MetaLearning: Growing Self-Directed Learners

Empowering Students to Learn -- 2014

Stephen Carroll, PhD

Problem: Low Graduation Rates

	United States
Percentage of students who graduate within 150% of nominal time	49*

Source: http://www.oecd.org/edu/highlights.pdf

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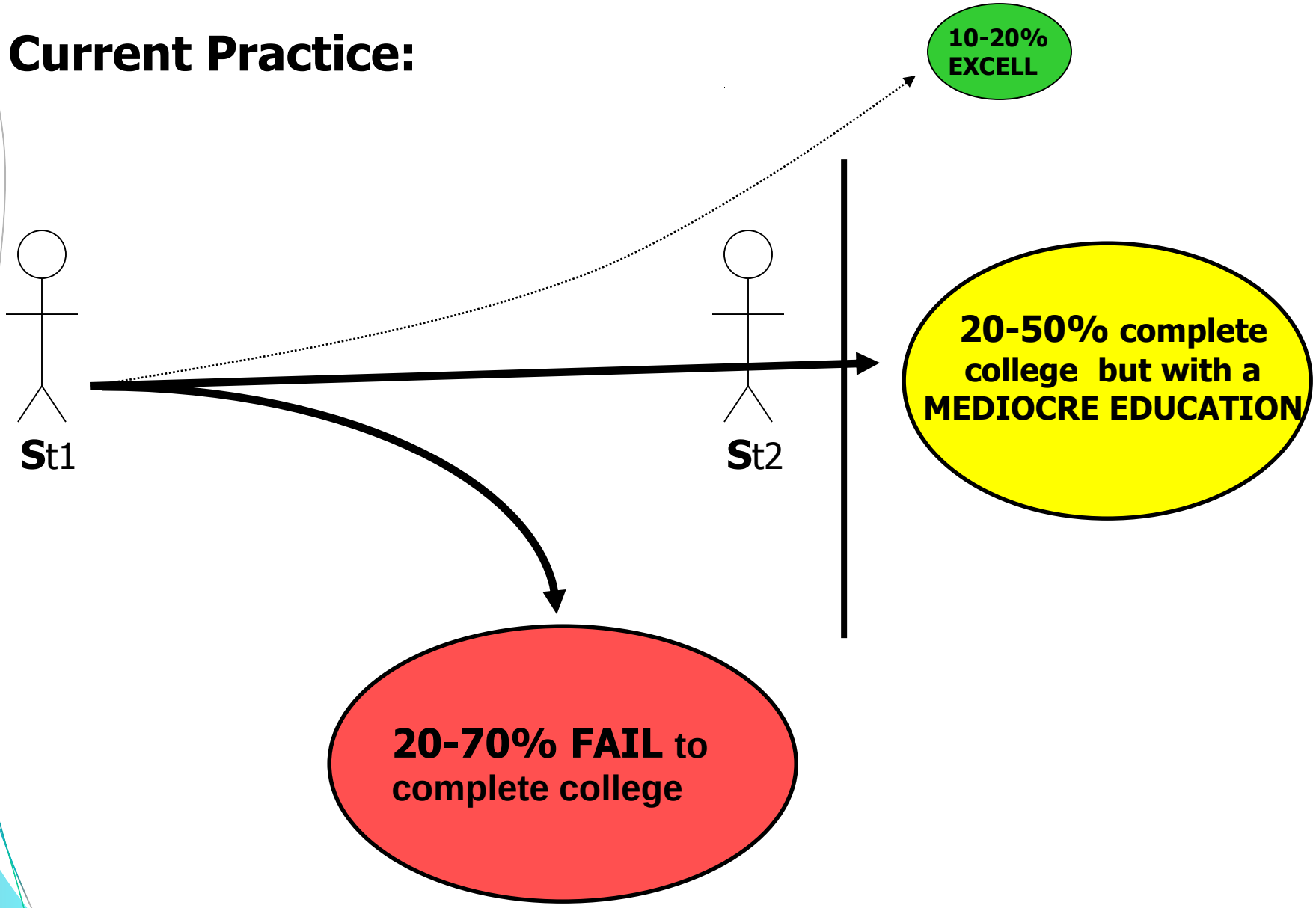
	United States
Percentage of students who graduate within 150% of nominal time	49*

This number has changed very little over the last 40+ years.

Source: http://www.oecd.org/edu/highlights.pdf

Problem: Passive Learning

Current Practice:



Apparent Cause:

- **PASSIVE LEARNING** (an oxymoron)
- Students' existing learning *habits* aim at low-level thinking skills and passive, dependent learning.
- In college those learning habits don't work well.
- Consequent motivation and engagement problems further erode students' confidence, academic performance—and learning.
- Poor learning skills severely limits their potential for success in college—and in 21st century life.

Root Cause: Our Focus on Teaching

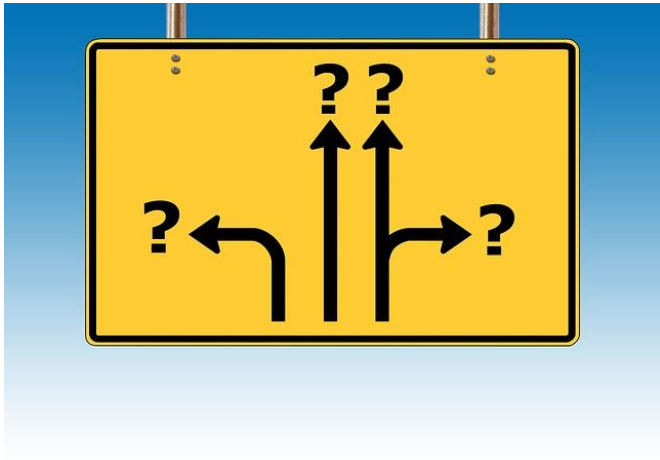
We don't teach students *how to learn*.

- We have learned a lot about how people learn over the past 15 years.
- Why don't we use what we've learned to improve our students' learning?
- Epistemological gap

Epistemology of Learning

What is learning?

- What does it mean to learn something?
- How can you tell when you've learned something?



