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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

Paper or Pixels: What are People Reading Online?

By [A. Dawn Shaikh](#)

Summary: This study evaluated the reading habits of Internet users across five document types - journal articles, news, newsletters, literature, and product information. Internet users completed an online survey indicating how likely they were to read a document online or on paper. Journal articles were primarily reported to be read in printed form, while documents such as online news, newsletters, and product reviews were reported to be read mainly online. Users reported that they tend not to use online sources for reading literature. Primary factors determining whether a document was printed or read online were size, importance, and intended purpose of document.

INTRODUCTION

The number of libraries and websites now offering online access to textbooks, journals, news, and general information is steadily increasing. The number of learners using online textbooks and materials was expected to reach 2.2 million in 2003 ("Another non-traditional option," n.d.). In April of 2003, 148 of the 150 top-selling newspapers in America were online (Berger, 2003). In addition, universities are offering up to ten times the number of online journals as print journals (De Groote & Dorsch, 2003). Web pages offering product information and reviews are in the millions when doing basic GoogleTM searches. Websites such as East of the Web (www.eastoftheweb.com) contain over 1500 short stories available for online reading. Declines in hosting and software costs have lead to an overabundance of online newsletters and e-zines as well (Marcus, 1997).

De Groote and Dorsch (2003) reported that many studies have found a preference among medical professionals for accessing documents online using online databases. Results from their survey of medical professionals' online reading habits further indicated that many medical personnel either prefer to read the entire full-text journal online or print it to read. However, documents other than academic journals were not considered. Some medical professionals report spending an average of 4.4 hours per week reading journal articles (Saint et al., 2000). Many university libraries are reporting a decline in the usage of print journals and magazines as more readers access the full-text articles online (De Groote & Dorsch, 2001). Despite the apparent increase in online reading, many users report using personal printers to print online articles for reading (De Groote & Dorsch, 2001). Similar trends are happening in other professions. Rho and Gedeon (2000) reported that 96% of their participants (university researchers and research students) located articles using the

web, and a majority of the participants preferred to only skim part of academic journal articles online and then print to read from paper; however, as few as 3% reported reading the entire article online.

Reasons for not reading articles online vary. Hornbæk and Frøkjør (2003) reported users found navigation difficult when using online documents, and they preferred the tangibility of paper documents. Other explanations included perceived slower reading speeds, lower comprehension, and increased fatigue. Torre, Wright, Wilson, Diener-West, and Bass (2003) found two main barriers to reading electronic publications among physicians: (1) inability to read anywhere and (2) preference for print media. De Groote and Dorsch (2003) reported the following reasons for using printed documents: better quality graphics; document portability; ability to highlight the article; original formatting retained; and more legible tables. Reasons for preferring online publications included: quicker and easier to locate; 24-hour access; lower cost; access from home/office, efficiency; and convenience.

This paper explores the online reading habits for five document types across a variety of participants. Reasons for reading online or on paper are also assessed.

METHOD

Participants

Participants were solicited by an email invitation to complete an online survey. The invitation was sent to a variety of e-mail lists including lists for hobbyists, the UTEST list (sponsored by Clemson University), and other professional listservs. Student participants were recruited through psychology classes for course credit. A total of 330 respondents (221 females, 109 males) completed the survey. Ages of the participants ranged from 18 to 73 years ($M = 33$).

Participants were from a variety of professions, including students (36.4%), technology (14.2%), education (12.1%), self-employed (5.2%), homemakers (4.8%), executive/managerial (4.2%), medical/dental (3.3%), and other professions (19.8%). The participants were also an educated group with 41.2% reporting a post graduate or higher level of education and 47% reporting at least some college or a four-year degree.

Over 49% of respondents reported reading online for 2-6 hours per week, while 13% reported reading online 7-14 hours per week, and almost 7% indicated they spend 15 hours or more per week reading online. A total of 61.8% of respondents described their comfort level as "very comfortable" when asked, "How comfortable are you locating information, such as an online document, using the Internet?"

