Experimental research in the past 5 – 10 years has shown that many of our most widely and deeply believed ideas about what helps students learn are actually false! For example:

1. We do NOT learn best when the instruction mode is matched to our “personal learning style,” even though that kind of meshing may seem easier or feel more comfortable. We learn best when the process requires more effort, or is more difficult and less comfortable.

2. We often learn best when we use more than one “learning style” or mode: e.g., visual, auditory, and/or kinesthetic.

3. Repeating material you’re trying to remember – e.g., re-reading a chapter or your highlighted parts of it (unless it’s been some time since you read it), can actually cause problems such as:
   - A false sense of “mastery,” or an illusion of knowledge, based on familiarity or fluency with the text.
   - Mere repetition does not teach us how to apply main ideas in a new context, or how the main ideas relate to other examples not included in the text.
   - We gain no sense of the gaps in our knowledge without self-testing.

““The brain does not store facts, ideas, and experiences like a computer does, as a file that is clicked open, always displaying the identical image. It embeds them in networks of perceptions, facts, and thoughts, slightly different combinations of which bubble up each time….

“Using our memories changes our memories.” [Footnote 2: Carey p. 20]

Strategies for remembering information for longer than a day or two are different from the strategies needed to remember it for a longer period of time. Strategies for rote memorization differ from strategies for learning concepts and knowing how to apply them to new contexts.

Memory systems such as the Peg System, Linking System, and Location Method help “mental athletes” memorize long lists of random numbers or letters and win memory championships, but they are rarely relevant to passing university-level classes. Acronyms can help you memorize a list of words but are similarly not so well-suited to mastering college material.
1. **Spaced Learning**

“Spaced Study” is studying academic material in multiple sessions, with a day or more in between. There is very extensive research evidence suggesting that our brains need time to “consolidate” information we have learned. For example, after reading or listening to a lecture, especially when we review it and quiz ourselves about it more than once later on, memory traces (or mental representations in long term memory) are strengthened, given meaning, and connected to our prior knowledge & memories.²

You don’t necessarily need to study for a long period of time in each session: your review sessions could be as short as 10 minutes!

This strategy requires some “time management”: see if you can schedule multiple study sessions ahead of exam or quiz dates, with some days in between.

Month of: ___________________________

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Exam/quiz subject: 
Exam/quiz date: 
Days I will study:
TOP EMPIRICALLY SUPPORTED LEARNING STRATEGIES

RETRIEVAL PRACTICE

Long-term retention requires practice retrieving information from memory. When we listen to lectures or read & re-read texts we are receiving “input,” but when we take an exam we’re expected to retrieve that input and practice “output.” Also, when we quiz ourselves we discover what we know & don’t yet know.

Examples:
1. Take practice quizzes or tests. Or, create your own quiz: what questions do you think your prof might ask about the material?
2. Teach someone else: explaining a concept to your roommate, or even your water bottle, helps you understand it far more deeply, & identify gaps in your understanding.
3. Create a mind map from memory: create a simple visual representation of the main concepts and how they are related. Then, check your notes or text to see if you have missed any key points.
4. “Cover and Recite”: To review material from a textbook, read a heading while covering up the text below it. Try to recall all the important points made in that section. Then check to see if you missed anything.
5. Preview text chapters before your more careful read.

Ideas and goals for retrieval practice:

LEARNING STYLES AND SENSES

Studying through more than one sensory mode (e.g., visual, auditory, kinesthetic) helps create multiple connections or associations to that material in different parts of the brain.
E.g., besides reading a text and listening to lecture about that material, try reciting the important parts out loud, or even—if you’re daring, experiment with dancing or acting or drawing it!

Ideas and goals for learning styles:

SLEEP

There is overwhelming research evidence of the absolutely essential role of sleep in consolidating memories, or moving information into long-term memory. When preparing for an exam, make sure you get adequate sleep the night before (even better, the week before).
FOCUSED AND DIFFUSED THINKING MODES

Our understanding of a concept, and our ability to integrate it with other memories (or create multiple associations to it) is enhanced by taking a break after a period of focused studying. E.g., after reading a section of a bio-chem text, take a short break to do a more “diffuse” task, such as unloading the dishwasher, going for a short walk, etc.

