

The 21st Century Study Skills: Activating the Inactive Learner

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Agenda

- **Engagement Through Neuroscience**
- **Strategies based on brain-based learning**
- **Designing for optimal approach to engagement and study skill**
- **Landmark College pedagogies for engaging learners with LD**



New Understanding of How We Learn

Strategies and study skills are most effective when anchored in brain-based processes of learning

1.

Our brains are uniquely organized

2.

Learning is a physiological process

3.

Importance of pattern recognition



New Understanding of How We Learn

Strategies and study skills are most effective when anchored in brain-based processes of learning

4.

Influenced by emotions and inhibited by threat

5.

Learning is developmental

6.

Importance of novelty (Gamification)



Brain Basics

- Neurons – 100 billion (1,000,000,000,000)
- Neurons communicate through electrical and chemical impulses

Cerebrodiversity

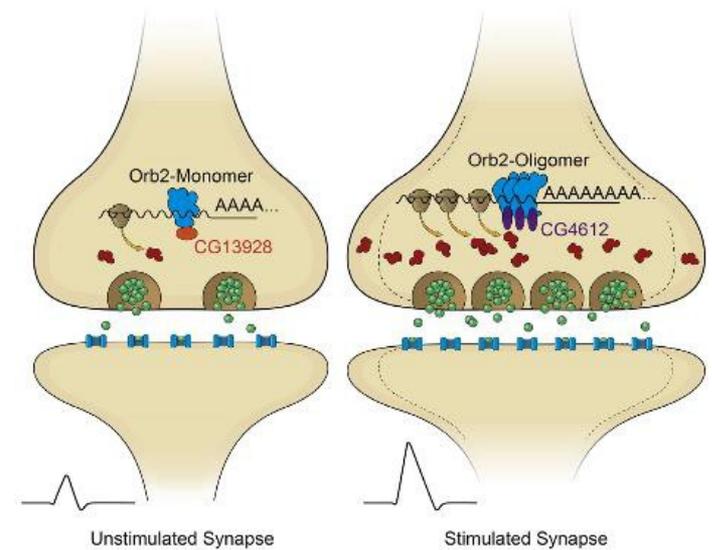
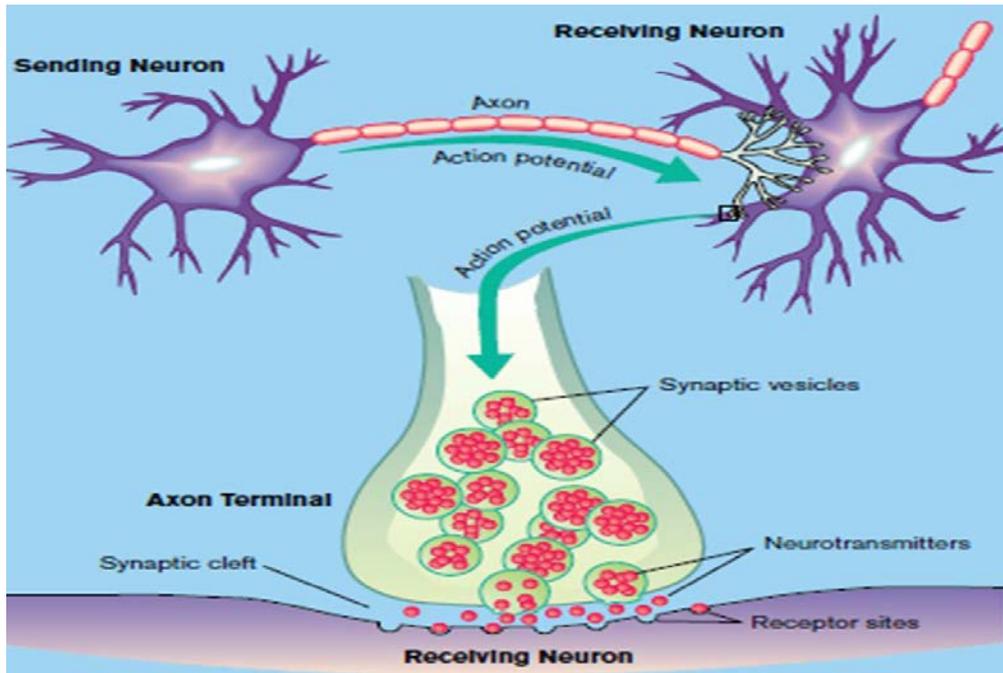
Neuroplasticity

Connectivity

Ecosystem that is in constant competition with itself
Survival = Neural Activation



Our Brains are Uniquely Organized



- The human brain can interpret images that the eye sees in just **13 milliseconds**



Our Brains are Uniquely Organized

The wiring of our brain changes with learning; and no two brains are wired alike.

Jensen 2015

Wiring is malleable; changing one's pattern of thinking changes the wiring

J. Schwartz - OCD patients
C. Dweck - Mindset

Repeated thought and action can change the brain's structure; robustness of feedback from the environment is key



Neuroplasticity and Mindset Research

TED Talk by Carol Dweck, PhD; Professor of Psychology at Stanford University.



