

From Silver Bullets to First Principles

Effectively Leveraging Technology in Higher Education

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Anticipation Guide

1. Teaching involves presenting students with material and holding students accountable for learning the material.
2. Technology allows teachers to teach more powerfully, more efficiently, and with less effort.
3. In online teaching/learning, students connect with peers, near and far, to construct knowledge.

Yes? No? What would you
change?

Introductory Frame

So...

a philosopher,
a monk, and
a researcher

balance

responsibility

student development

walk into my mind...

3 Questions to Avoid Silver Bullets

- 1.
- 2.
- 3.

Part 1

••••• AT&T 10:29 AM 63%
My friend was like: meet people in real life
instead of tinder. I was like: Real life? What is this
app and where can I download it?
🕒 18m

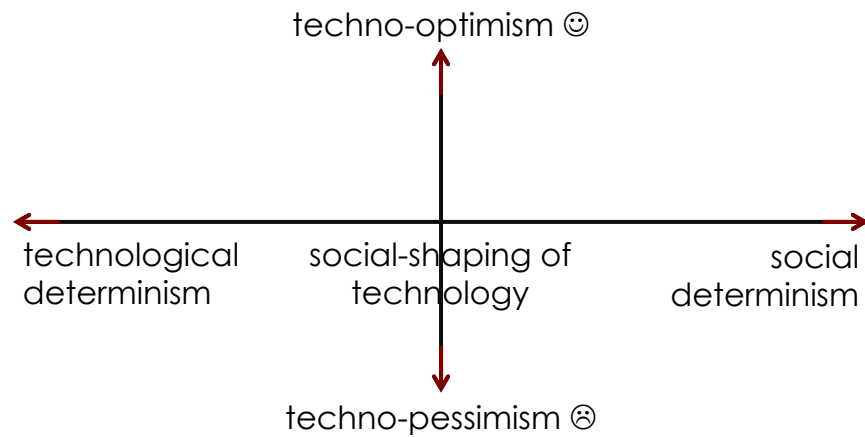
12

A Change in Perspective

https://www.youtube.com/watch?v=Weq_sHxghcg

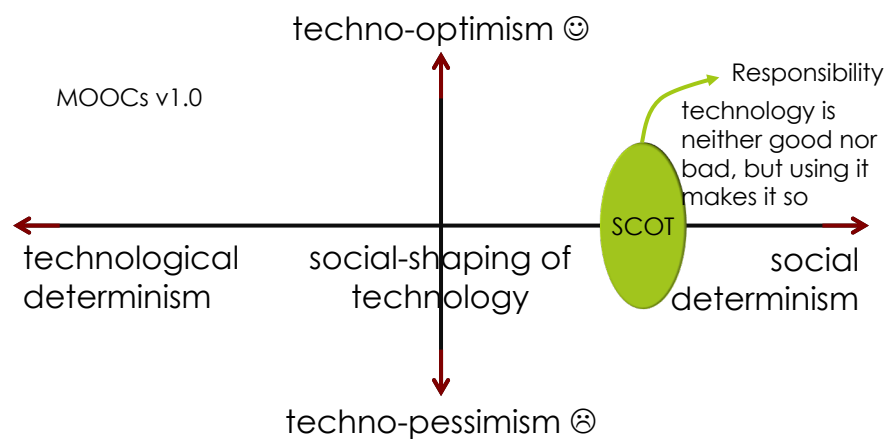
David Stearns, U of Washington

Introductory Frame



David Stearns, U of Washington

Introductory Frame



In 50 years there will only be 10 institutions in the world delivering education, and Udacity has a shot at being one of them.

- Sebastian Thrun (Udacity)



SIMO Master of Science in Applied Finance

Is 2013 Year Of The MOOC?

Massive open online courses are forcing institutions to consider how to offer course credit and verify student identities.

What kind of credit should be given a student half a world away, one who never set foot on the campus and who experienced school as a mix of self-guided instruction, "personalized" online classes and computerized grading?

