Brain-Based Learning (v 1.0): Myths, Realities, and Opportunities for Our Teaching Practice

Sarah Grison, Ph.D.
sgrison@parkland.edu

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Who are we? Why are we here?

- PhD at University of Wales, Bangor, in cognitive neuroscience
- Director of Introductory Psychology, University of Illinois
- Also teacher training in Educational psychology
- Arrived at Parkland in 2013
- Oh – and I’m a mother too.

Let’s hear about you & your goals!

http://tinyurl.com/h2j97nq
What are our goals today?

- Learn about brain-based learning and recognize the myths versus the realities of this approach
- Explore a few teaching and learning tools from the literature on brain-based research
- Discuss whether/how these brain-based learning might be useful for classes you teach

Let’s warm up with some brain-based questions!
Truth or Myth?

Have you heard that some people are more left-brained and some are more right-brained? Is this

A. the truth?

B. a myth?

http://www.nlp4education.co.uk/brainbasedlearning/brain/images/abc_brain_functionn.jpg
Truth or Myth?

Have you heard that some people are more left-brained and some are more right-brained? Is this

A. the truth?

B. a myth?

Click here to read the truth: There are usually minor differences in processing between the hemispheres. People use both hemispheres in daily life.

http://tinyurl.com/gryvqx2
Truth or Myth?

Have you heard that brain training can improve mental function? Is this

A. the truth?

B. a myth?
Truth or Myth?

Have you heard that brain training can improve mental function? Is this

A. the truth?

B. a myth?

Click here and here to read the truth:

Training on game-like tasks does not tend to transfer to improvements in mental processing for day to day activities.
Lots of myths about brain-based learning!

Click here to learn that listening to Mozart does NOT make you smarter.

Click here to learn that baby Einstein DVDs do NOT promote infant development.

Click here to learn how Brain Gym, a program that uses intentional movements to improve learning, does NOT work.

http://tinyurl.com/jn795mz
So, what is the truth of brain-based learning?

- Conceptualized as mind, brain, & education science, MBE...
  - Is a science, which depends on scientific methods
  - Relies on empirical research from several related fields
  - Translates understanding of brain structure & processes to teaching & learning tools

Interdisciplinary field of Mind, Brain & Education science

http://education.jhu.edu/sebin/x/w/Tokuhama%201.1.png
Who does brain-based learning right?

If MBE science leads to evidence-based teaching and learning tools, then these can have significant impact!

Click here to learn about MIT Integrated Learning Initiatives

Click here for the International Mind, Brain, and Education Society and click here for the journal

Click here to see the book by Tokuhama-Espinosa, 2010

Click here for the APA pdf that summarizes evidence-based learning techniques
Let’s look at an example!

What do you think that students say is the most effective way to learn by reading a textbook?

A. Highlighting information
B. Summarizing key points
C. Memorizing keywords
D. Re-reading material

*study*

(verb)

The act of texting, eating and watching TV with an open textbook nearby.
Let’s look at an example!

What do you think that students say is the most effective way to learn by reading a textbook?

A. Highlighting information  
B. Summarizing key points  
C. Memorizing keywords  
D. Re-reading material

Do you agree with them?  
Are they right?  
Let’s see?
Meta-analysis examined effectiveness of 10 learning techniques (see Table 4)

None of the 4 reading techniques were effective!
✓ NOT highlighting
✓ NOT summarizing
✓ NOT memorizing keywords
✓ NOT re-reading material

Dunlosky et al., 2013
Instead, the 4 most effective overall learning techniques were:

- Elaborative interrogation
- Self-explanation
- Distributed practice
- Practice testing
Why do these tools work?

Because ALL memory and learning can be explained by how neurons function in the brain!

Neurons that fire together wire together.

— Donald O. Hebb —

http://tinyurl.com/hfz3r4j
An over-simplified primer – Part 1

The human brain...

Is made up of billions of individual neurons
Neurons connect together to communicate, and when specific ones “communicate” often...

They create vast networks that support rich information processing!
Think of it this way…

The LA freeway is like neural communication in your brain…

Exits you take often are like strong neural connections, but exits not used are like neural connections that are pruned.
So, wait...why do these tools work?

Because these four evidence-based tools all require **active** processing by networks of neurons. Done repeatedly, this leads to memory and learning.

Four evidence based techniques (Dunlosky et al., 2013):

- Elaborative interrogation
- Self-explanation
- Distributed practice
- Practice testing

See how neural connections change over the lifespan? First we develop connections, then we prune. This also shows learning!
Think-Pair-Share

Please discuss these effective techniques. Might one be appropriate for one of your classes? If so, how might you implement it this term? We will discuss your ideas!

A. **Elaborative interrogation:** Helping students ask/answer deep “Why?” and “How?” questions about material.

B. **Self-explanation:** Explaining what the information means, especially with respect to your life or experiences.

C. **Distributed practice:** Supporting studying specific material over several days/episodes.

D. **Practice testing:** Giving repeated attempts at testing with feedback.
Final Thoughts...

Of the 4 most effective learning techniques, which one(s) are you likely to try this term?

A. Practice testing
B. Distributed practice
C. Elaborative interrogation
D. Self-explanation
E. More than one of these!

She needs some active processing techniques to help her learn!
What are our goals today?

Learn about brain-based learning and recognize the myths versus the realities of this approach.

Explore a few teaching and learning tools from the literature on brain-based research.

Discuss whether/how these brain-based learning tools might be useful for classes you teach.

What do you think? Did we reach our goals for today?
Please complete the feedback sheet on your table.
Thank you!
Shameless plugs for future activities!

- Brain-based learning v2.0
- Using student response systems for attendance, participation and learning
- Facilitating a growth mindset for ourselves and for students
- Let me know on the sheet if you might be interested!

http://tinyurl.com/hvqvgkq

http://tinyurl.com/hqx2ro7
Thank you for the chance to work with you!

Please feel free to share any thoughts or feedback.
I’m at sgrison@parkland.edu and in D177.
Or visit me (or any of us!) in the Hub (D115)

Gratuitous photo of my daughters!
Did you remember to sign in?

I am happy to send anyone a copy of this PPT!