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Mnemonic techniques for eLearning

Along with comprehension, memory is the main element in training. Fortunately, there are a number of techniques that can support it.

The importance of memory

Memory plays such a fundamental role in learning that there is often a danger of thinking that this is the only process involved. On the other hand, the tests to prove knowledge of a topic are the questions and tasks to be solved: passing these tests requires the examinee to recall topics and notions to memory, and eventually to reason about the information retrieved.

While **recalling information is a necessary condition for knowing a topic**, this is not sufficient to have the mastery that allows one to employ that information in complex reasoning. Knowing the basic procedures for cold chain storage in food service is one thing; optimizing logistics, purchasing, and production through these notions is quite another.

Of course, **developing a problem solving approach requires proper training**. Some employees may be naturally inclined to optimize processes and think about possible improvements. But in general, in a company that gives due consideration to its wealth of skills and knowledge, this goal will be pursued by selecting a variety of e-test courses to which its employees can be subjected. Because of the variety and effectiveness of eLearning courses, any company that wants to make itself a Learning Organization can create a library of content for itself.

What types of memory

Memory is not unique. There are several classifications in research. First, a **distinction should be made between recognition and recall**. This distinction may immediately be familiar to anyone who has been uncertain during a question: while studying, you had the impression that you had learned the information, but on examination you are unable to recall it. Well, recognition means the ability to state whether one is familiar with a piece of information while recall is the ability to retrieve said information. A simple experiment to notice the difference: have someone observe a group of messy objects for a few seconds; then ask the person if there was one among the objects, which was conspicuously absent. If the objects were observed well, there should be no uncertainty in the answer. Try asking instead to list the objects: if these are in large numbers or arranged in a haphazard manner or, again, the observation time was limited, recalling the complete list to memory will be more complicated. It would thus seem that recalling information requires more effort. This is one reason why at least a second reading is usually required to prepare for an important examination.

An early classification proposed was between short-term and long-term memory. Short-term memory, with a duration of twenty to thirty seconds, to act as the first gateway of information. According to **Miller's Law**, we are only able to process a very limited amount of information at a time. Long-term memory, on the other hand, stores and retrieves information for all other durations, from a few minutes to a lifetime.

Subsequent studies have proposed different ways of classifying memory, while maintaining the initial distinction. Other types of memory include:

- Operational memory
- Declarative memory
- Procedural memory

Operational memory is closely related to short-term memory: it, too, is short-lived, but whereas short-term memory has only the function of retaining information such as the impression of a particular thing, operational memory is employed by the brain to perform tasks, such as performing a calculation in mind. It is easy to draw the **parallel between operational memory and the Ram** of a pc, and indeed this is what has been done in theories comparing the brain and the computer. Declarative memory, or

explicit memory, is that function that requires conscious recall of experienced or learned information. For the former, episodic memory, which operates through autobiographical memories, comes into play; for the latter, we speak of semantic memory, which is concerned with storing and retrieving learned facts and meanings. **Procedural memory**, or implicit memory, is based on learning by doing: it is closely related to motor memory, such as riding a bicycle. procedural memory also includes priming, or priming, a mechanism by which, the repetition of a stimulus causes it to unconsciously influence the response to a subsequent stimulus: for example, a person who is asked to think of a fruit, immediately after he or she has been exposed to the color yellow several times, will most likely unconsciously think of a banana.

How to forget

So, having distinguished the different types of memory, we can ask how to improve learning. As mentioned, recognizing and recalling are only a necessary condition for comprehension but **understanding a concept is no guarantee for memory recall**. Four can be the different causes of forgetting:

- Forgetting dependent on the encoding signal
- Organic causes
- Interference between multiple memories
- Decay of information

Forgetfulness could depend on the lack of semantic or episodic signals: one does not remember something because one did not associate it well with some other already familiar information. Aging of the brain may result in deterioration of mnemonic abilities. Multiple memories may interfere with each other: information may get confused or mixed together during encoding. According to the decay theory, the memory of information may decay over time. The action of repeated recall of information can prevent this decay: this is what is indicated in the forgetting curve and **time-spaced repetition exercises**.

Mnemonic techniques

So far the normal functioning of the brain-machine, as far as we have been able to understand it to date. There are a number of techniques for improving this functioning to ensure long-term recall of information. Some of these are very ancient techniques, reflecting the fact that learning and remembering have always been of primary importance to societies: continuing education, which today is an indispensable practice for individuals, businesses and society in general, has always been the hallmark of the great personalities of the past. It is no coincidence that some of these techniques are associated with important names: Cicero, Pico della Mirandola, Ramon Llull, and many others. In general, these techniques insist on **improving the encoding of information by associating multiple sensory stimuli or episodic memories with each other**.

Some of the most important mnemonic techniques include:

- The technique of loci
- The imagines agentes
- The phonetic conversion

The theory of loci has a courtly origin. Cicero reports the story of Simonides of Ceo who, the only survivor of an earthquake that occurred during a banquet, had managed to identify the victims by remembering where they were seated. According to this technique, **information that is physically located in a familiar space is more easily encoded and recalled**. According to this technique, to remember a list of information, it is necessary to place it along a path in a familiar environment. A garden, a house, a building or an urban route: the more vividly one can imagine finding this information along the route, the easier it will be to imagine repeating it to recall it.

Imagines agentes also use the mechanism of association. They are actual vivid scenes that the imagination can create in order to recall something: it may be a gymnast repeating the movements he or she will have to perform or a scene linking the meanings of a word in two different languages, or the procedures to be performed in order to use a program. The more exaggerated, suggestive and curious the image, the more it will arouse attention and be easy to encode. It is possible to remember long excerpts of a passage by representing key words in pictures, and then to sort these pictures into a familiar path by combining these two mnemonics.

Phonetic conversion is a way to turn consonants into numbers and vice versa. This technique can be very useful for remembering digits such as Civil Code articles, fleet license plates, telephone numbers, etc.

Then there is a whole series of more specific techniques for semantic information, which are distinguished according to whether the information is verbal, musical, mathematical, etc. These include rhyming, breaking down into simple parts, or creating acronyms.

eLearning and mnemonics

eLearning can benefit greatly from the use of mnemonic techniques. By its very nature, this technology combines the written word with audiovisual documents; it allows for live interaction between multiple people; and it allows for the aggregation of information from multiple sources. Creating imagines agentes is as simple as it gets: from simple illustrations to movies and first-person simulations, audiovisual content is itself a method of suggesting the learner and transforming them from spectator to user. If we think of language courses, with the recited scenes illustrating the vocabulary to be used in various situations, we can get a good idea of these images. Remembering the situations in which they are used is much more effective than memorizing the list of vocabulary to be used in a restaurant. The technique of loci also finds a natural development in eLearning: even just the signs that indicate the sequence of lessons are "places" to orient the learner. For those courses that make use of virtual reality, the potential multiplies. An example? Who does not remember, even after many years, the paths of favorite video games? Associating these virtual paths with notions requires that there be some consistency of meaning among them, but the result can be very interesting.

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