



# Improving Teaching & Learning

Andy Neill  
Professor of Biology  
Joliet Junior College  
aneill@jjc.edu



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## Improving Teaching & Learning

### Defining our terms of engagement

- **Teacher** – person who facilitates learning
- **Learner / Student** – person who studies a subject
- **Teaching / Learning** – the act of doing
- **Educate** – to provide knowledge and stimulate mental growth
- **Thinking** – combining information in new ways



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## Improving Teaching & Learning

**“Instead of making the work easier,  
let’s make the  
thinking easier.”**

**Daniel T. Willingham**

*Why Don't Students Like School*

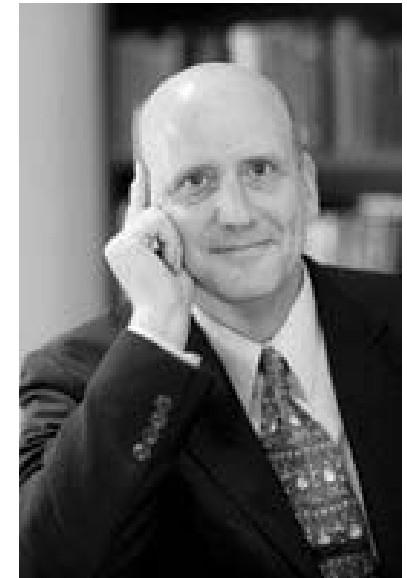
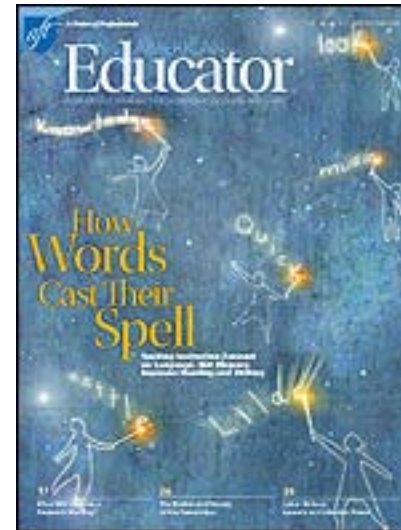


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## Improving Teaching & Learning

- The Cognitive Scientist
- Daniel T. Willingham
- University of Virginia
- Lucid writing on the subject of cognitive psychology, memory and learning
- *American Educator*, Winter 2008-2009