The power of believing that you can:

[LCIRT - Banerjee 2017](#)



Mindset (Dweck, 2006)

Fixed Mindset: students believe their IQ and talent are innate traits that don't change

- Typically worry about not looking smart, get upset by mistakes, and give up sooner on tough tasks.
 - E.g. “I just can't learn math”; “I am just not good at writing”

Growth Mindset: Students believe that ability can change as a result of effort, perseverance, and practice

- See mistakes as a way to learn, embrace challenges, and persist in the face of setbacks.
 - E.g., “Math is hard, but if I try, I can get better at it”

Not about performance – low and high achieving students can have either mindset



Research: Fixed vs. Growth Mindset

Studies have shown, students with a growth mindset:

- Are more motivated and engaged, even when work is challenging (Yeager et al., 2013)
- Are more likely to review or revise their work (Dweck, 2006)
- Score better on math and verbal standardized tests (Blackwell et al., 2007; Good et al., 2003)
- Fail fewer classes and have higher GPAs (Blackwell et al., 2007)
- Are more likely to persist in high school and college (Hochanadel & Finamore, 2015)
- More likely to report positive attitude towards “hard work” and “constructive criticism” (Banerjee, Bryck, & Grabowski, 2015)



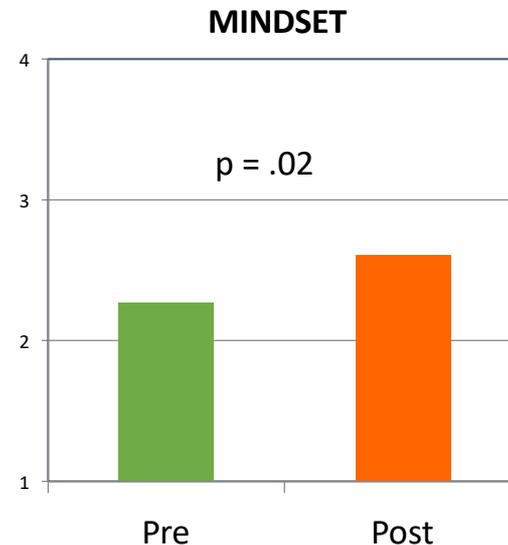
The Mindset Research Project: Results

Feasibility: data collected from 95% (71 of 75) of participating students

Programmatic effects:

Several areas of positive growth seen in attitude and mindset overall (*in both groups*) at the end of the program

- Mindset item: “You can learn new things, but you can’t really change your basic intelligence”





The Mindset Research Project: Results

Intervention effects Mindset intervention group showed improvement on:

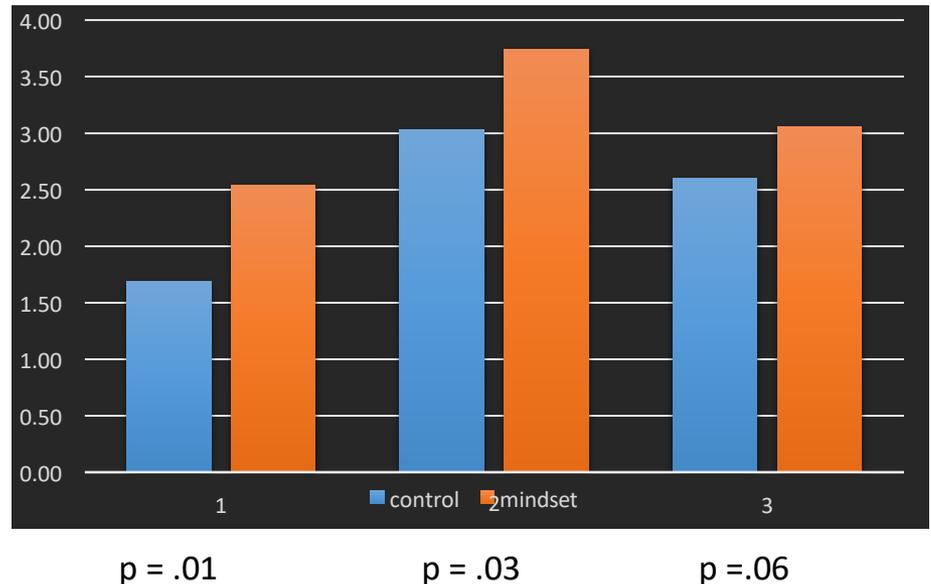
Constructive Criticism

1 = “ I have certain academic weaknesses which I can do nothing about, and teachers should understand that before being critical.”
(reverse scored)

2 = “I talk to my teachers afterwards about my test or assignment, if I get a poor grade.”