The New York Times

November 2, 2012

The Year of the MOOC

By LAURA PAPPANO

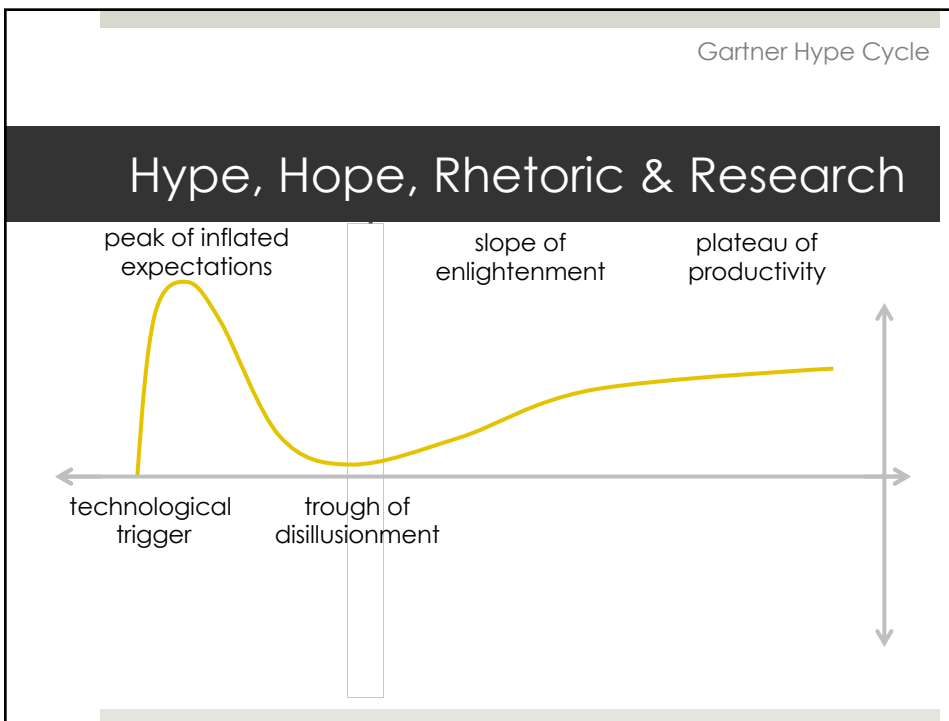
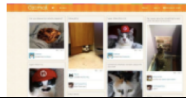
IN late September, as workers applied joint compound to new office walls, code-writing interns and "edX fellows" — grad students and postdocs verse open online courses. As if anyone needed reminding, a row of aqua Post-its

