AmericanHonors

Thinking More Clearly, Learning More Deeply

Active Learning, Working Memory, & Silver Bullets

If Your Dreams Don't Scare You, They're Not Big Enough.

Peter E. Doolittle
Assistant Provost for Teaching and Learning
Executive Director, Center for Instructional Development and Educational Research
Professor, Educational Psychology
Virginia Tech

Anticipation Guide

Directions: **Agree**, **Disagree**, or **Revise**.

1. Anyone can teach.
2. Active learning in students is fostered by note taking and discussions with fellow students.
3. Technology allows teachers to teach more powerfully, more efficiently, and with less effort.

Agenda

1. Introduction
2. Learning First
3. Working Memory Capacity
4. Silver Bullets
5. Conclusion

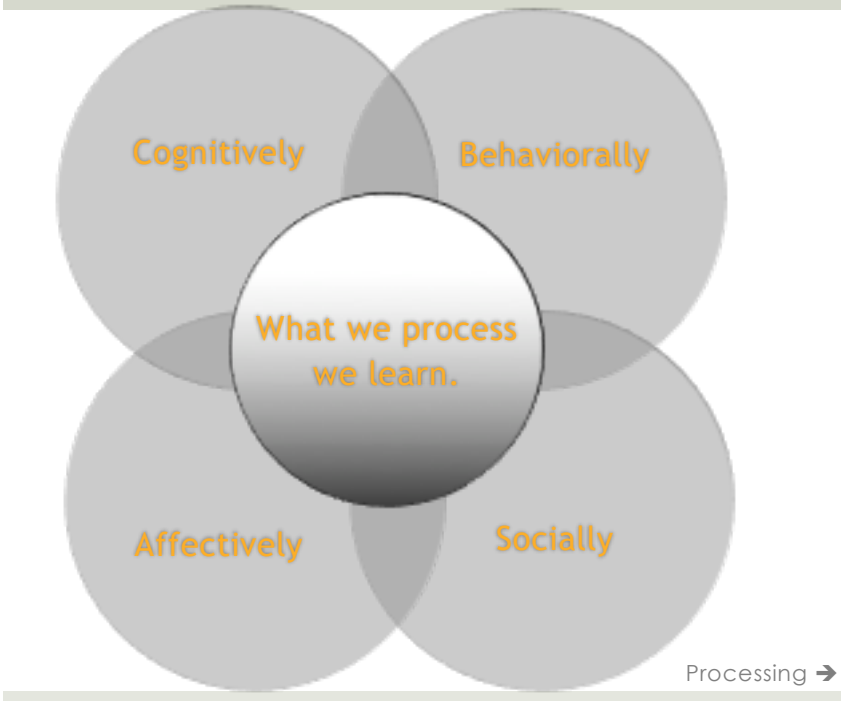
Perspective →

Learning First.

Words →

What does this activity tell us?

1. Knowledge is actively constructed.
2. Knowledge is organized.
3. When specifics are lost, meaning remains.
4. Strategies enhance construction.
5. Knowledge/construction can be assessed.



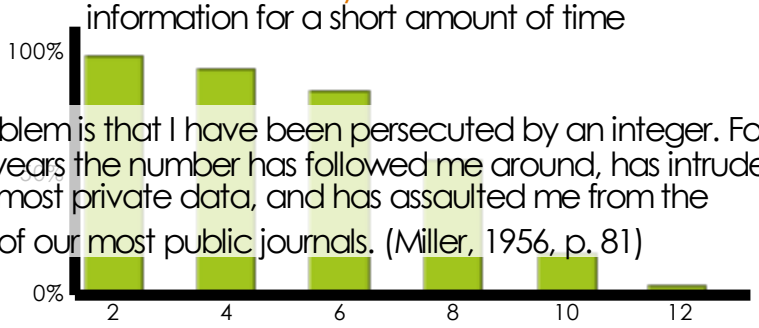
Working Memory Capacity

Write down as many letters as you can remember, in order.

