# The New Theory of Disuse and Performance Learning

When we talk about our memory, or our lack of it, it is most commonly described as knowledge that is “in” or “out” of our brains. When we forget something, we describe that as “losing” a memory. If a particular memory—an old phone number, for instance—falls into disuse, we imagine it disappears. We also assume that if we organize information in clear, regimented order, and then repeat our study of that information in discrete blocks, we will attach that information to our brains more strongly.

Research over the last few decades has upended many of these conventional notions. In a New Theory of Disuse, forgetting is described as a problem not of loss, but of crowding out memories with new information, combined with diminished ability for retrieval. Memories don’t degrade, but rather our ability to retrieve them—a memory’s “retrieval strength”—can be weak or strong.

The question for scholars working on this theory has been: if memories don’t disappear, how do we improve our ability to retrieve them? Experiments have shown that the context in which a memory is created is critical to both its storage and retrieval strength. And, counter to conventional assumptions about teaching and learning, building learning courses that require harder work from learners can improve retrieval. Some of the most influential researchers in the field, Elizabeth and Robert Bjork, have described this as "creating desirable difficulties" to enhance learning. Let’s consider a few specific methods that emerge from this theory.

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## Testing for Learning, not Assessment

While it is generally used as an assessment tool, testing can be utilized as a learning tool. If we test as a means of reinforcing memory, and administer tests in a way that isn't experienced like an exam, the cognitive work that learners exert in the process works in their favor. One successful version is “pre-testing,” a technique in which learners are asked to retrieve information that has not yet been introduced. The struggle to answer questions that it induces creates a kind of mental map, building a field in the brain onto which the memory will eventually be placed, and accessed more easily later. Continued testing or review after information is introduced, carefully spaced over time, builds both storage and retrieval strength.

## Interleaving and Disruption

“Interleaving” has been used to describe the techniques of designing a course of learning in which different categories are mixed randomly and spaced out over the learning program. A given category or topic in the course is halted and another introduced before the first category is completed, and then a review of categories is also accomplished with an unpredictable mix. While the learner may find this lack of category completion disruptive, the interruptions and random order of exposure change the way the brain builds a strong path to the memory.

Some of the more conventional methods of instruction—such as repetition of material, or focused and linear directions—remain appropriate and effective for supporting specific and short term tasks. "Blocking"—where learners go through repetitive drills of the same task or information—is a familiar method to most of us from our formal schooling, and/or from sports practice. Several studies have shown that performance on an assessment exam, for instance, can be improved this way, but that the effectiveness of "blocking" diminishes over time.

## Conclusions and Questions

So, what do these findings suggest for workplace learning? It seems to us that many of the findings on memory and learning have enticing connections to Performance Support, and encourage our shift toward the concept of Performance Learning. As shorthand, you can think of Performance Support as analogous to turn-by-turn GPS, and Performance Learning to a roadmap. Let's review some of the key points:

| New Theory of Disuse | Application in Performance Learning |
|---|---|
| **Desirable difficulty** | Achieved through focus of the "difficulty" toward authentic problems within the actual context of work and through minimal initial guidance for the user, only followed by additional support upon the user's need. |
| **Retrieval strength** | This is greatly enhanced by context in which the information is initially learned. In Performance Learning, initial learning is immediately proximate to the context in which retrieval is required. |
| **Testing** | Learning can be reinforced through periodic micro-testing (or boosting). Pre-testing is achieved by purposely putting learners into an unfamiliar context without much preparation followed then by the support and guidance of Performance Learning. |
| **Interleaving and Disruption** | Performance Learning is by nature variable, with work (or performance) interleaved with moments of prescribed or ad hoc supported learning. |

In an organizational context (and not in a school, where much of the research we are reading about is focused), the primary question is: what kinds of knowledge might be most effectively transmitted using these methods? How do organizations assess the goals of a learning project that clearly delineate the long-term over short-term needs? And how might we account for the possibility of frustration among learners who might experience such methods as initially ineffective?

Have some thoughts on these or have questions of your own?
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The findings on memory and learning encourage our shift toward **Performance Learning**