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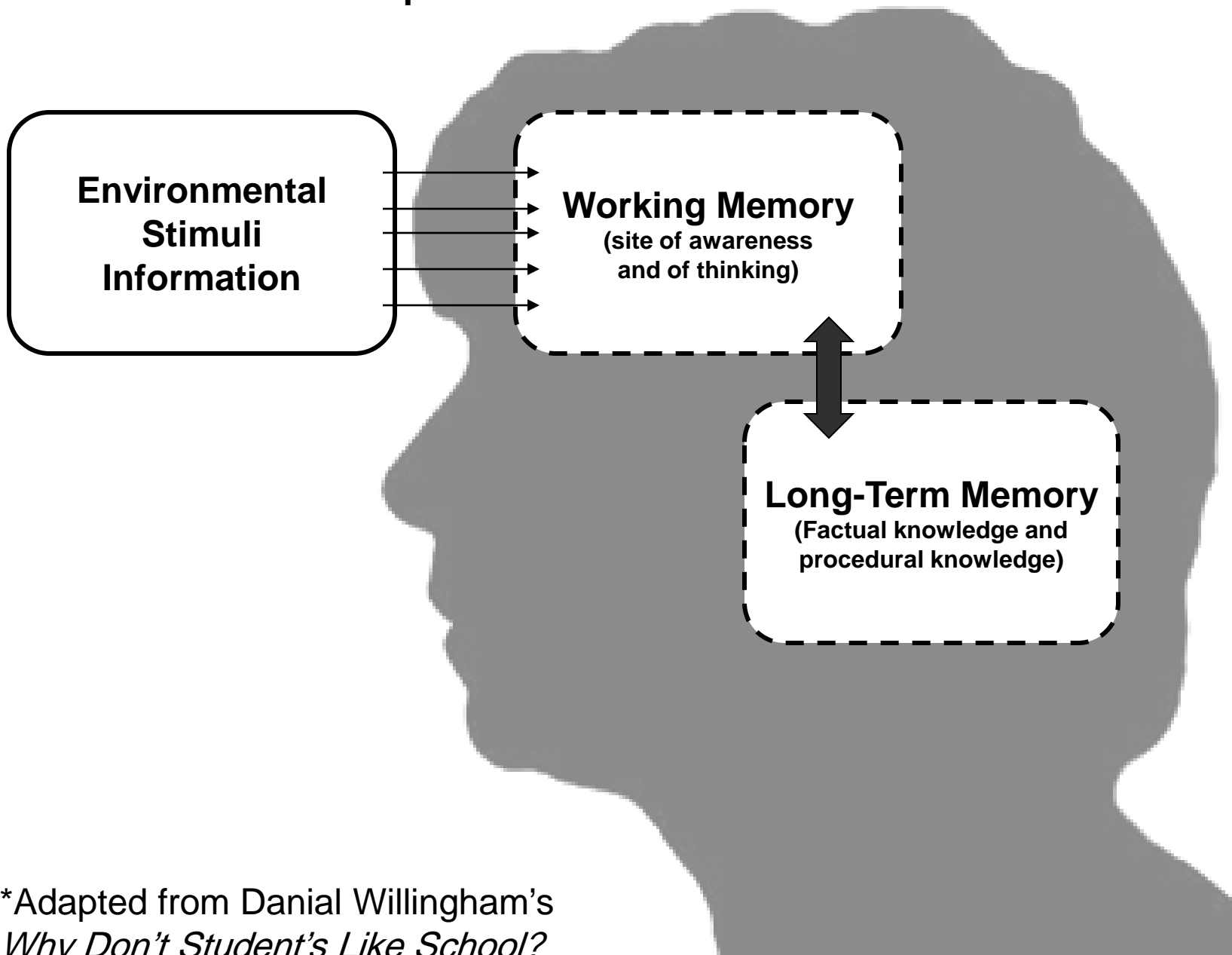
### Memory Principles (Obvious Yet Overlooked)...

- **Principle One**: Memories are formed as the residue of thought.
- **Principle Two**: Memories are inaccessible mostly due to missing or ambiguous cues.
- **Principle Three**: People tend to think their learning is more complete than it really is.