Learning is…

- Greater Understanding (50-70%)
- Skill Acquisition (25-35%)
- Total ≈ 90%

These are lower-order thinking skills on Bloom's taxonomy

Learning is…

- Affective change (5-15%)
- Habit formation/integration (>5%)

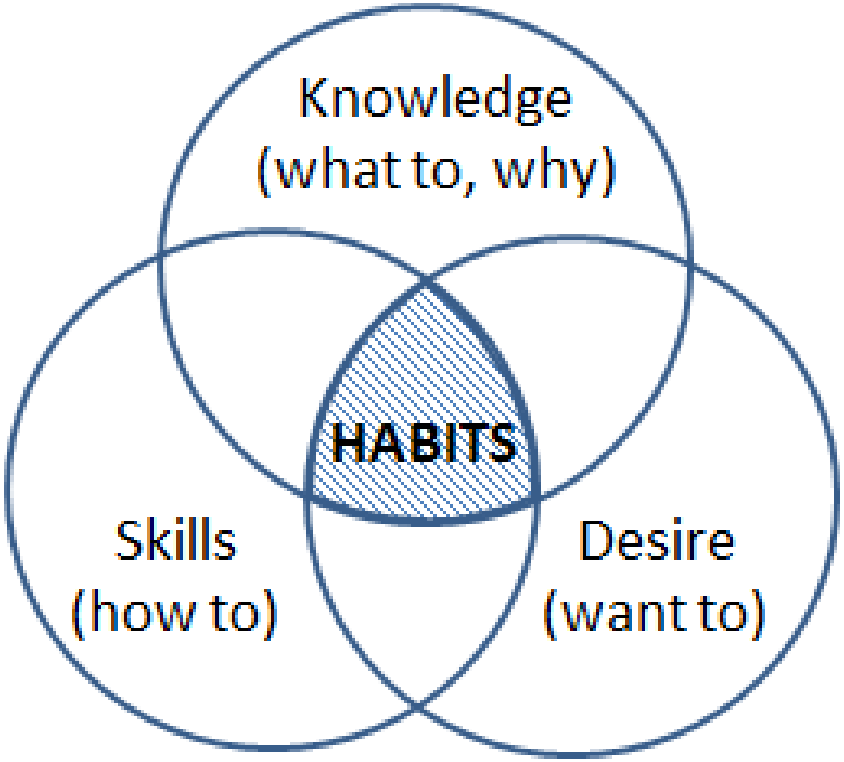
Epistemology of Learning

Our existing epistemologies of learning lead to cramming and forgetting—and failure.

Facilitating *durable learning* depends on changing students' attitudes and forming new habits. (You only keep what you value and use regularly.)

Learning is Forming New Habits

- Fueled by attitudes and desires (emotion)
- Supported by skills and understanding



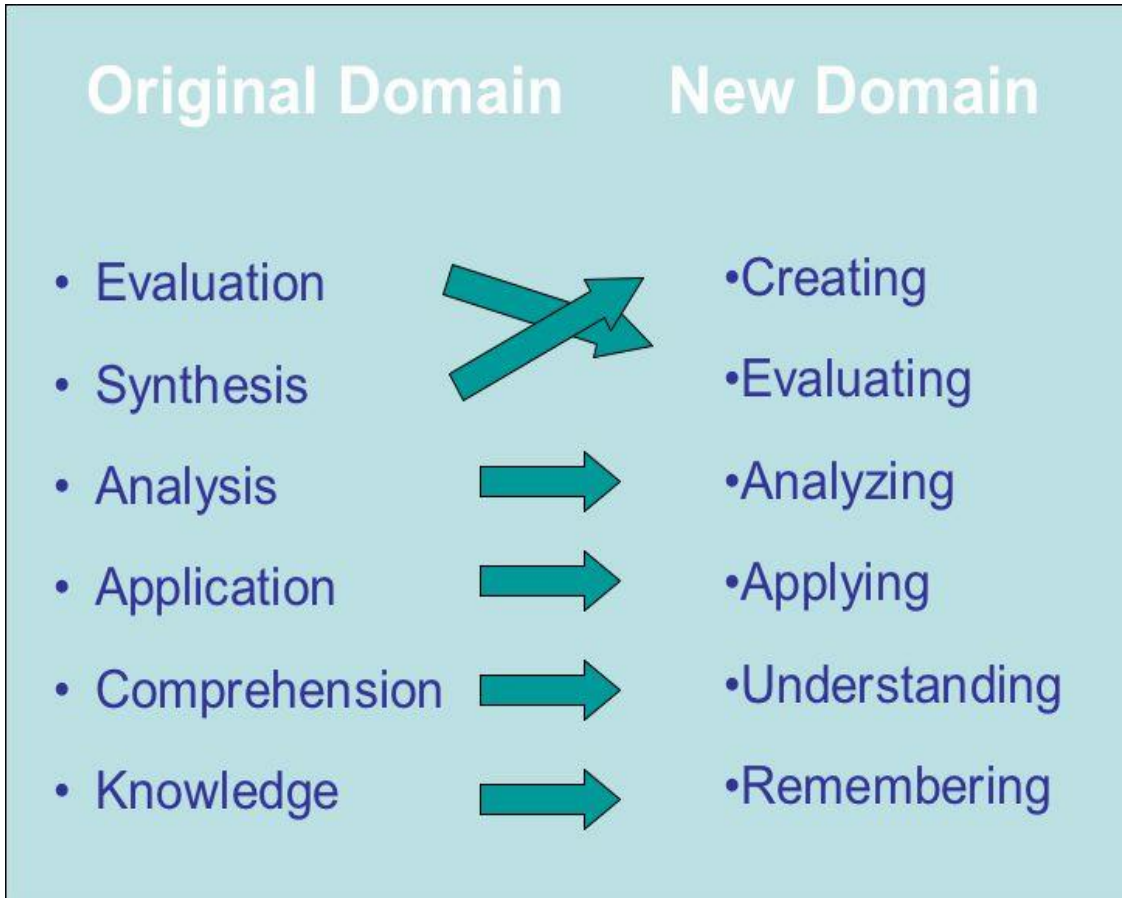
Epistemology of Learning

How we define *learning*

- shapes how students learn more than how we define teaching or our course goals
- because it defines how we assess learning.

Try this experiment

Rank your course learning objectives using Bloom's Taxonomy: What do you want your students to be able to do at the end of your course?



Try this experiment

Then ask your students to evaluate where your teaching focuses using that same taxonomy.