Hard work

3 = “I usually spend hours on a homework assignment until I feel it is the best I can do “



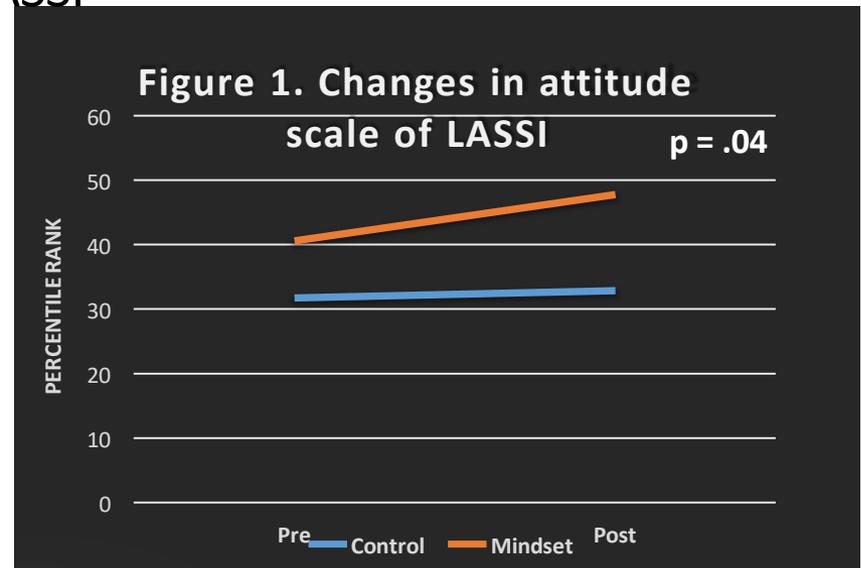


The Mindset Research Project: Results

Intervention effects: Mindset intervention group showed improvement on *attitudes towards academics* on the LASSI

Example items:

- “I have a positive attitude about attending my classes”.
- “I only study the subjects I like. ”
- “I feel confused and undecided as to what my educational goals should be.”





Our Brains are Uniquely Organized

Videos and Discussion

How the Brain Works:

<https://www.youtube.com/watch?v=XSzsl5aGcK4>

Example discussion prompts:

- Do you ever hesitate before asking a question because you think it's a stupid question?
- Did watching this video change your mind?
- **Follow-up:** Research suggests the more you believe you can learn (and learn by asking question), the more you can actually learn. What suggestions do you have to get over the fear of asking 'stupid' questions?



Our Brains are Uniquely Organized

Areas of the Brain:

https://www.youtube.com/watch?v=5_vT_mnKomY

Discussion prompt(s):

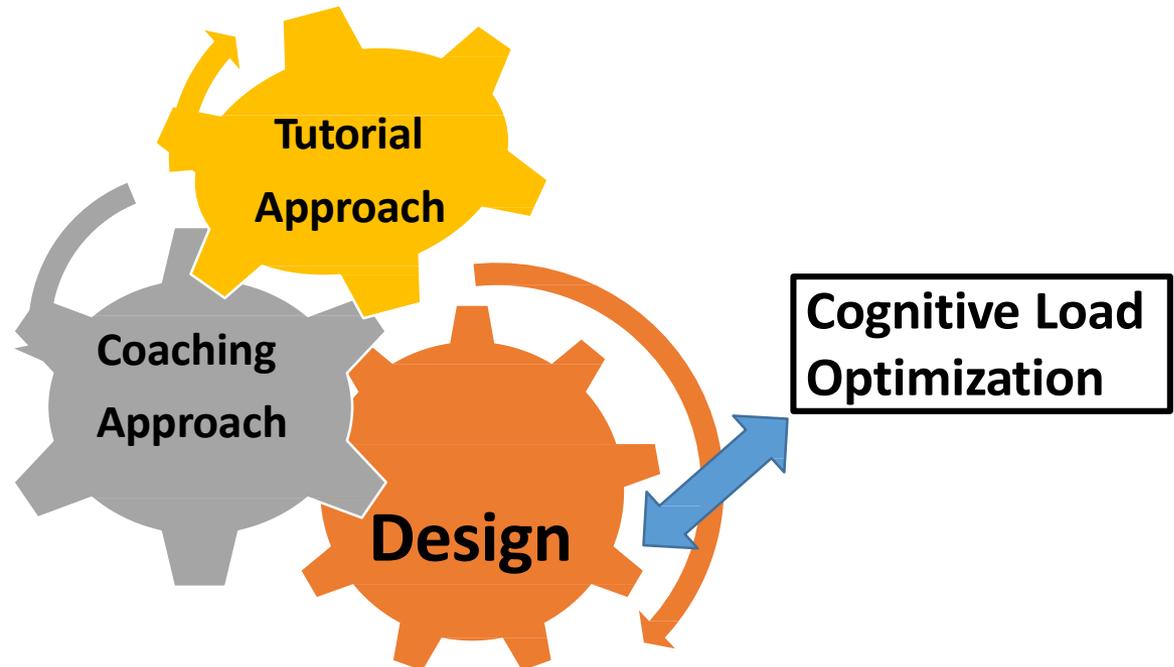
- Do you feel like one of the areas of the brain has more influence on your behaviors than the others?

