

The Testing Effect Theory: Supporting Your Students' Memories and Learning

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Memory, Learning, and Performance

Why take practice tests? You have likely given your students practice tests at many points in your lessons. Often, you may check in to monitor their progress and ensure they are learning the material. But how often do you assign tests as a way to help your students retrieve information and engage in the process of strengthening their memory? Practice tests can be a useful study tool for improving memory and learning. In fact, any recall activity can be used as a way for student to “test” their memory and determine what they can recall from stored knowledge in their minds. This continued practice can be an important way to improve memory and recall, and incorporating it into your lessons is another tool for you to support student understanding and improve performance in your classroom.

In this article, you will be introduced to one of many theories on memory, the Testing Effect Theory, which explains how learning increases when students are repeatedly tested on content, particularly through a variety of recall and retrieval methods.

The Retrieval Process of Memory

Memory can be categorized into three main stages. The first stage is encoding, which is when we receive new information. The second stage is storage. This is how your brain organizes information and stores it until you are ready to retrieve and recall it. Finally, retrieval is the process of recalling information that you have stored in your memory.

The retrieval process for memory can actually be strengthened over time, allowing you to remember concepts more deeply and making it more likely that you will accurately retrieve information from



your memories. Many memory theories have examined the retrieval process and suggest research-proven strategies that can improve your recall and retrieval. The Testing Effect Theory is an interesting and important idea that explains how testing concepts can strengthen the retrieval process and, thus, your memory.

The Testing Effect Theory

The first published study of this theory is attributed to Edwina E. Abbott in 1909. Since then, numerous studies have supported the idea that repeated testing leads to better long-term recall. Actively retrieving information from memory strengthens long-term retention far more than rereading or passive review. Being tested on content helps students retain that content. What makes this finding particularly useful for teachers is that the benefit applies even before students feel ready. The act of attempting to retrieve information, even imperfectly, produces stronger memory than reviewing the same material again. So, a low-stakes practice test, or other activities that require your students to retrieve information in their minds, will typically do more for your students than a study guide will. The act of testing yourself is a critical component to solidifying concepts in your memory.

Testing can be done through active or passive means, via retrieval. Retrieval practice is a strategy that focuses on retrieving information from memory and recalling content stored there [link: <https://www.edutopia.org/video/making-retrieval-practice-a-classroom-routine/>]. Passive retrieval testing involves tasks such as matching, fill-in-the-blank, and multiple-choice questions. The answer is there, and students must choose the correct one. Active retrieval testing is more open-ended, and students must generate the correct answers rather than just choose one. For example, students could be required to label a plant diagram but not be provided with a word bank.

As you would imagine, active retrieval forces our brain to work harder, making more neural connections. However, there is also a place for passive retrieval methods, as they can build students' confidence and provide the scaffolding necessary to support learning.

Consider this classroom example:

In Mr. Blazier's 11th-grade US History class, his students engage in frequent "testing" throughout each daily lesson. He begins each class with a low-stakes warm-up, usually just 3 or 4 multiple-choice questions, or a set of vocabulary terms to match with definitions. These cover content from as recently as the day before to as far back as the beginning of the school year. During his lectures, he follows a loose pattern: 5-10 minutes

of lecture, then 5 minutes for students to brain-dump what they recall and share with their neighbor, adding to their notes. After each lecture, students complete an independent assignment that varies by topic but always requires them to recall important facts from the day's lecture.

By the time his students take a unit exam, they have been exposed to the content so many times and in so many methods that they are almost always highly successful.

The fact that Mr. Blazier's students are usually successful on his unit assessments is evidence that his strategies are working. He is "testing" his students in multiple ways each day, from the warm-up to the final task, and these repeated opportunities to retrieve knowledge from memory lead to increased learning.

Two Testing Effect Theory Strategies

You can support the testing effect theory in many ways [link <https://www.structural-learning.com/post/testing-effect-retrieval-practice>], from providing practice tests as a study tool to frequently exit tickets or quizzes to require students to frequently recall topics. But this article will introduce two additional strategies to support recall and retrieval in your students: flashcards and retrieval grids.

Strategy 1: Flashcards

Flashcards are a classic learning tool. They can be used by kindergarten students practicing basic addition facts, middle school students learning world geography, college students studying chemical reactions, and anything in between. Flashcards can be created to align with any topic, and all you need is a stack of index cards and a writing tool. By creating their own flashcards, students are already engaging in a powerful retrieval method for generating information.

They have to think about what is most important (deep processing), and they are creating a mental cue through the act of writing.

The testing effect comes into play as students consistently use the flashcards to recall information. Flashcards allow students to self-check for immediate feedback, and the repetition strengthens neural connections that lead to long-term memory storage. You can utilize the "Notecard System" prep practice packet here [<https://www.modelteaching.com/wp-content/uploads/2022/02/Notecard-System-Prep-Packet.pdf>] as a formal way to help your students plan for and then practice retrieval practice using flashcards.

Let's take a closer look at some specific ways flashcards can be used.

- ✓ Basic math computations (problem on the front, answer on the back)
- ✓ Higher-level math formulas
- ✓ Geography (outline of state or country or continent on the front, name on the back)
- ✓ Events, People, or Places
- ✓ Sight words and letter sounds
- ✓ Vocabulary/ Definitions
- ✓ Parts of speech
- ✓ Cause and effect pairs
- ✓ Categories or classifications
- ✓ Broad concepts with specific examples

Students can use their flashcards to test each other or work independently and self-check. They can even use the flashcards in both directions to further reinforce the knowledge.

Strategy 2: Retrieval Grids

A Retrieval Grid is simply a table of rows and columns with a variety of questions/prompts. [link: <https://www.learningandthebrain.com/blog/retrieval-grids-the-good-the-bad-and-the-potential-solutions/>] They cover a variety of topics and skills and are often color-coded by topic or skill, or by when they were learned. Retrieval Grids force students' brains to frequently shift gears to recall information from a variety of lessons, thereby engaging the Spacing Effect theory (more on this later in this section).

Some teachers even color-code each grid containing a question and assign point values to the colors (more points for older information), which can motivate students to aim for a high score. Students answer as many questions as they can from the grid, and then tally up their points at the end of the exercise.

Try this task:

Use our provided retrieval grid resource and the accompanying sample to create your own retrieval grid for your classroom, giving your students strategies to practice retrieving concepts and strengthen their memory.

A comprehensive understanding of memory theories for your classroom

If you would like to learn more about different memory theories that can support the process of encoding, storage, or retrieval in your students' memory, you can take a comprehensive memory strategies course to enhance your understanding of research-backed memory strategies that can improve student learning and strengthen memory.



Applying Memory Theories in the Classroom: Teaching with Encoding, Storage & Retrieval in Mind

(24 Hrs) This course will define memory theories and help participants learn about the three memory processes: encoding, storage, and retrieval. By the end of the course, participants will be able to explicitly teach strategies and incorporate them into their daily practices to develop students' encoding and storage skills and, most importantly, their ability to recall information from memory.

[Learn More About The Course →](#)

References:

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