Taking notes? Bring a pen, skip the computer

A little ‘desirable difficulty’ is good for memory, a new study suggests

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JUST ABOUT EVERY professor has complained about students with screens in front of them flitting over to Facebook or Tumblr instead of listening to a lecture. But, those distractions aside, it’s hard to blame the kids for wanting to type their notes instead of write them out longhand. Think of how much quicker you can type an e-mail than write a letter: Digital note-taking is simply easier.

A paper published online in the journal Psychological Science last month, however, suggests that longhand may actually hold an advantage when it comes to the most important reason we take notes—that is, to help us remember what we’ve heard. The researchers—Pam Mueller, a graduate student at Princeton University, and Daniel Oppenheimer, a psychology professor at UCLA’s Anderson School of Management—had students take notes on a lecture, and then quizzed them on it later. In the end,

longhand note-takers performed better on quizzes than their laptop-wielding peers, even though the Internet was disabled.

If these findings seem suspiciously Luddite in their implications, it's because they run counter to what we view as a key purpose of modern technology: to streamline, automate, and simplify tasks for us. But in fact, sometimes the easiest method is not the best. What Mueller and Oppenheimer observed is an illuminating example of what psychologists call "desirable difficulty"—the fact that sometimes, obstacles that frustrate us actually help us learn. It's a phenomenon that suggests that, instead of rushing headlong into new technologies that make life easier, it may be worthwhile to ask whether they really improve outcomes or in some way sell us short. Mueller and Oppenheimer started by having subjects watch a lecture on a screen, and assigning them to take notes either by hand or on a laptop. About 30 minutes later, subjects were quizzed about factual and conceptual elements of the lecture. They found that students who took longhand notes performed significantly better, particularly on conceptual questions.

Something even more surprising happened when the researchers waited a week to quiz their subjects, and then allowed them to review their own notes first. Because the laptop users could type faster than the writers could write, they had taken more notes, which

other research has shown to be beneficial. “We though we might see [laptop users] rebound because they had extra content,” Mueller said. But the longhand note-takers still outperformed them. “We were really surprised that they seemed to not get any benefit from that.”

All notes are not created equal. Because laptop users are better able to keep up with the pace of speech, it turns out, they are more susceptible to transcribing lectures verbatim, a style of note-taking that previous experiments has shown to be inferior. “If students are taking down notes on everything that’s said in class, they’re just functioning as a stenographer,” said Michael Friedman, a cognitive psychologist who is conducting note-taking research as a fellow at the Harvard Initiative for Learning & Teaching.
Note-taking is a two-part action: creating the notes (“encoding”) and reviewing them later (“storage”), both of which confer learning benefits. When the encoding becomes too easy, that first opportunity to learn is wasted, particularly when it comes to absorbing concepts rather than rote facts. (Some note-takers—say, journalists conducting interviews—do need verbatim notes, of course.) But even when Mueller and Oppenheimer specifically warned their subjects about the perils of verbatim notes, the laptop users couldn’t help themselves. When people have the chance to act like stenographers, they do.

Taking notes by hand, by contrast, forces students to

grapple with the material enough to summarize it, since they aren't physically capable of writing down every word. The constraints enforced by the rudimentary technology of pen and paper force a deeper engagement with the material, the paper concludes.

Twenty years ago, cognitive psychologist Robert Bjork gave this phenomenon a name: "desirable difficulty." Bjork used it to describe how making learning harder can also make the information stick. For example, Oppenheimer coauthored a 2010 study that found that printing information in hard-to-read fonts helped students remember it later. But it's tempting to apply the concept outside the world of education, too. A default assumption of modern life is that if technology can make something easier for us, we should use it. Desirable difficulty throws that idea into question. Oppenheimer points out that we encounter situations where desirable difficulty plays out every day. Cellphones makes calling so easy that we no longer remember our best friends' numbers. Recent research has shown that when people know they can use a search engine to recall information later, they are less likely to learn that information in the first place, instead opting to learn where they can locate the information. "That isn't to say that cellphones or Google are disadvantageous," he wrote in an e-mail. "They both are incredibly helpful and allow us to function much more efficiently. But they may be detrimental for certain goals: If your goal is to

memorize phone numbers, don't use autodial." Just as you can dial people's phone numbers from your cellphone keypad, it's possible to learn to use modern tools in ways that replicate some of the difficulty of older methods. In the case of note-taking, that could mean taking notes on a laptop but with some adjustments. "Students are notoriously incomplete note-takers," said Kenneth Kiewra, an educational psychologist at the University of Nebraska-Lincoln who has been studying note-taking since the 1980s. His research has shown that students capture only about a third of important lecture ideas in their notes. "The laptop has potential because people can record more with a laptop, but we need to get them to not do it mindlessly." In a study currently under review, he found that built-in breaks for note revision during class helped students significantly improve their notes—and their future quiz performances.

Others in the burgeoning scholarly research on note-taking have further suggestions. Mueller, for example, is interested in studying whether stylus-and-tablet devices might combine the benefits of computers and longhand. Oppenheimer speculates that it might be possible to somehow force typers to slow down, ensuring they take digital notes at the speed of longhand.

Meanwhile, the concept of "desirable difficulty" is finding parallels beyond the borders of pedagogy.

Oppenheimer's 2012 book, "Democracy Despite Itself," locates a similar phenomenon within politics: The "veto players" who make democracy so frustratingly inefficient also protect us from catastrophically terrible policies being swept into law. Malcolm Gladwell used the term in his most recent book, "David and Goliath," in observing that extremely successful people have often lost a parent in childhood and that many entrepreneurs have dyslexia. And echoes of the concept can be found in the ongoing vogue for "slow" everything: Slow food, slow church, slow parenting—and yes, slow education. It may be human nature to take the easiest route available, but it's becoming clear that slowness and difficulty can add real value.

Meanwhile, professors and teachers will have decisions to make. Oppenheimer now starts each semester by describing his research on note-taking, and very few students go on to use laptops in his class. Some instructors go even further. University of Virginia history professor James Loeffler banned laptops from his classrooms a few years ago, fed up with how the devices turned even attentive students from big thinkers into transcribers. "My policy stems from my own critical reasoning—precisely what I am trying to teach students—not social science data," he said by e-mail. But, he added, "It's nice to have some reinforcement."