- When you're feeling upset , are you able to use the thinking part of your brain to override the emotion side of your brain's response? Why or why not?



Our Brains are Uniquely Organized

What does this mean for Study Skills?





Our Brains are Uniquely Organized

- Individual cognitive capacity is varied
- Lower order and higher order processes compete for cognitive working space
 - Example: *concentrating on spelling or mechanics vs. analyzing the validity of ideas as they relate to a central thesis*



Ibrahim Dahlstrom-Hakki



Our Brains are Uniquely Organized

- **Some common constrictors of cognitive working space**
 - Weakness in working memory, attention, and executive functions
 - Speed of information processing
 - Poorly automatized skills
 - Anxiety, stress, or other affective issues
 - Multi-tasking

Cogn
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Space

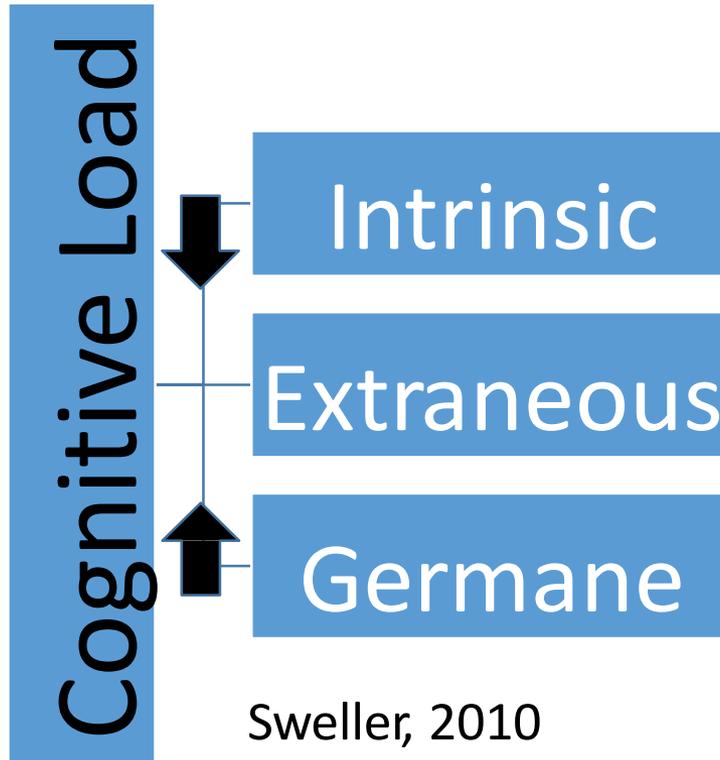
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Ibrahim Dahlstrom-Hakki



Our Brains are Uniquely Organized

Each of the cognitive loads are additive, and instructional design's goal should be to reduce extraneous cognitive load to free up working memory



Ex: $3+5$; $2745 + 132$

 **Presentation**

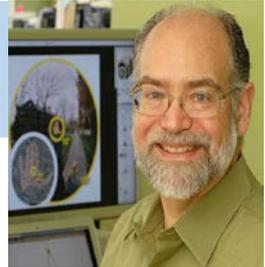
Automating schema into LTM



Sweller, 2010

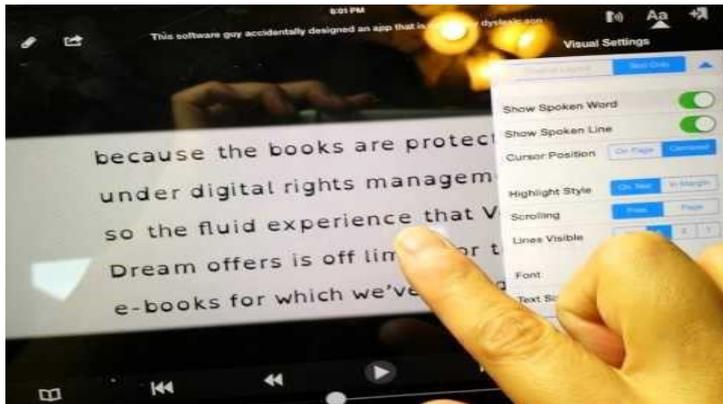


Our Brains are Uniquely Organized



RESEARCH EXAMPLE (Reducing Extraneous Cognitive Load)

In a study with high school students with dyslexia, Schneps (2013) found that reading on the palm-sized screen of an iPod Touch reduced inefficiencies in the ways students' eyes flitted across the page. The shorter lines on the screen made reading faster, without diminishing comprehension.



Paper Version

STUDENT NAME: _____ Date: _____
 Tutor's Initials: _____ Period: _____

Time it took student to read first pass through: ___ min ___ sec

A group of women crammed in to the Crenshaw Boulevard bus, getting on at the Grove Street stop. Shoving students and other passengers into the bus, by pushing and heaving, they forced themselves into the bus to make room for themselves where none seemed to be. As the bus moved on the long RUN to Huntington Street, the women settled into their own private worlds, creating the illusion of space for themselves by looking away from the others on the bus. The worlds they made for themselves were made from newspapers and magazines, behind blank spaces on the panels of advertising that lined the space above the windows.

