NOT ALL ACTIVE LEARNING IS CREATED EQUAL

Annie Murray-Close & Holly Buckland Parker, Nov. 14, 2019

INTRODUCTIONS

- Name
- College & Department

Learning Outcomes

Participants will be able to:

- Identify intentional ways to use active learning to produce more effective learning results.
- Experience active learning in its glory
- Identify small ways to integrate active learning to improve learning and evaluations

What is Active Learning?

WHAT IS ACTIVE LEARNING?

★Write down a **definition** of active learning

★Write down 1-2 **examples**
- What makes each an example of active learning?

WHAT IS ACTIVE LEARNING?

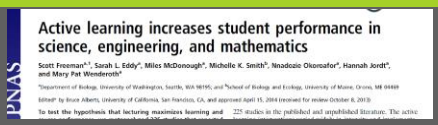
- "Active learning engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work."
  - (Freeman et al., 2014)

"SHOULD WE ASK OR SHOULD WE TELL?" (FREEMAN ET AL., 2014)

- Lectures: "more or less continuous expositions by a speaker who wants the audience to learn something" (see Freeman et al., 2014)
- Active learning versus lectures
  - Not an either/or

Does Active Learning Work?

DOES ACTIVE LEARNING WORK?


PNAS

Active learning increases student performance in science, engineering, and mathematics

Scott Freeman[a,1], Sarah L. Eddy[a], Miles McDonough[a], Michelle K. Smith[b], Nnadozie Okoroafor[a], Hannah Jordt[a], and Mary Pat Wenderoth[a]

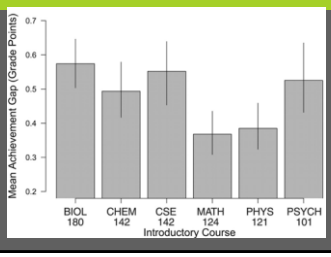
[a]Department of Biology, University of Washington, Seattle, WA 98195; and [b]School of Biology and Ecology, University of Maine, Orono, ME 04469

Edited* by Bruce Alberts, University of California, San Francisco, CA, and approved April 15, 2014 (received for review October 8, 2013)

To test the hypothesis that lecturing maximizes learning and 225 studies in the published and unpublished literature. The active

- Active learning vs traditional lecture
  - Exam scores improved 6% with active learning
  - Students in lecture 1.5x more likely to fail
  - Effects occurred across all class sizes, but were biggest in smaller (n ≤ 50 students) classrooms

FOR WHOM IS ACTIVE LEARNING MOST EFFECTIVE?



Haak et al. (2011). *Science.*

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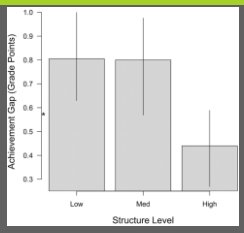


Haak et al. (2011). *Science.*

IMPORTANCE OF UNDERSTANDING **WHY** IT WORKS

"The results instructors achieve implementing active-learning instruction vary substantially…. instructors commonly implement active-learning strategies differently than intended, making decisions to omit parts that are crucial to student learning."

"It may be unreasonable to expect that instructors will immediately achieve impressive learning gains using active learning. The danger of promising—implicitly or explicitly—that active learning is much more effective than traditional lecture (without caveat) is that instructors will try it, achieve mediocre results, and quit—perhaps with diminished faith in the value of education research."

Auerbach et al. (2018)

"Instructors using active learning in our study represent the range of science education expertise among introductory college biology instructors using these methods. In contrast, most of the faculty using active learning in previous studies had backgrounds in science education research. The expertise gained during research likely prepares these instructors to use active learning more effectively."

Andrews et al. (2011)

Why Active Learning Works

WHY MIGHT ACTIVE LEARNING WORK?

- Think: Write down 2-3 ideas about **why** you think active learning might work
- Pair: Pair up with 1-2 people to share your ideas
- Share: Larger group discussion

WHY DOES ACTIVE LEARNING WORK?

- Attention
- Dual coding
- Retrieval practice
- **Elaboration**

Learning Scientists Blog (2016).

