

“But Still It Moves”: Screens, Print, and Reading

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Abstract

As the amount of reading people are doing on digital devices mushrooms, a growing number of voices are suggesting that onscreen reading will replace printed hard copy. Digital reading has multiple advantages, including portability, democratic access, and (generally) price. However, concerned scholars are questioning whether reading on digital devices undermines important aspects of reading, including uninterrupted concentration.

This paper compares the cases for reading onscreen versus reading in hard copy, considering such variables as cognitive performance, eye-movement, and reader preference. After summarizing studies the author has previously done on college students’ self-reported reading patterns, the paper presents findings from a subsequent study in which subjects were observed actually reading on a computer screen versus in hard copy. The study compared the extent to which readers were distracted from the reading tasks (e.g., checking their mobile phones, playing with distractor toys in the experimental room) during the two reading conditions. Subjects in the same study completed a questionnaire that probed multitasking and distraction issues.

Keywords

eReaders; hard copy; reading; mobile phones; tablets

“Babies born today will probably never read anything in print.”

Thus declared Ben Horowitz, co-founder of Andreessen Horowitz Venture Capital, in 2012.¹ The same year, Hugh McGuire argued that the book and the internet will merge, with traditional stretches of text yielding to shorter passages containing hyperlinks, a task for which the internet is ideally suited (McGuire 2012). As sales of eBooks, eReaders, tablets, and smart phones surge, and as the march towards online education fuels production and adoption of digital texts, the future of reading in hard copy is generating growing scrutiny.

Digital reading was initially the domain of desktop computers or terminals, with laptops then assuming a larger role. The first eReader to show commercial success, Amazon’s Kindle (introduced in 2007), downloaded books electronically but was designed as a stand-alone platform. Following Apple’s launch of the multifunctional iPad in 2010, both Amazon and Barnes & Noble introduced eReaders that also provided general internet access.

Reading on digital screens (including desktops, laptops, eReaders, tablets, and mobile phones) has become integrally tied to simultaneous internet availability.² Given the growing shift from reading in hard copy to reading onscreen, we need to weigh the advantages and disadvantages of digital reading. These include the challenges of reading on devices that entice users to toggle between reading and internet functions, thus breaking concentration. We therefore begin with a short overview of positive aspects of reading onscreen, including relevant current research from the psychological literature. We then turn to dissenting voices, including from users and from reading experts. We conclude by addressing the specific

¹ The Association of Magazine Media, San Francisco, October 2012.

² One exception is Kindle’s Paperwhite (given its limited internet access), which some users purchase explicitly to avoid distraction.

issue of multitasking, presenting results from a recent study in the US exploring user multitasking when reading onscreen versus in print.

The Case for Reading Onscreen

General Considerations

Among the advantages of digital reading are these:

- eBooks are generally less expensive than print counterparts.
- Multiple books can be loaded onto a single portable device, also reducing paper use.
- Thanks to the internet, democratic access to digitized scholarship becomes technologically possible.

See Baron (In Preparation) for expanded discussion of these issues.

Psychological/Cognitive Literature

Early studies comparing reading performance onscreen versus in print indicated that print yielded better outcomes (Dillon 1992). However, with improvements in screen quality, along with users' exponentially-expanded experience reading onscreen, most current studies report no fundamental differences in such areas as reading speed, comprehension, and eye-movement (Ackerman and Goldsmith 2011; Holzinger *et al.* 2011; Zambardi and Carniglia 2012).³

Case closed? Hardly.

The Case for Reading in Hard Copy

In 1633, the Inquisition demanded Galileo disavow his claim that the earth revolves around the sun, rather than the sun going around the earth. According to subsequent physics hagiography, following his recantation, Galileo is reputed to have whispered under his breath, "But still it moves."

Just so, despite the benefits of eReading – and surging sales of digital content and devices – the fate of print is hardly sealed. The first relevant voices we need to hear are from readers themselves.

User Preference

Numerous studies find users continuing to favor hard copy. Parents prefer their young children read (or be read to) in print (McLean and Kulo 2013). Teenage readers show a preference for reading printed books (McLean and Kulo 2013), even as teens' access to eBooks grows (Rainie and Duggan 2012; Scholastic 2013). Austrian (Holzinger *et al.* 2011) and German (Kretzschmar *et al.* 2013) studies note that although adult subjects performed equally well on tests when reading in both media, the vast majority indicated a preference for print. In a late 2010 study, American college students overwhelmingly preferred reading hard copy for all genres except academic journal articles, most of which were only available digitally anyway (Baron 2013). As of late 2012, 60% of US college students still preferred printed books over eTexts, and only 26% were "very satisfied" with digital texts, down from 30% the previous year (Book Industry Study Group 2013).