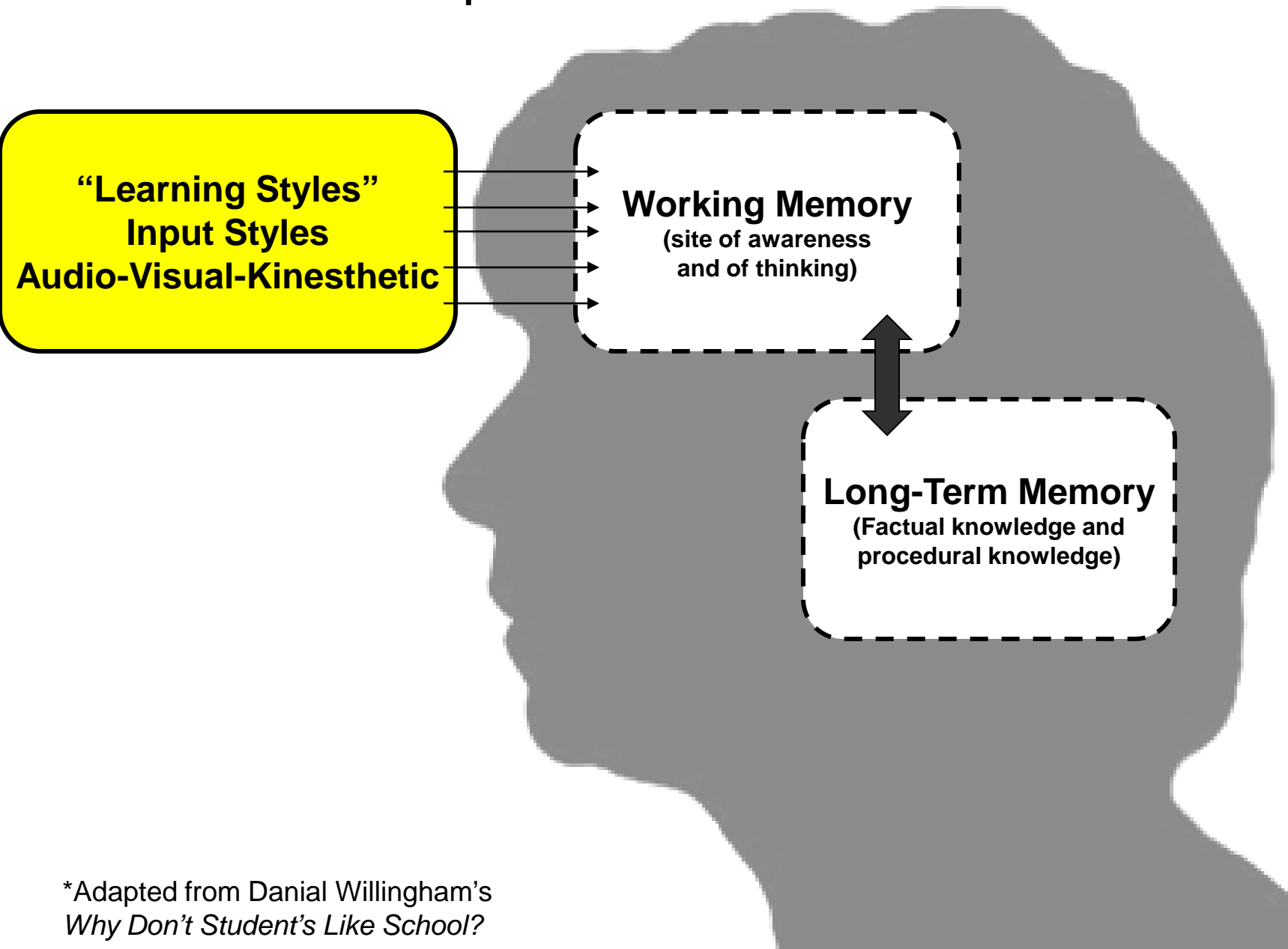
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## Simplest Model of the Mind Possible\*



\*Adapted from Danial Willingham's  
*Why Don't Student's Like School?*

# Simplest Model of the Mind Possible\*



\*Adapted from Danial Willingham’s *Why Don’t Student’s Like School?*



# Improving Teaching & Learning

## Mnemonic Devices...

- Pegword
- Method of Loci
- Acronym
- Acrostic
- Music or Rhymes
- Mnemonic Associations
- Keyword





# Improving Teaching & Learning

Acronym-Acrostic Hybrid

Memorable phrases

Enhances recall

S  
C  
O  
P  
E  
S



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# Improving Teaching & Learning

**S**can at low power

**C**enter the specimen

**fO**cus with coarse knob

**P**ower up to med/high

**finE** focus only

**S**hut-down the shutter lever



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### Student Metacognitive Assessment... (Thinking about their thinking)

- *“My mnemonic (sic) helped. It helped because I spent a lot of extra time trying to figure our (sic) ideas for the word thus, making me focus more attention to that one vocabulary word.”*

Bio151 Student, Fall  
2009



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# Improving Teaching & Learning

## Student Metacognitive Assessment... (Thinking about their thinking)

- *“My mnemonic DID help! When I saw the word cellulose in question 4 it reminded me of my mnemonic where I bumped into the wall of my house while on my cell phone.”*
- Example of Method-of-Loci Mnemonic
- Addresses Second Memory Principle
- Learning was successful for this student in this small isolated incident





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## Student Metacognitive Assessment... (Thinking about their thinking)

