

# ***Cognitive Diversity and Workplace Performance***

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- Co-Founder, Potentia Institute (PI<sup>21</sup>)
- January 27<sup>th</sup>, 2020
- Graduate Medical Education
- Stanford Health Care

# Padlet Questions (10 minutes)

- STICKY NOTE 1: Define what cognitive diversity or learner variability means to you.
- STICKY NOTE 2: Give an example of a challenge you face in teaching and supervising someone.
- STICKY NOTE 3: What resources or ideas do you share with struggling graduate students or residents?



***Go to  
Padlet or  
(Use  
Paper  
Sticky)***





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# ***DISCUSSION OF RESPONSES (10 MINUTES)***

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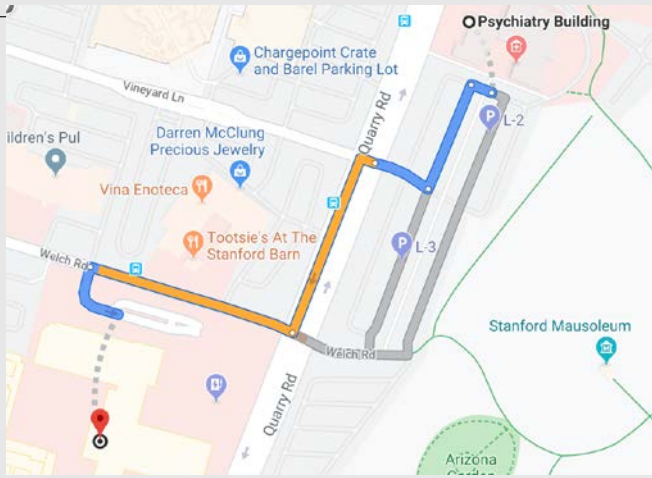
5-7  
minute  
Activity:

***WHAT DOES COGNITIVE DIVERSITY  
REALLY LOOK LIKE?***

A background image of a map with several red pushpins. One pushpin is in sharp focus in the foreground, while others are blurred in the background. The map shows streets and landmarks, with a purple line indicating a route.

# ***Using your phone:***

- My goal for you:
- Map your way from 401 Quarry Rd. Palo Alto, CA to 725 Welch Rd. Palo Alto, CA.
- Requirements:
  - Use your smartphone the way you usually would.
  - You have no more than 3 minutes to map the directions.
  - You may leave the room to accomplish the goal.



**Psychiatry Building**  
 401 Quarry Rd, Palo Alto, CA 94304, USA

↑ Walk west  
 16 ft

↶ Turn left  
 0.1 mi

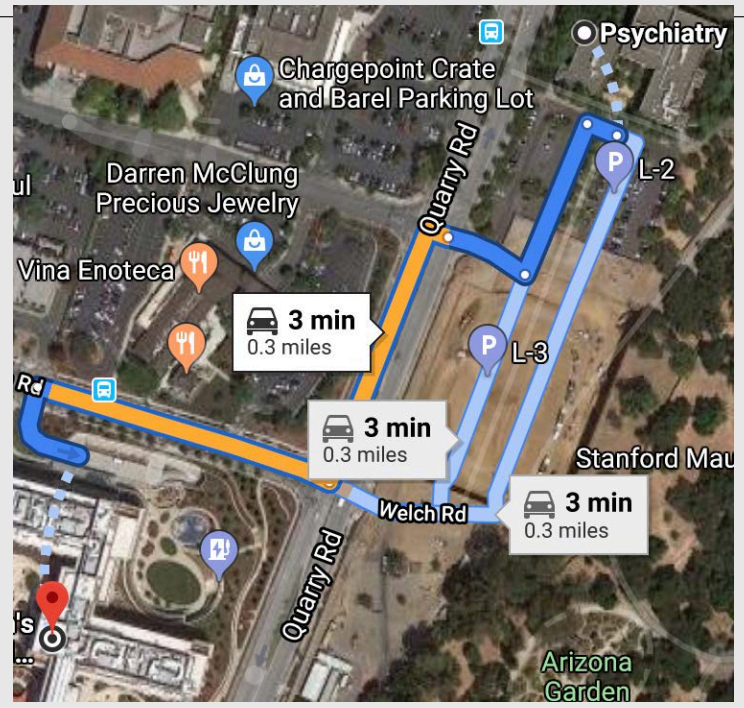
↷ Turn right onto Welch Rd  
 0.1 mi

↷ Turn right  
 121 ft

↶ Slight left  
 Destination will be on the right

Stanford Children's Health | Lucile Packard  
 Children's Hospital Stanford  
 725 Welch Rd, Palo Alto, CA 94304, United States