INTERLEAVE

“Interleave” different subjects or types of problems when you study. For example: when you’ve been learning how to solve various math problems, study for the exam by mixing up different kinds of practice problems. It’s often more helpful to study more than one subject during a study session than to spend long periods of time (perhaps an hour or more) studying just one subject.

CREATE A STUDY SCHEDULE:

How to:
1. List tasks.
2. Determine priorities.
3. Break large tasks into smaller steps.
4. Plan a schedule with diffuse-mode breaks.

Tasks:

Priorities:

Start time: _____:_____ am/pm
I will work for _____ minutes
Subject: _________________
My task broken into smaller parts:
____________________________________________________
____________________________________________________
____________________________________________________

End time: ____:_____ am/pm
I will take a break by:
For _____ minutes

Start time: _____:_____ am/pm
I will work for _____ minutes
Subject: _________________
My task broken into smaller parts:
____________________________________________________
____________________________________________________
____________________________________________________

End time: ____:_____ am/pm
I will take a break by:
For _____ minutes

Start time: _____:_____ am/pm
I will work for _____ minutes
Subject: _________________
My task broken into smaller parts:
____________________________________________________
____________________________________________________
____________________________________________________

End time: ____:_____ am/pm
STUDY SCHEDULE EXAMPLE

How to:
1. List tasks.
2. Determine priorities.
3. Break large tasks into smaller steps.
4. Plan a schedule with diffuse-mode breaks.

Start time: __8:00__ am/pm
I will work for __30__ minutes
Subject: Neurology: chapter 4
My task broken into smaller parts:
Preview the whole chapter
Read section on diseases of peripheral nerve

End time: __8:30__ am/pm
I will take a break by: Unloading the dishwasher
For __10__ minutes

Start time: __8:40__ am/pm
I will work for __30__ minutes
Subject: New Testament
My task broken into smaller parts:
Read 1 Corinthians 3 – 5
Then read manual for those chapters
Summarize as if I’m teaching it to new convert: out loud!

End time: __9:10__ am/pm
I will take a break by: Taking a walk around the block
For __10__ minutes

Start time: __9:20__ am/pm
I will work for __30__ minutes
Subject: Neurology and New Testament
My task broken into smaller parts:
10 min.: “Cover & Recite”: diseases of peripheral nerves Ch. 4
5 min. Preview section on diseases of the cranial nerves
10 min. Recite main points from 1 Corinthians 3 - 5

End time: __9:50__ am/pm
I will take a break by: Loading the dishwasher
For __10__ minutes

Play!!!!!! Ice cream & Tonight Show with spouse

What other memory strategies have helped you in the past?

Which of the above strategies would you like to experiment with further?
Research in the past 10 years has revolutionized our understanding of how we learn, retrieve, and retain information. See how well you understand recent research findings by taking this quiz:

1. You will learn and remember information best when the mode of instruction is matched to your preferred learning mode (e.g., visual, auditory, kinesthetic).
   - True   False

2. You will most likely remember information better—and retain it for a longer period of time-- if you study for three hours (180 minutes total) the night before an exam than if you study for 30 minutes on four different days (120 minutes total) across a two-week time period before the exam.
   - True   False

3. After reading a textbook chapter, most students have a pretty accurate understanding of how well they understand the material they have read.
   - True   False

4. When learning how to discriminate between different items (e.g., learning how to identify which artist painted each of several different paintings), it is most helpful to study and master one class of items at a time (e.g., the works of one painter at a time) before moving on to learn the next class of items.
   - True   False

5. Testing yourself on material in a textbook chapter, such as creating or taking a practice test, is usually more helpful than re-reading highlighted sections of that chapter.
   - True   False

6. It is almost always best to find a well-lit, distraction-free place to study, and do all of your studying in that same place.
   - True   False

Key: 1. F, 2. F, 3. F, 4. F, 5. T, 6. True and false: a distraction-free study spot is very helpful initially for more careful study, but mixing up the time and location of review session adds associations to the material.

