

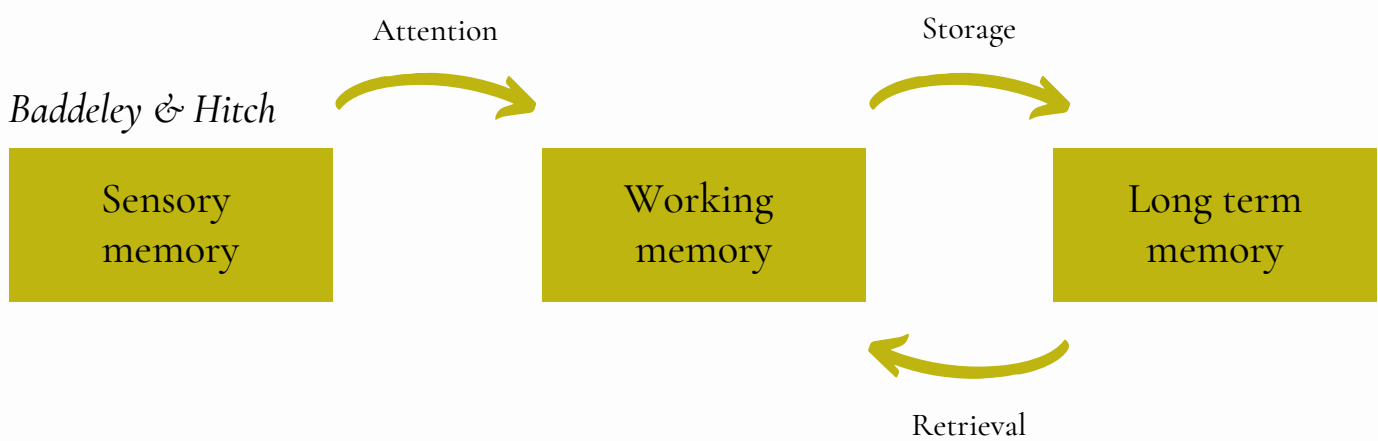


Active Learning

This infographic provides a recap of Paul Kirschner's Keynote presentation on active learning at the EB TLC Conference on the 11th of May 2022.

How can learning occur?

In order for students to learn and retain the acquired knowledge in their long term memory, the information that comes into the sensory memory needs to be processed in the working memory and subsequently continuously retrieved from the long term memory:



What constitutes good education?

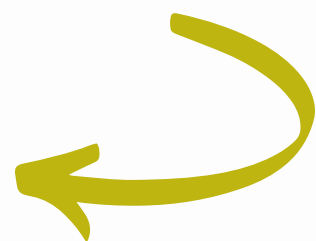


These three elements depend on
1) how students study, and
2) how lecturers teach.

Learning should not simply lead to a good exam grade;
learning should be a change in long term memory.

Poor proxies for how much students are learning:

- How much work students get done
- How engaged and motivated students are
- Whether students are getting enough attention in the forms of feedback and explanations



When information is processed more deeply, you learn more deeply. This is not merely about bringing the information into long term memory, but also about continuously retrieving it.



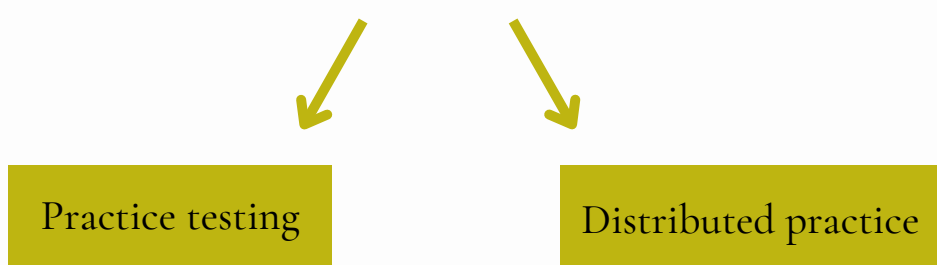
Learning = storing + retrieving



Learning is a generative activity, it about **sense making**: transforming the information into something meaningful. It is always an active process.

Learning can be improved through instruction and **learning/study strategies**.