BCYHLPFTNWBNWZSCPL

Short-Term Memory

Short term memory = retention of a small amount of information for a short amount of time



My problem is that I have been persecuted by an integer. For seven years the number has followed me around, has intruded on my most private data, and has assaulted me from the pages of our most public journals. (Miller, 1956, p. 81)

Working Memory

- Crucible of Thought
  - Stores Immediate Experiences
  - Access Long-Term Memory
  - Processes Experience and Memory
  - Maintains Current Goal for Processing
  - (especially in the presence of distraction)
- STM = Storage
- WM = Storage + Processing = Attentional Control

(Doolittle & Mariano, 2008; Unsworth & Engle, 2007; Vergauwe et al., 2015)

Working Memory Capacity

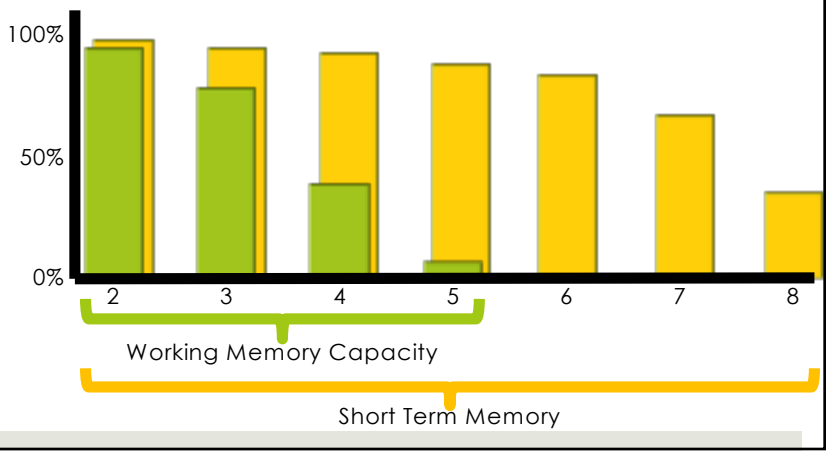
Recall the words out loud, in order.

(3 + 7) / 2 = 5 ? Cow
(8 - 3) + 1 = 7 ? Star

Cow, Star

Operation Span Task

Working Memory Capacity



Working Memory Capacity

Positive impacts (↑WMC) include:

- Fluid Intelligence/Fluid Reasoning
- LTM Activation
- Attentional Control
- Reading/Language Comprehension
- Reasoning
- Storytelling
- Complex Cognition

(Doolittle & Mariano, 2008; Unsworth & Engle, 2007; Vergauwe et al., 2015)

Working Memory Capacity

Working Memory Training ≠ ↑ WMC

Learn & Use Strategies

(Redick, Shipstead, Wiemers, Melby-Lervag, &Hulme, 2015)

Working Memory Capacity

WMC Strategies

1. Segmenting Instruction
2. Scaffolding Instruction
3. Lower Cognitive Load/Lower Information Density
4. Examples, Examples, Examples
5. Practice with Feedback

Clarity ➔

Working Memory Capacity

Multitasking

Driving ➔

Multitasking: The Myth

- Tapscott, 1998
  - multitasking
- Frand, 2000
  - "multitasking way of life"
- Prensky , 2001
  - "digital natives accustomed to the twitch-speed, multitasking "

Watson, C. E., Terry, K.,& Doolittle, P. (2012). Please read while texting and driving. In J. Groccia (Ed.), *To improve the academy* (vol. 31) (pp. 295-310). Bolton, MA: Anchor.

Was Any Research Available?

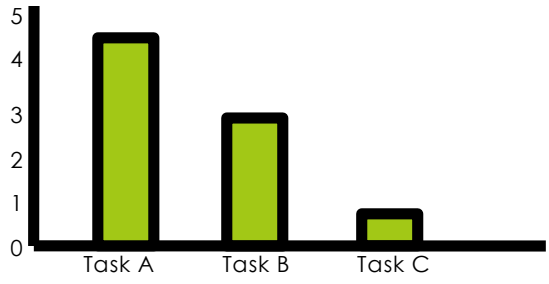
"The greater the number of objects to which our consciousness is simultaneously extended, the smaller is the intensity with which it is able to consider each."

Hamilton, Mansel, & Veitch 1861

Processing, WMC, & Multitasking

2 to 60 by 2s

Results



A + A
Low

A + C
Med

C + C
High

Multitasking and Research

"The truth to multitasking is evident in the empirical studies… humans lack the cognitive, behavioral, and cortical structures necessary to multitask effectively."

-- Watson, Terry, & Doolittle (2012)

Multitasking and Research

"fMRI technology found that multitasking is not actually a concurrent process, but a sequential one that involves task-switching."

