Pay Attention, Class: Here Come More Facts for You to Forget

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A.P. European History was the best-reviewed class in my old high school. The teacher was a kindly man with an admirable devotion to his subject. Despite his skills, however, and despite the fact that I received an A, all that remained in my head from the entire course a few years later was the phrase "warm-water ports." And I wasn't even sure what it meant.

Students will soon forget much of the information they've been taught. The truth of that statement will be conceded, either willingly or reluctantly, by just about anyone who has spent time in school. We commit a list of facts, dates, or definitions to memory, but before long we couldn't recall most of them if our lives depended on it. Thus, one teacher quips, "'Covering content' is like being the guy on the corner handing out cheap, mass advertisements. We are basically saying to our kids, 'Here, throw this away for me.'"

Before sitting down to plan a course, therefore, every high school and college instructor ought to ask, "What can I reasonably expect students to remember from it a few years from now?" A few stray facts devoid of context? Something unexpected and hilarious that happened one morning, maybe? A comment that carried an emotional charge — and may have had nothing to do with the lesson?

Such an outcome would be deeply subversive of traditional schooling with its reliance on a knowledge-based curriculum. But does research confirm the premise that much of that knowledge goes in one ear and out the other? On this question, as on many others, extracting a straightforward conclusion from the available data proves to be tricky. It seems clear that the decline in what's remembered from school instruction isn't linear and continuous over many years; rather, a period of "rapid forgetting" is followed by a long plateau.[1] But it's hard to specify exactly how much is forgotten because any such estimate depends on multiple factors. And, as I've discovered with other topics, the conclusion offered in a paper's Discussion section isn't always justified by the results that precede it.

Consider a major review of the relevant research published in 1994. George Semb and John Ellis tracked down 56 studies, 22 of which were not peer-reviewed, and announced that "although forgetting does occur, the amount lost is not as great as expected by popular belief."[2] That's both surprising and encouraging … until you look more closely at the evidence the authors cited to support that conclusion:

Amount of time that's passed: About four-fifths of the studies measured how much students recalled from a specific class less than a year later — and in some cases only a few weeks later. There's not much reason to believe that the material is remembered for a long time.

Age when exposed: A couple of influential early studies dealt with high school instruction, but most of the research has focused on higher education. It's not clear that these findings can be generalized to what's retained from secondary, let alone elementary, teaching.

Prior knowledge: Most studies failed to take into account what students already knew before they took a given class, which, as the authors admitted, means their later scores would underestimate how much they had forgotten from the class.

Measurement method: The results for open-ended recall were considerably worse than for recognition tasks. We might be able to pick out a correct answer from among a bunch of wrong ones, but that's not particularly reassuring; rarely in real life is our memory jogged by multiple-choice tests. ("Oh, right, answer B does ring a bell.")

Dependence on re-exposure: If you took several Spanish courses, you're likely to remember more of the language years later than if you took just one. Similarly, if you went on to study more math in college, you'll forget much less high school algebra than if Algebra was your last course.[3] Perhaps the key takeaway from the studies under review is that recollection depends largely on our revisiting, reviewing, and perhaps relearning the material later. So, the good news about remembering a fair amount of what we were taught turns out to be true only if we keep rehearsing it — a whopper of a caveat.

Type of instruction: One interesting discovery in the Semb and Ellis review is that students forget considerably more if they were taught by direct instruction than if their classroom featured a discovery-oriented, learning-by-doing approach. "Instructional strategies that actively involve students in learning may result in qualitatively different memories that are more resistant to forgetting than memories acquired through more traditional instructional methods."[4]

Indeed, other studies confirm this. Pre-service teachers learning math in a "constructivist learning environment showed better retention of almost all the concepts than the students in the traditional [lecture-based] class," for example. And Australian middle schoolers in more progressive classrooms (featuring active learning and group discussions) remembered significantly more geography content than those in conventional classrooms. Much has been written about how such education helps students think deeply and enjoy learning. Apparently, it also pays dividends with respect to mere retention of facts.

Nevertheless, our ability to (accurately) recall information is limited no matter how it's taught. And those limits have been confirmed by investigations conducted in the three decades since Semb and Ellis published their review. For example:

* In a study that Semb and Ellis themselves coauthored, students forgot about two thirds of what they had been taught a few years earlier in a college psychology course, and those who had received an A remembered only slightly more than their classmates with lower grades.[5]

* Medical students forgot 30 percent of basic science facts after one year and 50 percent after two years.[6]

* A study that tracked down students who had taken a course in consumer behavior discovered that "most of the knowledge gained in the course is lost within two years."[7]

* Retention of facts from a course in agricultural education was "abysmal" after only six weeks had passed.[8]

Effacing Facts

So does this mean that education is a waste of time? Are teachers destined to spend their careers handing out the equivalent of fliers that students will just toss in the trash?