**B**ig Bluestem

**L**ittle Bluestem

**I**ndian Grass

**S**witch Grass

**S**ide Oats Grama



Joy H. Bio107, Fall 2009



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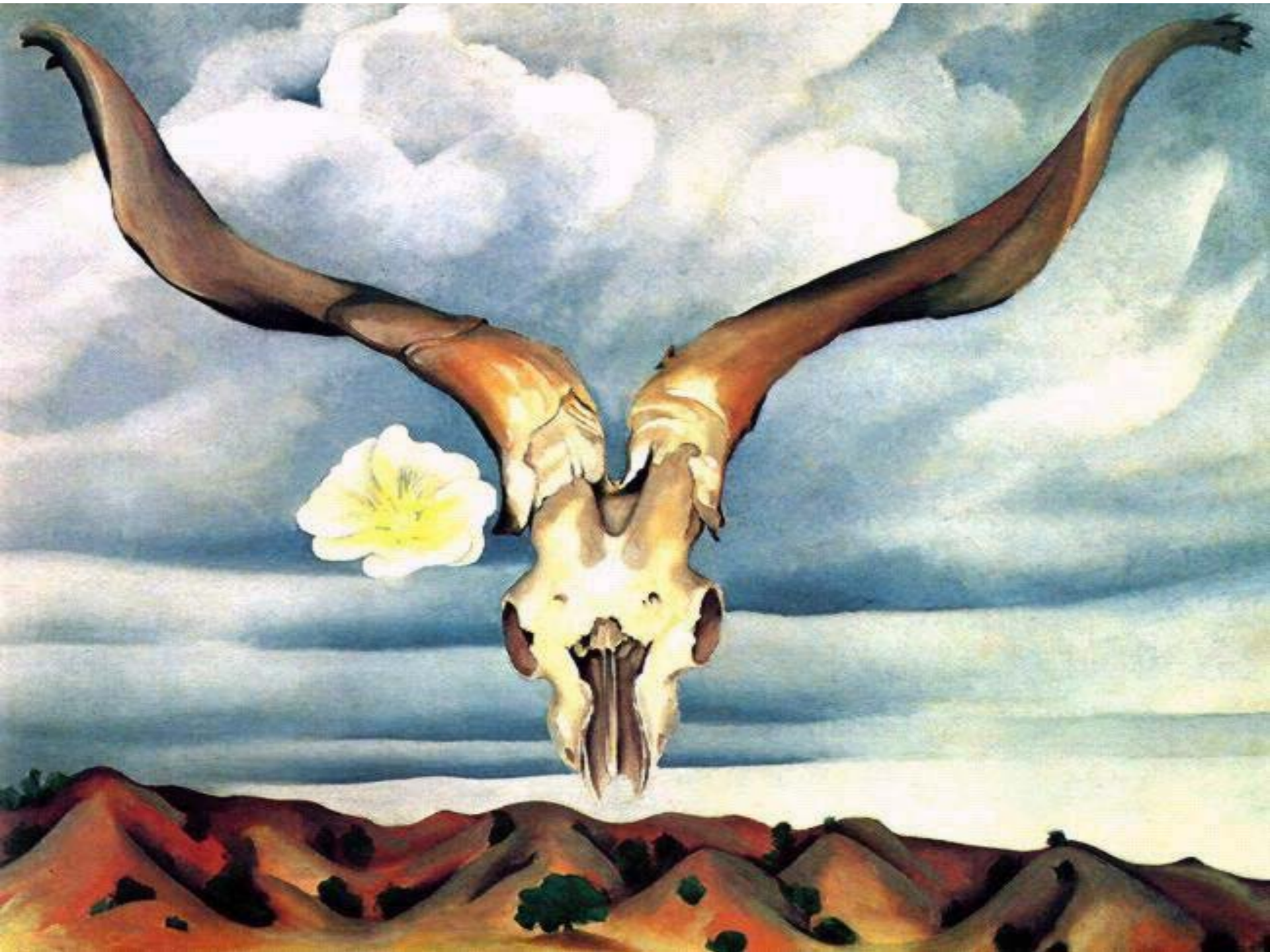
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## Reflective insight...