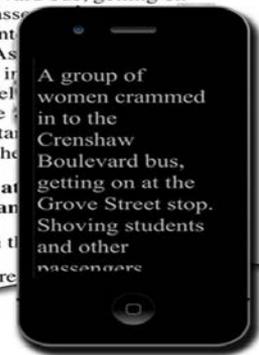
2-1. Why was it difficult to get on the bus?

A. The bus tried to skip the stop.
 B. The bus was under construction.
 C. The bus had lots of people on it.
 D. Everyone had bookbags.

2-3. Staring at the bus, passengers served the same purpose as

A. getting on the bus.
 B. taking a break from reading.
 C. reading the newspaper.
 D. reading the magazine.

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Reducing Extraneous Load



Voice Dream Reader

<http://www.voicedream.com/reader/>

Demo:

https://www.youtube.com/watch?v=anCnM8lQ_QTY&t=117s



Our Brains are Uniquely Organized

As designers of 21st century study skills, our goal is to **reduce the extraneous load, maximize the germane load, and manage the intrinsic load (Clarke et al., 2006)**

Few examples for reducing Extraneous Load and increasing Germane Load

- *Maximize signal to noise ratio*
- *Embed generative strategies within studying: elaboration; self-querying*
- *Pattern and anomaly recognition*
- *Outsource cognitive overload*



Embedding Generative Strategies

Demonstration



Our brains are Uniquely Organized

- **Working Memory and Short-Term Memory are the work horses of our cognitive abilities**



How do you facilitate memory capacity?

- Buy-in
- Familiarity
- Repetition
- Automaticity



Our Brains are Uniquely Organized

- Ask your students to map their cognitive load challenges in each quadrant. Then ask: **What can you outsource/offload/use technology for, within each quadrant?**

Academic

**Long-Term/
Big Picture**

**Interpersonal
Social**

Personal



New Understanding of How We Learn

Strategies and study skills are most effective when anchored in brain-based processes of learning

Our brains are uniquely organized



Learning is a physiological process

Brain learns through pattern seeking and being alert of anomalies/novelty



Learning is a Physiological Process



Embodied Cognition – *How the Body Knows its Mind* (Beilock, 2015)

Learning involves ALL available resources

Body and movement are a resource, just as much as the mind

“Cognition is an extended system assembled from a broad array of resources” (Wilson & Golonka, 2013)



Learning is a Physiological Process

➤ Research

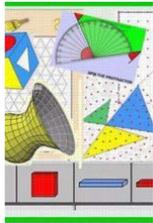
- **Greening the Brain** – Stephan Kaplan et al., at U Michigan (50 minutes of walking in Ann Arbor Arboretum compared to walking in down town Huron Street); Test performance was better for the green walkers
- **SMART initiative at Landmark College** – All first year students with LD (Bringing Theory to Practice Grant – AAC&U); based on the Mayo Clinic program by Amit Sood on Stress Management and Resiliency

Based on principles that include Compassion and Gratitude



Learning is a Physiological Process

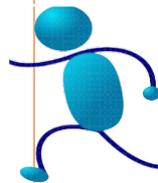
Strategies using movement engage students:



Manipulatives



Power Poses
and Gestures



Pacing; Exercise



Learning is a Physiological Process

- **Exercise is a 21st century study skill!**
- Improves concentration and memory
- Research has also shown that intense aerobic activity can actually grow new brain cells in a part of the brain responsible for memory, the hippocampus (Erickson et al. 2011)
- Exercise mimics some of the effects of anti-depression medication



Learning is a Physiological Process

➤ Research at Landmark College on Exercise



Study examines the implications of exercise training as a means of promoting student well-being, engagement, and cognition. The intervention involves an eight-week exercise program for students with LD.

Measurement of reported stress, self-esteem, and behavioral measures of executive function before and after training. *Spring 2018 completion*

New Understanding of How We Learn

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Our brains are uniquely organized



Learning is a physiological process



Brain learns through pattern recognition



Leveraging Pattern Recognition

- **Our brains innately seek to recognize patterns and make meaning**
- **Reading is a pattern recognition exercise**

[e.g., *“hte littl lo@n wlof”*.]

“Courses, courses!” crater stop-murder. “Hoes debt ladle Manx wetter gloss slobbers? Any prance axe lackeys knots a barter! Lucks lackey garner dense wetter oil gnat, wile oil ware during aster set hair an kipper cheers worm! Courses!”

- **Highly attuned to be alert to anomalies/differences/**



Leveraging Pattern Recognition

There was, moreover, a boldness and rotundity of speech among these matrons, as most of them seemed to be, that would startle us at the present day, whether in respect to its purport or its volume of tone.

