Handwriting might be a lost art, but educators should make sure it lives on in the classroom.

According to a new study, Pam Mueller and Daniel Oppenheimer of Princeton University and UCLA Los Angeles respectively, students who write out their notes by hand actually learn more than those to type their notes on laptops. Over the course of several experiments, Mueller and Oppenheimer tested students’ memories for factual detail, conceptual comprehension, and synthesizing capabilities after half of them took notes by hands and the other half took notes by way of computer. Students who used laptops cranked out more words than hand-writers did, but the hand-writers ended up with a stronger conceptual understanding across the board.
Should students take notes by hand or on laptops? A recent study suggests taking notes on a laptop hinders learning and retention. Here’s Cindi May writing for Scientific American:

What drives this paradoxical finding? Mueller and Oppenheimer postulate that taking notes by hand requires different types of cognitive processing than taking notes on a laptop, and these different processes have consequences for learning. Writing by hand is slower and more cumbersome than typing, and students cannot possibly write down every word in a lecture. Instead, they listen, digest, and summarize so that they can succinctly capture the essence of the information. Thus, taking notes by hand forces the brain to engage in some heavy “mental lifting,” and these efforts foster comprehension and retention. By contrast, when typing students can easily produce a written record of the lecture without processing its meaning, as faster typing speeds allow
students to transcribe a lecture word for word without devoting much thought to the content.

What’s surprising is that even when students were warned of the risks of verbatim note-taking, their electronic notes still demonstrated the same amount of rote dictation as pen-to-paper documentation did. Does that suggest handwriting’s universal advantage over laptops?

Some scientists are reportedly skeptical of the findings, wondering if the effects are overstated. Typing notes on a screen does have its benefits. Electronic documents can lend themselves to better organizational formatting. Moreover, when it comes time to revisit electronic notes later, some students might find the flexible format beneficial. On a laptop, notetakers can delete, reorder, and build on ideas with a simple click or keystroke. But on paper, that kind of fluid assimilation and rearrangement of concepts just isn’t possible. Syncing between devices can make notes ultra-portable, too—and search options available on laptops make studying more efficient.

Writing by hand can also lend itself to verbatim note-taking too, though—especially if educators couple their lectures with wordy PowerPoint presentations or dense textbook readings. Depending on what kind of learner a student is, those simultaneous visual cues might make passive dictation easier, resulting in less long-term retention.

The study does indicate the importance of note-taking overall, though, no matter the medium:

These findings hold important implications for students who use their laptops to access lecture outlines and notes that have been posted by professors before class. Because students can use these posted materials to access lecture content with a mere click, there is no need to organize, synthesize or summarize in their own words. Indeed, students may take very minimal notes or not take notes at all, and may consequently forego the opportunity to engage in the mental work that supports learning.
Twenty years ago, cognitive psychologist Robert Bjork called this phenomenon “desirable difficulty,” the idea that making learning harder can help information stick. If teachers required students to take their own notes or (on top of that) requested that they handwrite them, students could perform better on tests—and they might even feel empowered to be more creative throughout the learning process, too. Some combination of handwritten and typed notes could also expedite the learning process and illustrate the power of engaging with material in more ways than one.