Faculty Center Book Club
Small Teaching: Everyday Lessons from the Science of Learning
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Knowledge is the base of the Bloom’s taxonomy pyramid, creating new knowledge is at the pinnacle.

Research by cognitive psychologists tells us we can’t “offload the responsibility for teaching our students basic knowledge to elementary school teachers or to Google.” (14)

“We have to know things, in other words, to think critically about them.
Retrieving: Quizzes > Re-reading

○ “The kids scored a full grade level higher on the material that had been quizzed than on the material that had not been quizzed” (Brown, Roediger, and McDaniel 2014)—Note: six social studies classrooms in a middle school in Missouri (23)

○ Not all types of testing are equal: Students who took the short-answer exam recalled almost 50 percent of the material 30 days later with absolutely no reexposure or study time. (25)

○ Brian Rogerson taught introductory chemistry over five semesters in New Jersey. During two semesters, 10 minutes before the end of each 75-minute class, he stopped and asked students to respond to a question on the material he had just covered in the lecture. (26)

○ In the semesters Rogerson didn’t implement this technique, 35 percent of his students failed or withdrew; in the semesters he DID implement, that rate fell to 17 percent! (27)

○ We remember what we think about.
Models and Principles for Retrieving

- Opening and closing questions (29)
- Online Retrieval (34)
- The Retrieving Syllabus: “Use your course syllabus as a means to foster retrieval practice through brief, small teaching moments.” (36)
- Frequency matters
- Give your students something to think about
“Emotions have the power to focus our attention and give us a quick cognitive boost, so perhaps the tiny emotional investment I make into a predicted game helps lodge it more firmly in my memory.” (43)

What do you think of Lang’s examples of prediction in higher ed?

“In other words, taking a few seconds to predict the answer before learning it, even when the prediction is incorrect, seemed to increase subsequent retention of learned material.

Do we remember what we get WRONG rather than what we get right?

“Taking a practice test and getting answers wrong seems to improve subsequent study, because the test adjusts our thinking in some way to the kind of material we need to know” (Carey 2014b)—Benedict Carey, How We Learn

Does getting things wrong encourage or discourage learning? When does it become discouraging?

Carey says making predictions and being pre-tested allows us a clearer understanding of what our final assessment might look, which impacts how we study. (50)

Carey also says (Lang’s summary) ”prediction activities help us recognize more accurately the gaps in our knowledge.” (51)
Models and Principles for Predicting

- Pretesting on material they haven’t learned yet: “You should make absolutely clear to students the purpose of what you are doing so that they don’t feel as if you are unfairly asking them about material they haven’t learned yet.” (54)
- Clicker predictions?! WHO USES CLICKERS AND WHY? (55)
- “Informal, in-class predictions about any course material to which they are exposed.” (56)
- Stay conceptual, provide fast feedback, induce reflection (59)
- Stop before the conclusion and ask students to predict the outcome (60)
Interleaving: A Painful Struggle Becomes Enjoyable

- “A) Spacing out learning sessions over time; and b) mixing up your practice of skills you are seeking to develop.” (65)
- “A study conducted almost 30 years ago on French language acquisition in an American high school (Bloom and Shuell 1981)… The researchers divided around 50 students into two groups and charged each group with learning 20 new French vocabulary words in different ways.”
- “Spacing out learning thus forces us to engage at least partially in memory retrieval.” (67)
- “Interleaving refers to the practice of spending some time learning one thing and then pausing to concentrate on learning a second thing before having quite mastered that first thing, and then moving onto a third thing.” Not very “Karate Kid,” is it?
- Does this sound messy?
Models and Principles for Interleaving

- Cumulative Learning—"Students who had taken a cumulative final exam scored substantially higher on the postcourse assessment than those who had taken noncumulative finals (Khanna, Brack and Finken 2013)" (74)

- Mixed Classroom Learning—"Teachers of STEM classes…often ask students to complete homework problems prior to class and then open the next class with a brief review of those problems or the opportunity to ask questions about them and clarify answers. A very slight modification…review as usual. Then, before moving on to new material…give them one more new problem to complete right there in class. [It's] one more opportunity to practice the problem-solving skill you introduced in the last class period." (78)

- Online Learning Environments: “Staggered online deadlines that ensure spaced rather than massed work” (Miller 2014, p. 109) (79)

- Block AND Interleave—Ensure students return to the material over and again throughout the semester.

- Keep it small and frequent—Return to key course concepts and skills

- Explain and support—Avoid student frustration by speaking to them about the benefits of interleaving

- Create weekly mini review sessions and stagger deadlines and quiz dates