“Goodwives,” said a hard-featured dame of fifty, “I’ll tell ye a piece of my mind. It would be greatly for the public behoof, if we women, being of mature age and church-members in good repute, should have the handling of such malefactresses as this women. What think ye, gossips? If the hussy stood up for judgment before us five, that are now here in a knot together, would she come off with such a sentence as the worshipful magistrates have awarded? Marry, I trow not!”

“People say,” said another, “that the Reverend Master Dimmesdale, her godly pastor, takes it very grievously to heart that such a scandal should have come upon his congregation.



Leveraging Pattern Recognition

▪ Activating prior knowledge

What strategies do you use to activate prior knowledge?

- Preview; Brainstorm; KWL; Others?

▪ Recommendations

- Activate **relevant** prior knowledge
- Minimize **irrelevant** prior knowledge
- Compensate for **missing** prior knowledge



Classroom Pedagogies at Landmark College

1. **Advance organizers** - *activating interest and prior knowledge; reviews*
2. **Activators** - *forming a personal connection to the lesson or topic*
3. **Clear directions** - *communicating expectations and task requirements*
4. **Connectors** - *explicit connection between prior and new content*
5. **Multisensory techniques** - *visual, auditory, kinesthetic*
6. **Strategizers** - *toolbox of strategies; metacognitive strategies*
7. **Summarizers** - *incremental and frequent reviews*
8. **Routines** - *building effective study habits*
9. **Flexible assessment** - *multiple means of assessment; varying rubrics*

New Understanding of How We Learn

Strategies and study skills are most effective when anchored in brain-based processes of learning



Influenced by emotions and inhibited by threat

Learning is a developmental process

Effect of Novelty and Learning through Gamification



Influenced by emotions and inhibited by threat

Stereotype Threat: ST occurs when awareness of negative stereotype about a social group results in sub-optimal performance by members of that group. (Wheeler & Petty, 2001)

Causal mechanisms of ST – affects WM

Capacity of WM system to attend to task-relevant information is disrupted

Research: Effect on math performance by gender and racial stereotyping; spill over

Schmader & Johns, 2003,
Beilock et al. (2007)

Stigmatization and Stereotype Threat among Adolescents with Learning Disability: Impacts on Cognition and Performance in Math – NSF grant awarded to CAST (Daley & Johnston)

<http://resourcenters2015.videohall.com/presentations/569>



Influenced by Emotions and Inhibited by Threat

- **How does stereotype threat manifest itself in the classroom?**
 - Less academic risk-taking
 - Reduced class participation
 - Poor self-confidence – giving up easily
 - Reduced capacity for WM and overall cognitive space



Influenced by Emotions and Inhibited by Threat

Strategies for Addressing Stereotype Threat

1.

- Teach about Stereotype Threat (Johns et al. 2005)
- Awareness helps to reduce its negative effects

2.

- Provide a sense of belonging and community; value affirmation
- Opportunities for positive peer group interactions



- Promote diverse perspectives and perspective taking
- Create an inclusive environment; “safe space to fail”
- Give “wise feedback” (Yeager et al. 2013)



Influenced by Emotions and Inhibited by Threat

Creating a Safe Space to Fail

- **Everyday interactions**
 - Verbal feedback from valued adults – praise
 - Framing of critical feedback; cognitive reappraisal
 - Talking about differences as part of group strength; rather than individual weaknesses
- **Theory Based Interventions**
 - Micro videos on neuroplasticity and visualizing neural growth

<https://labs.la.utexas.edu/adrg/files/2013/12/Yeager-et-al-RD-agenda-6-10-131.pdf>



Influenced by Emotions and Inhibited by Threat

DE-STRESS model (Schultz, 2011)

D	Define - the issues and understand the individual LD/ADHD profile
E	Educate - all stakeholders about LD and ADHD
S	Speculate – Helping students see beyond the immediate; learn to look ahead
T	Teach – Strategies, techniques, to minimize frustrations and maximize success
R	Reduce Threat – Teach students to recognize and de-activate stress triggers
E	Exercise – Regular and rigorous physical activity; sleep and nutrition
S	Success – Many opportunities to demonstrate and experience success
S	Strategize – Plan for maintaining reduced stress situation and future successes

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Influenced by emotions and inhibited by threat



Learning is a developmental process



Effect of Novelty and Learning through Gamification



Learning is Developmental

- Limbic system develops before the pre-frontal cortex; full range of executive function skills are last to develop
- **Paradox of the teenage brain**
 - Adolescent synaptic plasticity is way better than adults; but it is not yet fully developed (Jensen, 205)
- Teenage brain is more primed for addiction than adults



Learning is Developmental

- **Avoidance Behavior and Habits**

- **Does this sound familiar?**

Student hasn't completed the homework so she misses going to class. Next week, she has still to complete the work, so she misses class again; and yet again. Now she is failing the course and is in deep trouble.

The Power of Habit





Learning is Developmental

Strategies for Study Habits (group activity). Think of a student you are working with and a habit you would like to change. What cues and rewards can you implement to change the habit?

