Learning and the Brain:

What brain science is teaching us about learning in the age of information overload

Teaching Arts Luncheon  2/6/2015
A little about me

- Kathy Casale
- Adjunct Faculty, Education Department
- EDC 347/548 “Individual Differences in Student Learning”
- Smith Grad ‘84
- School Psychologist, Northampton Public Schools
A little about the conference

- *Learning & the Brain®* with research centers and labs at Harvard, Yale, MIT, Stanford, Berkeley, UC Berkeley, University of Chicago, Johns Hopkins, and other leading institutes “have joined forces to provide the latest findings and co-sponsor our efforts.”

- 3 multi-day conferences a year, a 1-day symposium in New York City, 5 hands-on summer institutes, and many one-day seminars.

- *Learning & the Brain®* also sponsors the online *Learning & the Brain® Society* and an online store.
Fall 2014: Boston 11/20-22

Focused, Organized Minds:
Using Brain Science to Engage Attention in a Distracted World
Some of the speakers:

John Gabrieli

http://gablab.mit.edu
Coach Meg

Margaret Moore, MBA

Her book was co-written with Dr. Paul Hammerness, Harvard Medical School, Department of Psychiatry
What was the big take-home message?

- Technology - and especially smart phones - are changing our lives in important and fundamental ways.
- Near-constant pulls on our attention are changing our daily habits, triangulating our relationships and overworking our brains, likely impacting how our students are learning.
Let’s get some data!

Take a minute and jot down:

● How many digital platforms do you check every day? (email/facebook/twitter, etc.)
● Estimate how many times each day you check them?
● About how many minutes each day do you think you are spending on a digital device?
How often do we unlock our phones?

on average, 110 times/day

many of us pick up our phones more than 1,500 times each week
Coach Meg said:

“We are **abusing our frontal lobes** with an overdose of negative stimuli as well as chronic distraction and chronic multi-tasking.”
Last year: over 300,000 accidents from texting while driving in the U.S.
her words:

“We are hacked/hooked/hijacked by our addictions to our screens/phones. Then, we can’t: remember, think, connect, collaborate, create or learn.”
A sampling of the data I heard:

- Americans take in 5 times as much information today as we did in 1986.

- Every hour there are 6,000 hours of new videos uploaded onto Youtube.

- There was a 381% increase in the number of diagnoses of ADHD from 1989 – 2000. Currently there are 6.4 million individuals in the US with this diagnosis.
Mothers are nursing their babies *while looking at their phones* – instead of at their babies.

Mothers are looking at their phones while pushing their babies in the stroller – and, *holding their phones over a baby’s face* while changing a diaper.
Where is her focus?
Okay - not just “moms”
Technology, and especially smart phones, are altering vital human attachment behaviors in a profound way.
Look familiar?
Steiner Adair says:

“We have brand new cultural norms that have emerged in the last 7 – 10 years. It is now normative behavior to be in a conversation with a loved one - hear a “ping” from a device – and turn our attention away.”

“Our attention is now triangulated by a piece of technology.”
It’s happening in schools too:
what do you notice?
Why are we addicted?

- Dr. Levitin explained that our over-reliance on text messages, facebook, twitter, etc is related to the **dopamine addiction loop**. We have “novelty detectors” in our brains that get activated each time these devices “ping.”

- Studies have shown that rats and monkeys will literally starve to death when they push buttons that give them shots of dopamine – it’s so highly addictive that they will stop eating/sleeping.
Logout is the hardest button to click.
What is our response?

To multi-task – to check/write email, talk on the phone and read/drive/eat/listen to a lecture -- all at the same time. But, it’s counterproductive – because multi-tasking doesn’t really exist in the brain.

What we are really doing is something Dr. Levitin called “fractionated attention.”
Does the brain process multiple inputs?

NOT REALY! “The brain is designed to beautifully handle one focus, one task at a time.”

“It is not designed for multiple, parallel tasks.”
4 components in the attentional system

1. The mind-wandering default mode (inner-directed thoughts: goals, feelings, plans)

2. The central executive (prevents you from being distracted, limits what enters your consciousness so you can focus)

3. The attentional filter (constantly monitors for anything that might be important)

4. The attentional switch (turns the spotlight of attention from one thing to the next)
Glucose

REALLY IMPORTANT chemical in the brain
It’s required for the central executive to work - focused work actually uses up ALOT of glucose.
SO: here’s the big problem:
The **Attentional Switch** ALSO requires glucose to function.
Every time we switch our attention from one thing to another, glucose is used.
Depletion of glucose causes a release of the stress hormone cortisol... and so, if we are constantly switching attention (for example from one screen to another to another to another) we feel tired, dizzy - depleted and stressed ... because we are.
So, how does this impact student learning?
What can we do to help our students?

Teach them about their brains!
Talk with them about ...

The power of doing one thing at a time.
Have a collaborative discussion about how they are using their devices during your class time and outside of it while they are reading/writing.

Try the Index Card Strategy!
We must trick ourselves - trick our brains - into staying on task when we need them to!

- Set aside certain times of the day for checking email and other social platforms - and stick to it!
- Train your friends and family that you may not respond immediately!
- Turn off the phone for pre-planned, specified “productivity hours.”
Talk with students about Glucose builders:

- sleep
- exercise
- whole foods
- spending time in nature
- meditation/yoga/prayer
- listening to music/looking at art
- taking “brain breaks” throughout the day
Be like “HSP’s”

“Highly successful people extend their brains:” they have cooks, gardeners, housekeepers, secretaries, chauffeurs, personal assistants - so they can focus on what they do best.

The rest of us need to organize our time, our stuff and our homes to manage the onslaught.
Reflection: a new ritual?

In an interview this week on "Fresh Air," neuroscientist and author Frances Jensen introduces a much-needed phrase to the modern neurological lexicon: “dementia of the preoccupied,” what Dr. Levitin called “fractionated attention.”

Jensen suggests that the best way to curb the crazed, distracted feelings, is to fight back with the opposite: End your days by reflecting deeply on the most important thing to happen to you during the day. How might you do that in your classroom? In what ways could we ask our students to do this on their own?