Memory

"We remember what we understand; we understand only what we pay attention to; we pay attention to what we want." - Edward Bolles

The statement above, made by a specialist in the study of memory, sums up this page on memory and the philosophy behind much of this web site on study skills.

- We insure more effective learning and memory when what we study and learn matches with and contributes to our career and educational goals.
- When we know how we learn best in terms of our learning style and preferences and are able to apply appropriate study techniques, we are better able to attend to, take in, and process information in various learning situations.
- When we fully understand information (at all cognitive levels), we are better able to remember information. By using elaboration strategies such as summarizing, questioning, and using visual organizers, we "deep process" information in a way that assists and insures understanding. As a result, we are better able to appropriately "file" and to retrieve information, and thus, assure memory of the information.

How Memory Works

Human memory works on two different levels: short term memory and long term memory.

Short term memory includes what you focus on in the moment, what holds your attention. Most people can only hold about 7 items of information in short term memory at any given moment (like a phone number). To learn information so that you can retain and recall it, you must transfer it from short term to long term memory.

Long term memory includes all the information that you know and can recall. In many ways, it becomes a part of you. Once information becomes a part of your long term memory, you'll have access to it for a long time.

There are two ways to move short term memory to long term memory: *rote learning* and *learning through understanding*. Rote learning means learning through repetition, which is mechanical and requires little understanding (learning multiplication tables). Learning through understanding involves learning and remembering by understanding the relationships among ideas and information (remembering main ideas and supporting details from a lecture because you understand the concepts and relationships between ideas). Both types of learning and memory are useful and often are used together. For example, in history, you need to relate facts (like dates) which you memorized by rote to your understanding of historical concepts (like the Civil War) which you remembered by understanding the information.

How We Forget and the Importance of Review

Four major theories on forgetting include:

1. **Fading**. According to the fading theory, the trace or mark a memory etches into your brain is like a path you make in the woods when you continually walk along the same route. If you don't take that same path, it eventually becomes overgrown until it disappears. In the same way, facts that you learn are forgotten when you don't review them.

   A famous study on forgetting textbook materials compared the percentage of material remembered after different intervals of time. The results were as follows:

After 1 day	54% was remembered.
After 7 days	35% was remembered.
After 14 days	21% was remembered.
After 21 days	18% was remembered.
After 28 days	19% was remembered.
After 63 days	17% was remembered.

   Remembering what you have heard in lectures is even more difficult to recall because you are not able to slow down, pause, reflect, or to reread unless you take excellent notes! In a study on recall after listening to a seminar, students forgot more than 90% of the points from the lecture after 14 days!

   The conclusions to be made from these studies?
   - **Without review, most information will be lost from memory.**
   - **The best time to review materials is within a day or two after the material has been read or presented in lecture.**

   The best way to study for a quiz or test is to keep the memory fresh on an ongoing basis. If you wait to review the information till the night before the test (let's say after 28 days), you will have forgotten 81% of the material and will have to study a lot longer to be sufficiently prepared for the test.

2. **Retrieval.** According to this theory, a forgotten fact hasn't faded, it has been misplaced in the "file cabinet" of your mind. Whether the information has disappeared completely, or has been lost, the result it the same—it has been forgotten. The key to avoiding retrieval problems is to label and file information correctly. You can also assist your memory by studying in "meaningful chunks."

3. **Interference**. This theory is based on the principle of limited space. As you keep adding new information, a conflict develops between the old and new information over the space available. The key to avoiding this problem is to look for connections and relationships between ideas so that they can be "filed together" or combined.

Ask yourself, “What do I already know about this?” or any of the “cognitive questions.”

4. **Interactive interference.** When you are learning a great deal of information at one time, you tend to remember best what is read or presented first and last. The rest gets lost in the shuffle. To avoid this problem, study one subject at a time, in meaningful chunks.

   Your attitude can also affect how well you learn and remember. You can “shut out” information if you consider it boring or if you don’t like the subject. To avoid this type of interference, set learning goals before you begin to read or study. **Link your study goals to your long-term career and educational goals**. If you have chosen goals that match your personal strengths and interests, you will be able to get through even the most difficult and uninteresting classes because they are important steps in helping you to meet your goals.

The Keys to Remembering

You can learn to remember more effectively if you learn and use the four keys described below. Each one helps you to enter information into your long term memory.

1. **Choose to remember**. Be interested. Pay attention. Want to learn and know. What you want is an important part of learning. When people are interested and want to learn, they learn and remember more effectively.

2. **Visualize or picture in your mind what you wish to remember.** For many people, a mental picture or visualization is clearer and easier to remember than words. For each major concept that you want to remember, create a mental picture and then look at it carefully for a few seconds. Once you've seen it clearly, you'll probably be able to recall it.

3. **Relate the ideas and information you wish to remember to each other and to ideas and information you already know.** When you relate information to other information, you create a chain of memories which lead to one another. When you label an information chain or group of ideas, you create a kind of "file" that makes it easy to locate and remember the information.

4. **Repeat what you wish to learn until you *overlearn* it**. Say it in your own words. Even though you've already learned something, go over it one more time. Research shows that the time you spend on overlearning and putting ideas into your own words will pay off by making recall easier and more complete.

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