**SPEECH TO TEXT OFF OR ON?**  
**TEXT TO SPEECH OFF OR ON?**



**3 min (0.3 mile)**  
 via Quarry Rd and Welch Rd  
 Fastest route

**Psychiatry Building**  
 401 Quarry Rd, Palo Alto, CA 94304, USA

↑ Head west towards Quarry Rd  
 52 ft

↶ Turn left towards Quarry Rd  
 266 ft

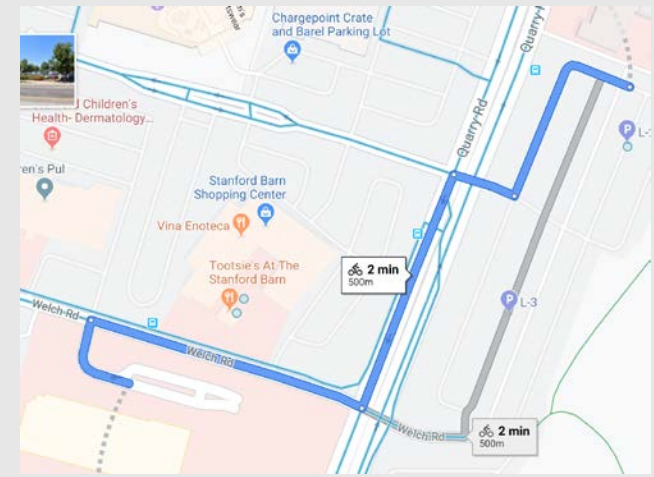
↷ Turn right towards Quarry Rd  
 141 ft

↶ Turn left onto Quarry Rd  
 472 ft

↷ Turn right onto Welch Rd  
 499 ft

↶ Turn left  
 Destination will be on the right  
 167 ft

**Stanford Children's Health | Lucile Packard**





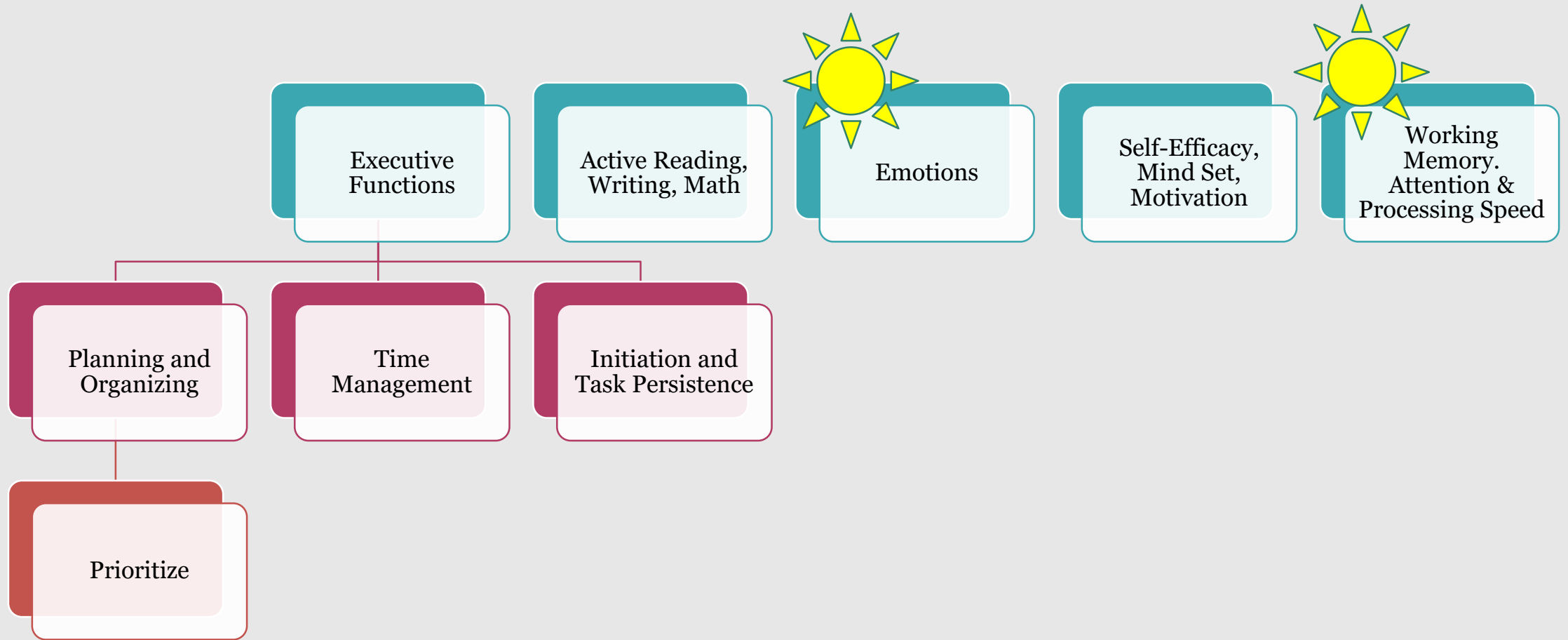
***DIVERSITY ENCOMPASSES A BROAD RANGE OF LEARNERS WHO  
PROCESS INFORMATION IN A MYRIAD OF  
WAYS AND PLACES.***





