

The Importance Of Paper-Based Materials In Education

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Over the last 20 years or so, technology has infiltrated almost every facet of our lives. The expansion of broadband, smartphones and portable technology has changed how we communicate, how we access information and how we work and learn.

While many of these changes are no doubt positive, there is growing evidence that this isn't always the case. As we shall explore in this article, researchers are beginning to cast doubt on the growing reliance on technology in the classroom.

In the past 10 to 15 years, there has been a gradual shift away from paper-based learning materials in schools towards digital and online. This shift accelerated rapidly during the pandemic when almost all schools moved lessons online. Research has shown that this increasing reliance on digital methods and resources may be negatively affecting the ability of students to learn and remember information. There is also growing concern about the impact of digital technology on mental health.

Digital Vs. Paper-Based Materials: Learning

In 2018, researchers in Israel and Spain examined 54 studies, involving more than 171,000 readers, that compared reading from digital text and printed text. They found that comprehension was better overall when people read printed as opposed to digital texts.¹

Similarly, a study involving millions of high school students in the 36 countries of the Organisation for Economic Cooperation and Development (OECD) found that those who use computers heavily at school “do a lot worse in most learning outcomes, even after accounting for social background and student demographics”. The same study also revealed that fourth-grade students (approx. 9-10 years) “who used tablets in all or almost all their classes had, on average, reading scores 14 points lower than those who never used them—a differential equivalent to an entire grade level”.²

Patricia Alexander is a psychologist at the University of Maryland, in the US, who studies how we learn. She has discovered that although students think they learn more reading online, tests show that they actually learn less than when reading print. Part of the problem can be attributed to the speed with which we typically read text on a screen, much of which is easy-to-understand text messages or social-media posts; but when it comes to reading more complex information on screen, which requires more attention and thought, people still tend to scan it rather than read it properly.³

As well as encouraging us to read quickly, reading online usually involves scrolling, which can make it hard for the brain to create mental maps that help us to remember. When reading a printed book, for example, it's easy to know roughly which page you're on, but that's far more difficult when scrolling through text on a screen. Further, a small study, published in 2019, revealed that it's not just when scrolling that the brain struggles to make mental maps: when a group of 50 participants was asked to read a 28-page story, some of them read a printed version and others read the story on an e-book; those reading the printed version understood the chronology of the plot better than those reading the digital version.⁴

The benefits of paper-based learning materials aren't restricted to reading, writing on paper rather than typing on a keyboard can also produce better results. A 2014 study⁵ compared the outcome of students taking lecture notes by hand with those who took notes on a laptop. When it came to testing the students on their knowledge of the information, they were allowed to review their notes for 10 minutes before the test; “those who took longhand notes performed better on both factual and conceptual questions.”

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The authors of the study concluded that, “laptop use can negatively affect performance on educational assessments, even — or perhaps especially — when the computer is used for its intended function of easier note taking. For that reason, laptop use in classrooms should be viewed with a healthy dose of caution; despite their growing popularity, laptops may be doing more harm in classrooms than good.”

Perhaps one of the most noticeable differences between reading printed matter compared to reading on a screen is distractions. When we’re reading from a screen, we’re more often than not connected to other services, which bring with them pop-ups and pings from social media, emails and text messages, all of which divert our attention and break concentration. Even in schools, depending on the school’s policy, this can be an issue, particularly when tech-savvy students know how to bypass firewalls and other restrictions.

Digital Vs. Paper-Based Materials: Mental Health

There is growing concern about the impact of digital devices on mental health, including increased rates of anxiety and depression. With devices now being used by students in school as well as outside of it, there is little respite from the constant stimulation they deliver. Paper-based learning materials, in addition to providing cognitive benefits, also provide a much-needed break from the digital world.

A study conducted by researchers at the University of Washington found that students who used paper-based planners were less likely to experience symptoms of anxiety and depression than those who used digital planners. The study, published in 2017, involved 264 undergraduate students who were randomly assigned to use either a paper-based planner or a digital planner. The researchers found that the students who used the paper-based planner reported lower levels of anxiety and depression than those who used the digital planner.

The negative effect of digital devices isn’t limited to their use during the day. The blue light these devices emit also affects how well we sleep. A study conducted by researchers at the University of California, Los Angeles, found that those who read from a tablet took longer to fall asleep, had less REM sleep, and felt less rested in the morning than those who read from a paper book.⁶

Poor sleep quality can bring with it a range of negative health consequences. In addition to the effect poor sleep has on mental well-being, it also increases the risk of obesity, diabetes, and cardiovascular disease.

Conclusion

Above are just a few examples of a growing body of research that suggests that the removal of paper-based learning materials may be detrimental to students’ ability to learn and remember information, as well as their overall well-being.

Compared to human’s use of paper as an educational medium, digital and online tools are still very much in their infancy, with much research still to be done on their impact on our lives, good and bad. As such, we must question the speed – and continuation – of the shift from paper-based to digital and online learning materials.

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