TEACH*ing*

≠ LEARN*ing*

Part 2: Defining Learning

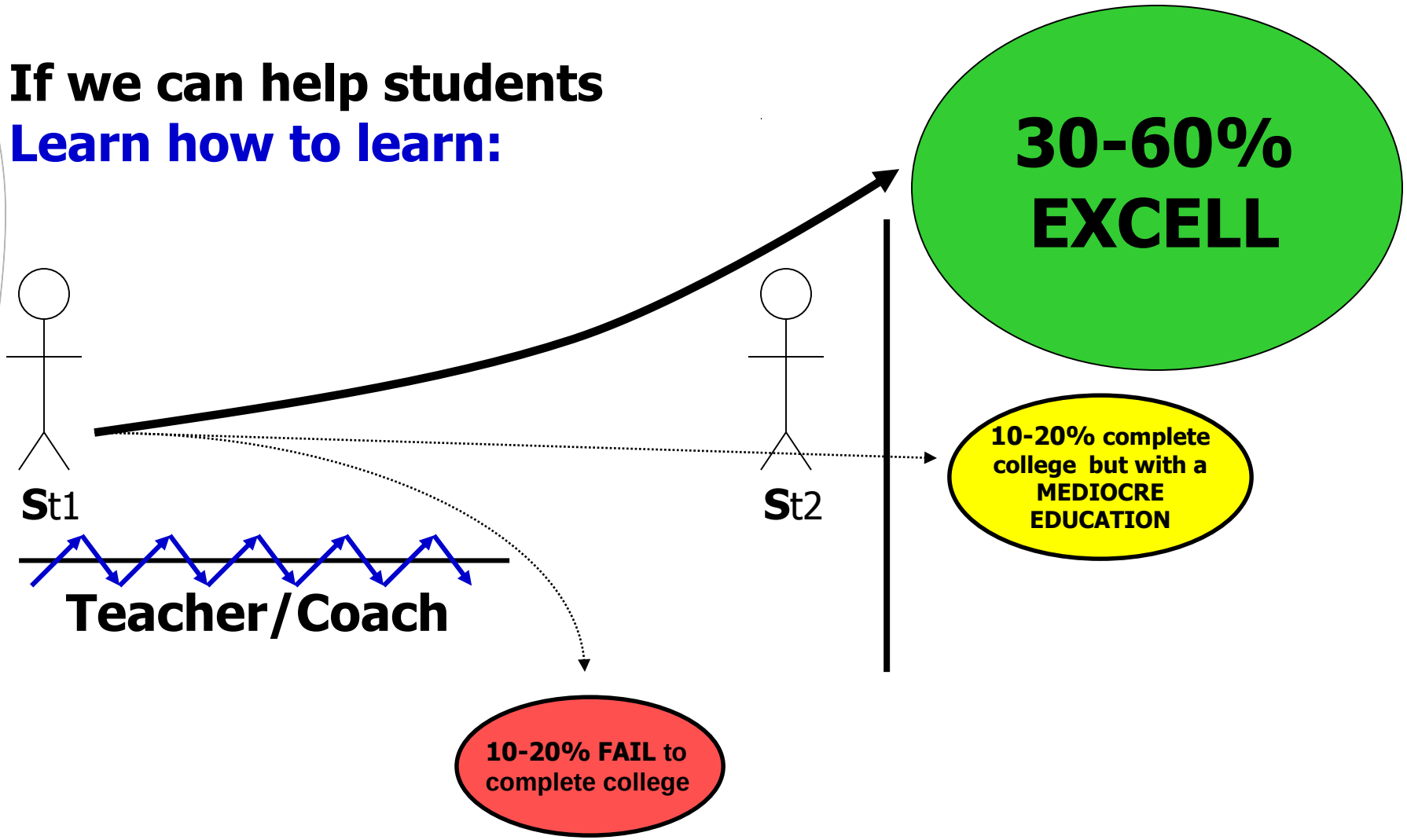
One Solution: MetaLearning

Teach students *how to become active, self-directed learners–*

More time spent on metalearning
= stronger outcomes.
(So far up to 20% of class time.)

One Solution: Teach MetaLearning

If we can help students
Learn how to learn:



One Solution: Teach MetaLearning

- Teach students ***how to learn*** for the 21st century
  - In an environment of rapid change, ability to learn quickly and effectively determines success in life
- Metalearning is based on current research in cognitive science, neurobiology and learning theory
- Eight years worth of data and experience show that it makes a significant difference in students' learning
- It's especially effective in making students more self-motivated and more self-directed learners

MetaLearning's Promise

This is no panacea; it will be difficult at first. It will take everyone a while to unlearn old habits and to develop new ones. (It takes ~21 days to break in a new habit.)

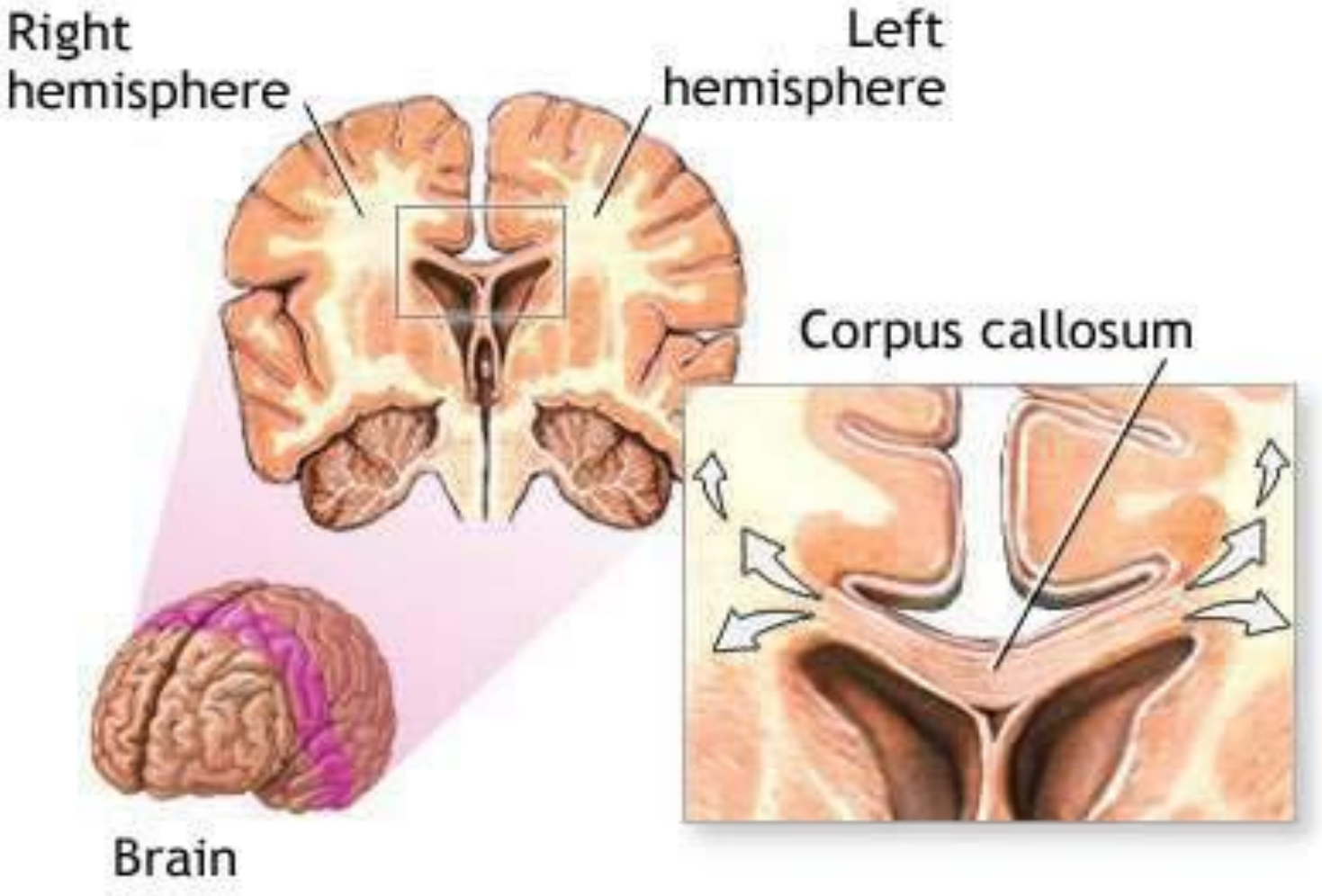
The payoff is that your students will learn more, learn faster and retain what they learn longer—thus, *your performance as faculty will increase as well*.

Start with one day—the first day of class, perhaps.

