

Memorize What, Exactly?

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By educationrealist

Four anecdotes.

First: [Learning Math](#), in which I describe my experiences in high school math, learning very little, remembering nothing, yet passing the AP Calculus test.

Second: I read [A Game of Thrones](#) when it first came out in the early 90s. Much traveling, much killing, no getting too attached to people because they turned awful or died, or both. Not all that much fun, but Tyrion was The Awesome, which was enough to make me pick up [Clash of Kings](#) when it came out. But I couldn't remember a single damn thing that happened in *Thrones*, except Ned Stark died and Tyrion was The Awesome. So I had to reread *Thrones* before *Clash*, which is no small thing, even with a reading speed of a thousand words per minute. And when it was all over, much traveling, much killing, no getting attached, and Tyrion, who I still liked enough to pick up [Storm of Swords](#) when it finally showed up, even knowing I had to read both *Thrones* and *Kings* again because I couldn't remember what the hell had happened.

I quit after [Swords](#). When the books came up over the subsequent years, I couldn't ever remember why I'd quit. Yes, it was irritating to reread the books, but I was pretty sure it wasn't that. Something had pissed me off, but I couldn't have told you what it was until last October, when 8 billion shocked tweets about the Red Wedding episode reminded me oh, yeah, that was why.

Third:

Last semester, I had two kids who would have had an easy time moving from Algebra II/Trig to AP Calculus, but for reasons unknown were in my regular precalc class. I assigned them special topics daily; most of them were a good two or three steps past my ability but we'd have fun chewing over the problems and anything I couldn't figure out I'd get back to them later. So last month, I told them, "I have a [friend who's a real mathematician](#) who says that complex says that complex number operations can all be explained by rotations on the imaginary plane. The book doesn't explain this, and I have no clue what he's talking about. So here's the chapter on vectors, which you'll need in order to understand the imaginary plane. Read that, then [read this](#), and then figure out what he means."

They figured out what he meant for addition and subtraction, but got hung up on multiplication. I got involved and we mostly made sense of multiplication by the time the bell rang.

I don't remember any of the details. But that doesn't matter, because I remember that I *got* it. Once I've built the path, I can go back later and recreate it.

Last: at my first grad school, I did an extensive presentation on the [Domain Naming System](#). Several years later, I tutored a kid who went to one of the precious snowflake charters, and he had to do a graduation project.

"I have a website."

"Great. Did you use Dreamhost, or what?"

"Godaddy."

"Yeah, but just as a registrar, or did you buy web services?"

"I bought the URL. Isn't that the same thing?"

"The place that stores your URL is the registry," I said automatically. "And no, that's not the same thing."

"The registry tells the computer where to go?"

"Well, the packet, but only after the [root name servers](#) direct you to the registry, which..." I catch myself. "Look, getting the URL is like buying a street address. I'm asking you about the house."

End anecdotes.

Using my new, very fuzzy understanding of memory: I have no episodic memories and next to no semantic memory of my four years in high school math, although I apparently learned enough to fake my way through a pretty demanding test. The George R. R. Martin novels made no impression on my semantic memory, and very little on my episodic memory. However, I have a strong episodic memory of learning imaginary numbers, and that memory will eventually lead me to a solid semantic memory with all sorts of cross-references. The structure of the Domain Naming system is firmly stored in my

semantic memory, even though I never used it before or since, even though I can never recall the last name of the author or the title of article he wrote that fueled my research, "[Wrong Turn in Cyberspace](#)".

I included these stories as a frame of reference; I'm hoping that readers are engaged in some form of compare and contrast to prime them to think about the role of memory in learning. Not as experts, not in terms of cognitive science research, not the Daniel Willingham version of what we know and don't know. Just in the usual layman's notion of memory.

Because you don't hear memory mentioned much in the public debate on public education.

As I mentioned in my last [post on memory](#), it plays a huge role in the "[skills vs. knowledge](#)" debate. E.D. Hirsch, currently being lauded for his role in curriculum development, originally gained fame and notoriety for his book [Cultural Literacy](#), a list of things he felt were necessary for reading comprehension and genuine understanding. Then and now, he and the Core Knowledge folk stress the importance of content knowledge to reading. Teach children a coherent curriculum, they say, is essential to reading comprehension.