***Where and how  
does it show up?***

# Home, School, Work: How



# **Cognitive diversity really includes:**

---

Race

---

Culture

---

First Generation

---

Low income

---

Non English speakers

---

Gender

---

Neurodiverse populations: Learning Disabilities: Dyslexia, Dysgraphia, Dyscalculia, ADHD, Autism Spectrum

---

Mental health: anxiety and depression

---

Veterans, refugees, PTSD

# Why?

## The Changing Education Landscape



Populations are increasingly diverse with unique needs: 37% are first time college goers , 42% people of color and 9% first generation immigrants.\*



Mental health concerns on campus are growing: PTSD, depression and anxiety all impact the brain.



Administrators are responding to diverse student needs and the 21<sup>st</sup> century workforce, while facing increasing competition from new forms of educational preparation.



Serious issues of retention and completion in many programs exist.

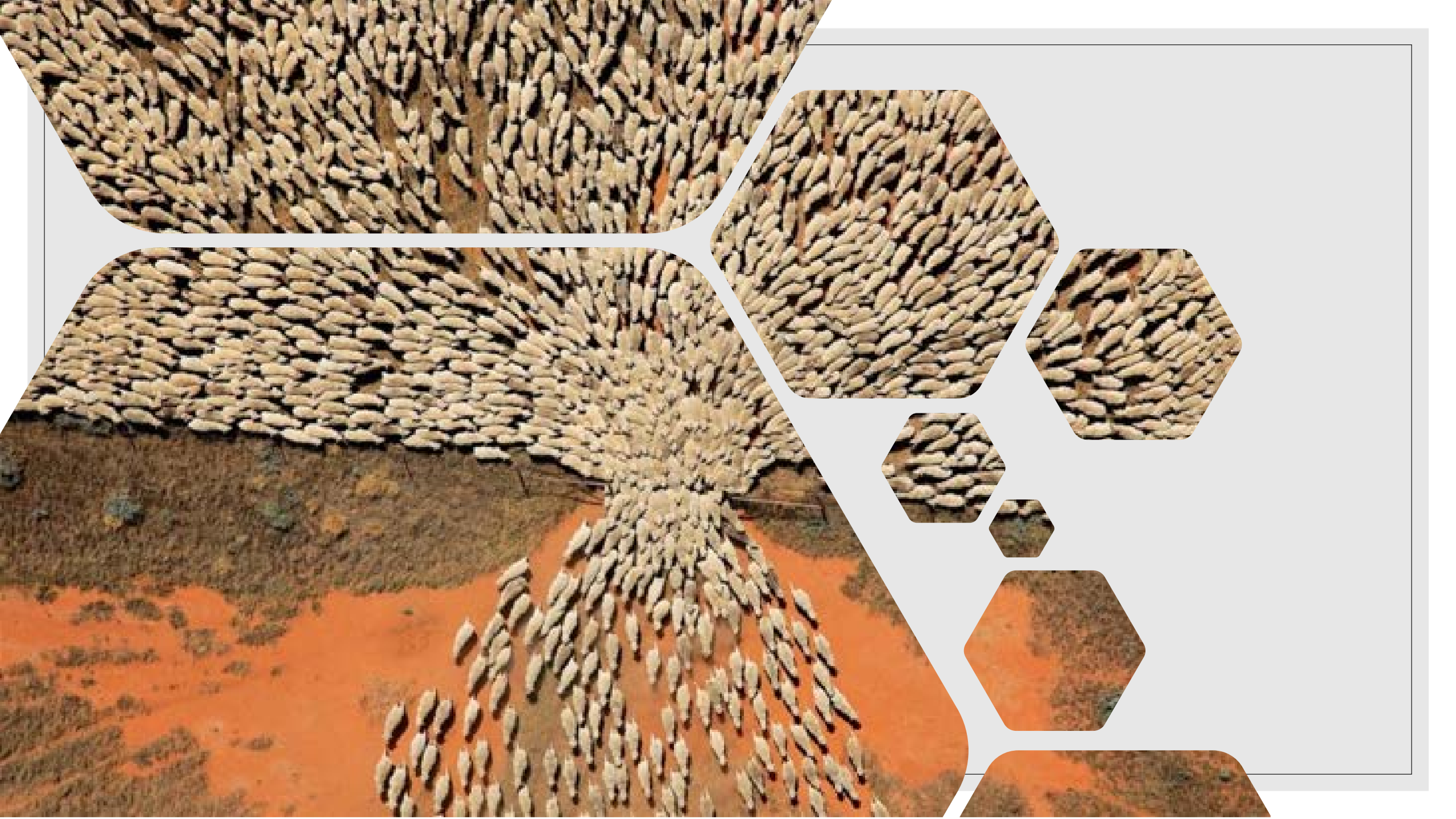


Lack of demonstrable learning gains for too many graduates with increasing cost and debt for learners are growing.