Materials

A short survey was designed to collect information on online reading habits and demographics. The survey consisted of 19 questions and was delivered via the Internet. The survey questions were based on previous surveys as well as the results of pilot testing. Participants were asked to indicate their online reading habits for five document types: academic/journal articles, news articles, literature (short stories, textbooks, etc), newsletters or e-zines, and product information or reviews.

Procedure

Participants chose one of five options to indicate their reading habits for each document type: (1) read online only; (2) print document to read on paper only; (3) read online first, then print to read

on paper again; (4) scan online first, then print to read on paper in more detail; and (5) do not use online sources for this document type. Participants were also asked to include all factors that determine whether they read a document online and on paper. Participants were asked if they preferred magazine subscriptions in paper, online, or both. Finally, demographic information was collected. The survey took approximately 10 minutes to complete.

RESULTS

Table 1 shows the results of all responses for each document type. When reading academic/journal articles online, only 20.3% reported reading them online while 70.4% reported printing the document. Most respondents (47.9%) reported that they "scan online first, then print to read on paper in more detail." The majority of respondents reported reading online news (68.2%) and newsletters (72.7%) exclusively online (Figure 1). Additionally, 64.8% of respondents indicated they preferred to read product information and reviews online rather than printing (29.4%). Online literature (such as textbooks and short stories) did not share this pattern. Over 56% of participants reported not reading literature online at all. Few participants across all document types indicated that they preferred to print the document to read on paper only. Participants still prefer to get journals and magazines in print form (66.1%) rather than online (13.6%). A few indicated they prefer to get subscriptions in both print and online form (20.3%).

Table 1. Users' online reading habits based on document type.

	Journal Article	News	Literature	Newsletters	Product Info
Read online only.	20.3%	68.2%	18.5%	72.7%	64.8%
Print document to read on paper only.	7.3%	2.4%	9.4%	.9%	.6%
Read online first, then print to read on paper again.	15.2%	10%	3.6%	4.2%	17.6%
Scan online first, then print to read in more detail.	47.9%	11.8%	12.4%	6.7%	11.8%
I do not use online sources for this document type.	9.4%	7.6%	56.1%	15.5%	5.2%

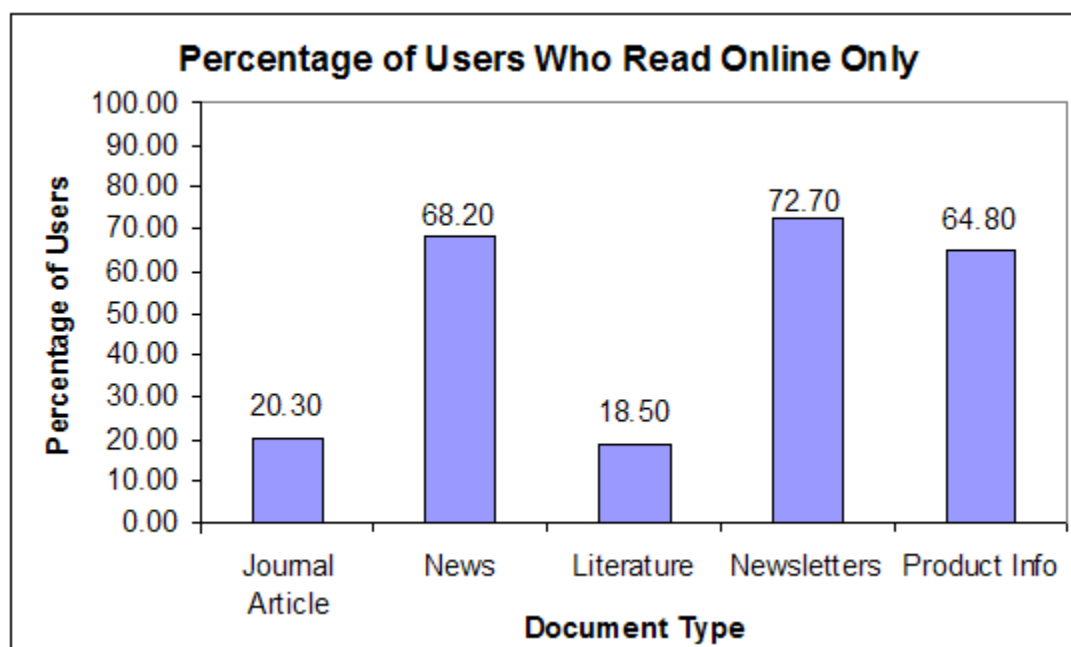


Figure 1. Percentage of participants who read online for each document type.

