



Why handwriting still matters in the digital age

From improving focus to strengthening cognitive pathways, handwriting offers neurological benefits that modern technology can't replicate.

By Vittoria Traverso, September 26, 2024

Think back to the last time you jotted down a quick note or made a grocery list. Chances are, it wasn't with pen and paper. Over the past decade, keyboards and screens have quietly replaced handwriting in our daily routines, from classrooms to office meetings. Some schools around the world have even stopped teaching cursive altogether.

Yet, research shows that putting pen to paper offers cognitive benefits that digital tools can't replicate.

"Statistically most studies on the relationship between handwriting and memory [including ones conducted in Japan, Norway and the United States] show that people are better at remembering things that they have written down, manually than on a computer," says Naomi Susan Baron, professor emerita of linguistics at American University in Washington D.C. and author of *Who Wrote This? How AI and the Lure of Efficiency Threaten Human Writing*.

From improved memory retention to enhanced learning outcomes, here's how maintaining the art of handwriting can significantly impact how we absorb and retain information.

What are the benefits of handwriting

The perks of writing by hand can partly be attributed to the engagement of multiple senses in the writing process.

“Holding a pen with our fingers, pressing it on a surface, and moving our hands to create letters and words is a complex cognitive-motor skill that requires a lot of our attention,” says Mellissa Prunty, reader in occupational therapy at Brunel University London who has researched the relationship between handwriting and learning. “This deeper level of processing, which involves mapping sounds to letter formations, has been shown to support reading and spelling in children, Prunty says.

Adults also benefit from the labor-intensive nature of handwriting. A study involving 42 adults learning Arabic found that participants who learned letters by writing them down by hand were quicker to recognize them, had an easier time naming them, and were better at sounding the newly learned letters out compared with people who were asked to learn the new characters by typing or by just looking at them.

“We think that our results can be partly explained by how handwriting activates different pathways to the same concept,” says Robert Wiley, a professor of psychology at the University of North Carolina Greensboro and co-author of the study. He explains that learning a new word involves connecting an abstract symbol with information on the visual, motor, and auditory levels. “Handwriting can activate more connections across these different dimensions compared with typing,” he says.

Through surveys with 205 young adults in the U.S. and Europe, Baron found that many students report more focus, steadier concentration, and better memory when producing a text by holding a writing instrument rather than pressing keys on a keyboard, suggesting that our sense of touch plays a vital role in the way we absorb information.

The fact that engaging our senses can make us better learners can be counterintuitive, but activities like touch and motion activate the same brain areas that are also involved with learning and memorization, says Lisa Aziz-Zadeh, a professor at the Brain and Creativity Institute at the University of Southern California “The human brain evolved to process sensory and motor information through evolution,” she says, “those same sensory and motor processing brain regions are now involved in higher cognition.”

A more active body, a more active brain

To better understand how our senses influence our cognition, we can think of our brain as a road system, says Audrey van der Meer, a professor of neuropsychology at the Norwegian University of Science and Technology. Brain networks in children are like faint and winding paths in a forest, she says. With practice and experience, these paths can become motorways that connect different parts of the brain to transport information fast and efficiently.

In a study published last January, van der Meer and her co-author Ruud van der Weel looked at brain scans of 36 young adults enrolled in university who performed writing tasks. The students were asked to write Pictionary words using a digital pen on a

touchscreen device or typing them on a keyboard. The participants' brain activity during each task was captured through electroencephalogram (EEG) techniques.

"The most surprising thing was that the whole brain was active when they were writing by hand, [while] much smaller areas were active when they were typewriting," van der Meer says. "This suggests that when you are writing by hand you are using most of your brain to get the job done."

Moreover, the study reported that the different parts of the brain activated by handwriting communicated with each other through brain waves associated with learning. "There is a whole body of research that talks about alfa and theta oscillations in the brain that are beneficial for learning and remembering," van der Meer says. "We found those oscillations were active during handwriting but not during typewriting."

As a result, researchers are encouraging the perseveration of handwriting skills. In Norway, many schools stopped teaching cursive writing, instead opting for pupils to write and read on an iPad, a trend van der Meer hopes to change through her research.

"I think we should have at least a minimum of handwriting in primary school curricula simply because it is so good for the developing brain," she says. In the U.S., cursive was removed from the [Common Core Standard](#), but several states decided to incorporate it back into school curricula due to its benefits for learning.

As for adults, van der Meer advises adults to use pen and paper, too. "Keeping some handwriting practice is a very good exercise for the brain," she says. "It is the equivalent of doing maintenance work on a busy road."