ATTENTION

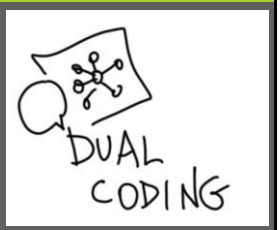
- Students' attention **frequently** alternatives from engaged to non-engaged
- Attention is better during non-lecture portions of class
  - Attention benefits continue to following course segment

Bunce et al. (2010)

Picture from: https://www.flickr.com/photos/vlsergey/4138735474

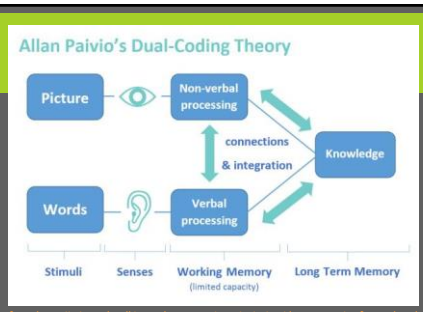
WHY DOES ACTIVE LEARNING WORK?

- Attention
- **Dual coding**



Learning Scientists Blog (2016).

Picture from: Learningscientists.org



Picture from: https://sciencetltoolkit.wordpress.com/2019/03/11/20-ideas-strategies-for-student-led-dual-coding/

WHY DOES ACTIVE LEARNING WORK?

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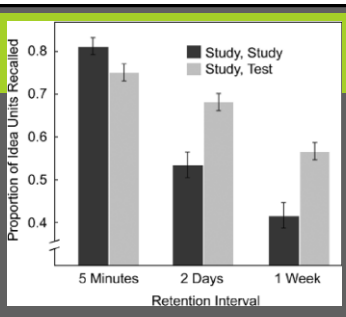
Learning Scientists Blog (2016).



Roediger & Karpicke (2006)

WHY DOES ACTIVE LEARNING WORK?

- Attention
- Dual coding
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- **Elaboration**

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ELABORATION: EXAMPLE TECHNIQUE

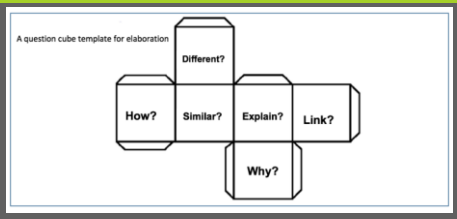
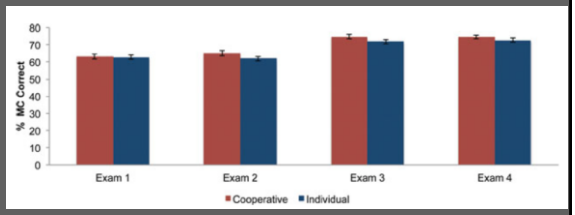


Image from: https://www.learningscientists.org/blog/2017/3/21-1?rq=cube

- "Structured course designs provide practice with problem-solving and reasoning skills that may be new to high-risk students… active learning that promotes peer interaction makes students articulate their logic and consider other points of view when solving problems, leading to learning gains."

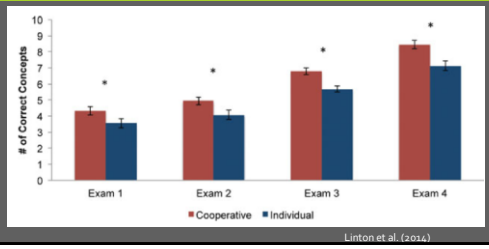
Haak et al. (2011). *Science*, p. 1215.

BENEFITS OF GROUP WORK: Multiple Choice



Linton et al. (2014)

BENEFITS OF GROUP WORK: Essay



Linton et al. (2014)

Harnessing the Science of Learning

IMPLICATIONS

- When designing activities, consider the **processes** underlying active learning benefits
  - Use active learning to increase attention
  - Ask students to represent information in multiple formats
  - Integrate retrieval
    - Closed book/notes
  - Have students work **in groups** to describe how/why things work and how different ideas relate to each other

Learning Scientists Blog (2016).

PAIR ACTIVE LEARNING WITH ACTIVE TEACHING

- Not all "active" activities improve learning
- Students needs **guidance** and **structure,** and this can include less active approaches such as lecture
  - Students must know and understand enough of the material to be successful in active learning

Learning Scientists Blog (2016).

