Why Active Learning

See ideas for different learning activities under the Activity Guides on Emory's Teaching Toolkit site

Overview: Why Active Learning Matters

Including as many active learning activities as you can on an ongoing basis will strengthen the student's connection to the class and their connection to the material.

Active Learning:

- Keeps Students Involved and Interested
- Supports Learning Communities
- Supports Knowledge Construction
  - Enables Practice of Knowledge Retrieval
  - Provides Opportunities for Feedback
- Improves Performance

Studies from the literature:

- Active learning boosts performance in STEM courses. Scott Freeman, Sarah L. Eddy, Miles McDonough, Michelle K. Smith, Nnadozie Okoroafor, Hannah Jordt, Mary Pat Wenderoth. *Proceedings of the National Academy of Sciences*, May 2014, 201319030; DOI: 10.1073/pnas.1319030111
- Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. Deslauriers L, McCarty L.S., Miller K, Callaghan K, and Kestin G. *Proceedings of the National Academy of Sciences*, September 24, 2019 116 (39) 19251-19257; first published September 4, 2019; https://doi.org/10.1073/pnas.1821936116

Keeps Students Involved and Interested

- ✓ Empower students to be invested in their learning
- ✓ Help learners be equipped to take ownership of their own learning and their own progress by incorporating:
  - **Metacognition principles:** awareness and understanding of your own learning (e.g. weave in self-assessments, reflection and journaling)
  - **Threshold concepts:** a sort of conceptual gateway; challenging concepts that can help a student transform their understanding of a subject once mastered (e.g. introduce scaffolding, multiple opportunities to practice and explore new concepts, flipped classroom models)

Supports Learning Communities

"A learning community is a group of people who share common academic goals and attitudes and meet semi-regularly to collaborate on classwork. Such communities have become the template for a cohort-based, interdisciplinary approach to higher education." – Wikipedia

- ✓ Learning communities play a large role in how one learns and can be critically important in courses where things like knowledge construction, rhetoric, collaboration etc. are major learning outcomes.
    - Learning communities aid in student learning and student success and help students feel invested and empowered
    - Students are more likely to participate in class discussion and activities if they feel like confident and comfortable!
- ✓ In a group of learners, each person brings different perspectives and experiences to the collective group. While they all may be reading the same thing in class, how they interpret it can vary quite widely. For a learner to fully understand the history, the context, the value of information or skills, learning it as part of a community of learners can drastically affect how and what they learn.

Supports Knowledge Construction

- ✓ Helps reinforce main points by "chunking" content
- ✓ Helps students build and solidify a working framework of knowledge
    - Without strong organized foundations or frameworks, students will have a difficult time moving into more advanced work
    - Without a framework organizing the information, every piece of information is treated and "new" or "independent"
    - The brain is not capable of remembering that much new information long-term.
    - If it's too linear, a missing piece of information will break the entire chain – not a very strong structure
- ✓ Reduces information overload
    - Average attention span is ~15-20 minutes
    - Taking a "brain break" will help students maintain focus over a longer period of time
- ✓ Enables **practicing retrieval** of new knowledge, which is key—not by rote, but with intention. Research supports that even one quiz/test during a course will improve final exam performance, and active learning offers more opportunities for corrective feedback.
- ✓ **Practicing with variation and spacing** allows for reflection and discrimination—elevating one's thinking about the material or skills.
    - Think about this as the opposite of cramming, it's habit- and strength-building to consolidate memories

Provides Opportunities for Feedback

- ✓ *Thinking* you know something and *demonstrating* you know something are very different!
- ✓ To avoid **illusions of knowing**, students need regular, ongoing feedback (self-guided, peer-guided or instructor-guided).
    - Self quizzes, flash cards
    - Speaking with or working with a partner to practice skills, solve problems, or review content, discussions
    - One-on-one meetings, independent assignments, exams

Active Learning Improves Performance

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

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]

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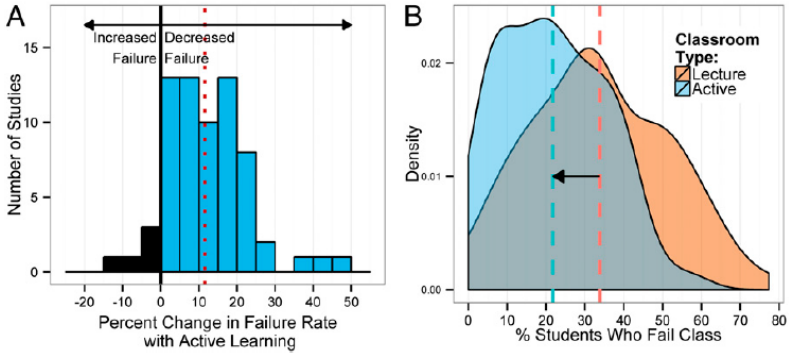

Fig. 1. Changes in failure rate. (*A*) Data plotted as percent change in failure rate in the same course, under active learning versus lecturing. The mean change (12%) is indicated by the dashed vertical line. (*B*) Kernel density plots of failure rates under active learning and under lecturing. The mean failure rates under each classroom type (21.8% and 33.8%) are shown by dashed vertical lines.