MetaLearning:
6 Steps to Changing Learning Habits

1. Help students *discover self-motivations* for learning
2. *Align their definitions of learning* with ours
3. Teach students *how learning works* and derive guiding principles
4. Derive *strategies and tactics* from principles
5. Develop effective learning *practices*
6. *Maintain* those habits

A Cross-lateral Neurobic



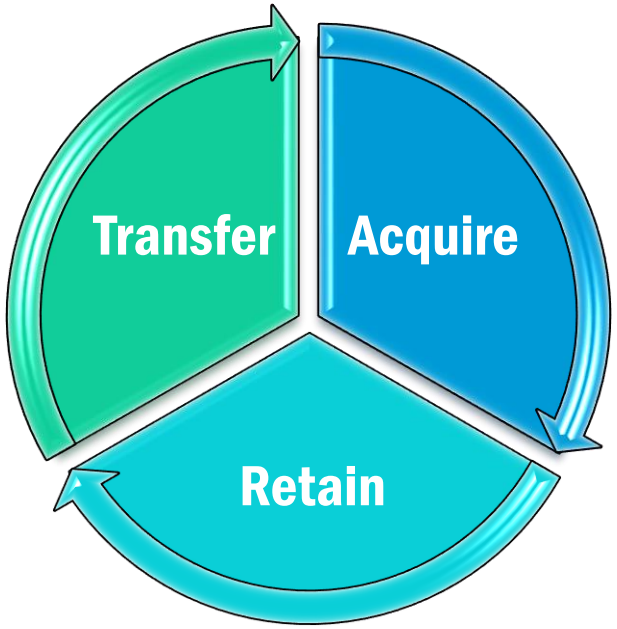
Cross-lateral Activity

Cross-lateral activity opens up the corpus callosum

- Gets more of your brain involved
- Balances the load
- Aids memory
- Makes learning easier

Step 3: The ART of Learning

- **A** Acquire new material
- **R** Retain new material
- **T** Transfer use of new material



The ART of Learning.

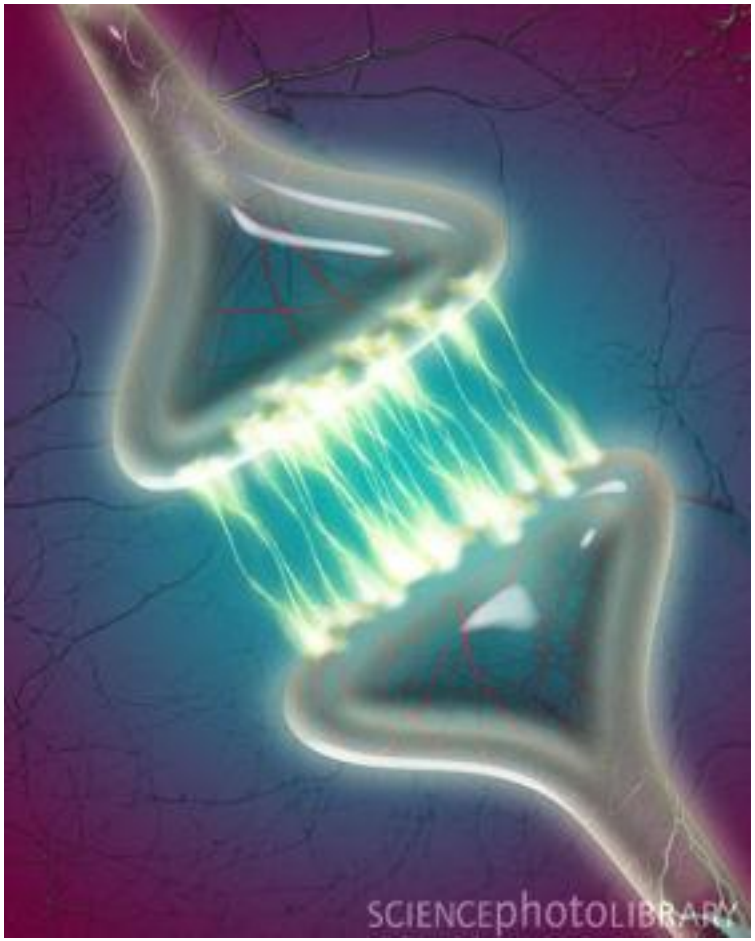
The A in ART is for **Acquisition**

Mnemonic:

Actively
Build
Connections

Learning IS Making Connections

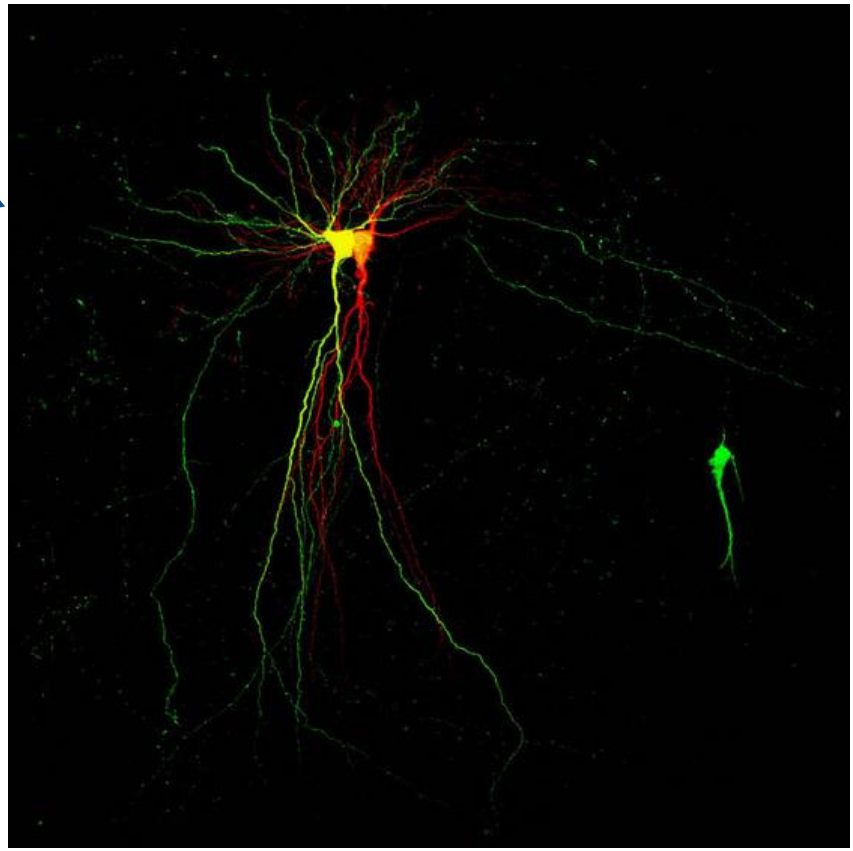
Learning ONLY happens when it is active and intentional, so keeping students engaged is vital



Learning IS making connections:

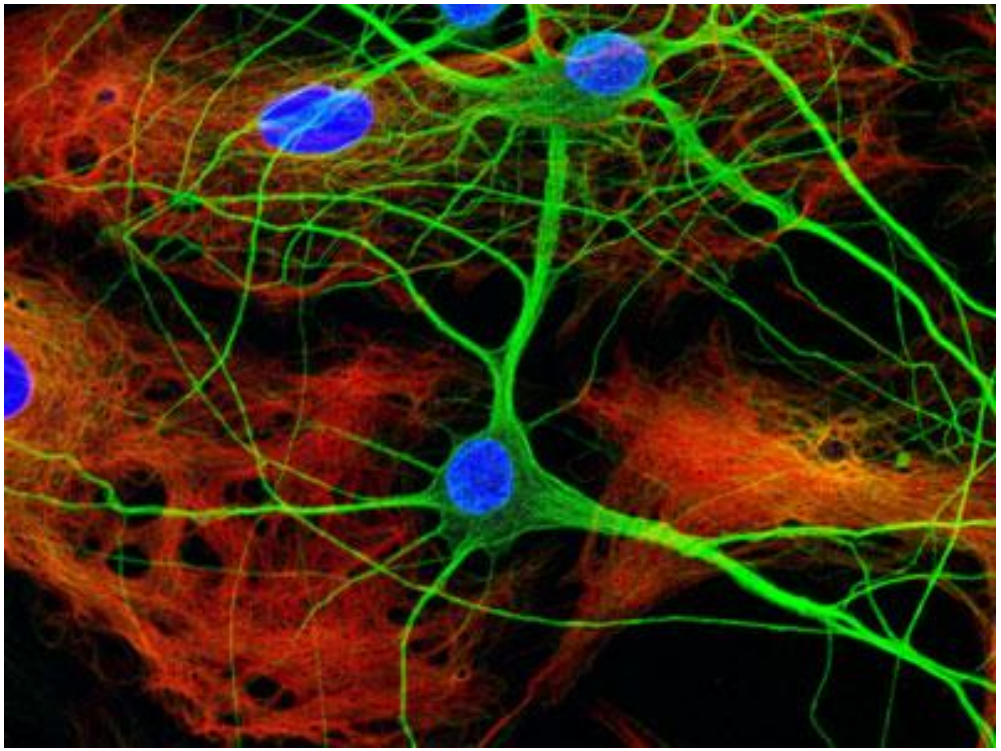
Neurons that fire together wire together

2 pyramidal neurons forming a synapse

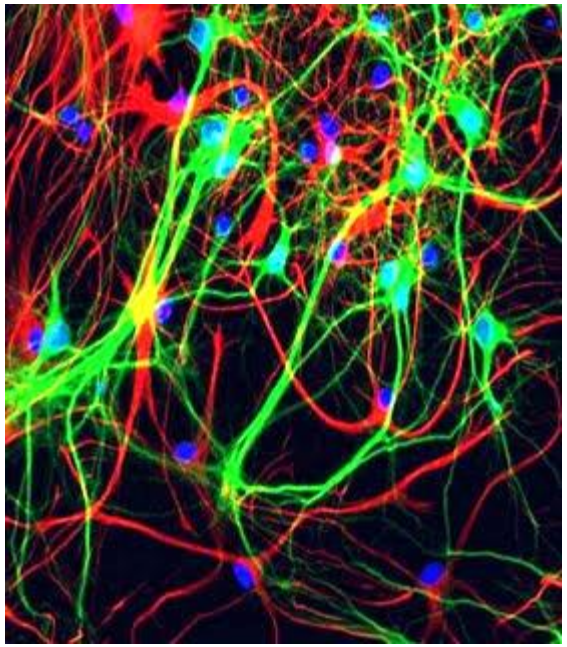


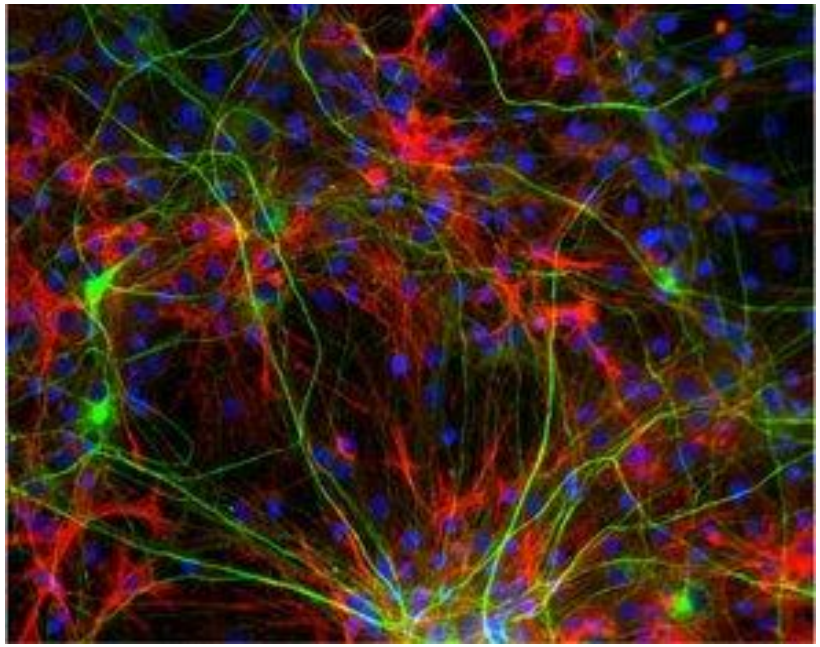
Focus teaching on helping students connect new information to old (not on uptake of content)