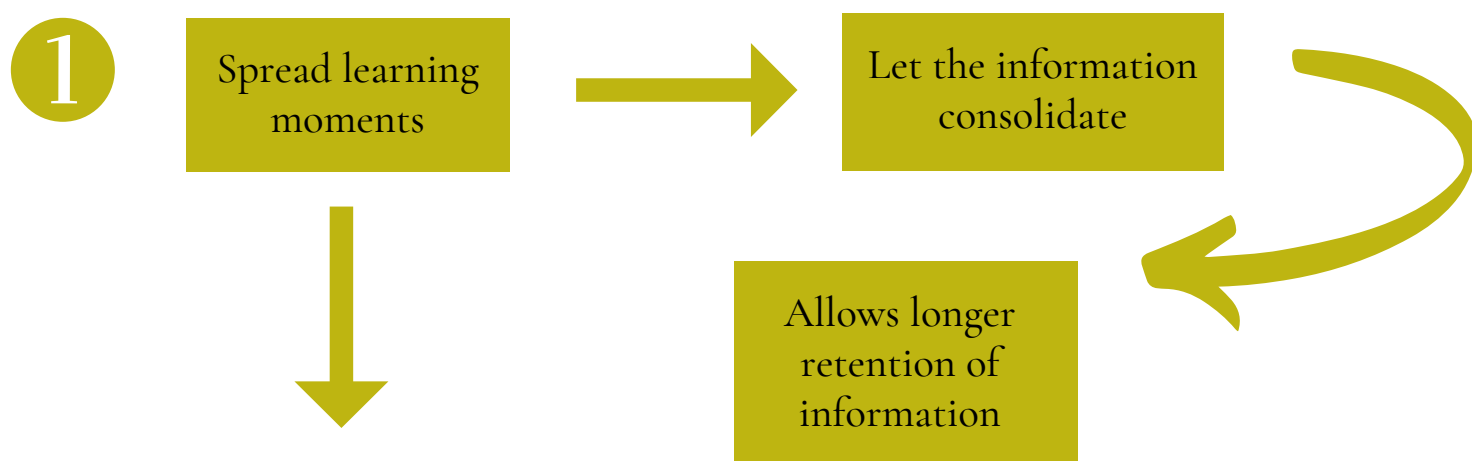
Research* has shown that out of various **study strategies**, only two techniques are considered good for different types of learners, materials, and tasks:



= a schedule of practice over time

Desirable difficulties

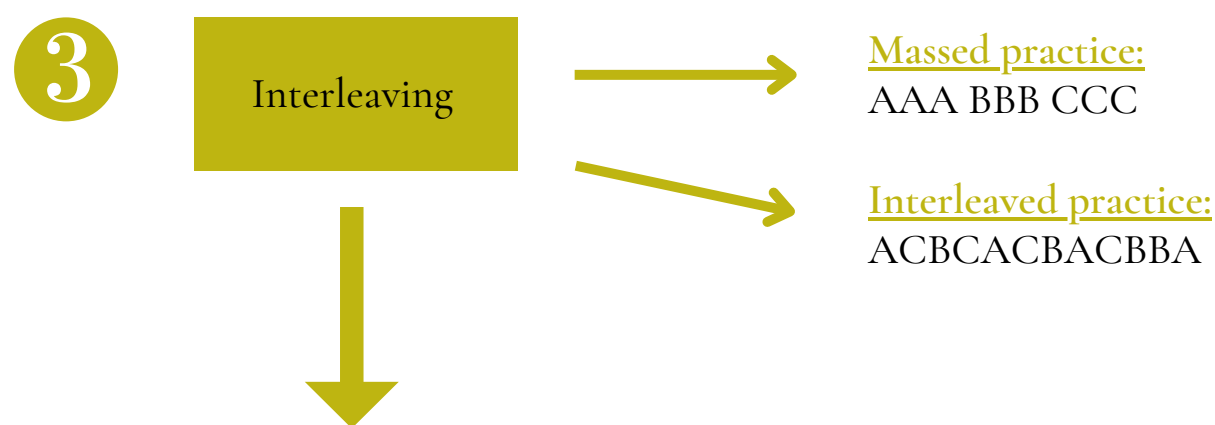
= a learning task or study strategy that requires a considerable but desirable amount of effort, thereby improving long-term performance.



Can be done through the assignments you give during your course.



- Helps the students learn better
- Reduces test anxiety



- Score best on exam
- Score well on individual topics (need to be able to spot the differences between similar concepts)
- Could be implemented after students have gained some basic understanding on the topic

Putting theory into practice**

How to apply 'Retrieving' approach?

2

- *Frequency matters* — The more students practice retrieving course material, the better they will learn it.
- *Ask Opening/Closing Questions* — Start or end class by asking students to recall information about previous content.
- *Align practice with assessments* — Use small retrieval practices that ask students to recall the types of information they will need to remember and use on high-stakes exams.
- *Give frequent, low-stakes quizzes* (at least weekly) to help students solidify their understanding of foundational concepts.

How to apply 'Interleaving' approach?

3

- *Leverage Cumulative Learning* — Consider ways in which every major assignment and exam draws from some information students have learned previously. Reveal connections to students.
- *Use Mixed Learning* — Introduce a topic at a basic level. Move to a new topic at a basic level. Return to the first topic at an advanced level. Return to the second topic at an advanced level in ways that build on the first topic.
- *Use regular review sessions*, such as 15 minutes at the end of a week or a course unit, for students to practice combining the skills learned earlier with the more-recently learned skills.
- *Ask students to refer back to notes* from an earlier class and reflect on the most critical points from that session.

*Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). *Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology*. Psychological Science in the Public Interest, 14, 4-58.

**Lang, James M. *Small Teaching: Everyday Lessons from the Science of Learning*. John Wiley & Sons, 2016.