

# Harnessing the Profound Connection Between Emotion and Learning to Enhance the Success of All Students



From the Pixar movie Inside Out

Shelly J. Schmidt, College of Agricultural, Consumer, and Environmental Sciences

# **Harnessing the Profound Connection Between Emotion and Learning to Enhance the Success of All Students**

## **Learning Objectives**

As a result of this presentation, participants will be able to:

1. Describe what teaching and learning are based on brain science biology
2. Explain the powerful impact emotion has on students' learning
3. Implement teaching strategies that leverage the intimate and profound connection between emotion and learning to enhance the success of all students

Traditionally, teaching and learning have been defined based on the actions of the teacher and learner...

## 1. What is teaching?

**Teaching** is the concerted sharing of knowledge and experience.



## 2. What is learning?

**Learning** is the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences.



...but what if we describe teaching and learning based on brain science biology?

**“Any conversation about effective teaching must begin with a consideration of how students learn.”**



# Brain Science Biology: What is Learning?

From a biological perspective, learning takes place via physical changes in the learner's brain

- ✓ this physical brain change involves formation and elimination of synapses (i.e., the connections between neurons)
- ✓ the more synapses formed the stronger the pathway (learning) becomes



If few synapses, learning is like a dirt path



If many synapses, learning is like a major highway

**Learning = Physical Brain Change**



# Brain Science Biology: What is Teaching?

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If **Learning = Physical Brain Change**, then

**Teaching = Facilitating changes in the learner's brain**

How can we facilitate brain change?

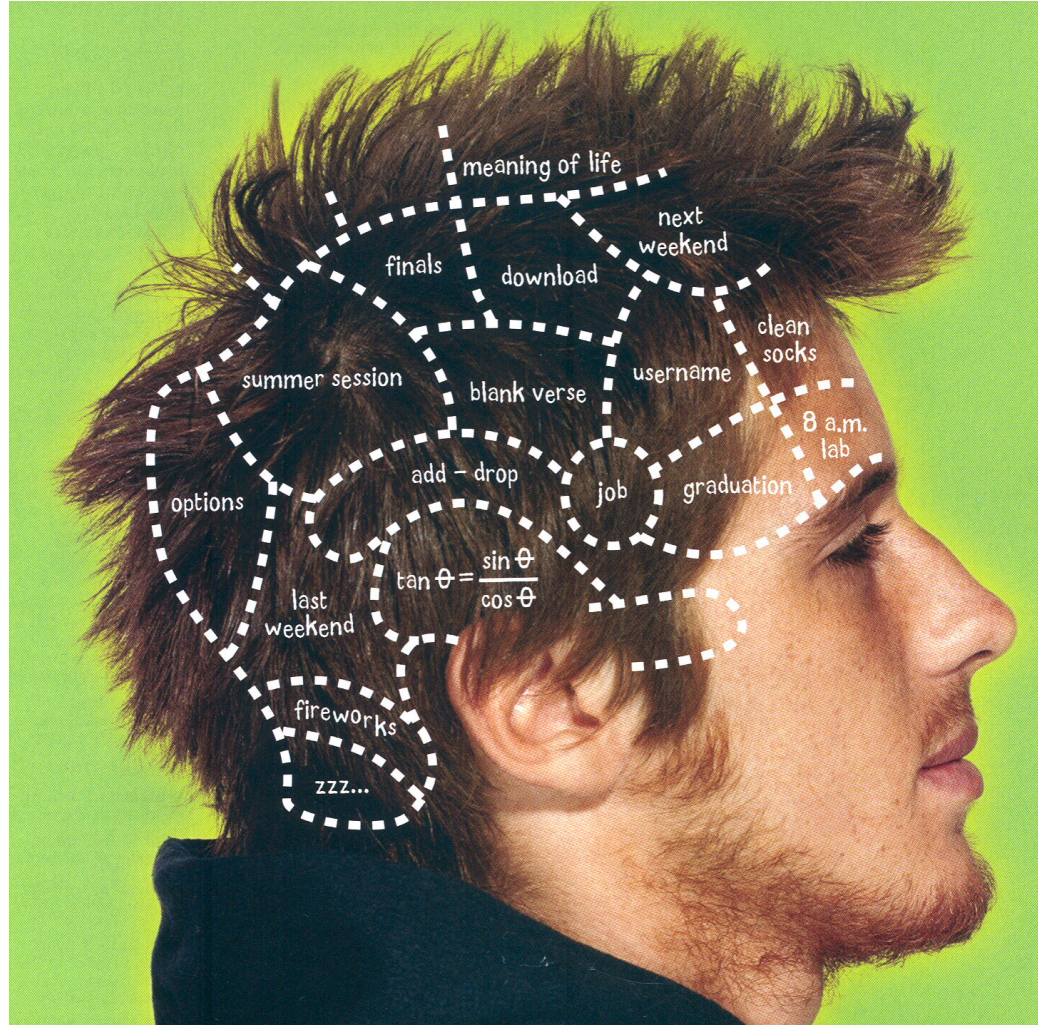
By creating an **environment** and implementing **practices** that nurture brain change