Source\* <https://www.luminafoundation.org/todays-student/>

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# Socio-emotional Factors in Learning

01

Work from mentoring research suggests that the most powerful contribution of a mentor is when a person sees “someone like me” and that provides a sense of belonging.

02

Research on depression, anxiety, PTSD and loneliness indicates that these emotions negatively impact working memory, attention and processing information.





I FORGOT  
EVERYTHING.  
SO NOW I  
JUST STAND  
HERE.





# Stereotype Threat

- Stereotype threat is believed to contribute to race- and gender-based achievement gaps.
- In their studies, Steele and Aronson found that situational factors—more than individual personality or other characteristics—can strengthen or weaken the stereotype-threat effect.
- Many questions remain about the cognitive mechanisms behind stereotype threat, and subsequent research has focused on three factors: stress, performance monitoring, and efforts to suppress negative thoughts and emotions.

# Recommendations to Reduce Stereotype Threat

## Training and encouraging

Training and encouraging educators to maintain high learning expectations for all students, regardless of race, gender, socioeconomic status, or perceived ability.

## Fostering

Fostering positive and supportive school and classroom cultures, which includes strong and trusting relationships among students and between teachers and students.

## Embracing and celebrating

Embracing and celebrating, rather than ignoring, student diversity in educational settings, and cultivating the perception that diversity is an educational asset that provides benefits to all students.

## Communicating

Communicating to students the belief that they are capable of achieving at high levels, even while giving critical feedback on their work.

# The process of working memory.

Illustration by Sarah Riazati & Mike Bamford  
[www.learnnc.org](http://www.learnnc.org)

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## Working Memory



The ability to temporarily hold and manipulate information for cognitive tasks performed in daily life.



Working memory holds information for a few seconds. It is temporary.



Working memory can hold only five to seven items at a time. It has a small capacity.



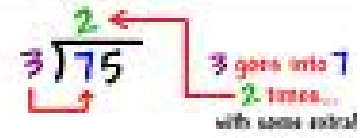



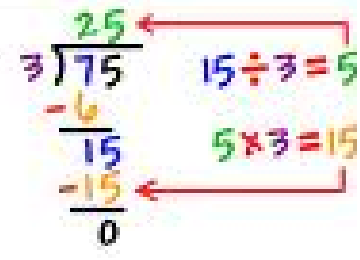
Working memory holds and manipulates information.