I've not engaged in this debate because, while I agree in principle about the importance of content, I've been plagued by the fact that Core Knowledge, the curriculum Hirsch developed, is ridiculously difficult. I remember reading Hirsch's "What Your X-Grader Should Know" books back when my son was in grade school, and thinking it was a reasonable challenge—not expectation, but challenge—for my much brighter than average kid. Little has changed since then. Last August, [Daniel Willingham](#) presented a first grade [Core Knowledge](#) lesson, discussing the response of elementary school teachers—and largely dismissing their concerns.

I taught a year of high school English, and the bottom third of my class would have found that first grade curriculum reasonably interesting and challenging, so I found Willingham's dismissal of the teachers' concerns quite puzzling. Willingham himself says that domain experts are the obvious people to ask, but he apparently finds the curriculum's success in Core Knowledge and Montessori schools a compelling counterargument. I do not.

Similarly, I've been following the Harry Webb/"fuzzy learning" drama, and been quite annoyed at the realization that I'm nowhere near as sympathetic to the traditionalist arguments as I was even five years ago.

Many people fail to understand the two different issues driving the "skills" side of the debate.

First, and the one I've discussed the most, the ideological minefields inherent in defining the content: aka, the "it's all dead white guys" protest. Agreeing on a curriculum is very near impossible, and it's unlikely that robust knowledge of African, Asian, or Aztec history will give the same bang for the content knowledge buck that Western civ or US History does, particularly as an aid to reading comprehension. Here I am squarely on the knowledge side of the debate, but I am flummoxed by the tone deaf ignorance of the curriculum folks. We will never be able to officially mandate content, unless it's gay history in California.

However, part of the resistance isn't fueled by progressive or conservative ideologues, but by teachers themselves, and here, I'm on their side. Teaching content is in large part about getting kids to store and then recall information in their semantic memory. As [Paul Bruno](#) just reminded everyone, school can help students increase their "crystallized intelligence"—that is, knowledge, which is inescapably linked with memory.

Teachers know this, either intuitively or consciously. Much of the pushback you see from them on memorization or teaching content knowledge involves their understanding of how much information never gets through in the first place, and how much never goes from the episodic to semantic memory (even if they don't call it that). The rest of it involves their understanding of kids who mindlessly memorize and yet aren't well-educated despite very high test scores. And of course, they conflate the two issues because it's not wise to say "look, the smart kids need to learn how to apply and internalize their knowledge so they can't just fake it, and the not-smart kids need more time to learn less knowledge so they don't just give up.

Then remember, speaking of memory, that many teachers have all these kids in the same class.

So many teachers, and I include myself here when teaching math, focus on teaching kids what to do, because we can't count on them retaining knowledge. If we can't be sure they'll remember facts, then we want them to have an approach to new situations that

Non-teachers really have very little understanding of how much kids in school simply don't understand, which is why it's frustrating, for example, to see Dan Willingham and commenters dismiss teacher doubts about the ability of their first graders to learn about ziggurats.

Teacher concerns vary by the subject matter they cover.

In English/composition/literature, memorization plays no role unless you want to wax eloquent on the value of knowing poetry by heart. I don't. In any event, the whole issue is small potatoes. At the high school level, memorizing punctuation and grammar rules is probably a good idea.

When I taught reading enrichment classes, I would tell my Asian students to stop mindlessly memorizing vocabulary. Even if they remember the definitions, they won't be able to use them, to take advantage of the meaning, because they aren't memorizing an understanding of the words. Better they should pack away the memories of our discussions about those words, the way my voice rises when I point out the absurdities of the current meanings of "credulous", "credible", and the way they change with the prefix "in". It's also useful to remember what they used to think the word meant, or some oddity about its spelling, or a conversation we had about a particular word or words. The memories around the words, I tell them, are more important than a straight shot definition.

When you read of people dismissing "memorization", they aren't dismissing this internalized retention, but the Memory Palace version, the one in which the fact is memorized without reference or meaning. And it wasn't until recently that I understood this distinction, because I didn't realize that most—many—some number of people memorize spatially, rather than referentially.

This may or may not have something to do with the fact that my forward and backwards list recall is not terribly impressive—probably above average, but not way out there. I've never understood what that had to do with intelligence. As a commenter at Westhunt points out, RAM and hard drive are two different things. But put me in a room with eight conversations going on, and I can track every one. Surely that's related to RAM?