



# ***BRIEF SURVEY OF EVIDENCE-BASED TEACHING AND LEARNING STRATEGIES***

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# KNOW YOUR MYTHS!

- There are lots of myths about learning out there
- Find out what they are so you don't fall prey to them
- Common study strategies often failing: rereading, highlighting, and mnemonics all have proven not to work under careful study
- Check out these myths:  
<http://www.edutopia.org/neuroscience-brain-based-learning-myth-busting>

# REINFORCEMENT LEARNING

- "In simplest terms, reinforcement learning is making a guess, being told whether you're right or wrong, and using that information to make a better guess next time." (Columbia U., 2016)
- Teens' brains are more reward-seeking than adult brains, so this method of teaching works better. Teens' brains also activate the hippocampus.
- Our brains finish maturing around age 25.

# PRACTICE TESTING

- Practice testing is an extremely effective way of learning
- Do you have old tests you aren't using anymore? Release them to students as practice tests with keys
- Talk to students about your way of thinking about writing exams or what material you think is important
- Help students to think about testing strategically

# DISTRIBUTED PRACTICE & FREQUENT QUIZZING

- Even self-quizzing helps
- Gives students rapid feedback that is more detailed than long homework
- The effort of recall reinforces and strengthens learning
- Connect old concepts to new concepts
- Recall concepts not used in a while
- Doesn't have to be long (1-3 questions is enough)
- Short quizzes are easy to grade, go over in class, discuss common errors, and can be done daily!
- <https://quizlet.com/>

# ELABORATIVE INTERROGATION

- Actively connect new information to old information
  - Example: I remember the formula for factoring sum/difference of cubes by connecting it to the perfect square formula
- Ask students to make connections themselves
- Good question to ask: What does this remind you of?
- The more connections you make, the easier it is to learn; no connection is too crazy if it helps recall

# SELF-EXPLANATION

- Put ideas in your own words
- Great for definitions and concepts: rewrite the definition
- Say why it matters to you
- Reviewing notes? Write about the big picture
- Summarizing what was learned in class? Model self-explanation for your students

# ACTIVE LEARNING STRATEGIES

- Here's your chance to practice
- “**Active learning** is a process whereby students engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class content.”
- Answer this question in your own words: What is active learning in your discipline and how can you use it with your students?

# INTERLEAVED PRACTICE

- Also known as mixed practice
- Helps students compare and contrast
- Develop strategies for telling when to use different techniques
- Creates flexibility

# SHARE YOUR STRUGGLES

- Empathy creates a positive atmosphere
- Sharing struggles doesn't discourage students, instead it encourages them because they know someone who got past it
- Emphasize how you got through it
- It's okay to say it's hard; don't say you are "bad" at it, or that you never use it



# RELEARNING

- Relearning builds connections in the brain
- Like using a muscle, relearning builds stronger connections, which means retention
- Learning cannot be a ritual

# COMBINE NEW AND OLD

- Build on familiar concepts to create new ones.
- The familiar memories make it easier to remember the new information and assimilate it.
- Have students learned the information in another class? Is it connected to something they learned before?
- Connect to things outside the class, too

# DO STUDENTS WANT WHAT YOU ARE TEACHING?

- Persistence can be a big problem for struggling students
- Gaining persistence can be a matter of motivation
- Students who want what you are teaching, if they believe they want it, will work for it
- Focus on what the students want from the course – do you know what they want?

# AVOID IMPLICIT BIAS

- All people have biases
- Teachers (both black and white) have different expectations of black students than for white students
- Teachers have different expectations for female students
- Adopt strategies to eliminate bias in grading (hide names and grade anonymously)
- Work to eliminate your unconscious biases by figuring out what they are <https://implicit.harvard.edu/implicit/>

# EXPLAIN IT

- This isn't about what you do for the students, but what the students do for themselves
- Students that know they will have to explain something to another person learn it more deeply themselves
- Ask students to put concepts in their own words
- Get them to work in groups and brainstorm explanations
- Have them figure something out (with as much help as they need), and then have them describe what they did

# PRAISE THE RIGHT WAY

- Giving and getting feedback can be hard
- Focus on improvement
- Red ink can have a nocebo effect
- Praise hard work and effort, not intelligence or smarts
- Have high expectations, but be reasonable

# ENGAGE MORE SENSES

- Watching a video? Turn on closed captions!
- Lecturing? Don't stand still: even moving your arms and walking around helps
- Read, write, do, say: learning styles are habits. Breaking those learning habits is *MORE* helpful than conforming to them

# TEACH STUDENTS HOW TO ASK FOR HELP

- Asking for help when you need it turns out to be closely associated with class
- Students from families with a lower socio-economic status can struggle with hurt pride when seeking assistance (strength of this relationship varies)
- Make it easy for students to seek help, encourage them to do it, and let them watch others do it (even set aside class time for it)
- There are no stupid questions if it's getting in the way of learning
- Take them to the tutoring lab as a class trip or hold office hours in the tutoring room

# MAKE LEARNING EVERYDAY

- Make learning a daily thing
- The more anxious a topic makes you, the more you need to do it every single day
- Make it common place
- Weave it into stories
- Make it a game; make it fun, if you can
- Try a scavenger hunt online for images or news stories



## MIX IT UP!

- There is no one perfect strategy
- Using a mix of strategies works best
- You don't need to do them all, but do use more than one
- Explain to students what you do and why you do it: get them to buy in!

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