TAKING THE STRESS OUT OF SEMESTER TESTS

by Bryan Lynch, Veritas School

"Cramming works fine in a pinch. It just doesn't last. Spacing does."
Benedict Carey, *How We Learn*

For readers of John Milton Gregory's *The Seven Laws of Teaching*, the idea that students need frequent and consistent review over time is not new. In fact, it is one of Gregory's laws: "Count reviews as always in order." The use of frequent and involuntary formative assessment has long been an important piece in daily classroom practice at Veritas. But while we all tried to build in regular and varied reviews during the year, we found that the way we were approaching semester final exams actually encouraged that nemesis of good learning, cramming.

True, we required teachers to give students a written review guide at least a week in advance, with everything that might be tested. In addition, teachers were to conduct at least three full-period review sessions with students prior to semester exams. The trouble was, for most of us that meant three big review sessions in the week or so leading up to the test. So, the result was big tests, big reviews, big stress for everyone, (especially students)—and a lot of cramming. Not good, you might justly say.

This changed for us in 2016. That year we used Benedict Carey's *How We Learn* as our source for a teacher training day. There were a number of very interesting concepts that challenged some teachers' previously held assumptions: guessing wrongly interferes with learning (Carey says this is false—wrong guesses can actually improve learning); always having a consistent time and place for study is best (false, according to Carey); people often remember more of what they've left incomplete (true, says Carey); and studying a concept immediately after learning doesn't deepen learning much (true, according to Carey).

But an idea that had a big impact on our practice of semester exam preparation was the concept of distributed review, or spacing out review periods. Carey describes research into what intervals between when something is initially learned, when it is reviewed, and when it will be tested result in the best retention. While the algorithms behind the conclusions will be interesting to some, the bottom line is that review periods before a test should be spread out over a much longer space of time than we had been doing. The further away the test, the more spread there should be.

This principle is reinforced in an interesting piece in *Policy Insights from the Behavioral and Brain Sciences* (https://www.dartmouth.edu/~cogedlab/pubs/Kang(2016,PIBBS).pdf). In it the author summarizes the

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results of many studies which "have demonstrated that spacing out repeated encounters with the material over time produces superior long-term learning compared with repetitions that are massed together" and "practice is more effective when spaced out over time, instead of massed or grouped together (equating total practice time)." While most studies have apparently focused on rote memory, there are others which have demonstrated that spaced practice also improves generalization and transfer of learning. Studies have demonstrated improved mathematics problem-solving, science concept learning, and long-term learning of English grammar in adult English-language learners.

Our practice of having all our major test review periods in the week or so before the semester exams was highly counterproductive. Not only did it not work to aid long-term retention, it encouraged a view of education—that it can and should be "crammed" in and then forgotten—that was antithetical to the classical education we said we valued, that is, a lifelong, thoughtful interaction with ideas.

For our next semester exam cycle we adopted a new approach. We kept the requirements of a complete review guide and three full-period reviews, but we put those reviews on an expanded schedule to push them much further from the test. For example, for our next semester exams for that school year (a semester is 18 weeks for us), material that would be tested at the end of the semester that was learned in weeks 1–5 were to be reviewed in week 12. Material from weeks 6–10 were reviewed in week 14. The final review took place in the week or so before the test. So, our three big reviews took place in weeks 12, 14, and 17, rather than having them all in weeks 16 and 17.

We make no claim that this schedule is ideally in line with the technical principles of spaced learning, and we're always looking to improve it. However, students have consistently reported that they feel much better prepared for tests, they experience less stress during

final exams week, and they retain their learning better under the new schedule. This new approach to semester exams, together with the usual frequent and ongoing reviews of classroom concepts, has led to better learning and a more humane semester finals week. John Milton Gregory, were he here, would no doubt say, looking at us with eyebrow cocked, "no kidding."

Looking back, it seems embarrassingly obvious—we should have seen it years ago. Spreading out major reviews over an extended period of several weeks, even months, rather than in the days prior to exams, works well for everyone. We continue to adjust the schedule, and, of course, students continue to be nervous during semester exam time. (And we've added a visit from baby goats in the office to our semester final routine—more because they're fun and cute than because they're necessary). But the days of high-stress semester exam cram weeks are, thankfully, long gone.