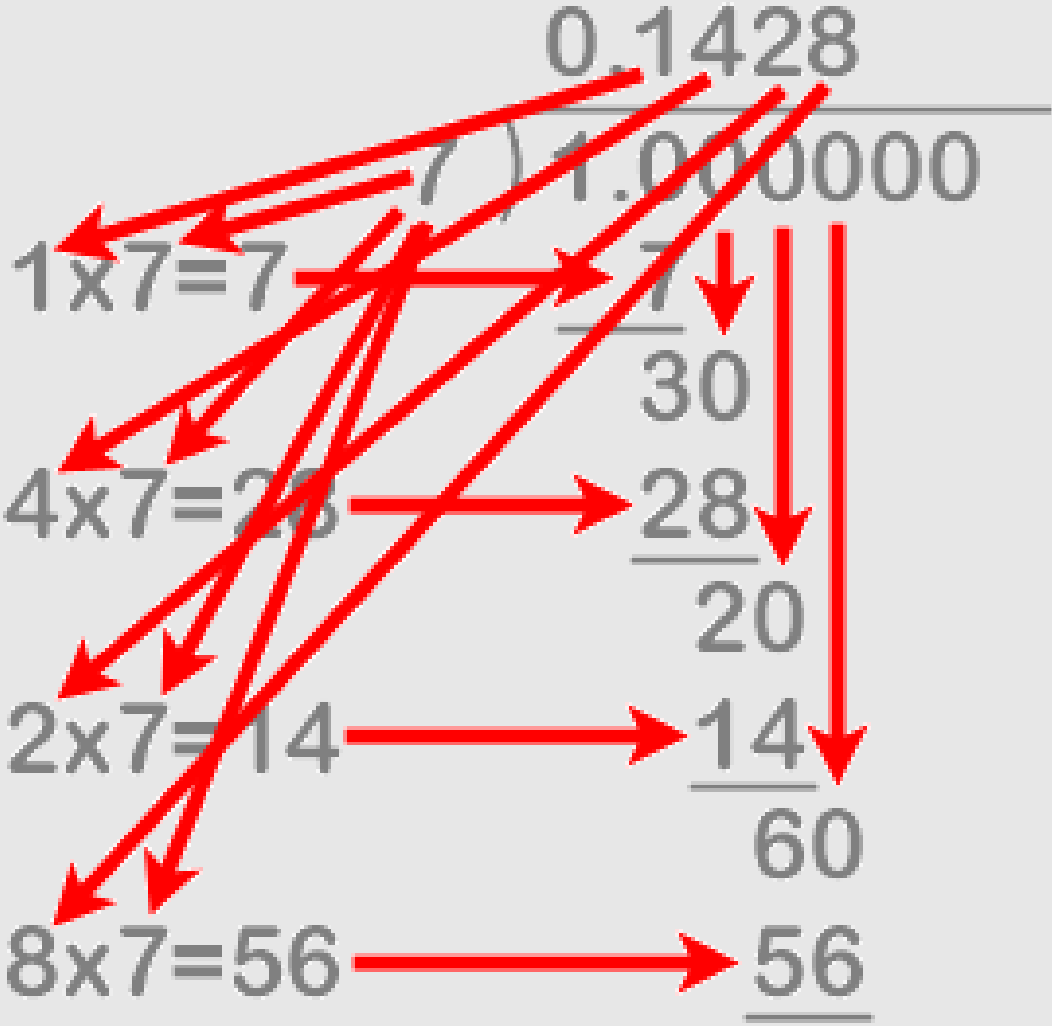
Working memory depends on control of attention and mental effort.

# Kind of thinking we often expect as learners/mentors:

- Systematically [organization]
- Linearly [organization]
- Recall math facts [memory]
- Self-monitor [metacognition]
- Move between operations [shift flexibly]
  - We have to scaffold this thinking when it's not present

Divide:	
Multiply:	
Subtract:	
Bring Down:	
Repeat:	

**The  
Reality for  
Many**



# COGNITION : Consider cognition in relation to your methods and materials



Cognitive processes underlie what we do and expect.

We all fall somewhere on the continuum for each process.



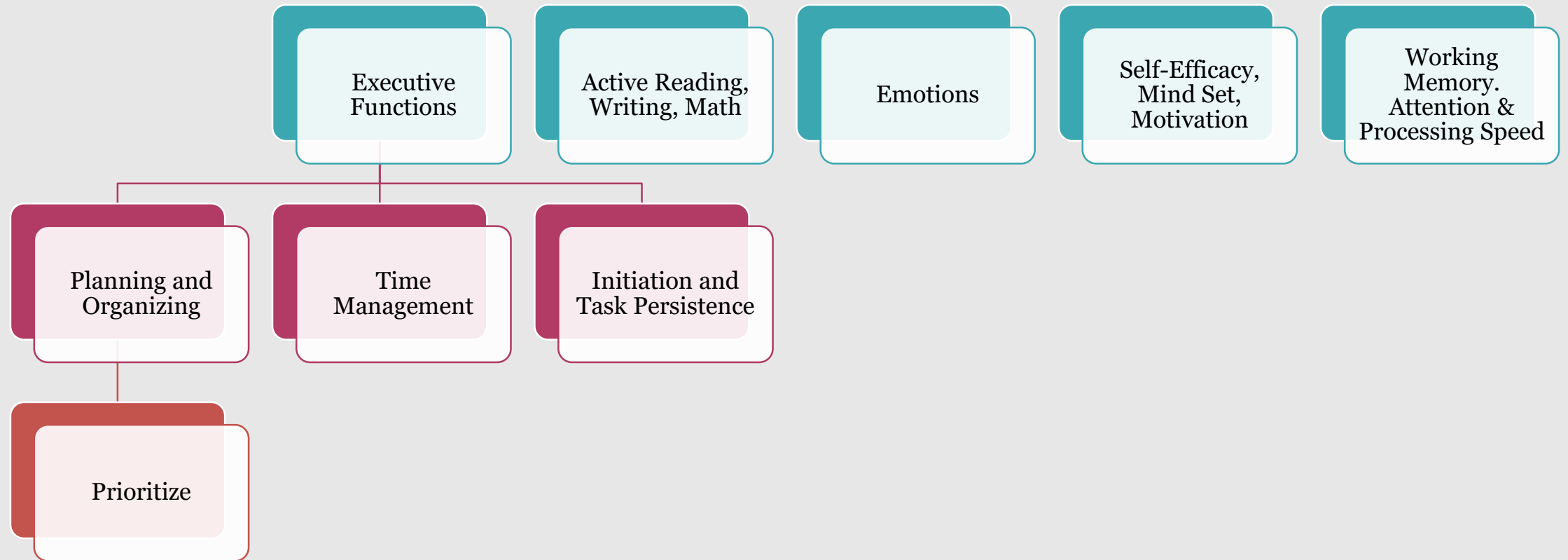
Extremes in one or more processes usually result in a diagnosed learning disability.