BARRIERS TO ACTIVE LEARNING

- Think: Write down 2-3 potential **barriers** to active learning
- Pair: Pair up with 2-3 others to discuss
- Share: Larger group discussion

BARRIERS

- Students don't engage
- Students don't like it
- Managing group dynamics
- It takes too much time

Image: https://en.wikipedia.org/wiki/File:Ashton_College_classroom.jpg

BARRIER: STUDENTS DON'T ENGAGE

- Make active learning **required** (Freeman et al., 2007)
  - Increase student accountability
- Use high levels of structure and communication DURING in-class activities

Freeman et al. (2007)

BARRIER: STUDENTS DON'T LIKE ACTIVE LEARNING

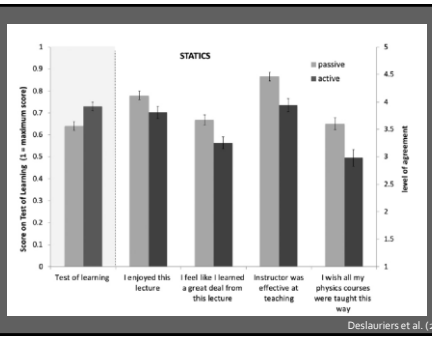
PNAS

Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom

Louis Deslauriers[a,1], Logan S. McCarty[a,b], Kelly Miller[c], Kristina Callaghan[a], and Greg Kestin[a]

[a]Department of Physics, Harvard University, Cambridge, MA 02138; [b]Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA 02138; and [c]School of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138

Edited by Kenneth W. Wachter, University of California, Berkeley, CA, and approved August 13, 2019 (received for review December 24, 2018)



Deslauriers et al. (2019)

STRATEGIES FOR STUDENT RESISTANCE: EXPLANATION

Explain the purpose.	Providing students with a rationale for using active learning in the classroom by explaining how the activities relate to their learning, connecting the activities with course topics, discussing their relevance to industry, etc.
Explain course expectations.	Communicating overall course expectations for student participation at the beginning of the semester
Explain activity expectations.	Providing explicit instructions about what students are expected to do for a specific active learning exercise

Tharayil et al. (2018)

STRATEGIES FOR STUDENT RESISTANCE: FACILITATION

Approach non-participants.	Confronting students who are not participating in activities by physically approaching them, calling on them during more structured lecture, etc.
Assume an encouraging demeanor.	Establishing verbal or non-verbal cues such as setting a tone for risk taking, caring about students' success, encouraging responses by using uncomfortable silences, etc.
Grade on participation.	Using points or grades to encourage participation
Walk around the room.	Walking around the room during active learning instruction

Tharayil et al. (2018)

STRATEGIES FOR STUDENT RESISTANCE: FACILITATION

Solicit student feedback.	Encouraging students to provide feedback about an in-class activity
Invite questions.	Prompting students to ask questions about an in-class activity during that activity
Develop a routine.	Establishing an "active learning" routine by having a standard type of "bell work," using a systematic approach to interact with students during an activity, regularly calling on students by name, etc.
Design activities for participation.	Structuring an activity so that students will be more likely to engage in active learning by creating student groups, reframing tasks, etc.
Use incremental activities.	Integrating support mechanisms to help students accomplish more complex tasks by giving hints, decomposing a problem into parts, etc.

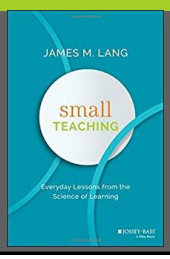
BARRIER: MANAGING GROUP DYNAMICS

- Establish ground rules
- Designate rotating group roles
- Develop and communicate clear instructions
- Provide careful discussion prompts
- Use facilitation skills
- Provide opportunities for closure, reflection, and feedback

https://teachingcenter.wustl.edu/resources/active-learning/group-work-in-class/facilitating-in-class-group-work/

BARRIER: IT TAKES TOO MUCH TIME

- Start small!
- CTL is available for support and consultations



CLOSING THOUGHTS

- What was the most important thing you learned during this session?
- What important question remains unanswered?

From: T. & Cross, K.P. (1993). Classroom assessment techniques: A handbook for college teachers (2nd Edition). San Francisco, CA: Jossey-Bass.

CTL RESOURCES

www.uvm.edu/ctl

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