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## Improving Teaching & Learning

- **Improving Memory & Learning Assessment Questionnaire**
- **Bio151 Fall 2009 (n=20)**

***Have you ever been taught study techniques in another class?***

**8 Yes**

**12 No**



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## Improving Teaching & Learning

- **Improving Memory & Learning Assessment Questionnaire**
- **Bio151 Fall 2009 (n=20)**

***Did reading and discussing about how students study and the ways memories are formed help your learning this semester?***

**13 Yes**

**6 No**



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## Improving Teaching & Learning

- **Improving Memory & Learning Assessment Questionnaire**
- **Bio151 Fall 2009 (n=20)**

***Do you think an occasional lesson on learning is a beneficial use of class time?***

**16 Yes**

**3 No**



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## Improving Teaching & Learning

- **Improving Memory & Learning Assessment Questionnaire**
- **Bio151 Fall 2009 (n=20)**

***Have you devoted more time to studying each week because we discussed some of the cognitive science behind learning mentioned in Willingham's article?***

**13 Yes**

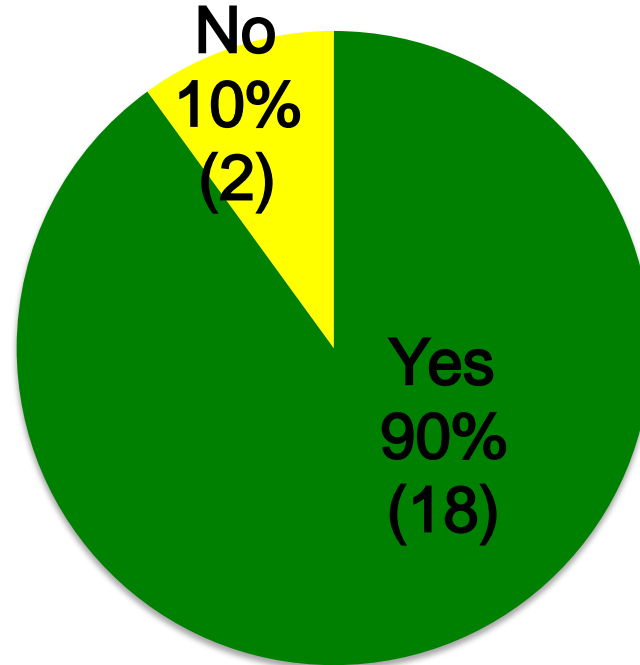
**6 No**



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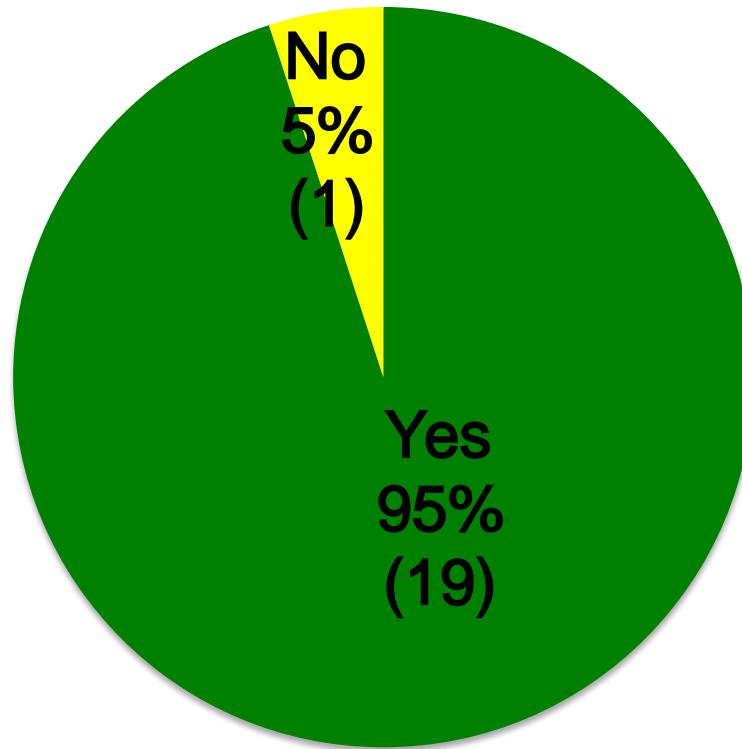


## Used mnemonic memory device before?





## Mnemonic useful in this class?

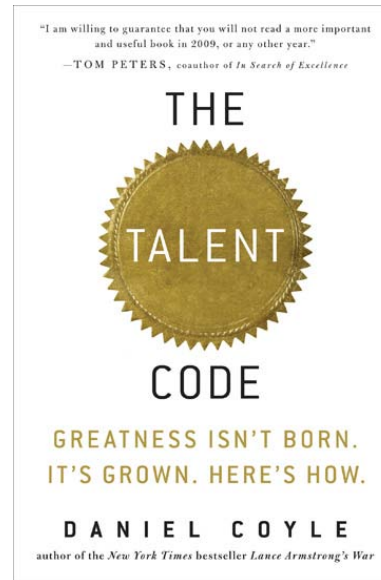




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## Got 10,000 Hours?