frequency and severity



These variations require us to consider how instruction and materials can be barriers to learning.

# What We Need to Scaffold: The Science





# Predictive factors of success in higher ed and the workforce

- Academic and cultural capital
- Self-efficacy and role models
- Executive functioning:
  - Planning
  - Organizing
  - Starting and Completing a task
  - Shifting thinking
  - Time management
- Learning strategies
- Psychological factors
- Self awareness and self regulation
- Emotional regulation



there is no

average

brain



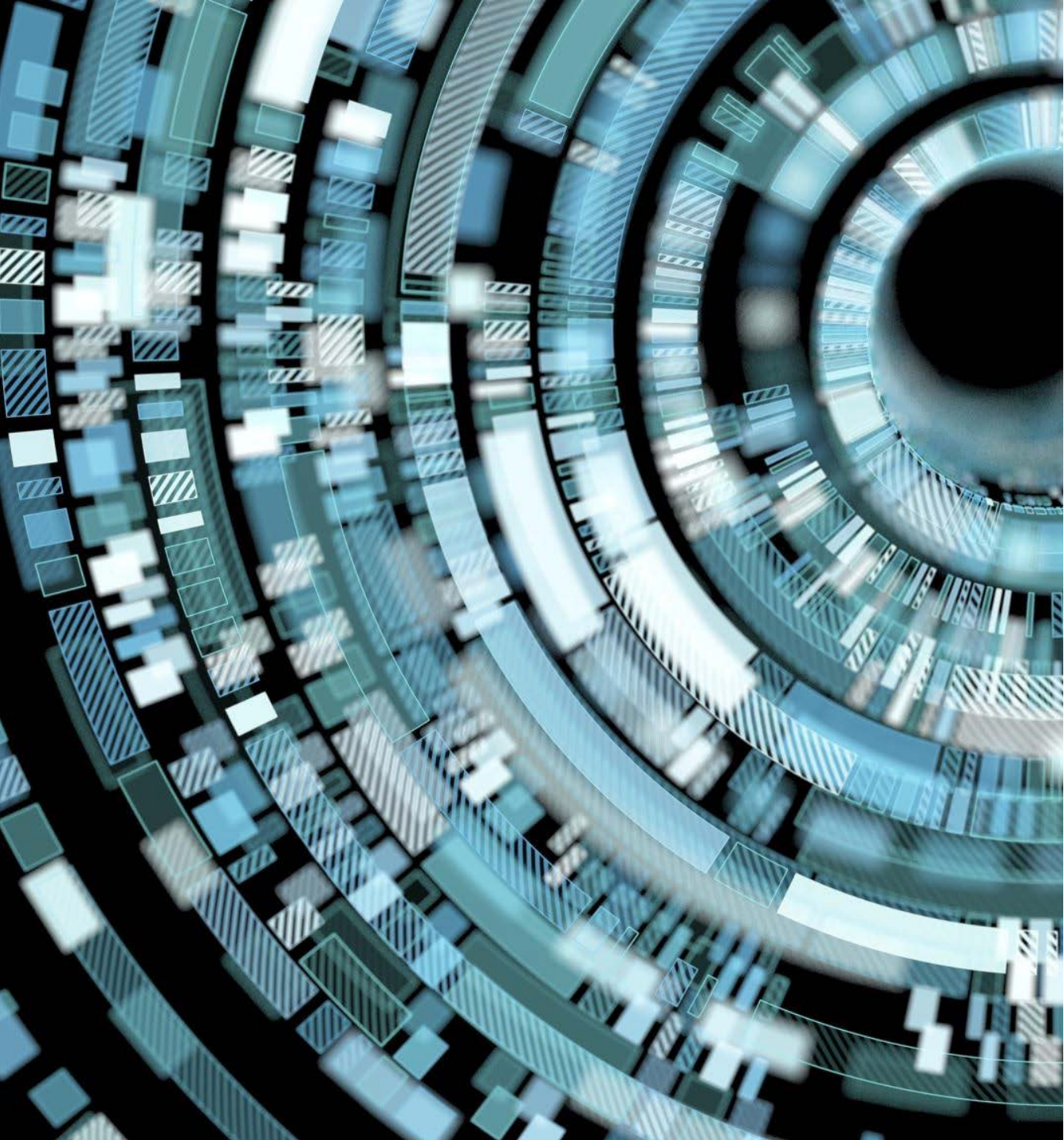
**KEEP**

**CALM**

this requires a

**PARADIGM**

**SHIFT**

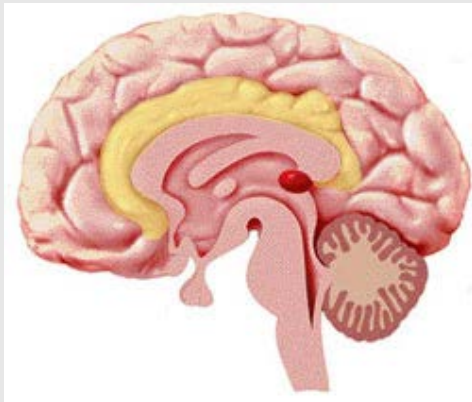


# Definition of UDL

- **Universal Design for Learning** is a framework to improve and optimize teaching and learning by rethinking the environment.

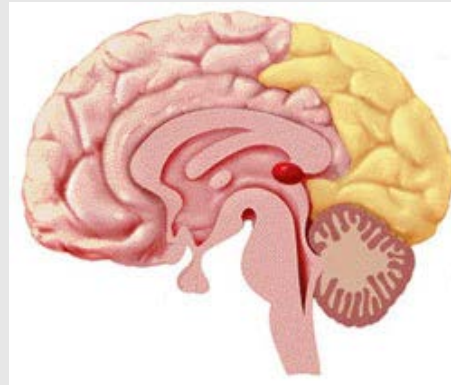
# Neurological Foundation of UDL: Networks of the Learning Brain

Affective



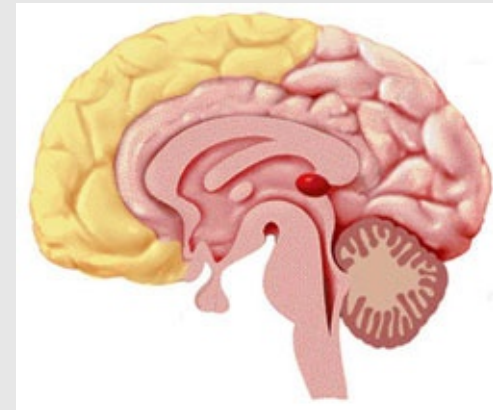
The “Why”

Recognition



The “What”

Strategic



The “How”

# Purposeful, proactive teaching and learning aligned with brain science (see handout)

## UDL Principles

Provide multiple means of  
**Engagement** →

Affective Networks  
The "WHY" of learning



Provide multiple means of  
**Representation** →

Recognition Networks  
The "WHAT" of learning



Provide multiple means of  
**Action & Expression** →

Strategic Networks  
The "HOW" of learning



# Purposeful, proactive teaching and learning aligned with brain science

## UDL Principles

Provide multiple means of  
**Engagement** →

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The "WHY" of learning



Provide multiple means of  
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Recognition Networks  
The "WHAT" of learning



Provide multiple means of  
**Action & Expression** →

Strategic Networks  
The "HOW" of learning



Goal


**Expert Learners** who are...

**Purposeful & Motivated**

**Resourceful & Knowledgeable**


**Strategic & Goal-Directed**

**Provide multiple means of Engagement**




Affective Networks  
The "WHY" of Learning