Reader Comments

An analysis of the open-ended comments revealed major factors that influence the decision to print a document or to read it online. These have been summarized in Table 2.

Size. Interestingly, the major reason participants gave for deciding to read a document from print OR to read it online was the size of the document. Respondents repeatedly noted that long documents were printed while short documents (1-5 pages) were easier to read online.

Purpose of document. Respondents noted that the purpose and importance of the document was a determining factor. If the purpose was for research, presentations, or supporting a point, the respondents reported they preferred to print it. If the document was for entertainment they favored reading it online.

Ease of navigation. Ease of navigation was mentioned as a major factor in determining to read online; in that users were inclined to print the document if navigating within the document was difficult. They also indicated they would print if the navigation back to the document was challenging. Users also included too much scrolling as a downside to reading online.

Convenience. The convenience of reading online (including ease of locating document and time efficient) was a major reason to read online as well. Participants favored using online documents because they could read them anytime. Locating documents online was viewed as more time efficient since a trip to the library or bookstore was not necessary.

Quality of document. The quality of the document when rendered in online format was seen as a deterrent for reading online, as several participants noted that if the quality was poor they would seek out a printed version.

Complexity of document. Factors influencing the decision to read documents in print included the need to refer to the document at a later time and the complexity of the document. Participants noted a preference for reading complex documents on paper. Participants specifically noted the

ability to highlight and make comments as a positive attribute of paper documents.

Portability. Portability of the document was mentioned as a benefit of printed material. In addition, several participants commented on the feel of paper in hand and the comfort attained by reading a paper document.

Table 2. Major reasons given for reading online and on paper

Major reasons for reading online	Major reasons for reading on paper
Size (174 responses) Importance/interest in document (113) Purpose of document (76) Quality of online document (52) Convenience (49) Navigation (49) Type of information (45)	Size (133 responses) Importance of document (96) Need for future reference (88) Purpose of document (59) Ability to highlight or comment on (46) Complexity of the document (38) Comfort reading and tangibility (35) Portability (30)

DISCUSSION

The results of this survey suggest that users of online material prefer to read text online rather than on paper. Guidelines such as the Research-Based Web Guidelines (2003), recently published by the National Cancer Institute, recommend that designers "provide an alternate form of all documents, resources, or files that can be printed in their entirety." They add that "many users prefer to read text from a paper copy of a document," and "they find this to be more convenient, and it allows them to make notes on the paper."

Participants in this survey indicate that printing documents is based primarily on the type of document and the intended purpose of the document. Specifically, academic articles are reported to be most likely printed, especially if they are large in size and important to the reader. Many news related sites, such as cnn.com and bbc.com, offer printer-friendly versions. The respondents in this survey indicated they typically read this type of information online with only 24.2% utilizing print options. In the domain of academic/journal articles, results from this survey indicate there is a clear need for print versions of the online material. The majority of respondents used online sources to locate academic articles, but then 70.4% reported printing the document to read on paper. These results are similar to those found by Rho and Gedeon (2000). This preference indicates the need for additional research on what formats (e.g., pdf, html, etc.) are preferred by users.

Future research should be conducted on methods that would increase the likelihood and comfort level of participants reading online. As with previous studies, major reasons participants chose to read from print was the intended purpose for the document, the need to reference in the future, and the ability to highlight and comment on the paper. Users may not be comfortable storing documents in electronic formats for future reference. The ability to highlight and comment in paper documents is one that has few parallels in the digital arena. However, Adobe Acrobat features such as highlight and digital annotation do not seem to be widely used, and actual usage patterns of these and other features should be studied further.

Note: Full additional information, see the proceedings of the [Human Factors and Ergonomics Society's 48th \(2004\) Annual Meeting](#)

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