“Learning results from what the student does and thinks and only from what the student does and thinks. The teacher can advance learning only by **influencing what the student does to learn.**”

Herbert A. Simon (2001)

To accomplish this task of influencing our students brains', we need to leverage the whole brain...

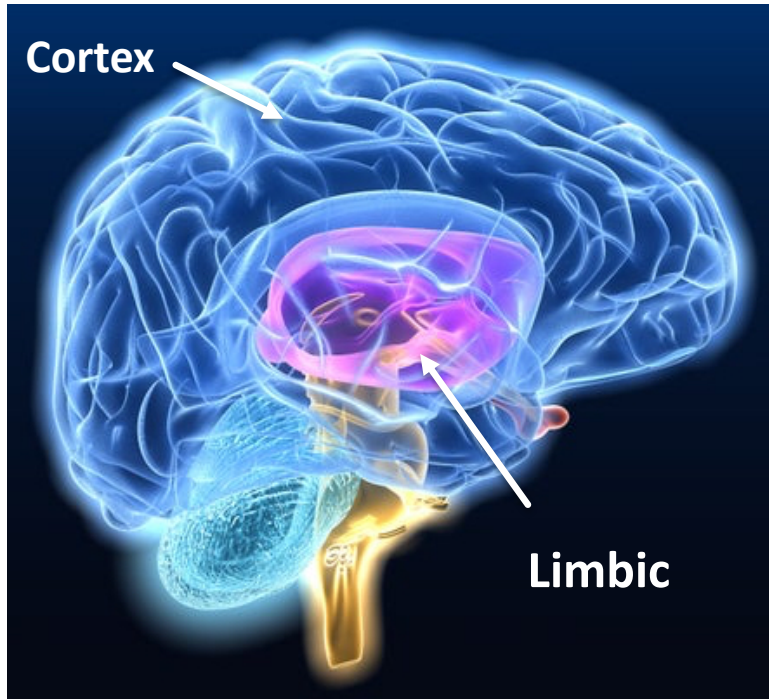


...both the Cognitive **AND** Emotion parts of the brain!



# The Intimate and Profound Connection Between the Cognitive and Emotion Parts of the Brain

Sensory Information



When the **limbic system** (emotion part of the brain) interprets sensory information and dispatches it to the cortex for processing, it sets the emotional tone of the information **before** it reaches the cortex.

