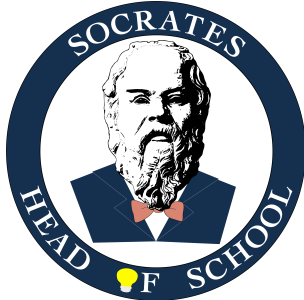


## *Understanding How We Learn* by Oliver Caviglioli, Yana Weinstein and Megan Sumeracki



### Think you might want to read this book?

While teachers are tasked with making sure that students learn skills and content, many are not familiar with the science behind learning, memory, and long-term retention of information. Weinstein and Sumeracki, two cognitive psychologists and hosts of *The Learning Scientists* blog have made an easy-to-digest guide for educational practitioners to become familiar with the tenets of memory and learning in *Understanding How We Learn*. They primarily focus on practical advice for incorporating these best practices in the

classroom. A must read for any teacher at any level!

### What would Socrates ask?

- How can learning the principles of memory and learning help teachers teach more effectively?
- How can learning about the principles of memory and learning help students study more effectively?
- What barriers exist that keep teachers from adopting evidence-based pedagogy?
- How can an overreliance on intuition lead teachers to use ineffective teaching techniques and students to use ineffective study techniques?

### Research

- Reading a textbook two times in a row takes twice as long, but does not improve long-term retention of the information

### Concepts

- The concept of “learning styles” is an example of something that great time, energy, and money has been spent on, but is not particularly good at increasing learning. There is no evidence to support “learning styles”.
- Very few teacher education courses and programs cover cognitive psychology and effective learning.
- There are several reasons why educators might not engage in evidence-based practice: lack of time, lack of access to academic journals, and difficulty interpreting technical writing, discomfort with change, uncertain findings, reluctance to accept findings that disagree with their intuition.
- Misconceptions and misunderstandings about learning start from grains of truth which can make them stick around even after they have been disproven. Many misunderstandings come from a desire to learn. We must work hard to overcome them. Common misunderstandings of research include:

- Individuals learn better when they receive information in their preferred learning style (eg. auditory, kinesthetic, etc.)
- Environments rich in stimuli improve the brains of preschool students.
- Differences in hemispheric dominance (left brain, right brain) can help explain individual differences among learners.
- We only use 10% of our brain
- Students bring different levels and types of knowledge to the classroom.
  - The types of questions that they ask about the material will depend on their prior knowledge.
- Teachers need to be aware of the “curse of knowledge”, or the phenomenon of thinking something is easy or obvious because they have a lot of experience with it.
  - This means that sometimes as teachers we lack awareness of how students process information; “it is hard to ‘unlearn’ the information and put ourselves in a student’s shoes to experience the novelty of learning about a concept.”
- Everything that we do requires memory in some form or another
  - Cognitive psychologists have found a four-stage model of memory: encoding, consolidation, storage, and retrieval
  - Memory is not like a library or computer, memory is *reconstructive* meaning that every time we retrieve a memory, we actually change it. We are prone to “false memories”, and misattribution of where we learned or found information
    - Recalling information *correctly* strengthens memory
    - Declarative memories are memories that we can directly access, voluntarily report the contents of, and are aware of remembering.
    - Procedural memory is demonstrated when we **do** things without having to think about them (ex. walking)
  - For memories to be recallable later, depends on whether it is encoded in a deep and meaningful way so that connections can be made and understanding achieved. We also need to consolidate those memories so that the connections that we have made get stronger. For this to happen, we need adequate rest and sleep
  - When we forget, it may be due to encoding failure or retrieval failure. Providing students with retrieval cues can help them remember learned information.
- Spaced practice is arguably one of the strongest contributions that cognitive psychology has made to education. Spaced learning occurs when studying is spaced out over a period of several days (as opposed to learning the materials immediately before an assessment aka: “cramming”).
  - Spacing may be effective in part because it increases what some call “storage strength” - a measure of deep learning
  - Interleaving, or switching between ideas and varying the order in which they are practices, has been shown to increase accuracy and speed in later testing as opposed to blocked practice
  - Helping students to plan out when they will study is hard, but would be very worthwhile if teachers can give them a more effective way to study.

- Teachers can reinforce spaced practice by:
  - Giving lagged homework so that students have to do homework on a concept they learned a while back.
  - Integrate brief reviews of previous ideas in later classes.
  - Give students a chance to engage with material covered in previous classes with spaced quizzes of some other kind of review.
  - Helping students plan for how they will study for cumulative tests or exams
- Retrieval practice involves reconstructing something that has been learned in the past from memory and thinking about it in the present.

**Quotes from the authors**

- “Unfortunately, education practice does not, for the most part, rely on research findings. Instead, we tend to rely on our intuitions about how to teach and learn - with detrimental consequences.”
- “If evidence supports the effectiveness of a strategy, then we should by all means adopt it, but continue to be flexible as the science evolves. After all, would you give your child a pill that had never been scientifically tested? Or worse, one that has been scientifically tested than then been shown not to work? Would you bring your child to a doctor whose practice was based on opinion and intuition alone, rather than the most up-to-date science?”

**Organizations/schools working on answers**

- [Learning Scientists blog](#)

**Gateways to further learning**

- [Organizing Instruction and Study to Improve Student Learning: IES Practice Guide](#)

**Referenced books with the potential to impact leading and learning in education**

Author(s) Last Name	Title
Reason	<i>Absent Minded?</i>

The applicability of this book to education is ....



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