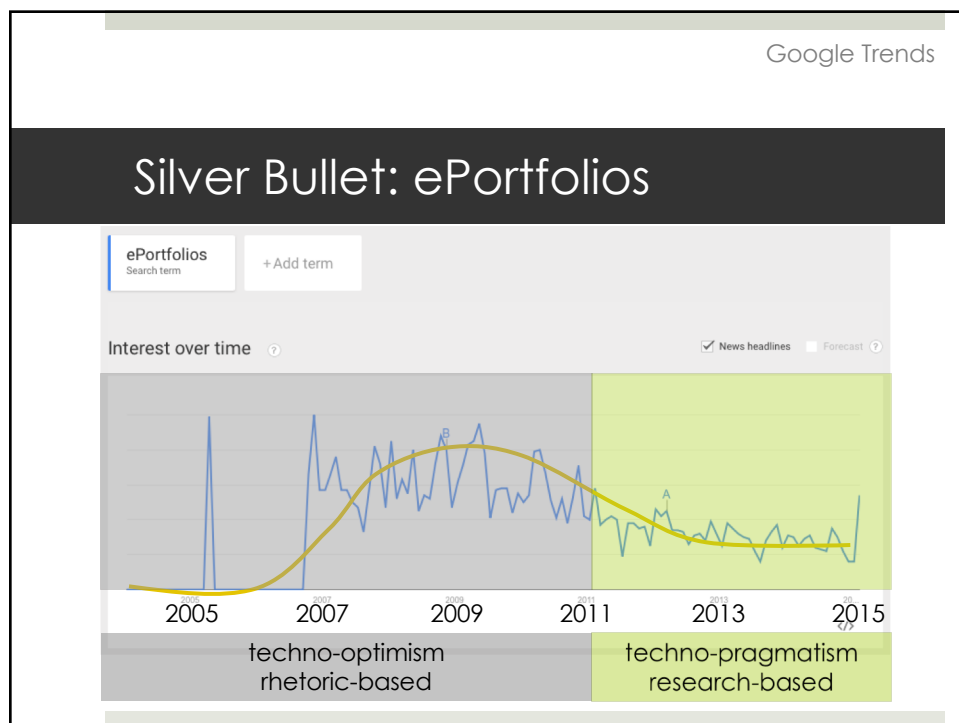
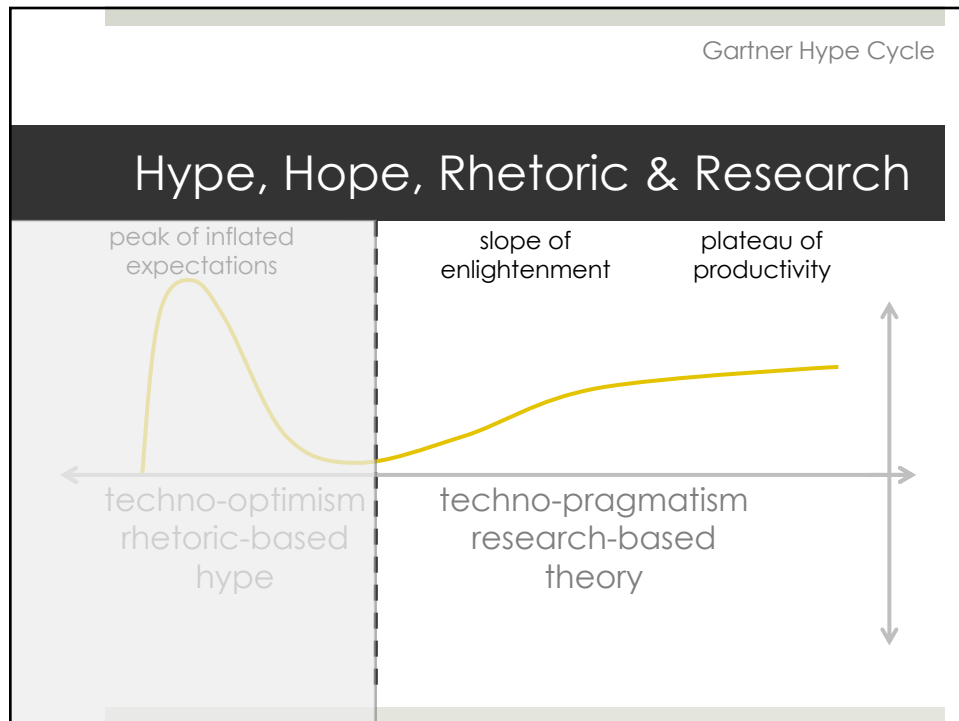
The paint is barely dry, yet edX, the nonprofit start-up from Harvard and MIT, is already open to the public. That's nothing. Coursera, founded just last January, has reached 150,000 signed up for Dr. Thrun's "Introduction to Artificial Intelligence".

"This has caught all of us by surprise," says David Stavens, who formed a company to help universities manage their online courses. "we were three guys in September."

"I like to call this the year of the MOOC."

We found that the majority of MOOCs scored poorly on most [learning] principles...[but] highly on organization and presentation of course material...although most MOOCs are well-packaged, their [learning] quality is low.