**Positive emotions:** ↑ motivation, learning, and success



**Emotional Tone**

**Negative emotions:** ↓ motivation, learning, and success

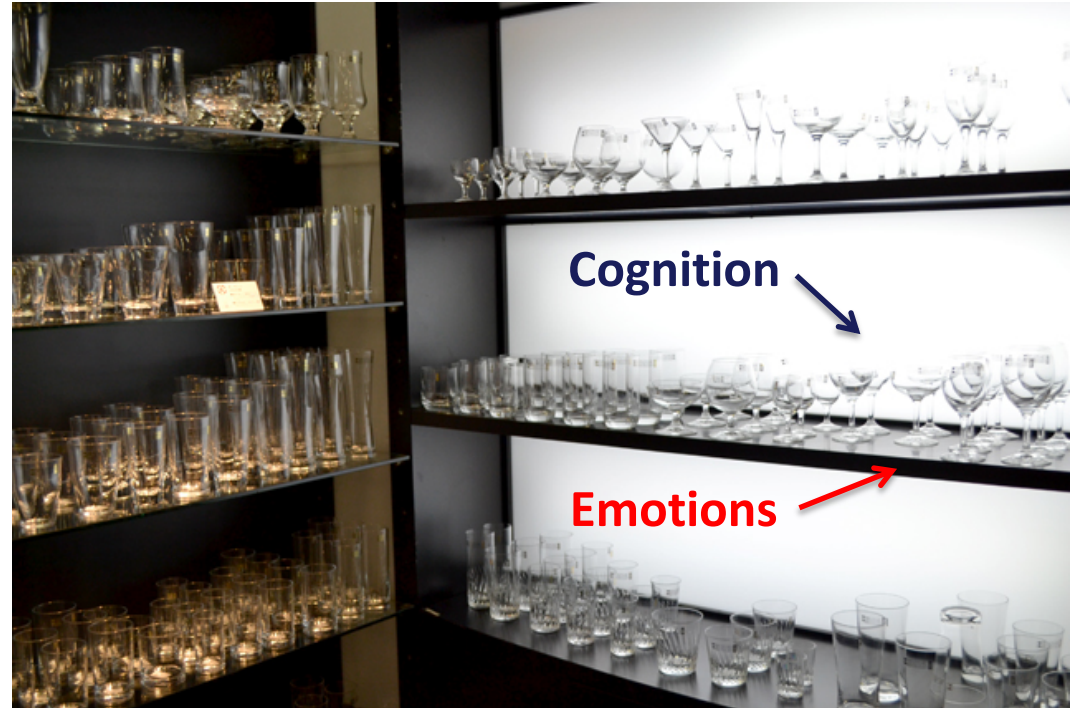


# The Intimate and Profound Connection Between the Cognitive and Emotion Parts of the Brain

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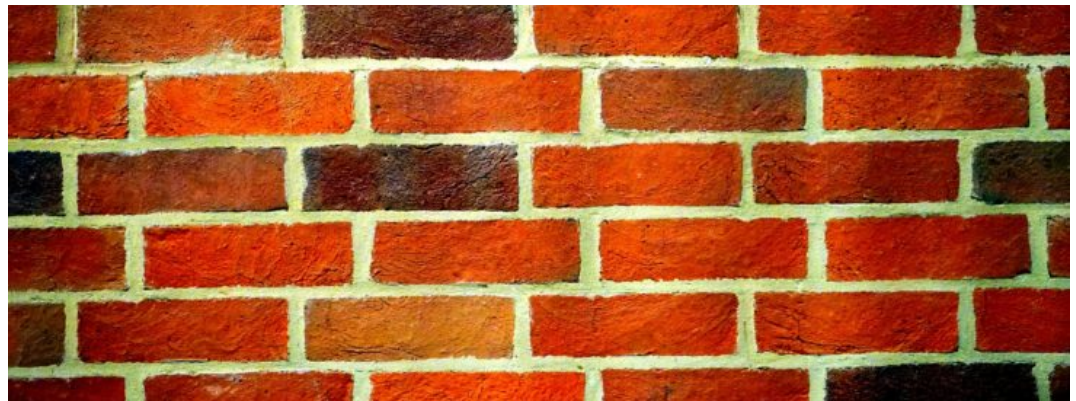
## Neuroscience “China Shop”

**Analogy:** Emotions are like the shelves underlying the cognitive glassware; without emotion, cognition has less support, making learning much less meaningful, useful, durable, and intrinsically motivated.