Ideas are patterns of neural firing



More complex ideas are more complex patterns—made up of smaller patterns





Get students to focus on patterns and meaning, not on facts and information

Learning IS Making Connections

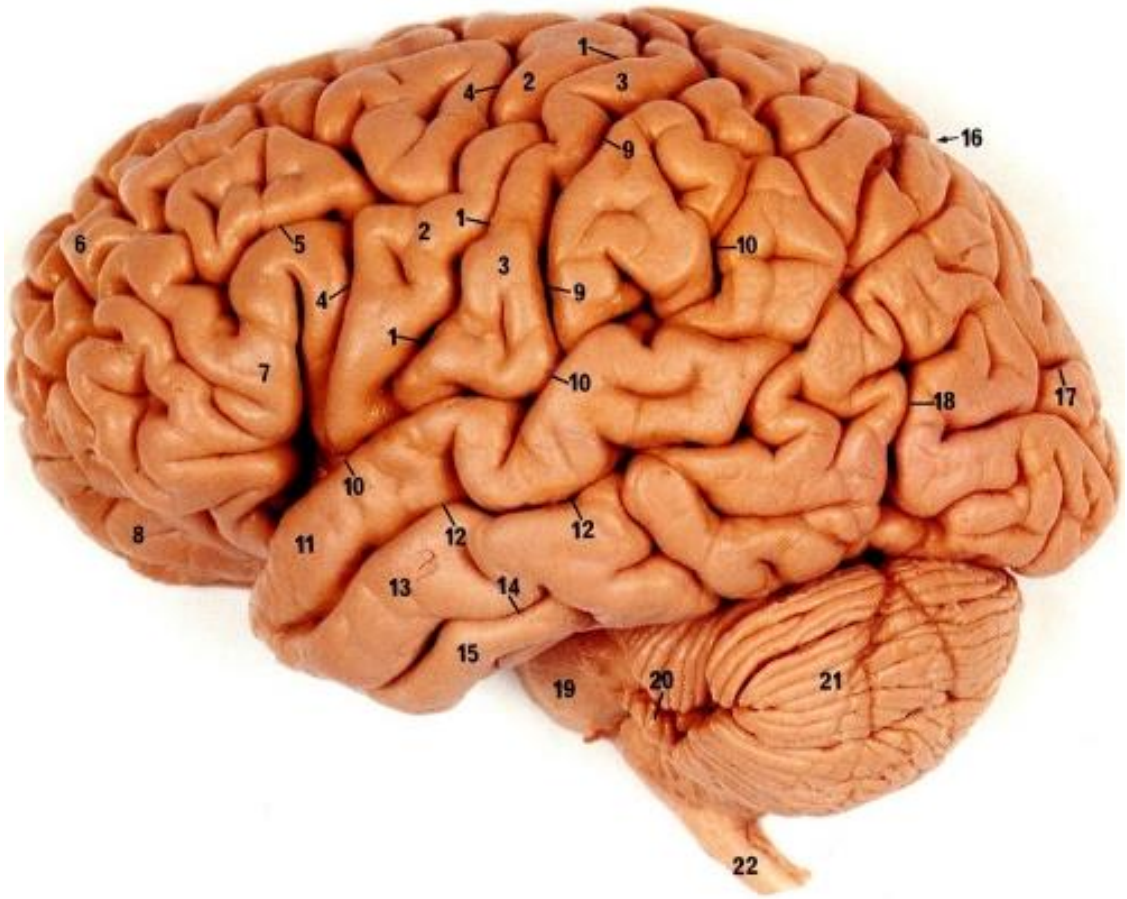
- Learning has the physical and metaphorical structure of an analogy.
- Therefore we must teach analogically, not *de novo.*
- “Nothing we learn can stand in isolation; we can sustain new learning only to the degree we can relate it to what we already know.” (Sci Am Mind, July 2010.)

Focus on helping students make connections between what they know and what they are trying to learn

Learning Changes the Brain

A Basic Brain—not very fold-ey

A Better Brain—more fold-ey



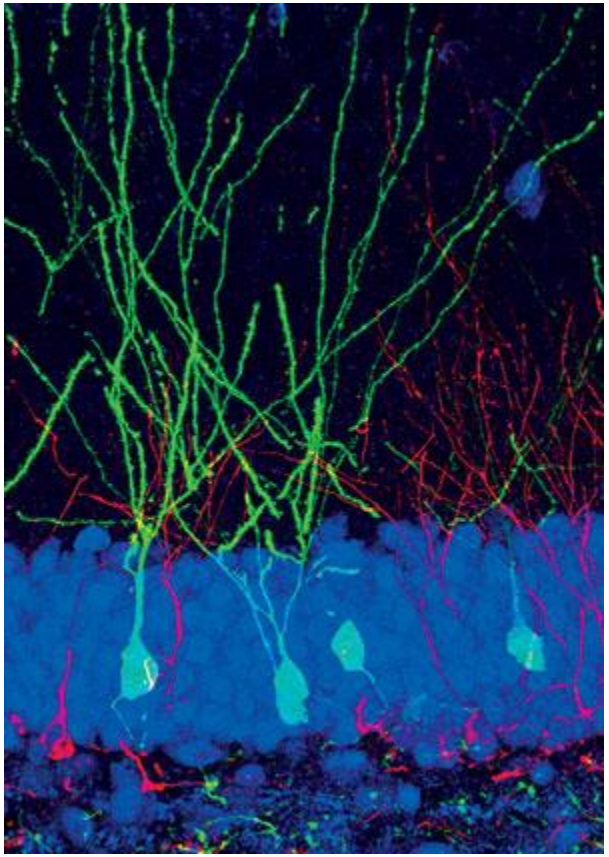
Make sure relevant learning happens every day in every class session

Learning Increases Brain Plasticity

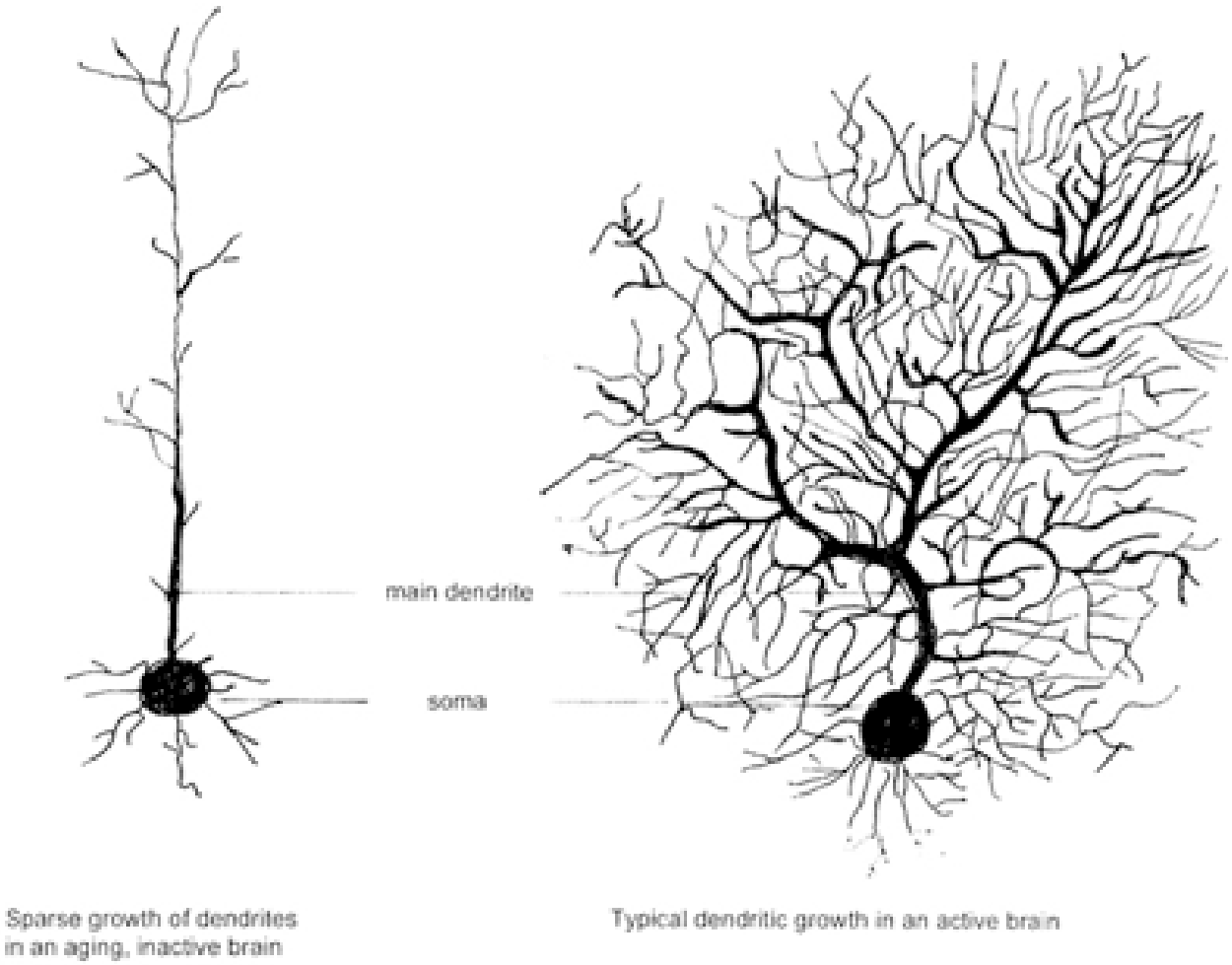
- Therefore we need our students to regularly experience sustained, challenging learning tasks
- The more they learn, the better learners they will become
- Analogy: Like building muscle or learning a foreign language (use it or lose it/working makes it stronger)

