THE ELECTRONIC

Scientists' Reading and Writing Processes: Implications for Electronic-Journal Design

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Most major scientific journals publish electronic versions of print articles on Internet Web sites. Although electronic journals, or e-journals, have made information more accessible to a wider audience, their current format does not meet the needs of the scientific community, according to Christine M Neuwirth, professor of English and human-computer interaction and computer science. That is primarily because many e-journals are electronic versions of print publications and lack interactive features that support how scientists use information. Neuwirth discussed how e-journal design is influenced by scientists' reading and writing processes.

To illustrate how technologic advances have affected information access and exchange, Neuwirth referred to the printing press and the personal computer. Evoking the more familiar example of e-mail, probably our preferred method for professional communication, Neuwirth noted that it, too, has important limitations. Although it is efficient in sending messages to large numbers of people, the information contained in long e-mail exchanges involving many people can be cumbersome to manage, and important information can be difficult to extract.

For information technology to identify and meet the needs of a group, it must be understood how people function in their own "communities of practice"—self-organized groups of people bound by what they do and by shared knowledge and priorities. Typically, they share common resources, vocabularies, and activities, and they may alter their habits in response to external influences. Communities of practice in science, for example, may comprise individuals with shared interests in a specific field of biomedical research. Neuwirth emphasized that strategies for designing e-journals must evolve from an understanding of how scientists read and extract information.

A survey conducted in early 2000 revealed that scientists read about 130 scholarly articles per year—a 30% increase over the rate in the middle 1990s.[1] University medical faculty topped the list, averaging 322 articles per year and devoting an average of 20 min per article.[1] Although the number of articles read per year has increased, the amount of time spent in reading articles has not increased proportionately; this suggests that scientists have become more efficient in retrieving and evaluating information. The increased use of online indexes and e-journals to access more information has probably contributed to the trend.

Many scientists use online indexes to find e-journal articles, but most prefer reading a printed copy. Reasons for the reluctance to read online include inconvenience, slow access, difficulties in reading on the screen, poor graphics, and searching, which is limited to the capabilities of the search function of the Internet browser. In addition, the online format does not conform to how scientists read scholarly papers. According to Neuwirth, linear reading, which is the customary way to read a novel, is not the typical approach that scientists use in their primary field of expertise. In their specialty, most scientists read selectively, browsing the abstract, skipping to the results, then going back to the methods. That is cumbersome to do online, but emerging technologies, such as pen-based tablet PCs that approximate the paper-text reading experience, promise to make reading electronic articles more popular.

Research on how to design e-journals that are more aligned with how scientists obtain information is continuing. The question of whether e-journals can cater to the individual pattern of readers and the extent to which the nature of the subject matter presented in journal articles constrains e-journal design are being explored. Among her suggestions on design changes, Neuwirth included listing abstracts in the table of contents to allow more efficient browsing for relevant information and improving how graphics and references are marked and retrieved from the text. She also recommended introducing the capability for sharing annotations, a time-honored approach that promotes more efficient information-processing and facilitates reading and review.

Neuwirth's research is focused on computer support for collaborative writing and communication, with expertise in improving the functionality of virtual workrooms. She is developing Work in Preparation (PREP) Editor, a computer-software platform for cooperative writing.

Reference

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