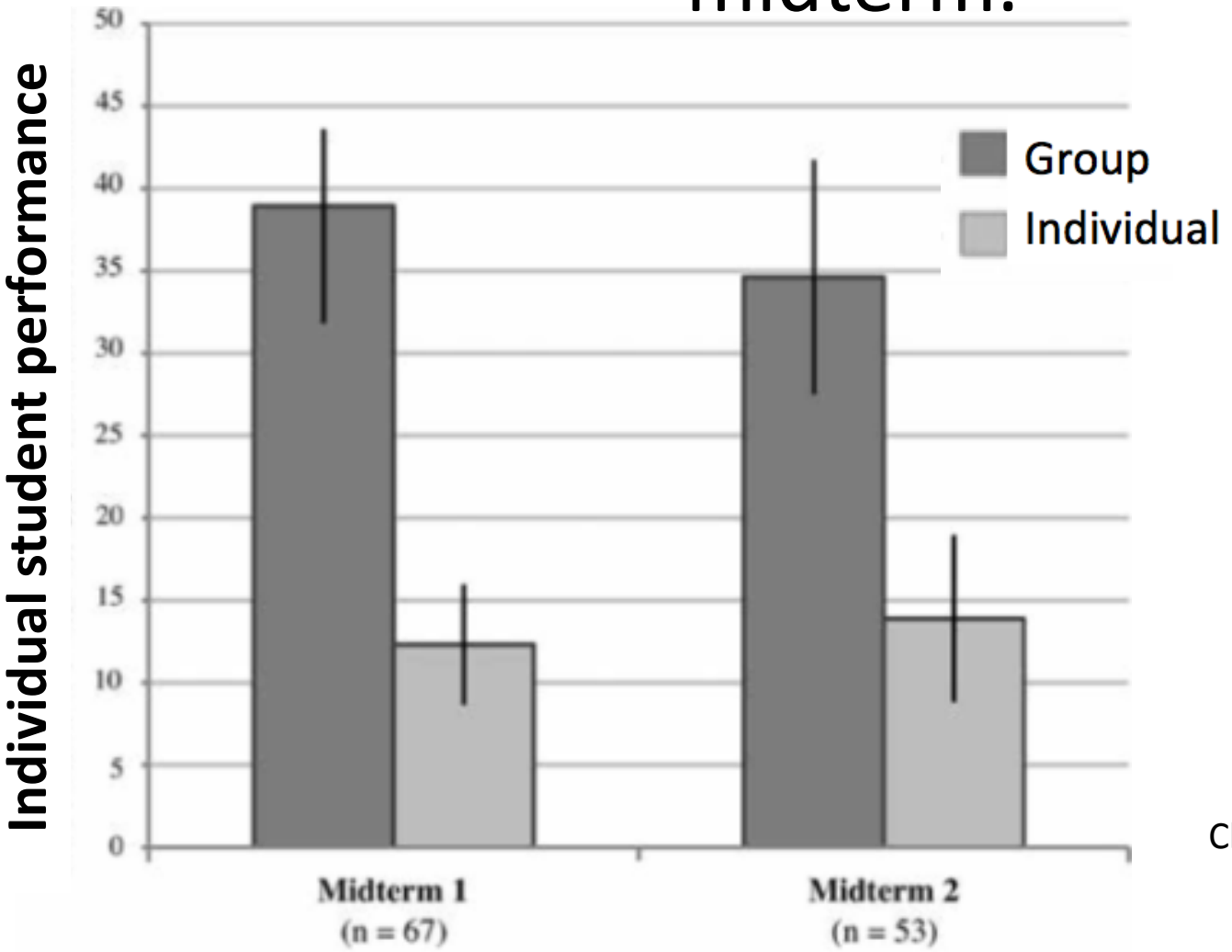
- Same format as two-stage review, except
  - For grades!
  - Students hand in 2nd stage in groups; no scratch cards.
- Video of students during final exam…

What do you notice?

http://www.cwsei.ubc.ca/resources/SEI_video.html

Students learn more:

performance on an individual pop quiz, one week after either <u>two-stage</u> or <u>traditional</u> midterm.



Clarkston & Gilley, 2013

There are some logistics to consider…

- Timing – when will individual portion and group portion be written?
- How long for each part?
- MCQ or short-answer?
- How will they be evaluated?
- Students with academic accommodations?
- How much is the individual and group exam worth?

But these tests are definitely worthwhile!

- Two-pager on this available at http://cwsei.ubc.ca/resources/instructor_guidance.htm

A review of some approaches

1. Peer instruction
2. Pre-class reading and assignments
3. Case studies
4. Worksheets
5. Two-stage review (and tests)
6. Others that came up…

Focus on one problem to solve: build an activity

- Consider a course you work with. Think of one topic or learning objective you know students have difficulty with. Write this down in once sentence.

- Using the list of possible active learning techniques (or other ideas), try to come up with one thing you might try in class to attack this topic.

- Form a group of 3, and describe the problem and your solution to the group members.
  - 5 minutes each – get some feedback

A question for you

Saturday workshop, 10am! What would you be interested in?

A. Effective use of demos/videos in class

B. Facilitation skills

C. Writing good peer instruction (clicker) questions

D. Other?

Thank you. Questions?

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Resources!
http://cwsei.ubc.ca/resources/index.html