³ However, see Mangen *et al.* (2013) for evidence of superior comprehension with print.

Reading Specialists

Experts on reading are expressing concern that reading onscreen compromises some components of what it means to read. Anne Mangen argues that haptic differences between physically handling print versus viewing digital text yield gaps in both cognition and aesthetic experience (Mangen 2011). Maryanne Wolf questions whether eReading might be undermining our skills in “deep reading”:

We still know very little about the digital reading brain. My major worry is that, confronted with a digital glut of immediate information that requires and receives less and less intellectual effort, many new (and older) readers will have neither the time nor the motivation to think through the possible layers of meaning in what they read (Wolf 2010)

Of relevance to this discussion are findings from several psychological studies. Rakefet Ackerman and Morris Goldsmith (2011) report that when allowed to self-regulate the time they spent in reading passages presented in hard copy or onscreen, subjects took less time – and performed worse – in the onscreen condition. Betsy Sparrow and her colleagues (2011) observed that when asked to find information on the internet, adult subjects were better at recalling the search path used for accessing the information than at remembering the information itself.

Spring 2013 Multitasking and Distraction Study

The major cognitive challenge from reading on internet-enabled devices is distraction caused by multitasking. Psychologists have long confirmed that multitasking diminishes performance. Yet both anecdotal reports and experimental findings continue to indicate that users reading onscreen tend to multitask (commonly by shifting to internet-powered activities). Baron (2013) reported that 90% of subjects said they were likely to multitask when reading onscreen (compared with 10% when reading in hard copy).

To learn more about the temptation to multitask while reading onscreen, the author and her graduate research assistant conducted an observational study in the US in Spring 2013. Forty-seven undergraduate psychology students aged 18-24 read passages in two conditions: on a computer screen and in hard copy. Each passage took approximately 10-15 minutes to read. The experimental room was equipped with video cameras (recording reading behavior and other activity) and with sources of distraction (including popular hard-copy reading materials, a computer with an internet connection, and toys such as a yoyo and a koosh ball). Students also had access to their personal mobile phones, providing further potential distraction.

In addition to participating in the observation sessions, subjects completed an online questionnaire regarding their reading practices. Several of the questions focused on multitasking and distraction. Open-ended questions at the end of the survey inquired what subjects liked most and liked least about reading onscreen versus in hard copy. Additional surveys will be administered to university students in Germany and Japan during Summer and Fall 2013.

The observational study failed to reveal significant differences in the levels of distraction during the two reading tasks. In fact, very little distraction was evidenced in either condition. Since students were participating in the experiment in partial fulfillment of a course requirement, it seems likely that they essentially performed as instructed, reading the passages straight through, regardless of the reading platform. However, to the extent students did become distracted during the tasks, the level of distraction was higher in the screen reading condition. Moreover, at the end of the experiment, a number of subjects

spontaneously commented that when doing actual schoolwork, they are more likely to be distracted when reading on a screen than when reading in hard copy.

The questionnaire revealed additional evidence that the sample of undergraduate students perceived themselves to engage in more multitasking when reading onscreen and to find it easier to concentrate when reading in hard copy. While only 4% said they multitasked “very often” when reading in hard copy, 64% reported multitasking “very often” when reading on a digital screen. When asked on which platform it was easiest to concentrate on reading (hard copy, desktop or laptop, tablet computer, or eReader), 91% said “hard copy”. In the open-ended question that asked “What is the one thing you like least about reading on a digital screen?”, 43% explicitly mentioned problems with either distraction or concentration. (The next largest complaint was eye strain.)

Despite the assumptions of many educators that today’s students increasingly prefer doing their reading on computers, tablets, or mobile phones, a growing number of teenagers and young adults are indicating a continuing preference for print (e.g., Zickuhr *et al.* 2013). Findings from the author’s studies help us better understand contemporary reading practices. Hopefully such research will have practical implications for shaping directions in educational pedagogy.

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