Silver Bullets: ePortfolios

1996-2014

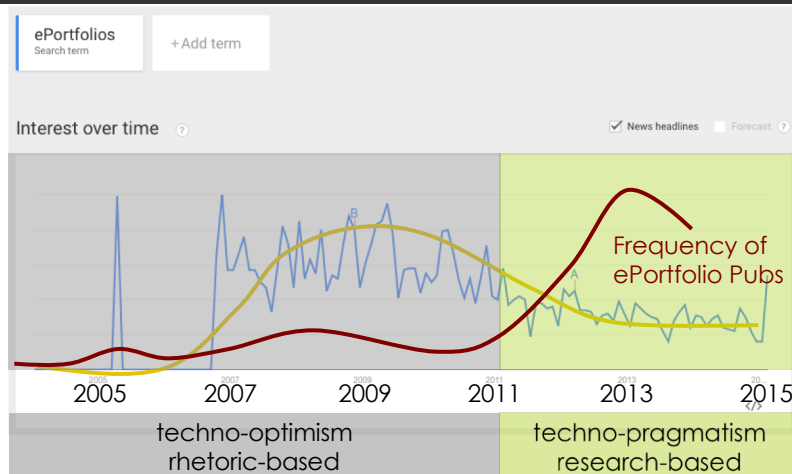
Article Type		N	%
Descriptive	(examples, do/don't)	92	42
Affective	(opinions, perceptions)	63	29
Outcomes	(learning, motivation)	36	17
Technology	(user interface, platform)	18	8
Assessment	(use of rubrics/tools)	8	4
Total		217	

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. (2015).

Google Trends

Silver Bullet: ePortfolios





3 Questions to Avoid Silver Bullets

1. Where's the research?

Part 2

The Need for Clarity

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

Silver Bullets: ePortfolios

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Rest	Snore	Sound
Tired	Bed	Comfort
Awake	Eat	Wake
Dream	Slumber	Night

(Word Activity)

Learning & Meaning

1. Knowledge/meaning is constructed during experience and reconstructed during recall.
2. Knowledge is organized.
3. When specifics are lost, meaning remains.
4. Cognitive strategies are used to function more effectively.
5. We can assess the effectiveness of our thinking.



Segmentation

The Effects of Segmentation and Personalization on Superficial and Comprehensive Strategy Instruction

Authors: Doolittle. P. (2010)

Design: 3 min multimedia tutorial or
2.5 hour multimedia tutorial over 4 days

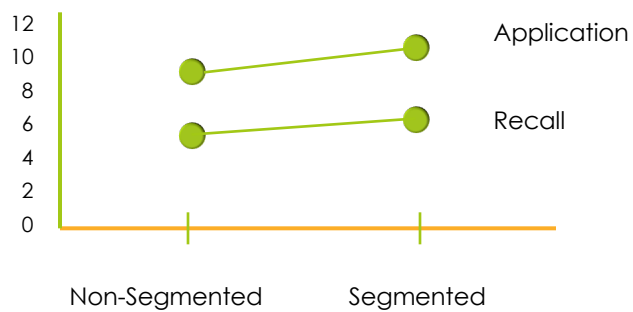
Topic: Historical Inquiry

Variables: Segmentation
Reduces cognitive load, facilitate processing

Publication: Journal of Educational Multimedia and
Hypermedia, 19(2), 5-21

Segmentation

The Effects of Segmentation and Personalization on Superficial and Comprehensive Strategy Instruction



Segmentation

Multimedia Learning and Individual Differences: Mediating the Effects of Working Memory Capacity with Segmentation

Authors: Lusk, D., Evans, A., Jeffery, T. Palmer, K. Wikstrom, C., & Doolittle, P. (2009)

Design: 11 min multimedia tutorial

Topic: Historical Inquiry

Variables: Segmentation
Low/High Working Memory Capacity

Publication: British Journal of Educational Technology, 40(4), 636-651

Working Memory Capacity

- 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)

Working Memory Capacity

- Storage + Processing = Attentional Control
- Positive impacts include:
 - Fluid Intelligence
 - LTM Activation
 - Attentional Control
 - Reading/Language Comprehension
 - Reasoning
 - Storytelling

Working Memory Capacity

Recall the words out loud, in order.