Learning Hard Stuff Grows Your Brain

New Brain Cells Forming



Learning Builds and Maintains Healthy Neurons

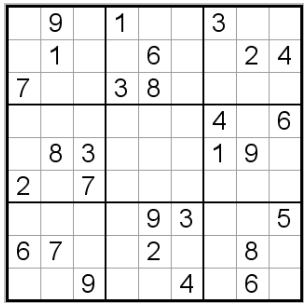


Provide opportunities for learning that constantly challenge students

Part 3: How Learning Works

Learning works best when it is difficult

- Therefore, we must teach our students to seek challenge
- Always prefer the difficult over the routine or the easy
- Optimal learning occurs in “flow state”—midway between boredom and anxiety
- Analogy: crosswords and sudokus



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	1			6			2	4
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						4		6
	8	3				1	9	
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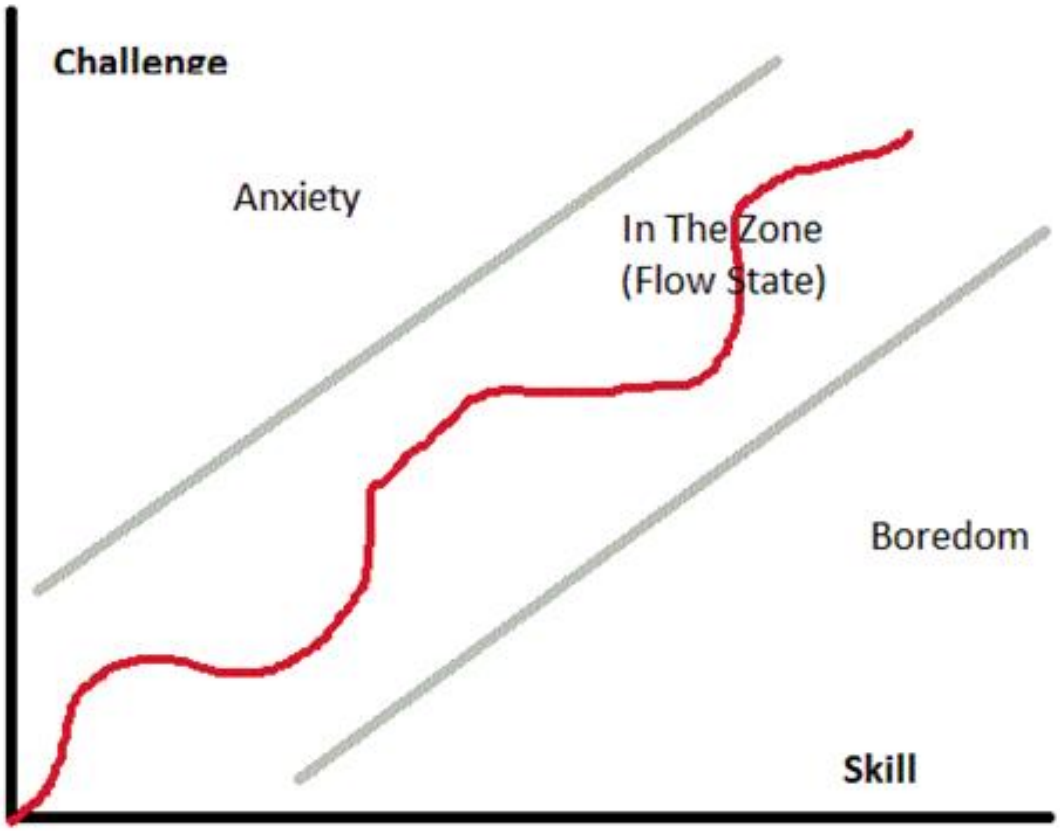
				9	3			5
6	7			2			8	
		9			4		6	

Rekindle students’ love of learning by helping them find optimal levels of challenge

Difficulty Increases Engagement



Based on *Flow*, by Mihaly Csikszentmihalyi (2002)

Reading Strategies

- Pre-Read
  - Context and purpose
  - Scan
  - Think
- Read Critically
  - Two highlighters and a pen
  - Reading journal or notebook
- Post-Reading
  - Review and reflect (pre-reading and notes)
  - Summary before switching gears/before sleep
  - Review within 24 hours

The ART of Learning: Habits of Acquisition

- Paying attention/active learning
- Note-Taking
- Reading strategies
- Not multitasking (microbreaks)

Evidence MetaLearning Works

	Control	Metalearners (Jr)	Metalearners (Sr)
Dean's List (top 10% of class)	10%	40%	45%
Honor societies	X		3.2X
Campus Leadership positions	X	2.7X	

Evidence MetaLearning Works

The quality of the work my students do now is better in every way than the work my students did before I started using these methods.