**Provide multiple means of Representation**



Recognition Networks  
The "WHAT" of Learning

**Provide multiple means of Action & Expression**



Strategic Networks  
The "HOW" of Learning

Access

**Provide options for Recruiting Interest**

- Optimize individual choice and autonomy
- Optimize relevance, value, and authenticity
- Minimize threats and distractions

**Provide options for Perception**

- Offer ways of customizing the display of information
- Offer alternatives for auditory information
- Offer alternatives for visual information

**Provide options for Physical Action**

- Vary the methods for response and navigation
- Optimize access to tools and assistive technologies

Build

**Provide options for Sustaining Effort & Persistence**

- Heighten salience of goals and objectives
- Vary demands and resources to optimize challenge
- Foster collaboration and community
- Increase mastery-oriented feedback

**Provide options for Language & Symbols**

- Clarify vocabulary and symbols
- Clarify syntax and structure
- Support decoding of text, mathematical notation, and symbols
- Promote understanding across languages
- Illustrate through multiple media

**Provide options for Expression & Communication**

- Use multiple media for communication
- Use multiple tools for construction and composition
- Build fluencies with graduated levels of support for practice and performance

Internalize

**Provide options for Self Regulation**

- Promote expectations and beliefs that optimize motivation
- Facilitate personal coping skills and strategies
- Develop self-assessment and reflection

**Provide options for Comprehension**

- Activate or supply background knowledge
- Highlight patterns, critical features, big ideas, and relationships
- Guide information processing and visualization
- Maximize transfer and generalization

**Provide options for Executive Functions**

- Guide appropriate goal-setting
- Support planning and strategy development
- Facilitate managing information and resources
- Enhance capacity for monitoring progress



# Analyze the Teaching and Learning Environment



## Knowledge

What are the *essential* concepts?

