Beliefs about Learning that Make You Stupid

• Learning is fast
• Being good at a subject is a matter of inborn talent rather than hard work,
• Knowledge is composed of isolated facts
• I’m really good at multi-tasking, especially during class or studying

Fixed vs. Growth Mindset (Carol Dweck)
Student mindset is his or her attitudes, beliefs, and expectations about learning and the whole academic context
Fixed Mindset: Ability and aptitude is inborn and unchangeable
Growth Mindset: Ability and aptitude are a product of effort and practice

The Nature of Attention
Attention is like a small spotlight in a darkened room.
The focus of attention is so narrow that we can’t take in a whole scene at once
Anything that draws attention away from the critical feature hurts attention
Inattentional blindness and Attentional Blink

Metacognition
• A student’s awareness of their level of understanding of a topic
• Metacognition distinguishes between stronger and weaker students
• One of the major tasks for a freshman is developing good metacognition
  – In high school, they spent years developing a metacognitive sense that is likely inadequate or even counterproductive for college.

Which of the following is the MOST important ingredient for successful learning?
1. The intention and desire to learn
2. Paying close attention to the material as you study
3. Learning in a way that matches your personal Learning Style?
4. The time you spend studying
5. What you think about while studying

Levels of Processing
• Shallow processing focuses on spelling, appearance and sound.
  o Rote memorization of facts
  o Flashcards with isolated facts
• Deep processing focuses on subjective meaning.
Relating new information to prior knowledge or other information
Making information personally meaningful

Achieving Deeper Processing
As you study, follow these principles:
• **Elaboration**: How does this concept relate to other concepts? Can I make it a story?
• **Distinctiveness**: How is this concept different from other concepts?
• **Personal**: How can I relate this to my own personal experience?
• **Appropriate to Retrieval and Application**: How am I expected to use or apply this?

Nuthall’s Rule of Three
For long-term learning to occur: *A student needed to encounter, on at least three different occasions, the complete set of information she or he needed to understand a concept.* Nuthall (2007, p. 63)

Cognitive Load Theory (e.g. van Merrienboer & Sweller, 2005)
• Mental effort is the amount of concentration that a person has available to devote to tasks
• Mental effort is always a limited resource
• Cognitive Load is the total amount of mental effort a task requires to complete it
  • A person can do multiple tasks as long as the total cognitive load does not exceed available mental effort
• If cognitive load exceeds available mental effort, then performance suffers

Three Types of Cognitive Load (Paas, Van Gog, & Sweller, 2010)
• **Intrinsic**: Load caused by the complexity of concept to be learned
• **Germaine**: Load caused by pedagogy and activities to learn concept
• **Extraneous**: Load caused by all factors unrelated to learning concept

Implications of Cognitive Load Theory
• If the cognitive load demanded of students exceeds their available mental effort, then learning will not occur
• If the cognitive load demanded of students takes up most or all of available cognitive effort, then there will not be enough mental effort available for learning or schema formation
• Teachers must monitor, manage and minimize cognitive load to allow schema development as well as design activities to promote schema development

The Curse of Expertise (aka Curse of Knowledge)
• The more one knows about a topic, the harder it becomes to remember not knowing a topic and the effort required to learn that topic
• Experts are overconfident in their ability to explain concepts (Fisher & Keil, 2015)
• Experts are poor at estimating the time and difficulty for novices to learn a concept (Hinds, 1999)
A teachable moment occurs when we...

- Become aware of gap or error in our knowledge
- See the value of correcting it
- Have a trusted source of accurate information
- Believe we can master new understanding given sufficient effort
- Have sufficient resources to attend to that source
- Have sufficient prior knowledge to comprehend information
- Recognize when we have mastered the new understanding
- Process new information for long-term recall
- Prime new information to be recalled appropriately and be preferred over prior knowledge

Perceptual Judgment Task

Instructions: You will hear a list of 24 words. For each word, check the “YES” box or “NO” box according to the instructions given to you. Pay attention and just do the best you can.

