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Usability News is a free web newsletter that is produced by the Software Usability Research Laboratory (SURL) at Wichita State University. The SURL team specializes in software/website user interface design, usability testing, and research in human-computer interaction.
Barbara S. Chaparro, Editor

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# E-Books: Are We Going Paperless?

**By Paula Selvidge & Christine Phillips**

Will electronic books (e-books) change the experience of reading? Will students soon carry a mobile device in their backpacks instead of a ton of textbooks? Some major university projects at the University of Michigan and at Columbia have already created and distributed electronic versions of textbooks (Epstein, 1999). In addition, Microsoft joined publishing firms and electronic manufacturers to set open technical standards for the electronic book format (Wired News, 1999). So what advantages do e-books offer? Some advantages include convenience and reduced storage space. Anywhere from 10 to 250 textbooks or novels can be held on the device, depending on the e-book model, so you can have a portion of your library with you. In addition, users can annotate, highlight, bookmark, and publish their own content on the e-book. By removing the need for paper, the cost of books should decrease and also decrease environmental damage. Another advantage of the e-book is accessibility. Those with visual impairments can increase the font size to improve readability.

If the electronic book is intended to replace the paper medium, it is important to explore whether differences exist in comprehension and reading speed from reading on an electronic book or paper. To examine this question, we administered the Nelson-Denny Reading Comprehension Tests (Form E and Form F) in two modes to sixteen participants, on a Rocket eBook™ from NuvoMedia and on paper. The presentation mode was varied within-subjects, with one test presented on the e-book and the other test on paper. The font size (10 pt.), font style (Times New Roman), and amount of information per page were identical for both paper and e-book. The Rocket eBook™ weighs 22 ounces, has a resolution of 105 dpi, and the screen color is grayscale with an optional backlight. The backlight was on during testing. The dependent variables included reading speed, a reading comprehension score, task difficulty and preference measures.

No differences between the two mediums were found in this study for both reading speed and reading comprehension. In addition, users rated the reading task difficulty about the same for both the paper and the e-book. When examining preference, nine of sixteen users preferred reading from paper to reading from the e-book. Users commented that they preferred paper because they were familiar with it and were wary of the e-book technology. Other reasons included the paper caused less eye strain and had less glare. Users also stated that they felt more in control with paper than the e-book. The users who preferred the e-book liked the page up/down buttons, felt the e-book was easier to manipulate than shuffling sheets of paper, and liked that they could read in low light levels with the device. The main complaint about the device was that it weighed too much and caused eye strain.

Some improvements to increase the usability of the e-books were noted in this study: 1) decreasing the weight of the device, 2) increasing screen resolution, 3) providing users with page numbers on each page, 4) improving the scrolling feature, 5) offering screen display with variable levels of contrast to

accommodate users with different visual capabilities, and 6) incorporating more functionality, such as a personal organizer and Internet access. In addition, the cost of the e-book (ranging from $199 to $1500) may delay the adoption of the new technology.

Further studies will explore the viability of the e-book as a replacement for its paper counterpart. Proofreading, making annotations, marking text, and reading for extended periods of time (i.e., a novel) are all tasks that need to be investigated before we can be confident users can truly enjoy the benefits of the electronic book.

## REFERENCES

Epstein, S. (1999). Electronic textbooks: From paper to pixels. *Syllabus, 12 (6),* 16-19.

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