$(3 + 7) / 2 = 5$? Cow

$(8 - 3) + 1 = 7$? Star

Operation Span Task
(explain directions)

Working Memory Capacity

Recall the words out loud, in order.

$$(9 - 6) / 3 = 2 ? \text{ Grass}$$

$$(5 + 3) - 6 = 2 ? \text{ Phone}$$

Working Memory Capacity

Recall the words out loud, in order.

$$(7 + 2) + 1 = 9 ? \text{ White}$$

$$(3 + 4) + 2 = 9 ? \text{ Cement}$$

$$(2 - 0) / 2 = 2 ? \text{ Pony}$$

Working Memory Capacity

Recall the words out loud, in order.

$(9 - 2) - 2 = 4$? System
 $(1 + 7) / 4 = 2$? Explore
 $(2 + 1) * 3 = 9$? Lips
 $(6 - 4) * 3 = 8$? Wired
 $(5 + 5) - 6 = 4$? Spring

Segmentation

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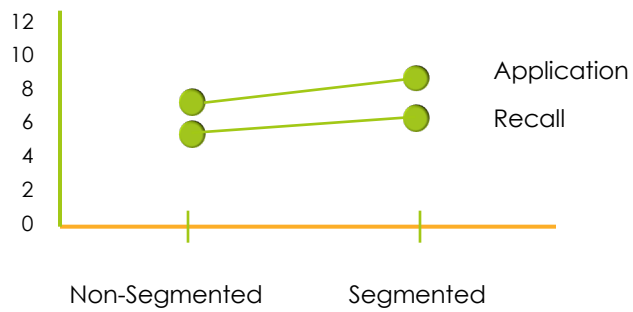
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Publication: British Journal of Educational Technology, 40(4), 636-651

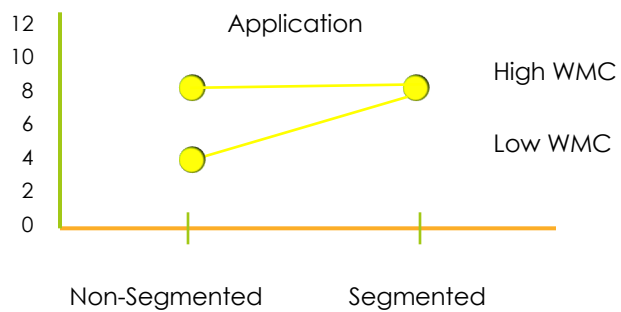
Segmentation

Multimedia Learning and Individual Differences: Mediating the Effects of Working Memory Capacity with Segmentation



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Multimedia Learning and Individual Differences: Mediating the Effects of Working Memory Capacity with Segmentation



Segmentation

Effect of Segmentation and Learner Disposition on Learning in a Multimedia Instructional Environment

Authors: Doolittle, P., Bryant, L., & Chittum, J. (2014)

Design: 9 min multimedia tutorial

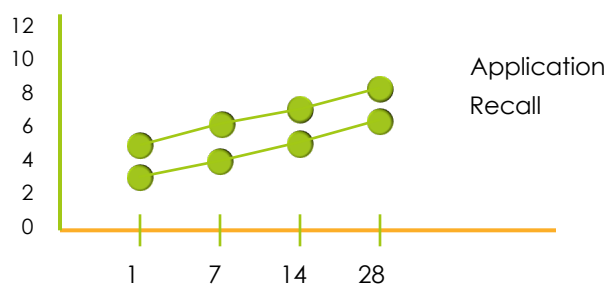
Topic: Historical Inquiry

Variables: Segmentation
1, 7, 14, & 28 segments

Publication: British Journal of Educational Technology

Segmentation

Effect of Segmentation and Learner Disposition on Learning in a Multimedia Instructional Environment