## Neuroscience “Bricks and Mortar”

**Analogy:** Emotion is the mortar that holds the cognitive bricks together.



# Cognitive (Cortex) and Emotion (Limbic System) Parts of the Brain and the Four Elements the Brain Relies on to Survive

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## Cortex

1. Reasoning

Cingulate cortex

4. Control

Anterior cingulate

Front

Posterior cingulate

Back

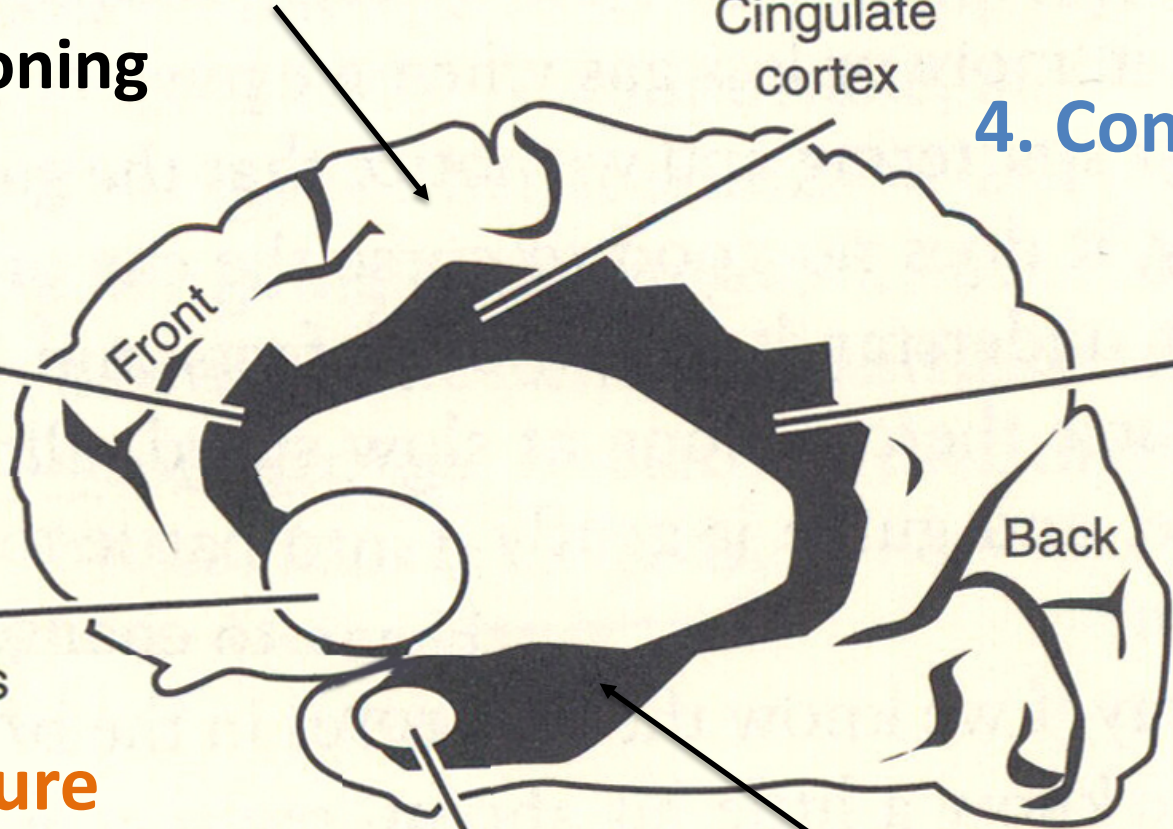
Basal structures

3. Pleasure

Amygdala

2. Fear

Limbic System



## Emotion Bottom Line

“We will always be motivated to learn things that fit into what we want and to resist those that don’t, especially things that look like potential threats (**fear**) to our happiness (**pleasure**) or seem as if they might take away our **control** of our lives.”

Facilitate brain  
change by:

↓ Fear    ↑ Pleasure    ↑ Control  
(or ↑ Safety)



↓ Fear ↑ Safety

## Building of the Golden Gate Bridge, 1933-36

Chief Architect: Joseph Strauss

Loss of Life Prediction: 35 men

Strauss, however, believed that they “... could cheat death by providing every known safety device for workers.”

When it came time to begin construction of the bridge’s roadway, Strauss envisioned the most “expensive, elaborate safety device ever conceived for a major construction site” – a safety net that would be set up underneath the emerging roadway.

The presence of the safety net saved 19 lives!

**And** significantly boosted morale and sped up the work.

(Kerievsky 2015)



# ↓ Fear ↑ Academic Safety

Q. How can we employ Strauss's revolutionary way of thinking about worker safety to keep our students safe?



1 An academically safe classroom **honors** the individual as a member of the discipline and **welcomes** him or her into the social ecosystem of that discipline.



“The discipline of \_\_\_\_\_ is open and accessible to you, and you are invited to explore what the members of this discipline actually *do* and what *dispositions* they actually demonstrate, and to develop your identity as a member of that discipline.”

This welcome message is for **ALL** students...