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Unitasking versus Multitasking

This activity will compare your ability to complete two tasks under two different conditions. In one condition, you will unitask (I made up that word), in which you will complete one task and then go to the next one. In the second condition, you will multi-task, in which you will complete both tasks at the same time by switching back and forth between them. Your time to complete two tasks will be recorded, so it is important that you complete both tasks as quickly as possible, but you must perform both tasks completely and correctly. If you make any errors, you must correct them. You will also be asked to rate the difficulty of each condition.

You will complete this task with a partner. One of you will complete the task while the other times you and records your times. You will then switch roles. Once you both have data, you can each compute the statistics for your results. So decide which of you will be the participant first and which of you will be the observer, then proceed.

Practice: This will give the participant practice on the two tasks.
1) As quickly as you can, but correctly, say the alphabet out loud from A through K in order.
2) As quickly as you can, but correctly, count down from 10 through 0 out loud.

Condition 1:
As quickly as you can, but correctly, first say the alphabet out loud from A through J in order and then count down aloud from 10 through 0. Once you start, you may not start over. You must complete both tasks correctly. The observer will give you the starting signal and record the number of seconds it takes you to complete both tasks.

Time: _______________

Rate your level of agreement with both statements by circling the appropriate number (Note: 1 is Strongly Disagree):

1) This task was easy for me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

2) I had to really concentrate in order to complete this task.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Condition 2:
As quickly as you can, but correctly, alternate between saying out loud the alphabet from A through K and counting down from 10 through 0. You will start with A-10 and then alternate going up with the alphabet and down with numbers. Once you start, you may not start over. You must complete both tasks correctly. The observer will give you the starting signal and record the number of seconds it takes you to complete both tasks.

Time: ________________
Rate your level of agreement with both statements by circling the appropriate number (note 1 is strongly disagree):

1) This task was easy for me.

<table>
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2) I had to really concentrate in order to complete this task.

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Computing the Cost of Multitasking

Once you have your two times, compute the cost of multi-tasking using the formula below. The first task was Uni-tasking and the second task was Multi-tasking.

\[
\% \text{ Cost of Multi-Tasking} = \left(\frac{\text{Time Uni-tasking} - \text{Time Multitasking}}{\text{Time Uni-tasking}}\right) \times 100
\]

A negative score indicates a cost of multi-tasking. A positive score indicates you multi-task better than you perform tasks singly.

Your \% Cost of Mult-tasking: ___________
Resources

Video Series: How to Get the Most Out of Studying

www.samford.edu/how-to-study
Introductory Video: Developing a Mindset for Successful Learning
Video 1: Beliefs That Make You Fail…Or Succeed
Video 2: What Students Should Understand About How People Learn
Video 3: Cognitive Principles for Optimizing Learning
Video 4: Putting the Principles for Optimizing Learning into Practice
Video 5: I Blew the Exam, Now What?

Video Series: The Cognitive Principles of Effective Teaching

Video 1: Beliefs about Teaching
Video 2: The Cognitive Challenges of Teaching: Mindset, Metacognition, and Trust
Video 3: The Cognitive Challenges of Teaching: Prior Knowledge, Misconceptions, Ineffective Learning Strategies, and Transfer
Video 4: The Cognitive Challenges of Teaching: Constraints of Selective Attention, Mental Effort, and Working Memory
Video 5: Teachable Moments, Formative Assessment, and Conceptual Change

Video on Learning Styles

Learning Styles & the Importance of Critical Self-Reflection by Tesia Marshik for TEDxUWLaCrosse
http://tedxtalks.ted.com/video/Learning-Styles-the-Importance

For Further Reading

Books on cognitive research applied to teaching:


Miscommunication and conflicting expectations between teacher and student can undermine instruction even when both the student and teacher are motivated to succeed.

Books on Formative Assessment:


**Blogs and Twitter Feeds**