The Science of Learning: A Research-Informed Strategy Approach to Learning Recovery and Acceleration

a collaboration between





THE CENTER *for* TRANSFORMATIVE TEACHING & LEARNING AT ST. ANDREW'S EPISCOPAL SCHOOL



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THE CENTER *for* TRANSFORMATIVE TEACHING & LEARNING AT ST. ANDREW'S EPISCOPAL SCHOOL



The CTTL's mission is to create and innovate in the field of Mind, Brain and Education Science research to allow teachers to maximize their effectiveness and students to achieve their highest potential.



We make learning research useful







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ABOUT EDUCATORS ADMINISTRATORS RESEARCH WINTER WEBINAR SERIES

What's Your MBE-IQ?

TAKE THE DIAGNOSTIC

SEE SAMPLE RESULTS

The NeuroEducation Confidence Diagnostic (NECD for short) is a free diagnostic tool for helping schools and districts gauge key elements related to teacher efficacy. Developed by the team at The Center for Transformative Teaching & Learning, the NECD measures an educator's influence, knowledge, and confidence around the science of teaching and learning. It's for teachers who want to identify gaps in their knowledge and confidence, as well as school and district administrators who want to get an overall picture of the organizational strengths and gaps in learning science knowledge and confidence in classroom practices. The NECD measures the following areas:

- · How much change can teachers affect within the school
- · Teacher's self reported knowledge of learning science and their confidence to apply it in the classroom
- · Evaluation of learning science scientific concepts and their application

What does your school or district get from the CTTL when they complete the NECD? Take a look at this fictional example from Springsteen Academy.

Bringing Mind, Brain, and Education (MBE) to Learning Recovery, Acceleration, and Growth

("Something for every teacher, school, and district")

Assessment Attention **Constrained Choice** Cognitive Load Diversity, Equity, and Inclusion **Dual Coding** Emotion and Cognition Engagement **Executive Function** Feedback Formative assessment Homework Knowledge Richness/Transfer Literacy (Science of Reading) Memory

Metacognition Mindsets Motivation (Extrinsic & Intrinsic) Multiple modalities Multi-tasking Neuromyths Neuroplasticity Novelty Play Project Based Learning Self-regulation Sleep Spaces for learning Stress (Episodic vs. Toxic (ACEs)) Wellbeing and Joy



What are two things <u>NO</u> student or employee will ever forget to bring with them to every school every day?





Current Grade (School year 2021-2022)	Last full, cohesive grade (School year 2018-2019)
12th	9th
11th	8th
10th	7th
9th	6th
8th	5th
7th	4th
6th	3rd
5th	2nd
4th	1st
3rd	к
2nd	PK
1st	PS



Currently Struggling Student



. .

. .



Currently an Academic Star

Participants in this webinar will be able to ...

- **Connect**, **extend**, and **challenge** their current understanding of how the brain learns and classroom practices with new ideas and ways of engaging with students
- Apply promising research-informed strategies and insights from Mind, Brain, and Education (MBE) Science to learning recovery and acceleration
- **Connect** emotion and cognition and the belonging mindset to how they work with each individual student



Keep doing (for students & colleagues)

Tweak (for students & colleagues)



Stop doing (for students & colleagues)

Start doing (for students & colleagues)

What Research is Informing Your Conversations?



Winter/Spring 2021



September 12, 2021

By the end of the 2020–21 school year, students were on average five months behind in math and four months behind in reading.

Cumulative months of unfinished learning due to the pandemic by type of school, grades 1 through 6



COVID-19 and education: The lingering effects of unfinished learning -McKinsey & Company (July 2021)

¹Town or suburb.

Source: Curriculum Associates i-Ready assessment data

What research is your school or district using or conducting to measure academic, social, and emotional learning loss, gaps, or growth as a result of COVID-19s impact on the continuity of the student's school experience?



Growth since March 2020 Gaps since March 2020



Student Well-Being Index: Elementary (3rd-5th)

STUDENT NAME:

DATE:

DIRECTIONS:

Below is a survey that is going to ask you how you have been doing. For each question, please choose the number that matches your feelings or actions in the last week. Your response can range from 1 (None of the Time) to 5 (All of the Time). There are no right or wrong answers here.