- Anders Ericsson
- Expert status
- Deep Practice
- Chunking Information
- Instilling Passion?



***The Talent Code***  
**Daniel Coyle**



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# Studying & Practicing

- **Expert = 10,000 hours**
- **Passing a class**
- **Bio151 = 5 credit hours**
- **7 contact/week**
- **10 hours studying/week**
- **272 hours in 16 weeks**
- **Fast Track Degrees?!**
- **Time in school vital**
- **Can't rush a fine wine**



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**We are what we do.**

- **Children 3-4 hrs TV<sup>1</sup>**
- **HS grad 15,000 hrs TV and 1,100 hrs in school<sup>1</sup>**
- **30,000 more words by age 3 in talkative homes<sup>2</sup>**
- **75 B txt msg evry month<sup>3</sup>**



<sup>1</sup>American Academy of Children & Adolescent Psychiatry 2001

<sup>1</sup>Watching TV Sensibly

<sup>2</sup>Literacy Empowers All Families, Sarasota, Florida

<sup>3</sup>Cellsigns 2010



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**Thanks for attending!**

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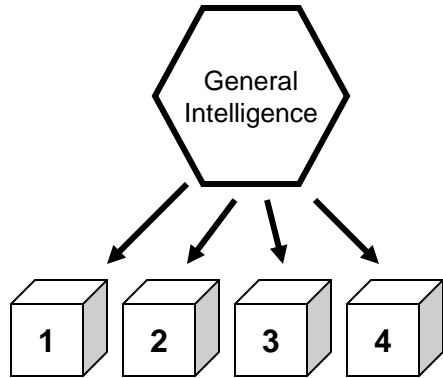


Figure 1: General intelligence underlies all intellectual tasks. No evidence supports this model.

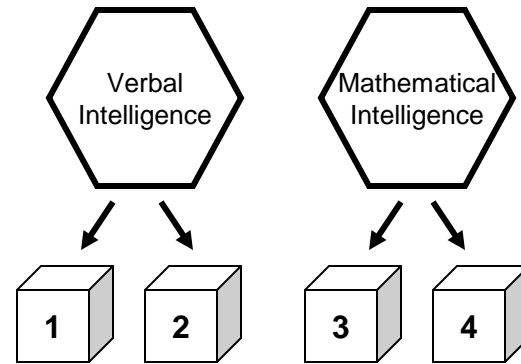


Figure 2: Verbal and mathematical intelligence are discrete and task specific. No evidence supports this model.

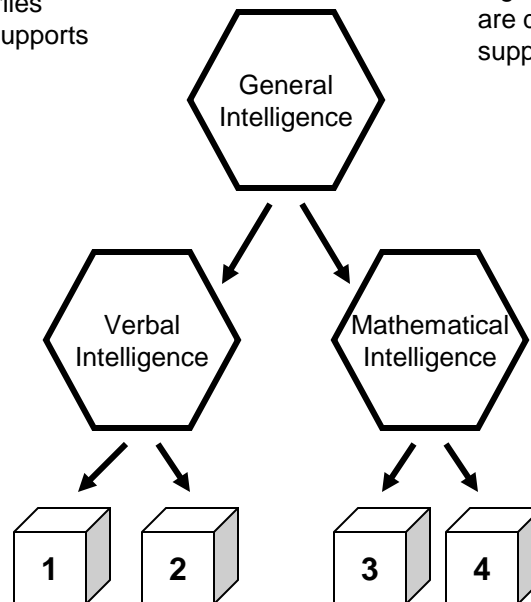


Figure 3: The dominant view of intelligence. General intelligence influences both verbal and mathematical.