

## Active Learning Making Thinking Visible

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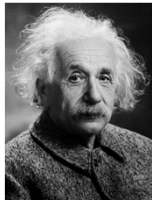
## Learning Objectives



- Define active learning
- Describe why active learning strategies are important
- Discuss pros and cons of specific active learning techniques and how they might be used in the health sciences classroom
- Identify challenges to using active learning and solutions to overcome them
- Differentiate between cooperative learning and other types of active learning.

*"It is a miracle that curiosity survives formal education."*

~ Albert Einstein



## Why Active Learning?



## The Lecture

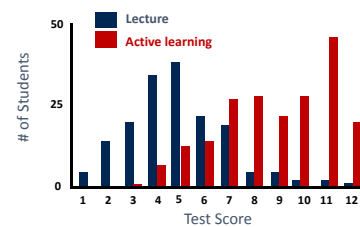
### • Students do not:

- Learn core concepts
- Retain knowledge
- Develop higher-level cognitive skills
- Change attitudes
- Transfer knowledge to other settings



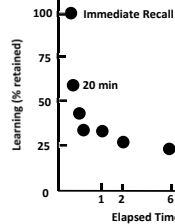
Fink (2003) Creating Significant Learning Experiences

## Lecture vs. Active Learning



Deslauriers et al. Science, 2011.  
[http://www.aaas.org/news/releases/2011/0512sp\\_teaching.shtml](http://www.aaas.org/news/releases/2011/0512sp_teaching.shtml)

## Forgetting Curve

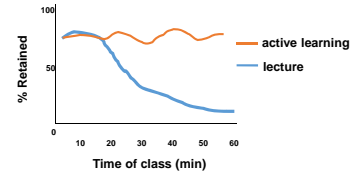


*"People usually forget 90% of what they learn in a class within the first 30 days...the majority of this forgetting occurs hours after class."*  
 ~ John Medina in Brain Rules



Hermann Ebbinghaus (1885): Memory: A contribution to experimental psychology  
 Brain Rules, John Medina (2008)

## Retention



From: McKeachie, *Teaching Tips: Strategies, Research and Theory for College and University Teachers*, Houghton-Mifflin (1998)

## Active Learning

Broadly defined...

Involves students in **doing things**, and **thinking about** the things they are doing.

Eison and Bonwell (1993) Active Learning: Creating Excitement in the Classroom

## Active Learning

Broadly defined...

Involves students in **doing things**, and **thinking about** the things they are doing.

"Does it make their thinking visible?"

- Activate prior knowledge
- Involve MOST students
- Metacognition/Reflection
- Feedback

Eison and Bonwell (1993) Active Learning: Creating Excitement in the Classroom  
 Medina MS. AJPE 2017:81(3) Article 41.

## What is active learning?

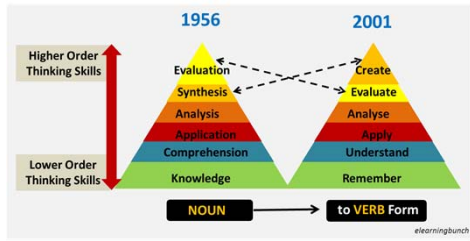
- Students involved in more than listening
- Developing skills rather than transmitting information
- Engaged in activities like reading, discussing, writing
- Higher order thinking (analysis, problem-solving)
- Can be cooperative or individual

Eison and Bonwell (1993) Active Learning: Creating Excitement in the Classroom  
 Medina MS. AJPE 2017:81(3) Article 41.

## Why active learning?

- Students are more engaged and energized.
- It facilitates deeper learning, critical- thinking and problem-solving
- Works especially well for preparing for clinical practice and integrating basic and clinical sciences.
- It allows for practice and feedback.
- It is more fun!

### Bloom's Taxonomy



<https://elearningbunch.wordpress.com/2013/02/20/revised-bloom-taxonomy/>

### Bloom's Taxonomy in the Classroom

		Traditional Lecture-based Classroom				
Instructional Design	Bloom's Taxonomy	In class		Out of Class		
		Remember	Understand	Apply	Analyze	Evaluate

Adapted, with permission, from Julie Schell (2017)

### Bloom's Taxonomy in the Classroom

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		Easy Part		Hard Part		

Adapted, with permission, from Julie Schell (2017)

### Bloom's Taxonomy in the Classroom

		Flipped Classroom – Active Learning				
Instructional Design	Bloom's Taxonomy	Out of Class		In Class		
		Remember	Understand	Apply	Analyze	Evaluate
		Easy Part		Hard Part		

Adapted, with permission, from Julie Schell (2017)

