How the Brain Learns
From Practitioner’s Corner

Using Rehearsal to Enhance Retention

Rehearsal refers to the learner’s reprocessing of new information in an attempt to determine sense and meaning. It occurs in two forms. Some information items have value only if they are remembered exactly as presented, such as the letters and sequence of the alphabet, spelling, poetry, telephone numbers, and the multiplication tables. This is called rote rehearsal. Sense and meaning are established quickly and the likelihood of long-term retention is high. Most of us can recall poems and telephone numbers that we learned many years ago.

More complex concepts require the learner to make connections and to form associations and other relationships in order to establish sense and meaning. Thus, the information may need to be reprocessed several times as new links are found. This is called elaborative rehearsal. The more senses that are used in this elaborative rehearsal, the more reliable the associations. Thus, when visual, auditory, and kinesthetic activities assist the learner during this rehearsal, the probability of long-term storage rises dramatically. That is why it is important for students to talk about what they are learning while they are learning it, and to have visual models as well.

Rehearsal is teacher-initiated and teacher directed. Recognizing that rehearsal is a necessary ingredient for retention of learning, teachers should consider the following when designing and presenting their lessons.

Rote Rehearsal Strategies
Simple Repetition. For remembering short items (telephone numbers, names and dates) this is simply repeating a set of items over and over until they can be recalled in correct sequence.

Cumulative Repetition. For longer sets of items (song, poem, list of battles) the learner rehearses the first few items. Then the next set of items in the sequence is added to the first set for the next rehearsal and so on. To remember a poem of four stanzas, the learner rehearses the first stanza, then rehearses the second stanza along, then the two together, then rehearses the third stanza, then the three stanzas together, etc.

Elaborate Rehearsal Strategies
Paraphrasing. Students orally restate ideas in their own words, which then become familiar cues for later storage. Using auditory modality helps the learner attach sense, making retention more likely.
Selecting and Notetaking. Students review texts, illustrations, and lectures and decide which portions are critical and important. They make these decisions based on criteria from the teacher, authors, or other students. The students then paraphrase the idea and write it into the notes. Adding the kinesthetic exercise of writing furthers retention.

Predicting. After studying a section of content, the students predict the material to follow or what questions the teacher might ask about that content. Prediction keeps students focused on the new content, adds interest, and helps them apply prior learnings to new situations, thus aiding retention.

Questioning. After studying content, students generate questions about the content. To be effective, the questions should range from lower-level thinking of recall, comprehension, and application to higher level thinking of analysis, synthesis, and evaluation (see Bloom’s Taxonomy) When designing questions of varying complexity, students engage in deeper cognitive processing, clarify concepts and predict meaning and associations- all contributors to retention.

Summarizing. Students reflect on and summarize in their heads the important material or skills learning in the lesson. This is often the last and critical stage where students can attach sense and meaning to the new learning. Summarizing rehearsal is also called closure.

Using Chunking to Enhance Retention

Categorical Chunking. This is a more sophisticated process in that the learner establishes various types of categories to help classify large amounts of information. The learner reviews the information looking for criteria that will group complex material into categories or arrays. The different types of categories can include:

Advantages and Disadvantages. The information is categories according to the pros and cons of the concept. Examples include energy use, abortion, and capital punishment.

Similarities and Differences. The learner compares two or more concepts using attributes that make them similar and different. Examples are comparing the Articles of Confederation to the Bill of Rights, mitosis to meiosis, and the U.S. Civil War to the Vietnam War.

Structure and Function. These categories are helpful with concepts that have parts with different function, such as identifying the parts of an animal cell, a carburetor, or the human digestive system.
Taxonomies. This system sorts information into hierarchical levels according to certain common characteristics. Examples are biological taxonomies (kingdom, phylum, class, etc.) taxonomies of learning (cognitive, affective and psychomotor) and governmental bureaucracies.

Arrays. These are less ordered than taxonomies in that the criteria for establishing the array are not always logical, but are more likely based on observable features. Human beings are classified, for example, by learning style and personality type. Dogs can be grouped by size, shape or fur length. Clothing can be divided by material, season, and gender.

*Making categorial chunking a regular part of classroom instruction can raise student learning, thinking and retention significantly.*

Using Mnemonics to Help Retention

Mnemonics (from Greek “to remember”) are very useful devices for remembering unrelated information, patterns or rules. They were developed by the ancient Greeks to help them remember dialogue in plays and for passing information to others when writing was impractical. There are many types of mnemonic schemes. Here are two that can be easily used in the classroom. Work with students to develop schemes appropriate for the content.

Rhyming and Mnemonics. Rhymes are simple and effective ways to remember rules and patterns. They work because if you forget part of the rhyme or get part of it wrong, the words lose their rhyme or rhythm and signal the error. To retrieve the missing or incorrect part you start the rhyme over again. And this helps you to relearn it. Have you ever tried to remember the fifth line of a song or poem, without starting at the beginning? It is very difficult to do since each line serves as the auditory cue for the next line.

Common examples of rhymes we have learned are “I before e, except after c....” “Thirty days hath September.....” and “Columbus sailed the ocean blue.....”

*Here are rhymes that can help students learning information in other areas:*

The Spanish Armada met its fate
In fifteen hundred and eighty-eight.
Divorced, beheaded, died;
Divorced, beheaded, survived.
(The fate of Henry VIII's six wives, in chronological order)

The number you are dividing by,
Turns upside down and multiplying (Rule for dividing fractions)