

Evaluating Training Effectiveness

Students do better when they know they will be tested and that their manager will view their test results. Students often overestimate their knowledge of a subject, however, especially if they are somewhat familiar with the content.

How do we know that we know something? If I said to you, "Could you name the first President of the United States?" you would say, "Yes, I could tell you that." On the other hand, if I said, "Could you tell me the names of the two series of novels written by Anthony Trollope?" you might say, "No." What processes go into your judgment of what you know? The answer may at first seem obvious: You look in your memory and see what's there. For the first question, you determine that your memory contains the fact that George Washington was the first U.S. President, so you answer "yes." For the second question, if you determine that your memory contains little information about Trollope (and doesn't include the novel series named Barchester and Palliser), you would answer "no."

"Familiarity" fools our mind into thinking we know more than we do

But, if the mechanism were really so simple, we would seldom — if ever — make mistakes about what we know. In fact, we do make such mistakes. For example, we have all confidently thought that we knew how to get to a destination, but then when put to the test by actually having to drive there; we realize that we don't know. The route may seem familiar, but that's a far cry from recalling every turn and street name.

The feeling of knowing has an important role in training settings because it is a key determinant of student studying (e.g., Mazzoni & Cornoldi, 1993). Suppose a student has been studying the Vikings with the goal of understanding where they were from and what they did. At what point does the student say to him or herself: "I understand this. If the trainer asks me, 'Who were the Vikings?' I could give a good answer."

Every trainer has seen that learners' assessments of their own knowledge are not always accurate. Indeed, this inaccuracy can be a source of significant frustration for learners on examinations. The student is certain that he or she has mastered some material, yet performs poorly on a test, and may, therefore, conclude that the test was not fair. The student has assessed his or her knowledge and concluded that it is solid, yet the examination indicates that it is not. What happened? What cues do learners use to decide that they know something?

Cognitive science research has shown that two cues are especially important in guiding our judgments of what we know: (1) our "familiarity" with a given body of information and (2) our "partial access" to that information. In this paper, we'll discuss how these two cues can lead learners to believe that they know material when they don't. And, we will suggest ways that trainers can help learners develop more realistic self-assessments of their knowledge.

The idea of familiarity is, well, familiar to all of us. We have all had the experience of seeing someone and sensing that her face is familiar but being unable to remember who that person is or how we know her.

Psychologists distinguish between familiarity and recollection. Familiarity is the knowledge of having seen or otherwise experienced some stimulus before, but having little information associated with it in your memory.

Recollection, on the other hand, is characterized by richer associations. For example, a student might be familiar with George Washington (he knows he was a President and maybe that there's a holiday named after him), whereas a student with more associations could probably recollect a substantial narrative about him. (See Yonelinas, 2002, for an extended review of the differences between recollection and familiarity.)

Although familiarity and recollection are different, an insidious effect of familiarity is that it can give you the feeling that you know something when you really don't. For example, it has been shown that if some key words of a question are familiar, you are more likely to think that you know the answer to the question. In one experiment demonstrating this effect (Reder, 1987), subjects were exposed to a variety of word pairs (e.g. "golf" and "par") and then asked to complete a short task that required them to think at least for a moment about the words. Next, subjects saw a set of trivia questions, some of which used words that the subjects had just been exposed to in the previous task. Subjects were asked to make a rapid judgment as to whether or not they knew the answer to the question — and then they were to provide the answer.

If the trivia question contained key words from the previous task (e.g., "What term in golf refers to a score of one under par on a particular hole?"), those words should have seemed familiar, and may have led to a feeling of knowing. Indeed, Reder found that subjects were likely to say that they knew the answer to a question containing familiar words, irrespective of whether they could actually answer the question. For questions in which words had not been rendered familiar, subjects were fairly accurate in rapidly assessing their knowledge.

A second basis for the feeling of knowing is "partial access," which refers to the knowledge that an individual has of either a component of the target material or information closely related to the target material. Suppose I ask you a question and the answer doesn't immediately come to mind, but some related information does. For example, when I ask for the names of the two series of Trollope novels, you readily recall Barchester and you know I mentioned the other series earlier; you even remember that it started with the letter P, and you believe it had two or three syllables. Your quick retrieval of this partial information will lead to a feeling of knowing the relevant information — even if Palliser is not actually in your memory.

The effect of partial access was demonstrated in an experiment (Koriat & Levy-Sadot, 2001) in which subjects were asked difficult trivia questions. If subjects couldn't answer a particular question, they were asked to judge whether they would recognize the answer if they saw it (i.e., to make a feeling-of-knowing judgment). The interesting twist: Some of the questions used categories for which lots of examples came to mind for their subjects (e.g., composers) and matching questions used categories for which few examples came to mind

(e.g., choreographers) — that is, these subjects could easily think of at least a few famous composers, but couldn't think of more than one or two choreographers, if any.