-- Charron & Koechlin (2010)

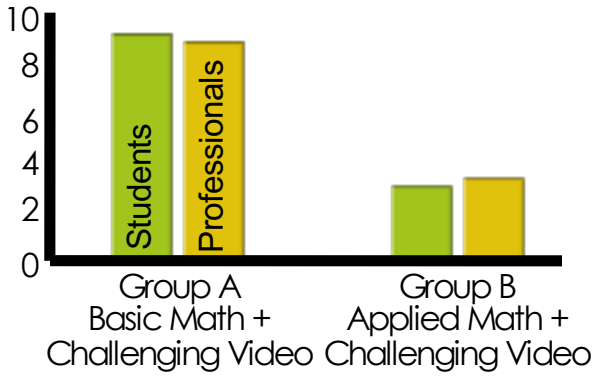
A Few Multitasking Results

- ↑ MT with a laptop in class → ↓ retention & class performance
- ↑ MT while studying → ↓ class performance
- ↑ laptop multitasking → ↓ performance by multitasker (11 %)
- ↑ laptop multitasking → ↓ performance by nearby peers (17 %)

(Judd, 2013; Junco & Cotton, 2011; Sana, Weston, & Cepeda, 2012; Zhang, 2015)

Accounting Students & Professionals

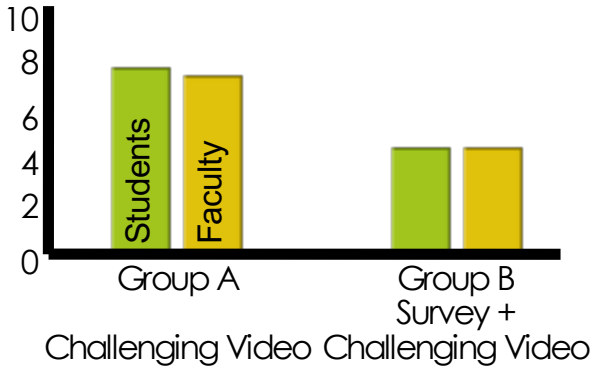
24 years old 50 years old



Negangard, Ozlanski, Pyzoha, & Doolittle (2015)

Students & Faculty

19 years old 41 years old



Doolittle (2015)

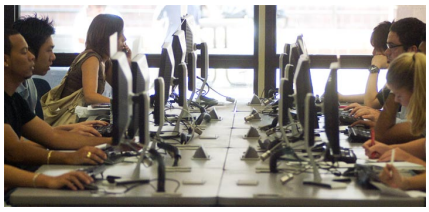
Multitasking, Teaching, and Learning

1. Students need to be conscious of multitasking - multitasking decreases learning and performance.
2. Students need to create non-multitasking environments in which to read, plan, & think – be self-regulated.
3. Students should foster automaticity and expertise though practice and feedback to reduce the effects of multitasking.

Multitasking, Learning, & Technology

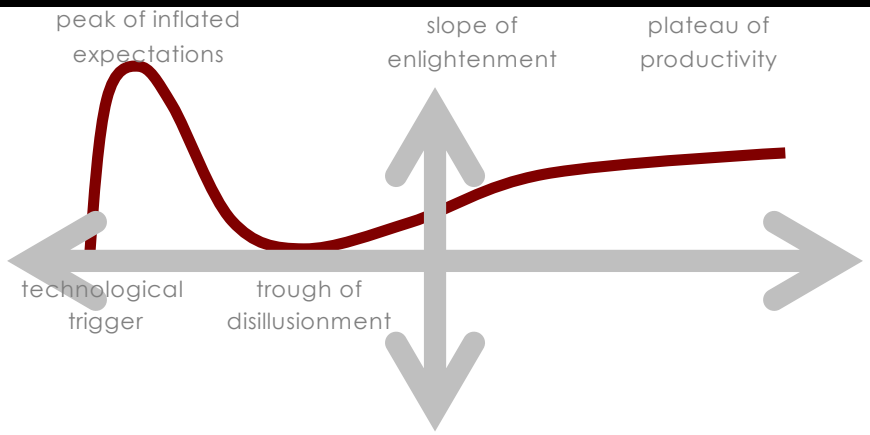
1. Faculty need to be conscious of multitasking - multitasking decreases learning and performance.
2. Faculty need to scaffold students' learning when multitasking is likely to be necessary.
3. Faculty should foster automaticity and expertise though practice and feedback to reduce the effects of multitasking.

