

The Business Brain

## How learning is like working on a construction site

Wednesday, October 20, 2010

**SUSAN PINKER**

What is the best way to learn something new? Most of us think repetition is the ticket: drills and practice, and a blizzard of PowerPoint slides on a single subject. The more condensed the training, the more information will be burned into the brain. That's the accepted wisdom, as intoned by parents, piano teachers and hockey coaches.

It also infuses much of workplace training, as well as workplace architecture. One spot is usually set aside for training, often a dimly lit conference room with a pull-down screen. The idea is for trainees to stick to one topic and not budge until new material is mastered.

But can true learning – the ability to hold on to new ideas and apply them in a variety of contexts – really happen when instruction occurs at a single session, or at a conference once-a-year?

The answer is no. Just watch eager young people as they acquire new information or ramp up on new software; they shift frequently between subjects and tasks. This peripatetic approach may seem inefficient, but it more accurately reflects new evidence about how learning and memory really work.

Variety and contrast, not predictability, are what drive long-term retention, according to studies from the Bjork Learning and Memory Lab at UCLA. Trying to learn new material at one sitting, or by repetition, just doesn't work. New information should be spaced out, with other material and activities thrown in to create contrasts. That's how our brains handle new information in the real world.

It's also the way most young people learn, according to a 2008 study by Nate Kornell, a Williams College psychology professor, and Professor Robert Bjork. This year, they and their colleagues published a study that examined how older learners form new concepts. The researchers presented university students and older adults with examples of one painter's work, testing how best to foster understanding of the artist's style. Should they intersperse Rembrandt's paintings with other Dutch masters to distinguish his unique features from those of other artists? Or is it better to group multiple Rembrandts, to emphasize his style?

The researchers expected that the latter teaching method – known as blocking, or massing– would work best with older learners. They were surprised to find that both age groups learned best when several artists' works were intermixed. People need the challenge provided by varying examples, spaced out over time, to build a new concept that will persist in their memories.

Yet, as Prof. Bjork notes, blocking is the most common approach to training. Presenting one topic at a time makes intuitive sense; the problem is that blocking facilitates short-term memory, but at the expense of long-term recall. "Everywhere in the world, people block [when teaching]. They think, 'I'll just go over this until people capture it and then I'll start something else.' But our results really suggest that all instruction should be varied," Prof. Bjork told me.

Though some of the best minds in cognitive science have spent their careers investigating how new memories are assigned to neural networks, the precise mechanisms have been hard to pin down. What we do know is that our memories are more like construction sites than they are like tape recorders: Work happens gradually, one layer at a time.

"The molecular processes underlying memory take time to complete, one step strengthening the next," Alcino Silva, a professor of neuroscience at UCLA (who was not involved in the study), told me. "Massing training results in weak molecular changes that can easily fade away, while spacing training triggers more robust molecular changes that then result in stronger and more stable memories."

So if your goal is to help people learn new skills or material, then you should space out training sessions and mix in contrasting material. That's how people will retain it, not only on the day they learn it, but when they need to know it.

Susan Pinker is a psychologist and author of *The Sexual Paradox: Extreme Men, Gifted Women and the Real Gender Gap*.