In the past week	None of the Time	Rarely	Some of the Time	Often	All of the Time	
	1	2	3	4	5	
1. I've been eating healthy foods	0	0	0	0	0	
2. I've been active	0	0	0	0	0	
3. I've been interested in my daily activities	0	0	0	0	0	
4. I've been getting enough sleep	0	0	0	0	0	
5. I've been in a good mood	0	0	0	0	0	
6. I've been feeling cared about by others	0	0	0	0	0	



Student Well-Being Index: Secondary (6th-12th)

STUDENT NAME:

DATE:

DIRECTIONS:

Below is a survey that is going to ask you how you have been doing. For each question, please indicate the number that matches your thoughts, feelings or actions in the last week. Your response can range from 1 [None of the Time] to 10 [All of the Time]. There are no right or wrong answers here.

In the past week	None of the Time		2				-	0		All of the Time
1. I've been active	0	0	0	0	0	0	0	0	0	0
2. I've been thinking clearly	0	0	0	0	0	0	0	0	0	0
3. I've been hopeful about the future	0	0	0	0	0	0	0	0	0	0
4. I've been feeling heard by others	0	0	0	0	0	0	0	0	0	0
5. I've been waking up feeling rested	0	0	0	0	0	0	0	0	0	0
I've been getting along well with others	0	0	0	0	0	0	0	0	0	0
7. I've been relaxed	0	0	0	0	0	0	0	0	0	0
 I've been feeling accepted for who I am (my race, my culture, my gender) 	0	0	0	0	0	0	0	0	0	0
9. I've been dealing with problems well	0	0	0	0	0	0	0	0	0	0
 I've been engaged in my daily activities 	0	0	0	0	0	0	0	0	0	0
 I've been feeling cared about by others 	0	0	0	0	0	0	0	0	0	0
12. I've been in a good mood	0	0	0	0	0	0	0	0	0	0

Why MBE?

"The strongest education research finding in the last twenty years is that the quality of a teacher is the single greatest in-school determinate of student outcomes."

- Better academic outcomes
- Reduced risk of adverse life events
- Greater gains in the labor market
- Increased lifetime earrings
- Increased development of social skills

These impacts are most pronounced for BIPOC and low income students.

Steiner 2018

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FACE THE MBE FACTS



A Neuromyth Busting Activity



Warning: These cards will provoke your thinking and enhance your professional learning. Side effects include spirited debate and laughter.



THE CENTER for TRANSFORMATIVE TEACHING & LEARNING ^{III} AT ST. ANDREW'S EPISCOPAL SCHOOL Students' brains are constantly rewiring in reaction to their environment. This means that every teacher is a brain changer, whether they believe in this or not



Research-informed strategies for learning recovery and acceleration

• Embrace Neuroplasticty



Neuroplasticity: The lifelong ability of the brain to change its organization as a result of experiences.





How might this graph inform your thinking about teaching and learning for your <u>students</u>?

As shown by this conceptual graph, drawn from multiple studies on humans and animals, the brain's plasticity is strongest in the first few years after birth. Thus, it is easier and less costly to form strong brain circuits during the early years than it is to intervene or "fix" them later.

Harvard Center for the Developing Child

"<u>ALL</u> students deserve a teacher who knows how the brain learns, works, thrives, and changes."



Currently Struggling Student *Currently* Just Fine Student *Currently* an Academic Star

The emotion and cognitive areas of the brain are highly interlinked, so emotional factors, like stress, anxiety, happiness, and belonging need to be considered when thinking about ways to improve learning.



Research-informed strategies for learning recovery and acceleration

- Embrace Neuroplasticty
- <u>Balancing stress</u> (see the emotion & cognition connection)



Balancing Stress



Effects of stress on the brain

Episodic stress:

• Amygdala disengages prefrontal cortex and engages "lizard brain"

Prolonged stress:

- Damage to hippocampus difficulty consolidating long term memory
- Damage to reward circuit increased high risk behaviors
- Overproduction of inflammatory hormones
- Epigenetic Effects



Pamela Cantor et. al. (2019)

Memory & Emotion

"'Downshifting' is a metaphor often used to describe how negative emotions cause us to process in our emotional center and lose focus on higher order thinking."

Dr. Mariale Hardiman, JHU





Contents lists available at ScienceDirect

Journal of Applied Research in Memory and Cognition

journal homepage: www.elsevier.com/locate/jarmac



Reducing the Consequences of Acute Stress on Memory Retrieval

Amy M. Smith*, Ayanna K. Thomas

Tufts University, United States

Psychological stress has been shown to impair episodic memory retrieval. Implicated in this memory impairment is the physiological stress response, which interferes with retrieval-related neural processing. An important next step in research is to determine how to improve post-stress memory accessibility. In this review, we first consider methodological differences in studies that have examined stress and memory, as they lend insight into the conditions under which stress does and does not impede retrieval. Motivated by these variations in methodology, we advocate for two potential approaches to intervention. One approach is to employ evidence-based techniques that reduce the physiological stress response. A second approach is to target the processes that occur during initial learning to promote the formation of highly accessible memories. Thus, this review serves to both critically evaluate the methods used to examine the effects of stress on memory retrieval and encourage research on interventions for stress-related memory impairment.