What is inclusive? Exclusive?



## Instruction

How can the concepts be taught?

What are the desired outcomes?



## Learning

What are some ways the learner can process information and express the outcomes?

# Sample Solutions for Barriers to Success

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Videos with CC



Text to speech



Videotape



Smartpens



Speech to text as a tool to write

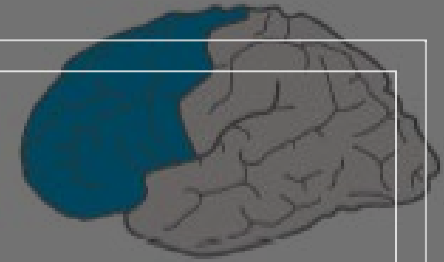
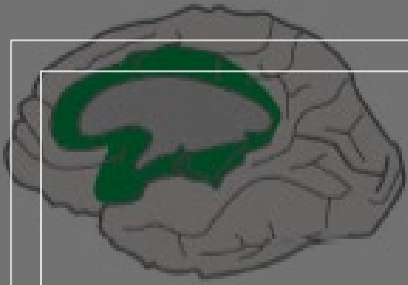


Notes uploaded to computer with voice output



Routinely use 14-pt font

# Universal Design for Learning Guidelines



SEE HANDOUT

## Provide Multiple Means of Engagement

*Purposeful, motivated learners*

### Provide options for self-regulation

- + Promote expectations and beliefs that optimize motivation
- + Facilitate personal coping skills and strategies
- + Develop self-assessment and reflection

### Provide options for sustaining effort and persistence

- + Heighten challenge and resources to optimize challenge

## Provide Multiple Means of Representation

*Resourceful, knowledgeable learners*

### Provide options for comprehension

- + Activate or supply background knowledge
- + Highlight patterns, critical features, big ideas, and relationships
- + Guide information processing, visualization, and manipulation
- + Maximize transfer and generalization

### Provide options for language, mathematical expressions, and symbols

- + Clarify vocabulary and symbols
- + Clarify syntax and structure
- + Support decoding of text, mathematical

## Provide Multiple Means of Action & Expression

*Strategic, goal-directed learners*

### Provide options for executive functions

- + Guide appropriate goal-setting
- + Support planning and strategy development
- + Enhance capacity for monitoring progress

### Provide options for expression and communication

- + Use multiple media for communication
- + Use multiple tools for construction and composition


# Group Activity

**Step 1: In small groups, pairs or on your own identify one of the scenarios from Sticky note #2 of the opening exercise. (5 minutes)**

**Step 2: Brainstorm ways to provide multiple means of representation when you approach this topic for discussion. (15 minutes)**

**Step 3: Enter your results on an orange sticky note or the blank UDL guideline sheet provided to you. (3 minutes)**

**Step 4: Share out (10 minutes)**



***Go to  
Padlet to  
reference  
Sticky note  
#2***



# Group Activity

**Step 1: In small groups, pairs or on your own identify one of the scenarios from Sticky note #2 of the opening exercise. (5 minutes)**

**Step 2: Brainstorm ways to provide multiple means of Expression when you approach this topic for discussion. (15 minutes)**

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**Step 4: Share out (10 minutes)**



# Think About Teaching and Learning in your Environment

- Do committees exist that review teaching and learning?
- Is faculty development available?
- What resources are available to students?
- What is the climate on campus for “struggling” students?

# Identify Collaborators

## Center for Medical Education

## Academic Support Systems

- Learning and Executive Function resources
- Technology support orientation
- New resident orientation

## Committees:

- Learning and teaching
- Curriculum Standards





***CLOSING***

***COLLECTIVELY SEEK TO UNDERSTAND THE SCIENCE OF LEARNING AND  
ENGAGEMENT;***

***SHIFT FROM THE VIEW THAT SOME LEARNERS HAVE LIMITATIONS TO THE VIEW  
THAT SOME METHODS AND MATERIALS HAVE LIMITATIONS;***

***THERE IS NO AVERAGE...ONLY A GREAT DEAL OF LEARNER VARIABILITY.***