More Evidence

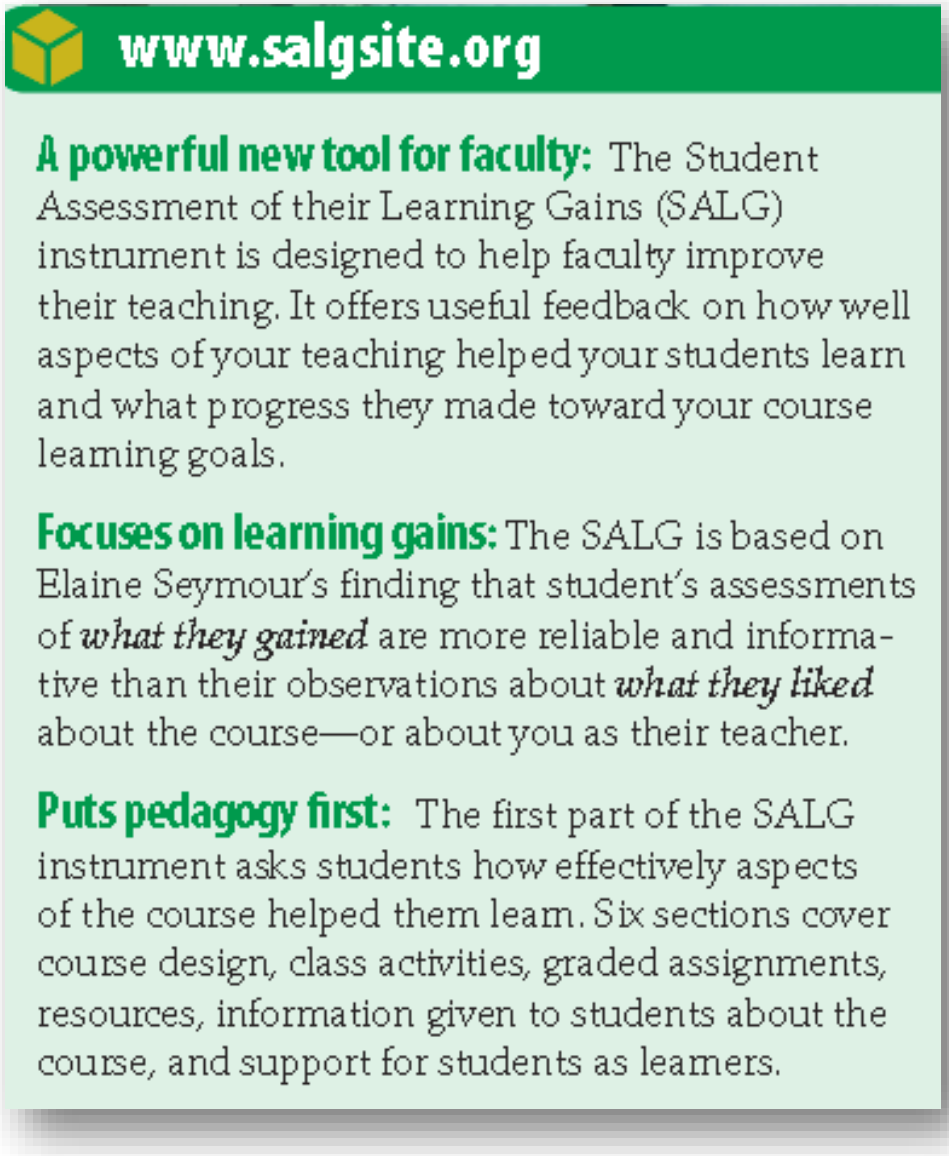
A recently completed study of 8 years' worth of data showed correlations between MetaLearning and increased learning proficiency in relation to 4 aspects of the course:

- Instructional approach
- Integration of class topics, activities, readings and assignments
- Course activities which required them to read with a critical point of view that displayed depth of thought and is mindful of the rhetorical situation
- Course activities which required them to analyze the rhetorical opportunities and constraints offered by different modes of presentation

Learning Assessment for Courses

The Student Assessment of their Learning Gains (SALG)

Free Tools at www.salgsite.org



Why SALG?

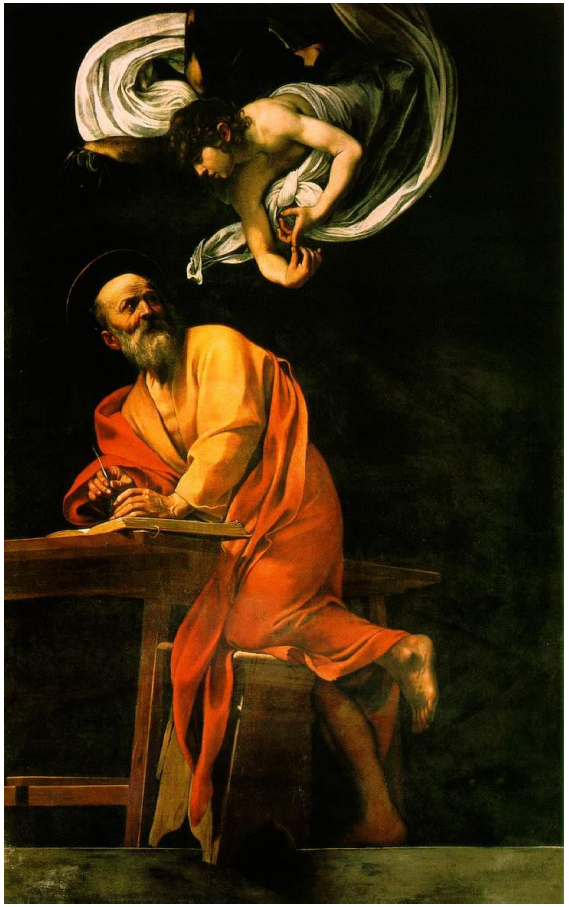
- Research shows that students will punish innovative teaching on standard student course evaluations *even if the students learned more and even if the students recognize that they learned more*.

- Therefore, to protect yourself, you need to use an evaluation instrument that focuses on learning, not on teacher behaviors and/or student satisfaction.

Write your summaries

3-5 sentences

in 4 minutes



A Challenge:
Keeping Father Guido Away

The 5-Minute University

MetaLearning Activity

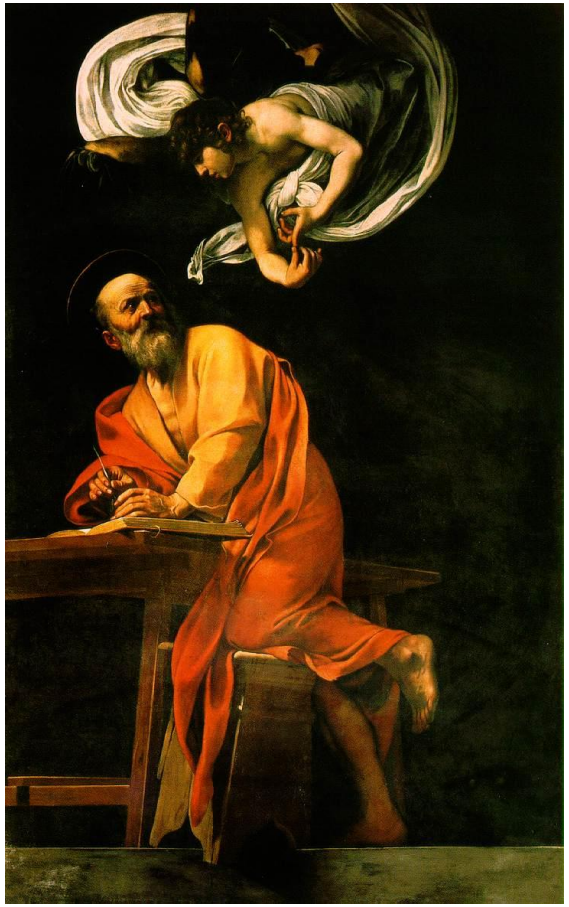
Brain Plasticity: What does this assignment require them to learn that they don't already know?	**Difficulty: In what way is this assignment difficult? What specific challenges does it pose to students?**
Connections: How does this assignment help students make connections from what they already know to the new material?	Habits: What new habits that will be essential to learning in your course does this assignment build?

Thank You!

Write your summaries:

3-5 sentences

in 3-5 minutes



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