Cue	Habit or Behavior	Reward
	Checking text messages on phone	
	Procrastination on homework	



Unlearning

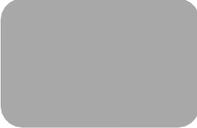
Changing mindsets and unlearning has a lot to do with identity. “The way we see ourselves and the way that others see us is threatened when we are asked to do something different.” – Marga Biller, Director, Harvard Innovations Lab

- Do I need to think, behave, do, or perceive in a new way?
- Is there previous learning that is getting in the way of my thinking, behaving or perceiving in new ways?
- Is what I am trying to learn (change) a threat/challenge to my identity, to how I see myself or how I see the world?
- Would trying harder give me the results I am looking for or might it create more entrenchment?

https://ww2.kqed.org/mindshift/2017/06/23/why-unlearning-old-habits-is-an-essential-step-for-innovation/?utm_medium=Email&utm_source=ExactTarget&utm_campaign=20170625Mindshift&mc_key=00Qi000001WzPV4EAN

New Understanding of How We Learn

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 Importance of Novelty and Gamification as a study skill



Novelty and Gamification



**Our brains are programmed to pay attention to what is novel;
survival heritage**

**When learning occurs accidentally or as a by-product of
exploration, it is fun!**

Today's formal education is efficient, but not often engaging

**It may be time to reinvent instruction and think in terms of
gamification and game based learning**



Gamification



Why are games engaging?

- Most perceive them as fun; do not have high stakes consequences
- Involve “achievable challenge”
- Have an element of chance
- Immediate feedback on performance



Novelty and Gamification





Gamification

Gamification

- Adoption of game-like principles within the instructional context
- Rezzly - <http://rezzly.com/> (content creation platform for quests)
 - <http://rezzly.com/case-studies/>

Game-Based Learning

- **Game-Based Learning**, on the other hand, means including games, often “video games” in your instruction.
- *Example:* Oregon Trail - https://archive.org/details/msdos_Oregon_Trail_The_1990

Gamifying Studying - Example

Elements of study skills can be designed as a **quest** in which students earn **badges** to display on their **virtual mantels**.

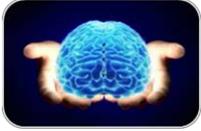
They can **level up** based on game performance and those who excel can earn a place on the **leaderboard**.

Source:

<http://community.mis.temple.edu/stevenljohnson/2012/05/19/gamification-of-mis3538-social-media-innovation/>

Gamification for nursing program:

<http://med.stanford.edu/sm/archive/sicko/game/SICKOTitle.html>



Gamification

Individual Studying can be Gamified

Games are supposed to entertain; we can apply the same principles to studying?

1. Determine what kind of game (*self; another peer; group*)
2. Why do you like it? (*fun, more effective way of studying/being engaging*)
3. What will be your reward system (*break, leisure time, retail therapy, video game time*)



Gamification

Individual Studying can be Gamified

- Incorporate a **narrative** into your studying
- Encourage **micro-learning of high yield facts**
- Make active use of **rewards schemes and leader boards**
- Change the way you **refer to studying** (novice, master)
- Find ways to get **instant feedback** (cute kitten site)
- Create a **gamified study environment** (act out the reading; build an essay)
- **Empower** learners to feel like heroes