"Partial access": Our mind is fooled when we know part of the material or related material

The results showed that whether or not they could actually recognize the right answer, people gave higher feeling-of-knowing judgments to questions using many-example categories (e.g., "Who composed the music for the ballet Swan Lake?") than to questions using few-example categories (e.g., "Who choreographed the ballet Swan Lake?"). The experimenters argued that when people see the composer question, the answer doesn't come to mind, but the names of

several composers do. This related information leads to a feeling of knowing. Informally, we could say that subjects conclude (consciously or unconsciously), "I can't retrieve the Swan Lake composer right now, but I

certainly seem to know a lot about composers. With a little more time, the answer to the question could probably be found." On the other hand, the choreographer question brings little information to mind and, therefore, no feeling of knowing.

These studies, and dozens of others like them, confirm two general principles of how people gauge their memories. First, people do not assess their knowledge directly by inspecting the contents of memory. Rather, they use cues such as familiarity and partial access. Second, most of the time these cues provide a reasonable assessment of knowledge, but they are fallible.

How learners end up with "familiarity" and "partial access" to material

If a student believes that he knows material, he will likely divert attention elsewhere; he will stop listening, reading, working, or participating. Mentally "checking out" is never a good choice for learners, but all the more so when they disengage because they think they know material that, in fact, they do not know. The feeling of knowing becomes a problem if you have the feeling without the knowing. There are some very obvious ways in which learners can reach this unfortunate situation in a training setting. Here are several common ones:

- **1. Rereading.** To prepare for an assessment, a student rereads notes and textbook materials. Along the way, she encounters familiar terms ("familiar" as in she knows she's heard these terms before), and indeed they become even more familiar to her as she rereads. She thinks, "Yes, I've seen this, I know this, I understand this." But feeling that you understand material as it is presented to you is not the same as being able to recount it yourself.

As trainers know, this gap between feeling that you know and genuine recollection can cause great frustration and lead to costly errors in the workplace. I have frequently had exchanges in which one of my learners protests that despite a low assessment score, he or she really knew the material. When I ask a general question or two, the student struggles to answer and ends up sputtering, "I can't exactly explain it, but I know it!" Invariably, a student with this problem has spent a great deal of time reading over the course material, yielding a lot of familiarity, but not the necessary and richer recollective knowledge.

- **2. Shallow Processing.** A trainer may prepare an excellent course containing a good deal of relevant material. But the meaning of the material will only reside in a student's memory if the student has actively thought about the relevance of the material. Let's say, for example, that a trainer has prepared a course on the importance of hand washing in the workplace, and on the relevance issue of whether the lack of behavior change in this area should be viewed as a personal hygiene preference or a public health concern. But, let's say that a given student did not process and retain the deep meaning intended by the lesson. He did absorb key terms like 'frequent' and 'thorough'." His familiarity with these key terms could mislead him into believing he was ready for a test on the subject.
- **3. Recollecting Related Information.** Sometimes learners know a lot of information related to the target topic, and that makes them feel as though they know the target information. (This is analogous to the subjects in the experiment who knew the names of many composers and so felt that they knew who composed Swan Lake.) Suppose that a class spent three weeks studying weather systems, including studying weather maps, collecting local data, keeping a weather journal, learning about catastrophic weather events like hurricanes, and so on. In preparation for a test, the trainer says that there will be a question on how meteorologists use weather maps to predict hurricanes. When the student hears "weather map," she might recall such superficial information as that they are color

coded, that they include temperature information, and so on; she feels she knows about weather maps and doesn't study further. In fact, she hasn't yet come to understand the core issue — how weather maps are used to predict weather. But her general familiarity with the maps has tricked her into believing she had the necessary knowledge when she didn't. (Ironically, the problem of recollecting related information is most likely to occur when a student has mastered a good deal of material on the general topic; that is, he's mastered related material, but not the target material. It's the knowledge of the related material that creates the feeling of knowing.)

Cognitive science research confirms trainers' impressions that learners do not always know what they think they know. It also shows where this false sense of knowledge comes from and helps us imagine the kinds of teaching and learning activities that could minimize this problem. In particular, trainers can help learners test their own knowledge in ways that provide more accurate assessments of what they really know — which enables learners to better judge when they have mastered material and when (and where) remediation is required.

The key thing is to ensure that any training provided responds clearly to business needs. Start with a training needs analysis before embarking on any training, as well as consultations with your staff and training professionals, and use this information to form the basis of your decisions about what training is appropriate and how to evaluate its effectiveness.

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