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What Does It Really Mean to Learn?

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9–12 minutes

I read “[Middlemarch](#)” for the first time during my sophomore year of college. I didn’t get it. Why would Dorothea, a young and intelligent woman, marry that annoying old man? How could she be so stupid? No one else in the class seemed to get it, either, and this pushed our professor over the edge. “Of course you don’t understand,” he roared, swilling a Diet Coke. “Trust me, you’ll read this book again when you’re forty, after your first divorce, and you’ll say, ‘Oh, I see!’”

Arguably, it’s one of the tragedies of humanities education that so much of it occurs between the ages of eighteen and twenty-two. We don’t teach people to drive at twelve, when they’re carless; why should we make them read novels about life’s regrets when they have none? Yet there’s a theory behind the assignment of “Middlemarch” to sophomores: it’s that knowledge acquired too early gets stored away. Patterns of thinking established now will be retraced later; ideas encountered first in art will prime us for the rest of life. This sounds chancy and vague, until you reflect on the fact that knowledge almost never arrives at the moment of its application. You take a class in law school today only to argue a complicated case years later; you learn C.P.R. years before saving a drowning man; you read online about how to deter a charging bear, because you never know. In the mid-twentieth

century, Toyota pioneered a methodology called just-in-time manufacturing, according to which car parts were constructed and delivered as close as possible to the hour of assembly. This was maximally efficient because it reduced waste and the cost of storage. But the human mind doesn't work that way. Knowledge must often molder in our mental warehouses for decades until we figure out what to do with it.

Leslie Valiant, an eminent computer scientist who teaches at Harvard, sees this as a strength. He calls our ability to learn over the long term “educability,” and in his new book, “[The Importance of Being Educable](#),” he argues that it's key to our success. When we think about what makes our minds special, we tend to focus on intelligence. But if we want to grasp reality in all its complexity, Valiant writes, then “cleverness is not enough.” We need to build capacious and flexible theories about the world—theories that will serve us in new, unanticipated, and strange circumstances—and we do that by gathering diverse kinds of knowledge, often in a slow, additive, serendipitous way, and knitting them together. Through this process, we acquire systems of beliefs that are broader and richer than the ones we can create through direct personal experience. This is how, after our first divorce, we find that we can draw on wisdom borrowed from English literature.

Valiant won the 2010 Turing Award, his discipline's version of the Nobel Prize, for developing ideas that underpin artificial intelligence and distributed computation, in which many computers work together to solve problems. In his book, he contrasts A.I.'s [way of learning](#) with ours. An A.I. can be astonishingly smart, and even think intuitively, kind of like a person. But A.I. systems, Valiant argues, are not as flexible as human minds because they are not yet educable. Even the most state-of-the-art A.I.s learn through a rigid process, in which they are trained, at great expense, and don't really get any smarter after that, no matter how much

new information they ingest. It's as though their minds freeze on graduation day. Yet human beings constantly improve their own minds through an unfolding, open-ended process that connects newly acquired facts and ideas to ones collected long ago. We "combine pieces of knowledge gained years apart" into "theories of considerable complexity that have many and disparate parts."

Valiant says that he tries not to use the word "intelligent" to describe people (in fact, he is "sometimes taken aback" when he hears others use it); instead, he is drawn to "valuable abilities that somehow involve learning and are not well captured by conventional notions of IQ." An educable mind, he writes, can learn from books, lectures, conversations, experiences, and Zen koans—from anything, really—and notice when relevant aspects of almost forgotten knowledge reveal themselves. We admire aspects of someone's educability when we say that they are a quick study, or identify them as "coachable," but what really makes them educable is that they apply insights "for purposes not foreseen at the time of the study or the coaching"; educability is something like "street smarts"—a term which connotes the "uncanny ability to negotiate the practicalities of life"—and is closely related to having common sense. When people strike us as particularly "well-educated," this might mean that they've had lots of school, Valiant writes, but it could also mean that they're exceptionally educable, with the ability to "take good advantage of whatever educational opportunities arise, whether formal or informal."

We'd probably like it if our political leaders were more educable: they "often need to make judgments on matters well beyond the knowledge and experience they had when elected." Valiant suggests that we value educability in doctors, too. Imagine that you feel a pain in your side. Is it appendicitis? It would be unwise, he writes, to rely on what you know about the disease, based on what a few people who've had it have told

you; you'd want to talk to a physician who's seen a thousand cases. A medical A.I. could also train by looking at thousands of cases; in fact, "if it has seen a million cases, a situation well beyond individual human experience, then it may make predictions that are stunningly better than our intuitions can even comprehend." And yet "the reason we go to doctors is not just that they have seen a thousand cases of a disease," Valiant argues. "It is that we believe doctors deliver further results." The basis of that extra value is educability.

Valiant doesn't get into details, but we can imagine for ourselves the value that a hypothetical doctor's educability might provide. Such a doctor might draw on a range of ideas and connections spanning years of learning. She learned about appendicitis in medical school, of course—and quickly concludes that you don't have it. But maybe her brother happens to be an avid cyclist, and she notices you drinking from a water bottle emblazoned with a logo she recognizes from his bike. Wasn't there an article online about how dangerous the city's bike lanes have become? More generally, she's also developed a new theory: she ought to ask more questions about the particulars of her patients' lives. She asks if you're a cyclist, discovers that you are, and eventually pinpoints the real issue—a bruised rib acquired in a fall, which you've not allowed to heal properly. Being educable, the doctor actually regards your case as an opportunity to learn, and is a better physician for it.

That's a rather schematic, explicit example of educability; sometimes, Valiant seems to be describing something more diffuse, and perhaps more powerful. To a degree, the connections, recombinations, and new applications of knowledge involved in being educable are useful precisely because they aren't obvious. Every so often, I learn a lesson in one part of life that seems to apply to another: when I swim down the beach, for example, I tend to look at the umbrellas on the sand and think

that I'm making very little progress, and yet, later, when I switch from the front crawl to the backstroke, I'm often surprised by the distance that I've travelled between my glances at the shore. The discovery that incremental progress feels faster when you let it accrue before judging it has been useful to me in my writing (and also in motivating me to clean out the garage). A civil-engineering class I took in college, which focussed on the structural forces shouldered by bridges and skyscrapers, comes back to me with great regularity when I think about all sorts of things. Wind exerts its force along the length of a skyscraper, causing it to bend. Similarly, a new source of stress in your life can't be compartmentalized; it increases the pressure everywhere. It's interesting to see one's mind through the lens of educability. It makes you wonder what other cross-pollinations have occurred.

Valiant thinks it might be useful to promote educability as an ideal. We could try to figure out how to measure and teach it in schools, or to encourage it in adults; at a time when accelerating technological change means there's always more to learn, we might seek to create a more educable society in general. (That change will further accelerate if Valiant's proposals for A.I. capable of "artificial educability" prove workable.) After reading his book, I thought, on a less exalted scale, about how I might improve my own educability. I concluded that I would seek to learn about a wider range of subjects, and simply try more things, trusting that my mind would someday knit it all together. I also figured that it couldn't hurt to remind myself of what I'd already learned. Down in the basement, a few big bookshelves hold my reading from college and graduate school. "Middlemarch" is there, along with many other books that I didn't understand then but have come to value with the passage of time. Reading widely about things that don't seem immediately or practically useful, in the hope that what you learn now may prove

meaningful later—that's pretty much the definition of a liberal-arts education. Who knew that one of its best defenders would turn out to be a computer scientist? ♦