Active learning boosts performance in STEM courses Scott Freeman, Sarah L. Eddy, Miles McDonough, Michelle K. Smith, Nnadozie Okoroafor, Hannah Jordt, Mary Pat Wenderoth. *Proceedings of the National Academy of Sciences* May 2014, 201319030; DOI: 10.1073/pnas.1319030111

- ✓ In 2014, the National Academy of Sciences analyzed results from 225 studies of STEM classes where the same instructor delivered lectures to half of the students randomly assigned and used active learning techniques for the other half.
    - Found that the student failure rate dropped by 12% points, from a 34% failure rate to a 22% failure rate.
    - "Most of the studies we analyzed were based on data from identical instructors teaching active learning v lecturing sections; some studies (e.g. Van Heuvelen in Am. J. Physics; Deslauriers et al. in Science)
    - Have purposely matched award-winning lecturers with inexperienced teachers who do active learning and found that the students did worse when given "brilliant lectures."
        - "We've yet to see any evidence that celebrated lecturers can help students more than even 1st-generation active learning does."

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

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]

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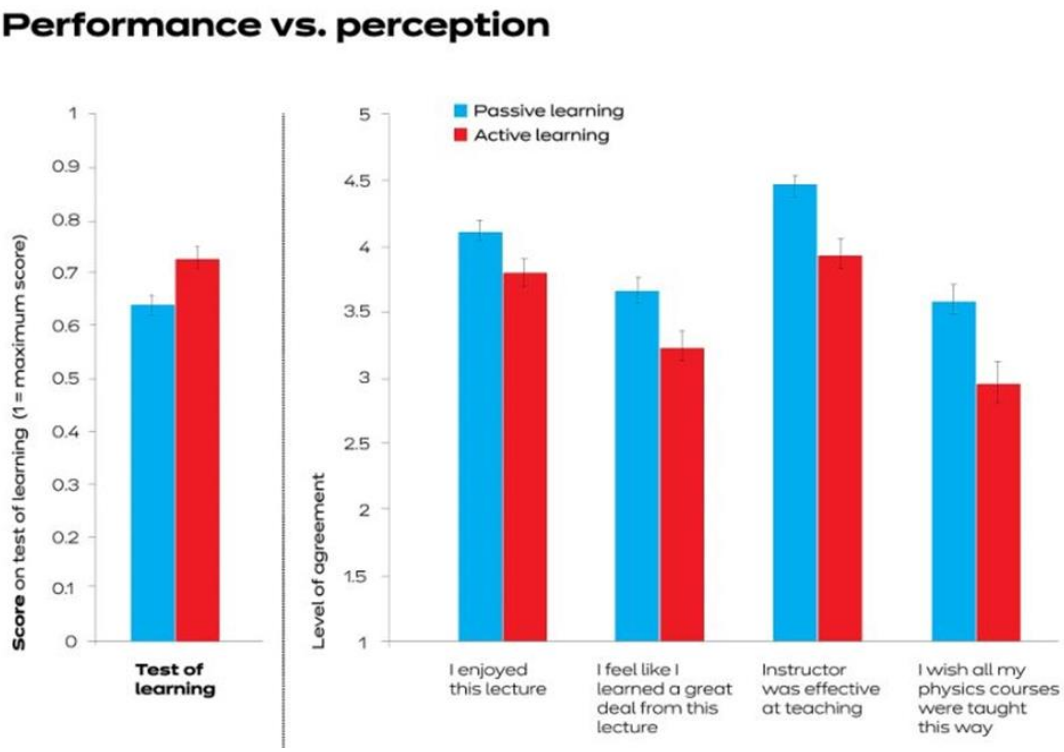

Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. Deslauriers L, McCarty L.S., Miller K, Callaghan K, and Kestin G. *Proceedings of the National Academy of Sciences* September 24, 2019 116 (39) 19251-19257; first published September 4, 2019; https://doi.org/10.1073/pnas.1821936116

- ✓ Students don't always think so, but it's true. Let them know why it is important!
- ✓ "We find that students' perception of their own learning can be anticorrelated with their actual learning under well-controlled implementations of active learning versus passive lectures.
- ✓ These results point to the **importance of preparing and coaching students early in the semester for active instruction and suggest that instructors should persuade students that they are benefitting from active instruction**…
- ✓ These results also suggest that **student evaluations of teaching should be used with caution as they rely on students' perceptions of learning and could inadvertently favor inferior passive teaching methods over research-based active pedagogical approaches**.