2 Once we invite the students in, we must clear the obstacles in the way.

# ↓ Fear ↑ Academic Safety

Q. What obstacles do you see that need clearing for student in your discipline/courses?

**TIME:** Disentangle assessment of student mastery from speed and pressure

**CORRECTNESS:** Give students the opportunity to learn from their mistakes and develop grit



# Using self-reflection and self-assessment to help students develop grit

## Agency: Develop Growth Mindset

1. Describe the effort or practice you have used for this current task and how it has affected your skills, work quality, or performance. How do you need to put in more effort for this project? In what ways is your effort sufficient?
2. Your reflection will be assessed using the following domains from the agency rubric. Explain next steps you might take to improve.

	Emerging	Developing	Proficient	Advanced
Build Confidence	Struggles to identify academic strengths, previous successes, or endurance gained from personal struggle to build confidence in academic success for a task, project, or class	Identifies an academic strength, previous success, or endurance gained through personal struggle, but does not use these skills to build confidence in success on a task, project, or class	Builds confidence to succeed (on a task, project, or class) by knowing and using academic strengths, previous success, or endurance gained through personal struggle	Consistently confident that success is possible (on a task, project, or class) by knowing and using academic strengths, previous successes, or endurance gained through personal struggle
Use Effort and Practice to Grow	Describes effort or practice in a limited way	Describes effort to practice but does not connect it to getting better at a skill, improved work quality, or performance	Understands how effort and practice relate to getting better at skills, improved work quality, or performance	Understands that effort and practice improve skills, quality, and performance and that the process takes patience and time

# ↓ Fear ↑ Academic Safety

Q. What obstacles do you see that need clearing for student in your discipline/courses?

**TIME:** Disentangle assessment of student mastery from speed and pressure

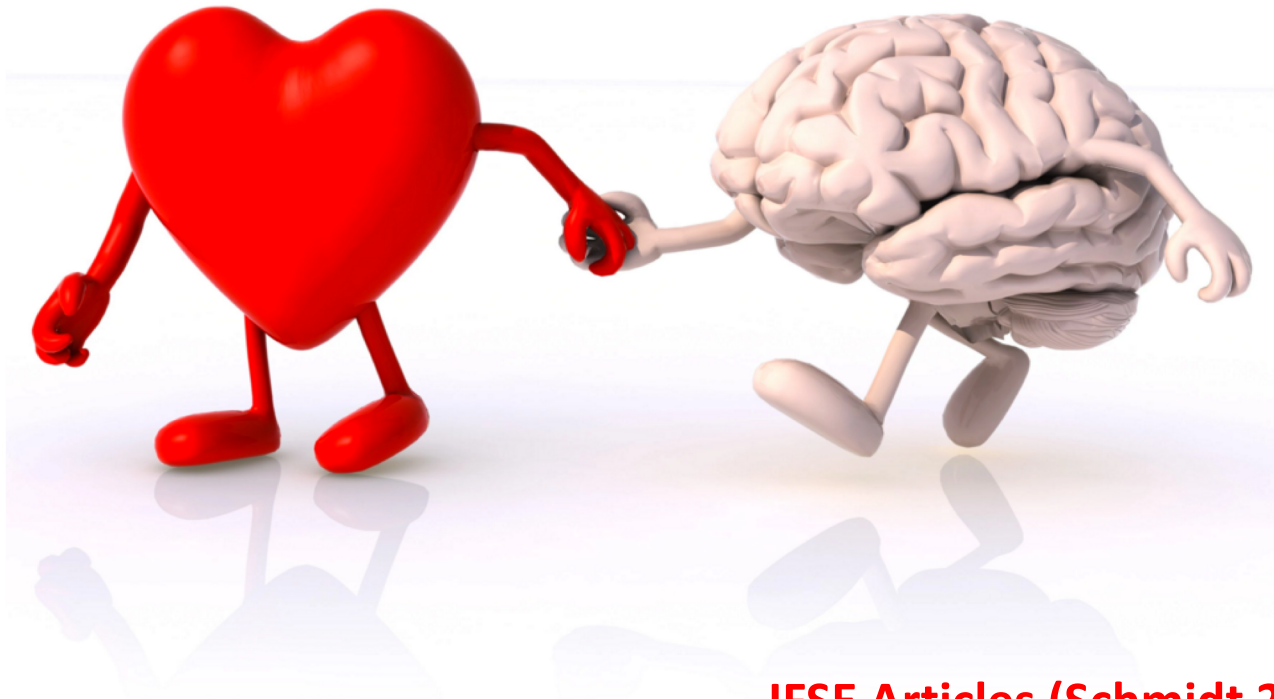
**CORRECTNESS:** Give students the opportunity to learn from their mistakes and develop grit