Silver Bullets



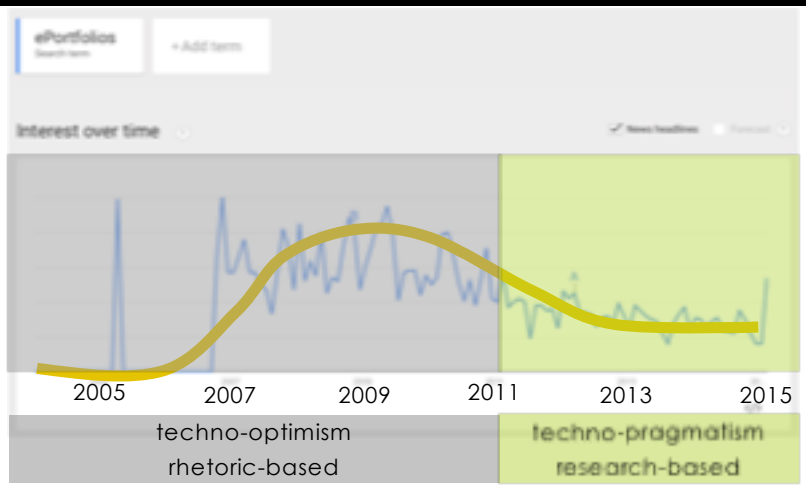
Gartner Hype Cycle

Silver Bullets: Technologies



Google Trends

Silver Bullet: ePortfolios



Silver Bullets: ePortfolios

1996-2014

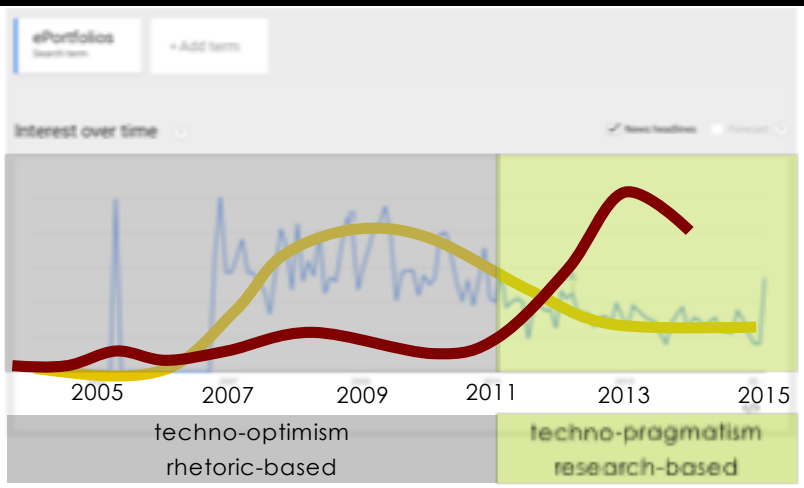
Article Type		N	%
Descriptive	(examples, do/don't)	92	42
Affective	(opinions, perceptions)	63	29
Outcomes	**(learning, motivation)**	**36**	**17**
Technology	(user interface, platform)	18	8
Assessment	(use of rubrics/tools)	8	4
	Total	217	

Bryant, L., & Chittum, J. (2013). ePortfolio effectiveness: A(n ill-fated) search for empirical support. *International Journal of ePortfolio, 3*(2),189-198.

Chittum, J., Woodyard, J., & Bryant, L. (2016).

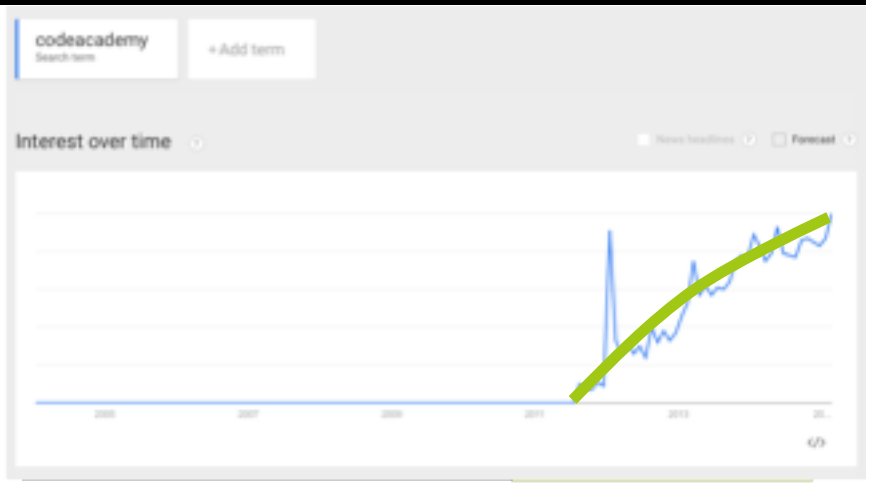
Google Trends

Silver Bullet: ePortfolios



Google Trends

Silver Bullet: Others



Take Home and Apply

- Learning through Processing
- Respecting and Leveraging WMC
- Avoiding Silver Bullets

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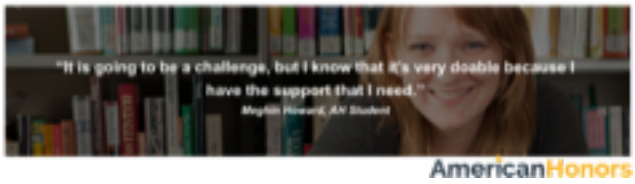

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