Gamification

Resource of Games and Gamification in the Classroom

<https://ww2.kqed.org/mindshift/tag/games/>

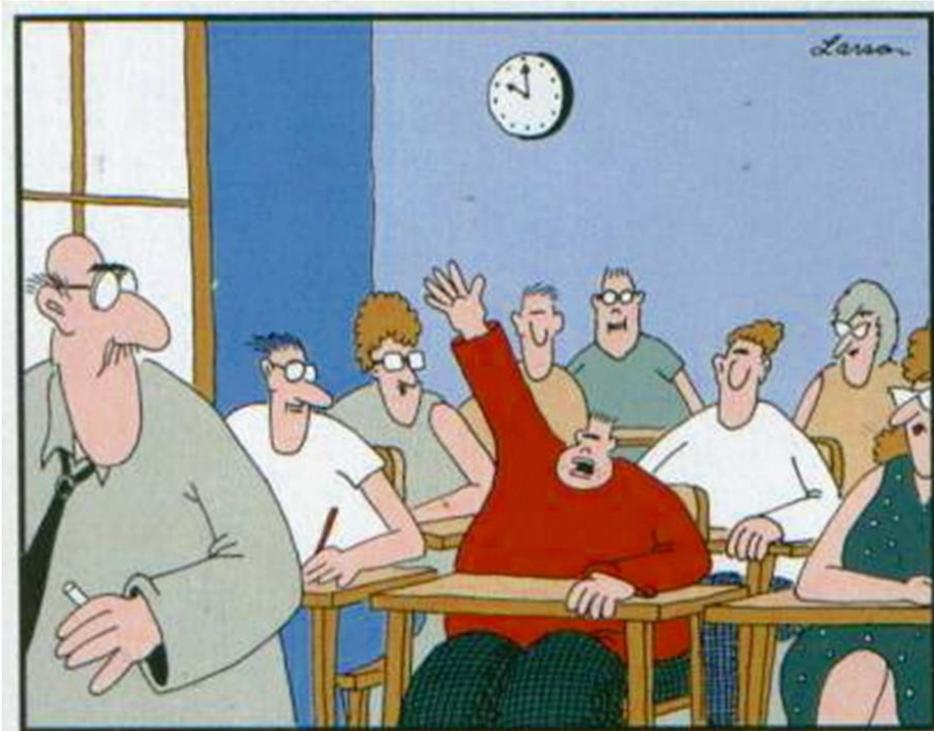


Novelty and Gamification

Group Activity

Can you think of ways to gamify:

- Note-taking
- Reading comprehension
- Time-management
- Writing
- Oral presentation



**"Mr. Osborne, may I be excused?
My brain is full."**

End

Question and Answers

Resources



Digital Writing Tools and Strategy

Summarizing tool

- SMMRY - <http://smmry.com/>
- [Summarizing.biz - https://www.summarizing.biz/best-summarizing-strategies/best-summarize-tool-online/](https://www.summarizing.biz/best-summarizing-strategies/best-summarize-tool-online/)

Writing Strategy using Summarizing Tool



Memory and Recall Aids

Digital Flash Cards

- **Study Blue** (online flash card) <https://www.studyblue.com/>
- **Anki** (program for memorizing) - <http://ankisrs.net/>
- **iStudy** (college specific, e.g., <http://istudy.psu.edu/>)
- **Quizlet** (mobile studying) - <http://quizlet.com/>
- **Wolfram Alpha** (online sevice)
- **Content Specific Flash Cards** – Medical and Law



Memory and Recall Aids

Medical Flash Card

<https://www.youtube.com/watch?v=EiKg08WoKPM&sns=em>

All Subject Areas

<https://www.brainscape.com/subjects>

Law

<http://www.flashcardmachine.com/law.html>





Reading Tools

- Read and Write Gold
- Voice Dream Reader
- Kurzweil
- Audio Book Resources (*Learning Ally; Bookshare*)



Other Digital Study Tools

-**Wolfram Alpha** - App (helpful for math/algebra/calculus)

<http://www.wolframalpha.com/examples/Math.html>

-**Khan Academy** (free instructional YouTube Videos)

<http://www.khanacademy.org/>

- **Math Talk** - <http://minds-in-bloom.com/getting-started-with-effective-ma/>

(National Council of Teachers of Mathematics)



Digital Writing Tools and Strategy

WRITING TOOLS

- **Inspiration**
- Cowriter (<http://www.donjohnston.com/products/cowriter/index.html>)
- WritetoLearn (<http://www.writetolearn.net/>)
- Ginger It!, <http://www.gingersoftware.com/?cpn=1&adg=1&ad=1&cnt=1&ln=1>
- Grammarly (available as an App as well)
<http://www.grammarly.com/?q=grammar&gclid=CLj6yqmTkKoCFYpd5QodlHA-xg>
- Abiword <http://www.abisource.com/>
- Spellchecker.net Language Tool <http://www.languagetool.org/>
- Grammar Slammer <http://downloads.zdnet.com/abstract.aspx?docid=721347>
- Whitesmoke <http://www.whitesmoke.com/>
- Autocrit <http://www.autocrit.com/>
- Grammar App by TapoLearn <http://itunes.apple.com/us/app/grammar-app/id377188655?mt=8>



Citation Tools and Plagiarism Check

CITATION TOOLS

- Easy Bib <http://www.easybib.com/>
- Knightcite <http://www.calvin.edu/library/knightcite/>
- NoodleTools <http://www.noodletools.com/>
- Citation Creation <http://www.citationcreation.com/>
- Endnotes - Software tool for publishing and managing bibliographies; reference assistant - <http://endnote.com/>

PLAGARISM CHECK - <https://elearningindustry.com/top-10-free-plagiarism-detection-tools-for-teachers>

- www.duplichecker.com
- www.scanmyessay.com



Digitizing Course Syllabus

- Highlighting – key words, phrases, due dates

- Icons as reminders



- Hyperlinks - linking to readings – *(example)*

- Visual syllabus (**Inspiration**)

- Grade Tracker <http://www.gradetracker.com/academy/grade-calculator>

- Google Calendar (interface calendar feature with multiple devices)

Take Away Points for Digital Study Tools

- **Tech solutions for academic tasks have their limitations – individual student profiles must be considered; assess entry level tech competencies**
- **Help students develop competencies with mainstream technologies such as Microsoft suite, Blackboard/Moodle, smart phones**
- **Focus on a core set of technologies rather than every new innovation; mix and match approach**
- **Teach strategies and skills that are enhanced by technology rather than the technology itself**