**GRADES:** Flip the message of grades from being a “diagnostic tool” (fixed mindset) to a “standard of excellence” that everyone can achieve (growth mindset)

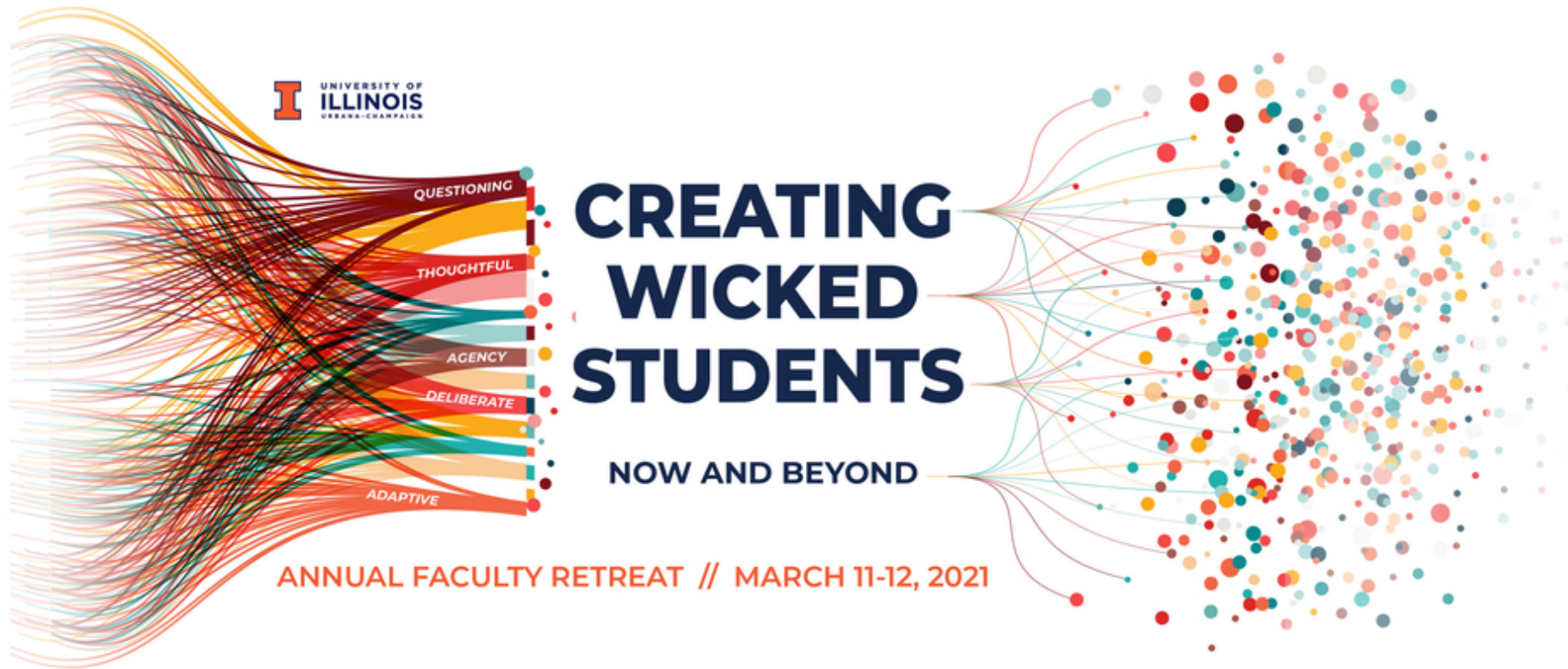
We need to reimagine each of these practices, so that we can present our students with a **growth mindset** view of education, as well as of the disciplines we teach.

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"The human brain is a learning organ; learning is what it does. The **main task of the teacher is to help the learner find connections.** Once a student encounters things that connect with her [his] life, her emotions, her experiences, or her understandings, she will learn. She won't be able to help herself. Her brain will change." (Zull 2002, p.242)







**“The difference between average teachers and great ones is their values. Average teachers prioritize the information; great teachers prioritize the student.”**

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