WHAT HELPS?







Shonkoff, Boyce & McEwen (2009)

"Being surrounded by other human beings doesn't guarantee a sense of belonging. **Belonging** actually has to do with identification as a member of a group and the higher quality interactions which come from that. It's the interactions over time which are supportive of us as full, authentic human beings."

> -Jeanine Stewart, senior consultant with the Neuroleadership Institute

Jan 10, 2021, 06:00pm EST | 12,646 views

Missing Your People: Why Belonging Is So Important And How To Create It





Belonging is a fundamental human need. GETTY

Source: Nicole Furlonge, LEARNS Collaboratiuve

Articles

The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: a meta-analytic review

H. Korpershoek 🔤 📵, E. T. Canrinus 📵, M. Fokkens-Bruinsma 🔞 & H. de Boer 🔞 Pages 641-680 | Received 10 Jun 2018, Accepted 30 Apr 2019, Published online: 27 May 2019

"When we find ourselves in situations where we are the 'out- group' or in an environment in which we feel like an outsider, we use our mental energy to monitor for threats, leaving fewer resources for higher cognitive processes. When students feel as if they don't **belong** in a school setting, the cognitive energy that should be used on social engagement and learning is being used to scan for group barriers, discrimination and stereotypes."

Positive Social and Academic Identity Development

Social Identity Race/Ethnicity Gender Sexual orientation Age Language Socioeconomic Status Religion Family Structure Ability Curriculum & Pedagogy



Academic Identity Effective Learning Strategies Self Efficacy Relevance Motivation Feedback Curriculum & Pedagogy

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Feedback is like icecream – the more you get the better



TRUE INCONCLUSIVE FALSE ("inc")

Research-informed strategies for learning recovery and acceleration

- Embrace Neuroplasticty
- Balancing stress
- <u>Elevate formative assessment and</u> give better feedback



Use formative / diagnostic assessment



Low- or no-stakes What do students know? What gaps exist? What needs more practice? What needs reteaching?

Give Better Feedback



Figure 1. Distribution (histogram) of 607 effects (ds) of feedback intervention on performance.

Kluger and DeNisi (1996)



David Yaeger et. al. (2014) "Breaking the Cycle of Mistrust: Wise Interventions to Provide Critical Feedback Across the Racial Divide."



Critical Feedback Across the Racial Divide."

Give Better Feedback



When you give back work with feedback on it:

(1) Give 10 minutes of class time for students to understand and act on the feedback they get

(2) ...which also allows you to manage the emotional climate

All students, even the strongest ones, can benefit from additional training in executive functioning.



TRUE INCONCLUSIVE FALSE ("inc")

Research-informed strategies for learning recovery and acceleration

- Embrace neuroplasticty
- Balancing stress
- Elevate formative assessment
- Build executive function skills



Executive functioning

fill in the blank

What is executive functioning?

"Executive functioning"?

- Remember instructions
- Active reading
- Come up with and execute a plan
- Focus attention & avoid distractions
- Know math facts
- Prioritize tasks
- Choose strategies
- Note taking
- Monitor progress
- Adjust strategies as necessary
- Juggle multiple tasks successfully
- Recognize when end-point has been reached
- Control impulses

Executive functioning is **a set of skills**





Executive Functioning

"Just as an air traffic control system at a busy airport safely manages the arrivals and departures of many aircraft on multiple runways, the brain needs this skill set to filter distractions, prioritize tasks, set and achieve goals, and control impulses."



- Remember instructions
- Come up with and execute a plan
- Focus attention & avoid distractions
- Prioritize tasks
- Choose strategies
- Monitor progress
- Adjust strategies as necessary
- Juggle multiple tasks successfully
- Recognize when end-point has been reached
- Control impulses

Stress and adverse experiences impact executive function skills

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THE CENTER *for* TRANSFORMATIVE TEACHING & LEARNING [™] At st. andrew's episcopal school **thecttl.org**





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Free Pilot Access Program to Public and Charter School **Teacher Cohorts**



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Exit Ticket







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