### The Flipped Classroom

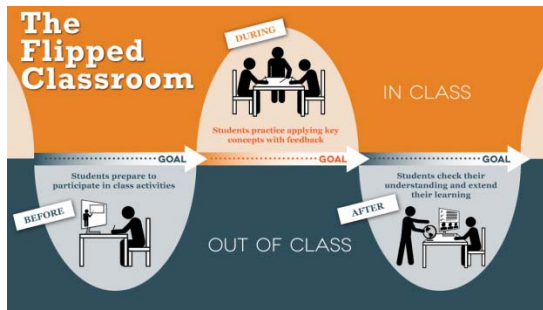
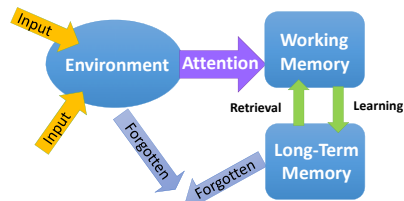


Image used, with permission, from Julie Schell (2017)

### Prior Knowledge

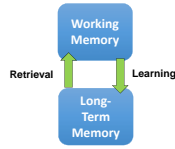
Learning is the interaction of NEW INFORMATION with PRIOR KNOWLEDGE



Adapted from Julie Schell (2016) and Daniel Willingham (2014), with permission

### Retrieval Practice or “The Testing Effect”

“It is firmly established that retrieving information from memory changes memory, increasing the likelihood that information will be successfully retrieved again in the future.”



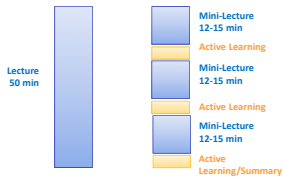
Roediger HL, Butler AC. *Trends in Cognitive Sciences* 2011;15(1):20-27.

### Retrieval Practice and Prior Knowledge in the Classroom

Two potential strategies

1. Chunked or punctuated lecture
2. Structured, collaborative learning

### Traditional vs. Punctuated Lecture

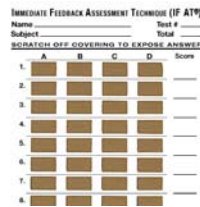


### What teaching methods can we use for retrieval practice in the classroom?



### Useful Tool for Retrieval and Feedback IF-AT Cards

- Immediate Feedback Assessment Technique
- Scratch off cards
- Immediate Feedback
- Allows for partial credit



[www.epsteineducation.com](http://www.epsteineducation.com)

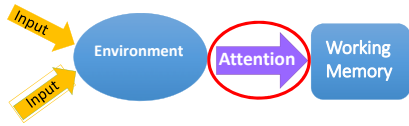
### Audience Response System a.k.a. Clickers

- Use in punctuated lecture
- Question (first retrieval)
- Poll (reflect on what they know)
- Discussion (with peers or faculty-led)
- Re-Poll (spaced retrieval)
- Explanation/Feedback



<https://www.turningtechnologies.com/icd/>

Make sure students focus **ATTENTION** where it is most important!



- Design of learning materials
- Connections with:
  - previous content (prior knowledge)
  - future experiences (patient care)

Adapted from Julie Schell (2016) and Daniel Willingham (2014)

## Active Learning Strategies



- Think-Pair-Share
- Minute Writes
- Muddiest Point
- Notes Exchange
- Socratic Questioning
- Debates
- Role playing
- Games
- Audience Response System
- Case-based learning
- Blended Learning
- Three step interview
- Focused listing
- Cooperative Learning (PBL, TBL)

Gleason BL, et al. AJPE 2011;75(9): Article 186.

## Case-Based Learning

- Good for large classes
- Can use audience-response system (ARS)
- Often preceded by assigned reading, "mini-lecture," or other resources.
- Usually not done as groups, but could.

Gleason BL, et al. AJPE 2011;75(9): Article 186.  
Srinivasan M et al. Acad Med 2007;82:71-82.

## What is cooperative learning?

- A type of active learning
- Structured form of small group problem solving
- Learn to collaborate
- Individual accountability
- Instills team building skills
- Sharpens social skills



Barbara Millis, Idea Paper #38  
<http://www.ideaedu.org/>

## Cooperative Learning

- Examples
  - Team-based learning (TBL)
  - Problem-based learning (PBL)
  - Peer instruction
- Tips for Success
  - Team formation (heterogeneous, permanent)
  - Clear expectations/procedures
  - Closure/wrap-up/feedback

## Key Points



- Active learning should make thinking visible.
- Active learning can be messy and unpredictable.
- It's okay for things to be messy and unpredictable.
- Retrieval/testing enhances learning.
- Interactive or punctuated lecture to increase engagement and attention
- Cooperative learning helps develop communication, teamwork, and collaborative decision making skills.
- Design materials to emphasize how this will be important in students' careers.