Segmentation

Effect of Active Segmentation and Processing on Learning in a Multimedia Instructional Environment

Authors: Doolittle, P. (2015)

Design: 9 min multimedia tutorial

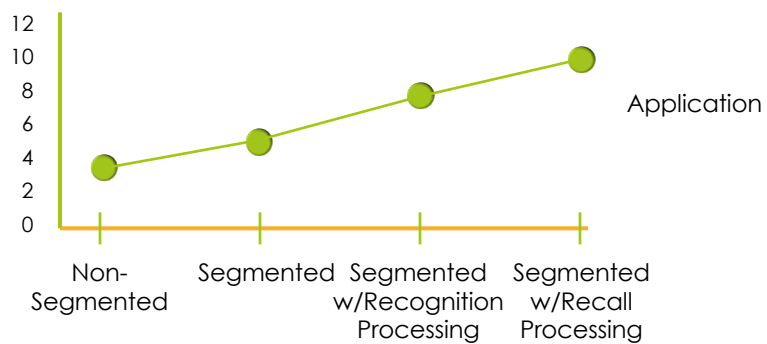
Topic: Historical Inquiry

Variables: Segmentation
Recognition Processing vs Recall Processing

Publication: Submitted

Segmentation

Effect of Active Segmentation and Processing on Learning in a Multimedia Instructional Environment



3 Questions to Avoid Silver Bullets

1. Where's the research?
2. Where's the processing?

When Hype & Research Collide

Multitasking

Multitasking: The Myth

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

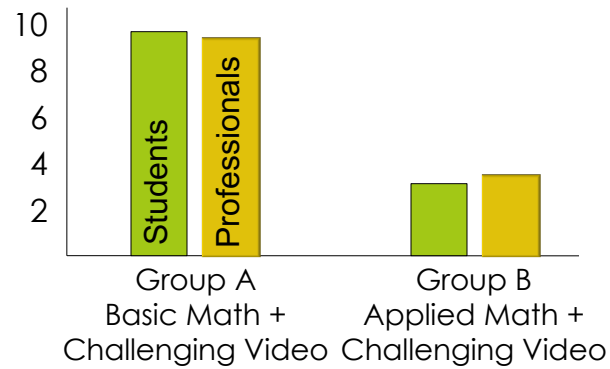
Watson, C. E., Terry, K., & Doolittle, P. (2012). Please read while texting and driving. In J. Groccia (Ed.), *To improve the academy* (vol. 31) (pp. 295-310). Bolton, MA: Anchor.

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."

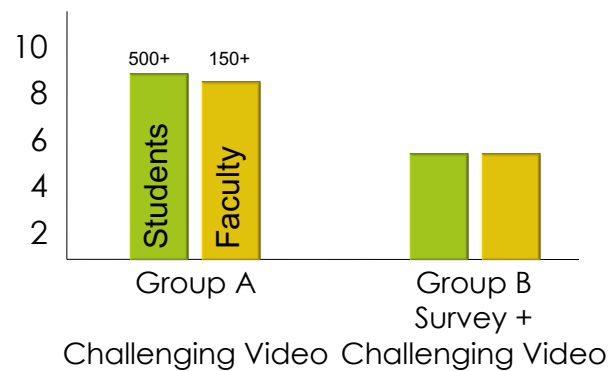
Hamilton, Mansel, & Veitch 1861

24 year olds 50 year olds
Students, Professionals, Multitasking



Negangard, Ozlanski, Pyzoha, & Doolittle (2015)

19 year olds 44 year olds
Students, Faculty, Multitasking



Doolittle, Woodyard, & Chittum (2015)

