For Complex Texts, the Brain Prefers Paper

Douglas Fisher and Nancy Frey

When a text requires some struggle, print rules!

We can do many powerful things with technology today that were unimaginable a decade ago. It's not an exaggeration to say that information access is at an all-time high, mainly because of the Internet. A simple online search can reveal thousands, or even more, sources that can be read and discussed online, including reports, articles, and entire books.

Given the unprecedented access to information the Internet provides, there's a significant push to have students read digitally in school. In addition to saving money and trees, many argue, digital reading is no longer just a skill youth will need in the future, but one they need to master *now*. We agree; reading digitally is an important skill, one that's ubiquitous in our society.

But this issue of *Educational Leadership* is about the brain and the educational decisions we make based on what is known about its cognitive, psychological, and emotional functions. And there's a body of evidence to suggest that when it comes to complex texts, *the brain prefers paper*.

The Myth of "Changed Brains"

Research indicates that, when a text is "comfortable"—easy for a student to read and understand—digital versions work just fine and are a good option. But when it comes to reading *complex* texts—the type that don't give up their meanings easily—readers understand and perform better when they read on paper.

Based on their review of 36 empirical studies, Singer and Alexander[1] noted that texts fewer than 500 words were understood at about the same level whether consumed in print or digital formats. But as the text length increased, comprehension of texts in digital formats suffered. Similarly, they found that students performed around the same on *general understanding* questions about texts read online or in print. However, print readers did better than digital readers on questions probing for more detailed, nuanced information.

Similarly, Mangen, Walgermo, and Brønnick[2] explored adolescents' comprehension of articles read in either digital or print formats. Students who read an article digitally scored worse on the assessment than those who read it on paper, whether the text was narrative or expository.

When we share such findings with educators, we often hear that the brains of "digital natives" have changed, that they read differently than we do. It's true that most toddlers

today can pinch and swipe—but their brains haven't changed when it comes to reading. They read with the same neural areas that the rest of us do.

And every brain still needs to be taught to read anew. There's no reading gene that passes from one generation to the next. Brains have to learn to read—and some of the texts those brains encounter will provoke struggle. We mean the good kind of struggle, when you have to reread, talk with others, revise your thinking, and so on. Grappling with a text that demands such struggle appears to be better managed when it's on paper.

The researchers we've referred to believe that our ability to recall, retrieve, and locate what we've just read is tied to the physical layout of the text. They speculate that spatial representation of text, which involves the ability to remember where you read something previously so you can go back and review it, is more difficult when a reader is scrolling digitally.

You have undoubtedly frequently looked back through the pages of a magazine or book to refer to something you'd read earlier. It's a bit more difficult to find the place when scrolling through a long digital text; instead, you must use the search function. Our brains seem to stack information in print, which helps us remember things.

"Man, That Poem Is Still with Me"

The teacher in the video that accompanies this column—an English language arts teacher at Health Sciences High and Middle College in San Diego—understands the value of using print when the text is complex. Students also read digitally in her class, but, using a commercially available program, she "levels" the digital texts she makes available to them to ensure they can read those texts without difficulty. In this lesson, however, she provides students a printed copy of Robert Frost's poem "The Road Less Travelled."

At the start of the lesson, she acknowledges that the poem is complex; Frost himself called it "tricky." This teacher has shared with us that students often have a superficial understanding of this poem and don't push their understanding—or their peers' understanding—any further. Having learners write on the text and return to it several times during a lesson helps them understand it at a deeper level. She says she engages students in practices like this to build a habit of persevering in reading complex texts:

> I know they will have to demonstrate their ability online with our state assessments, and I hope that they generalize some of the skills and strategies that I teach. But the best way I know to have them get ready for complex reading on a state test is to build their reading skills, which happens when they read on paper.

As the lesson progresses, this teacher asks her students several questions to guide their thinking and points out aspects of the poem they need to focus on. The students also collaborate with each other, grappling with their understanding as it evolves. They read, write, speak, and listen—and come to a much better understanding of this poem that they originally thought was "simple." As one student told us a few days later, "Man, that poem is still with me. When I make a decision, I think about the roads and what my options really are and what it means to choose one."

Worth It!

When texts are complex, it's worth the time and effort to have kids read them in print. If you want to save trees and money, stop copying worksheets. Have the few print pages you use with students be important readings that will push their thinking and help them develop good habits.

Endnotes

[1] Singer, L. M., & Alexander, P. A. (2017). Reading on paper and digitally: What the past decades of empirical research reveal. *Journal of Educational Research, 87*(6), 1007–1041.

[2] Mangen, A., Walgermo, B. R., & Brønnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International Journal of Educational Research, 58*, 61–68.

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