

# Study Smarter

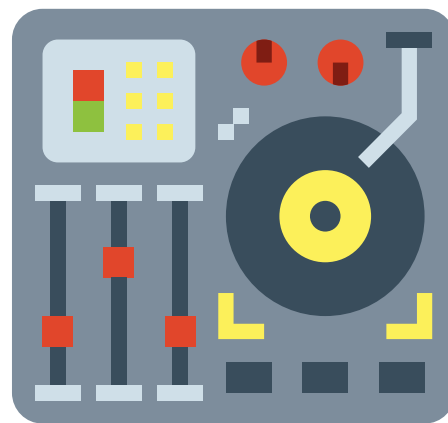
You may be surprised, but the most suggested study skills, such as "highlighting, underlining, and sustained poring over notes and texts," are ineffective. Instead, take advantage of these strategies from *Make It Stick: The Science of Successful Learning* (Brown et al., 2014).

## Plan Your Learning



### Space It Out

Compared to cramming, spaced practice is a lot more effective. When you space your learning, you create a schedule that *distributes study activities over time*, rather than cramming right before an exam. "Spacing out your practice feels less productive for the very reason that some forgetting has set in and you've got to work harder to recall the concepts. What you don't sense in the moment is that this added effort is making the learning stronger" (p. 48).



### Mix It Up

Vary your practice. "If you find yourself falling into single-minded, repetitive practice of a particular topic or skill, *change it up*: mix in the practice of other subjects, other skills, constantly challenging your ability to recognize the problem type and select the right solution" (p. 206). If you are getting frustrated, it is definitely time to switch to another topic, take a break, or get some physical exercise!



### Retrieve

"Retrieving knowledge and skill *from memory* should become your primary study strategy in place of rereading" (p. 201). In fact, the act of recalling any knowledge or skill strengthens your memory, making the information easier to remember and recall later on (e.g., while taking an exam). While retrieving information from memory can feel difficult, planning to engage in it during study time is greatly beneficial.



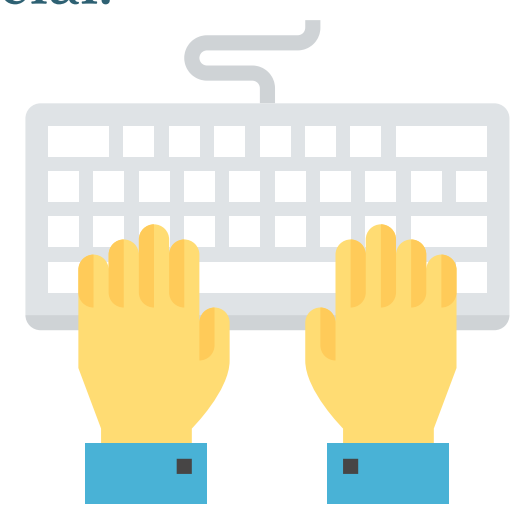
### Elaborate

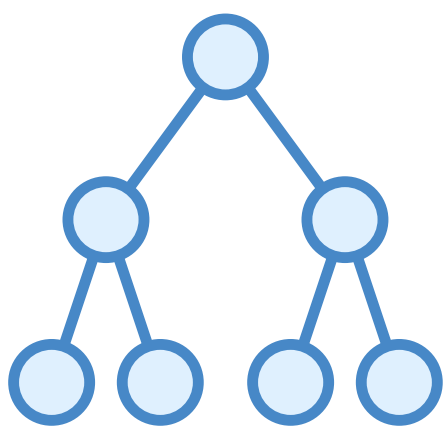
"Elaboration is the process of finding *additional layers of meaning* in new material... Examples include relating the material to what you already know, explaining it somebody else in your own words, or explaining how it relates to your life outside of class" (p. 207). When studying, engage in deeper processing by asking and explaining why and how things work.

## Develop Understanding

### Dual Code

Dual coding is the process of *integrating visuals and text or audio* in a way that facilitates understanding. When we learn the same information in multiple forms, this gives us multiple neural paths of retrieving the knowledge later on. Moreover, combining pictures with words is beneficial to all learners - not just those who prefer visuals.





## Find Examples

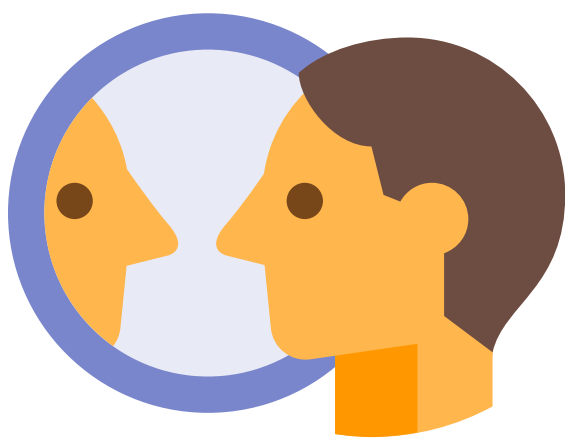
When studying abstract concepts, *illustrate them with specific examples*. Multiple different but related examples help demonstrate an abstract idea, making it easier to understand. If finding concrete examples to illustrate ideas is difficult, be sure to follow up with your instructor.

## Look for Rules



"People who as a matter of habit *extract underlying principles or rules* from new experiences are more successful learners than those who take their experience at face value" (p. 133). If identifying the underlying principles is difficult, be sure to follow up with your instructor.

## Reinforce



### Reflect

The act of taking a few minutes to *review what has been learned* is known as reflection. "Reflection is a form of retrieval practice (e.g., What happened? What did I do? How did it work out?), enhanced with elaboration (e.g., What would I do differently next time?)" (p. 66).



### Accept Struggle

"Effortful retrieval makes for stronger learning and retention. We're easily seduced into believing that learning is better when it's easier, but research shows the opposite: *when the mind has to work, learning sticks better*" (p. 43).



### Test Yourself

Testing or self-quizzing helps you identify what you know and don't know. "Set aside a little time every week throughout the semester to *quiz yourself on the material* in a course, both the current week's work and material covered in prior weeks" (p. 202).

## Mindset Matters



### Calibrate

"Calibration is the act of *aligning your judgments of what you know and don't know with objective feedback* so as to avoid being carried off by the illusions of mastery" (p. 210). Use instructor and peer corrective feedback as well as practice tests to identify areas where you need improvement.



### Believe You Can

Students who adopt a "growth mindset", the "belief that their intelligence was largely within their own control" are more likely to be successful in school (p. 180). Always know that you can get smarter through *sustained effort, the use of effective learning strategies, and help from others* when needed.

**"Remember that most successful students are those who take charge of their own learning and follow a simple but disciplined strategy. You may not have been taught how to do this, but you can do it, and you will likely surprise yourself with the results" (p. 201).**

Adapted from: Association of Colleges and University Educators (ACUE).

Additional Sources: *Understanding How We Learn: A Visual Guide* (Weinstein & Sumeracki, 2019).