Not exactly. Our experience of forgetting much of what we were taught, an impression that a careful reading of the research largely confirms, is a powerful indictment not of school, per se, but of a particular model of schooling. This distinction comes into sharp focus when traditionalists (and people outside the field of education) sound an alarm about all the "learning loss" that supposedly happens every summer and was said to have reached crisis proportions when Covid kept kids home.

The question we always ought to ask in response to such pronouncements is, What do you mean by "learning"? Yes, discrete particles of information, along with decontextualized skills, may evaporate like so many little puddles in the hot sun. (That's mostly what standardized tests measure, and virtually all claims of learning loss are based on test scores — including claims made by companies that sell standardized tests.[9])

But, as I've written elsewhere, deep understanding — new ways of thinking about ideas borne of authentic collaborative inquiry — are far less likely to vanish. Students may be unable to recall the six stages of cell division, or the definition of a participle, or the approved steps for doing long division. But they're probably not going to forget how to set up an experiment to test their own hypothesis (if they had the chance to *do* science). Or how to write a story that elicits a strong reaction from a reader (if they were invited to play with prose with that goal in mind). Or what it *means* to divide one number into another (if they were helped to understand mathematical principles from the inside out rather than just memorizing math facts and procedures).

Those who warn about learning loss may think they're drawing our attention to a tragic and inevitable consequence of students' being out of school, something that urgently requires remediation (with — wait for it — more of the same kind of instruction). But

what they're inadvertently doing is indicting the sort of education that emphasizes the transmission of information. I'm currently at work on a lengthy brief against a "bunch o' facts" approach to schooling. That so many of those facts are soon forgotten constitutes a devastating argument against this model, but I believe it's on shaky ground for other reasons, too. No wonder its proponents tend to dress it up with pretentious labels like "cultural literacy," "core knowledge," or — my personal favorite — a "content-rich" curriculum. (Please. A *phone book* is content-rich.)

When the goal is less about making meaning than remembering information, experts are reduced to offering tricks for boosting memory, such as encouraging students to quiz themselves on the content, "interleaving" (switching between) several topics, and so on — even if it's not clear how well these methods work over the long term. But when you read about such strategies, keep in mind that the claim "Doing *x* can improve learning!" mostly means "Doing *x* can help you recall facts long enough to do better on a test of rote recall." The real question is whether that should be our primary focus.

I noted earlier that recollection is higher following less didactic kinds of teaching. But it's sometimes hard to tease apart progressive pedagogy from a more progressive (that is, less content-oriented) curriculum. For example, one study[10] showed that students forgot less if they had been invited to design their own experiments. But the teachers who let them do so also had more ambitious goals for them than committing a body of knowledge to memory.

In general, educators dedicated to promoting understanding and critical thinking tend to set up classrooms where students are active learners, whereas those whose curriculum is fact-based tend to rely on more traditional methods of instruction. So, when students can't recall much of the course content, it's hard to tell whether that's more because their education had consisted mostly of being told stuff (by way of lectures and textbooks) or because remembering all that stuff was the whole point.

You see the paradox here? The more that schooling is devoted to teaching a bunch o' facts, the more of those facts we're likely to forget.

NOTES

1. Martin A. Conway, Gillian Cohen, and Nicola Stanhope, "Very Long-Term Memory for Knowledge Acquired at School and University," *Applied Cognitive Psychology* 6 (1992): 478.

2. George B. Semb and John A. Ellis, "Knowledge Taught in School: What Is Remembered," *Review of Educational Research* 64 (1994): 253-86.

3. Harry P. Bahrick and Lynda K. Hall, "Lifetime Maintenance of High School Mathematics Content," *Journal of Experiment Psychology: General* 120 (1991): 20-33

4. Semb and Ellis, p. 279.

5. John A. Ellis, George B. Semb, and Brian Cole, "Very Long-Term Memory for Information Taught in School," *Contemporary Educational Psychology* 23 (1998): 419-33.

6. Eugène J.F.M. Custers, "Long-Term Retention of Basic Science Knowledge: A Review Study," *Advances in Health Science Education* 15 (2010): 109-28.

7. Donald R. Bacon and Kim A. Stewart, "How Fast Do Students Forget What They Learn in Consumer Behavior? A Longitudinal Study," *Journal of Marketing Education* 28 (2006): 181-92.

8. Marshall A. Baker and J. Shane Robinson, "The Effect of Two Different Pedagogical Delivery Methods on Students' Retention of Knowledge Over Time," *Journal of Agricultural Education* 59 (2018): 100-18.

9. During the pandemic, many of the "learning loss" warnings were issued by a company called NWEA — and uncritically publicized by the media. Their headlines should have read "Testing Company Warns of Drop in Standardized Test Scores, Recommends Increased Trust in, Use of, and Preparation for, Standardized Tests."

10. Martin A. Conway, Gillian Cohen, and Nicola Stanhope, "On the Very Long-Term Retention of Knowledge Acquired Through Formal Education," *Journal of Experimental Psychology: General* 120 (1991): 395-409.