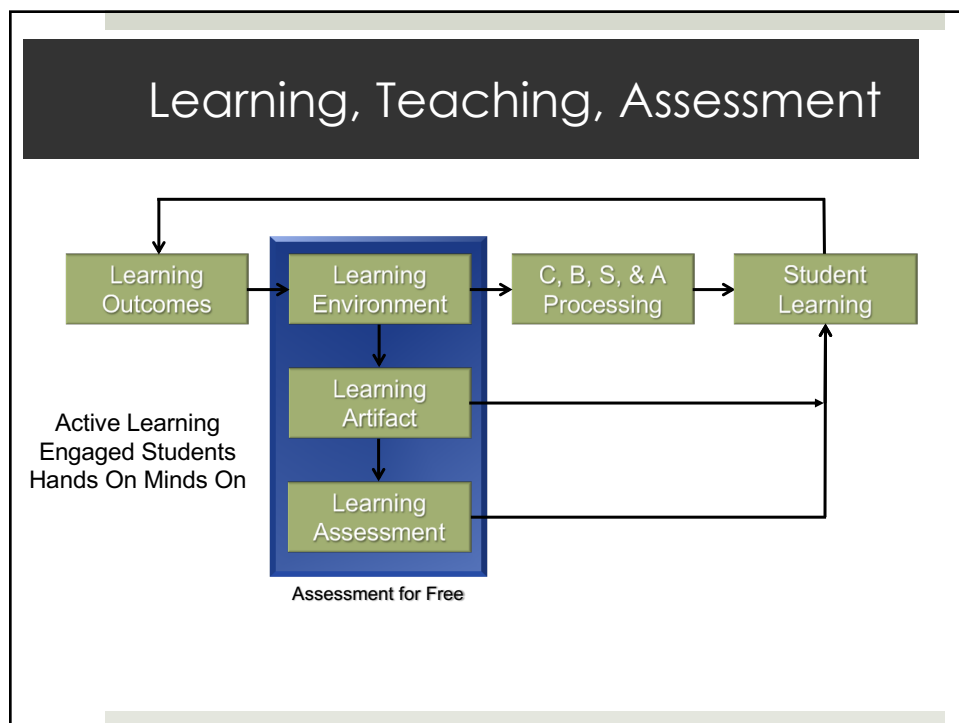
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2. Where's the processing?

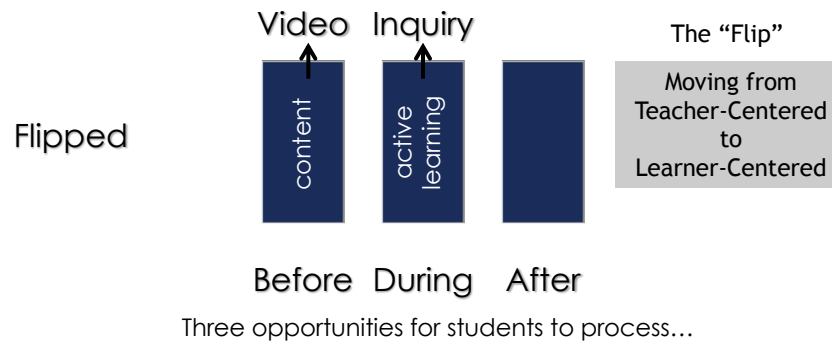
Part 3

The Need to Plan

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



Flipping: Design Beyond Video



Learning is not magic, it's by design.

3 Questions to Avoid Silver Bullets

1. Where's the research?
2. Where's the processing?
3. Where's the design?

3 questions to ask at every session

Flipping • Learning Spaces • Microcredentialing • MOOCs
 Social Web • Data Visualization • Feedback • Questions
 Faculty Development • Learning at Scale • Gaming
 Learning Analytics • Apple TV • 3D Modeling • Personalizing
 Schoology • VoiceThread • Respondus • MobLab • Artstor

The End

So...

a philosopher,
a monk, and
a researcher

balance
responsibility
student development

walk into my mind...