BRAIN HACKS TO FILL THE GAPS: BRAIN RESEARCH MEETS PERSONALIZED LEARNING

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Dr. Sousa is an international consultant in educational neuroscience. He is a highly respected author, with numerous books that provide an understanding of how the brain works and the effects of a student's environment on learning. He has presented to over 200,000 educators at national conventions and lead workshops on brain research and the science of education to schools in the United States and across the world.
Learning Standard: CCISD Strategic Plan Strategies

Goal I: We will inspire learning through an array of personalized opportunities and experiences.

Goal II: We will provide support to meet the needs and aspirations of each student.

Objective: Learn innovative, research-based strategies that support your student’s brain function to facilitate meaningful personalize learning experiences for all students.
Executive system:
• Higher-order thinking
• Problem solving
• Personality
• Working memory
• Control limbic responses

Limbic system:
• Emotional processing
• Emotional response

Limbic system matures faster than the logic systems in the brain. The last part of the brain to mature is the part capable of making rational decisions.
PRE-TEST: (TAKE A MOMENT AND RECORD YOUR TRUE OR FALSE ANSWER TO THE FOLLOWING QUESTIONS.)

1. Most students tend to learn new information through auditory means.
2. The structures responsible for deciding what gets stored in long-term memory are located in the brains rational system.
3. Learners that can perform a new task well are more likely to retain it.
LEARNING/INPUT

- All learners need to have some input initiate learning
- Our senses serve as our input sources for learning
- Input is most likely visual (46%), kinesthetic (35%), Auditory (19%)
- Most learners are multi-processors
COGNITIVE BELIEF SYSTEM

• Meaning and sense impact long-term storage

• How a person “feels” about a learning situation determines the amount of attention devoted to learning

• The rational system matures slowly in adolescents; therefore, adolescents are more likely to submit to their emotions

• Threats and emotions affect the memory process

• Fight or Flight Reaction
TAKE A WAYS!

• Educators tend to teach the way they learn

• When we implement instructional strategies that honor learning styles we increase student success

• Differentiated instruction that incorporates learning style and cognitive reasoning enables students to “feel” their success.
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HOW STUDENTS

Independent or partnership learning:

• Use your “Just the Facts” template to organize your learning

• Be ready to share a “important” or “wow” fact

http://prezi.com/9ko3aqzs4rka/?utm_campaign=share&utm_medium=copy&rc=ex0share

https://tinyurl.com/carrhacks
PRIMACY/RECENCY EFFECT

Degree of retention varies during a learning episode:

• We remember best that which comes first (prime-time-1) and last (prime-time-2)
• We remember least that which comes just past the middle
IMPLICATIONS FOR TEACHING: PRIME-TIME-1

• New information or new skills should be taught during prime-time-1 because it will most likely be remembered

• Only correct information should be discussed

• This is not the time to solicit what students know since if it is wrong information students will remember the incorrect information
IMPLICATIONS FOR TEACHING: PRIME-TIME-2

- Prime-time-2 is the second most powerful learning time
- Opportunity for learner to determine sense and meaning
No multi tasking!

The brain can only do one thing at a time!"

The mind can only pay conscious attention to one thought at a time. You can only do two things at once if one of them is automatic.
PLAN FOR 40 MINUTE CLASS PERIODS

• Plan two 20-minute learning segments instead of one long episode
• If using direct instruction do it during the first segment
• Go off task during segments
  • Stretch, tell a joke or story, share a cartoon
Boosting Retention

Average Retention Rate after 24 hours

- Lecture: 5%
- Reading: 10%
- Audio-Visual: 20%
- Demonstration: 30%
- Discussion Groups: 50%
- Practice by Doing: 75%
- Teach Others / Immediate Use of Learning: 90%

(adapted from David Sousa, *How the Brain Learns*, p. 95)
EFFECTS OF TRAUMA ON THE BRAIN

• Trauma (physical and emotional) releases abnormal levels of the stress hormones cortisol and norepinephrine into the bloodstream.

http://www.setinc.org/SET/How-We-Do-It/Science-With-Compassion/Science.htm
EFFECTS OF PROLONGED EXPOSURE TO STRESS HORMONES:

• Working and long-term memory problems affect learning
• Reduced ability of frontal lobe to control emotions
• Reduction of neurogenesis (new neuron production) in hippocampus – crucial to learning and memory
• Cognitive processing shifts to survival mode and safety issues
• Loss of identity with prior environment
• Greatly diminishes: reward cycle operations, motivation, pleasure and perseverance
WAYS TO REDUCE EFFECTS OF TRAUMA/STRESS IN CLASSROOM

• Ensure classrooms are physically safe and emotionally secure

• Be sensitive to cues in the environment that could cause a reaction in students, such as severe storm, and provide additional support.

• Alert students to any unexpected change in routines

• Designate a safe space if a student gets overwhelmed

• When appropriate, allow accommodations, such as shorten assignments/more time to complete

• Spend extra time with students asking about their interests and showing that you care

• Remember: behavioral problems may be transient due to trauma-related anxiety
EFFECTS OF TRAUMA ON EDUCATOR

• Be sure to take care of yourself to avoid compassion fatigue
TEACHING HACKS SUPPORTED BY NEUROSCIENCE

Beware of the “IT” file
CONSIDER USING A “MINI-LESSON” FORMAT TO DELIVER KEY POINTS: ASK NO QUESTIONS! IN A WHOLE CLASS SETTING, INCORRECT ANSWERS ARE RECORDED AS CORRECT BY THE BRAIN.
DON'T ASK: “DO YOU HAVE QUESTIONS?”

Instead ask:

• What can I clarify/explain better?
Checks and balances, principle of government under which separate branches are empowered to prevent actions by other branches and are induced to share power. Checks and balances are applied primarily in constitutional governments. They are of fundamental importance in tripartite governments, such as that of the United States, which separate powers among legislative, executive, and judicial branches.


https://www.tutor2u.net/politics/reference/checks-and-balances
Classroom components for the rewired brain

- Flipped
- Humor
- Games
- Exploratory
- Differentiated
- Conceptual
- Academic
- Mastery-based
- Loose structure
- Project-based
- Technology tools
Teachers are Brain Changers!

Teaching is the only profession that has the ability to change the brain every day.
How the Special Needs Brain Learns, David A. Sousa

Good Read: Engaging the Rewired Brain, David A. Sousa (webinar available: https://www.youtube.com/watch?v=BGR1vLPq2YI)
Explains how today’s technology use has actually “rewired” student’s brain function

https://lead4ward.com/playlists/