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Where Does Online Go From Here?

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ONLINE DATABASES

BY CAROL TENOPIR

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WHEN I ENTERED college in 1970, NLM Medlars existed and Dialog was under development, but few would have predicted the growth of online services throughout the 1970s. When I began writing this column in 1983, laserdiscs existed and CD-ROM was under development, but few would have predicted the growth of CD-ROM in the 1980s. And at the beginning of the 1990s, when e-mail and FTP were the main Internet applications, who could envision the phenomenal success of the World Wide Web?

As I write this last column of the 1990s, I wonder where online will go from here. I don't doubt that there will be new, hot information technologies in the first decade of the 21st century. Nor do I doubt that nearly all of the information technologies we now use (including print-on-paper) will still exist.

A good peek at the near-term future came at the Internet World conference, which was held in New York in October. Another, perhaps more surprising example came at the venerable Frankfurt Book Fair, held every autumn.

Wearable info technologies

Can you imagine wearing a book? People who have ever walked down the street with their noses buried in print may welcome the merging of portable computers, miniaturization, wireless communications, and the fashion industry.

At a futuristic fashion show at Internet World called "Brave Unwired World," models wore information devices on the runway, rather than just the latest fashion trend. The Nomadic Radio may look like a scarf, but it's a voice-activated computer and communications device that allows the wearer to access e-mail or voice mail. The Cycle-guide would be worn by bicycle messengers to provide ready access to maps, plus connections to their central office.

Who hasn't longed for a universal language translator like the one that makes interstellar travel so easy for the crew of *StarTrek*'s *Enterprise*? The Language Translator on the Internet World fashion runway promised a wearable language translation device. Other e-mail or web-searching wearables were embedded into glasses, jewelry, badges, even the fabric of a shirt.

Smart appliances

We can't buy these items yet, but both the hardware and societal changes necessary to make them a reality are not far off. Maybe it won't be a scarf but a piece of jewelry. If that device connects to e-mail, provides translation services, and links to information products such as travel guides, I'll be wearing it.

Already, aircraft mechanics wear headsets or glasses attached to their belts that connect to computers to access CD-ROM versions of technical manuals. They can see technical instructions while keeping their hands free.

If you don't want to wear your information products, you might still be interested in buying appliances with miniature built-in web servers. Internet World featured microwave ovens, security systems, and other home devices that connect to the Internet. The microwave, for example, includes a barcode scanner; the oven then connects to the Internet to download cooking instructions. The oven door also contains a touch-screen that allows the user to search the web or to see recipes or an automatic shopping list. The prototype microwave even supported online banking, an extraneous function.

An Internet-enabled security system can allow travelers to monitor their homes from a distance, change the on-off schedule of lights, or alert the security company office.

Voice input and output, speedy wireless communication, and incredibly small but powerful microprocessors are no longer the stuff of science fiction. They should have a profound impact on the information content industry, not to mention the hardware, software, and fashion industries. According to Cyber Dialogue Inc., approximately 27 million Americans would buy Internet-enabled devices if they could be purchased today. Many are not current web searchers. The web, and content from it, would become part of their everyday lives, perhaps without them even knowing it. They just know that they want their daily lives simplified by making their familiar labor-saving devices and appliances more useful—until the power goes out, of course, or they forget their passwords.

Already the ubiquitous portable telephone is becoming transformed into a web and information content access device, as well as a communications device. Sprint PCS began bombarding U.S. television this autumn with commercials for its Wireless Web telephone. It enables a portable phone to access the web through the user's regular information service provider and browser or through selected specially designated web sites via a MiniBrowser instead of Netscape Navigator or Internet Explorer. Not every web site is available through the MiniBrowser—the sites available tend to be information-loaded ones such as phone directories, weather reports, and newspaper headlines. Through an agreement with Yahoo, the MiniBrowser can even be programmed to receive user-specified updates automatically.

Electronic paper

New technology influences more traditional information media. In mid-October, Lucent Technologies and E Ink Corporation announced a joint agreement to develop electronic paper—the first flexible, plastic, electronic display entirely made with a process similar to ink-on-paper printing, rather than the more costly silicon-chip manufacturing process. Such paper has been talked about for years, but this is the first time it will be produced commercially. Electronic paper must combine the best characteristics of traditional paper and of electronic media—

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it must be lightweight, portable, and flexible, but also renewable, digital, and robust. Although you may not want to wrap fish and chips in it, you do want to read it on the subway.

Lucent's Bell Labs develops plastic transistors, which are more flexible than silicon chips, while E Ink brings electronic ink—millions of dye-filled microcapsules that, when charged by the electric field created by plastic transistors, causes the microcapsules to change color and form images.

Xerox Corporation and 3M are also working together to manufacture electronic paper. Neither project is likely to produce workable versions before next year, but content providers are already gearing up, and books and newspapers on electronic paper are not far away. E-paper feels and looks like real paper, while extant e-books require a reader.

E-books at Frankfurt

The 1999 Frankfurt Book Fair, as always, featured thousands of traditional, print-on-paper books. It also, for the first time, featured a notable presence of electronic books. Microsoft, in trying to expand the market for electronic books, decided to approach publishers and book dealers. Next year Microsoft will sponsor several e-book awards—the biggest of which will be $100,000 for the best e-book published originally in electronic form using Microsoft's ClearType technology. ClearType, which improves the resolution of text on screens, has so far been used mostly for published books on CD-ROM, which is not the technology of the future. (Penguin announced at Frankfurt that it will put 1000 of its Penguin Classics series titles on CD-ROM.)

Hand-held book readers, such as NuvoMedia's Rocket eBook, were also vying for attention in Frankfurt. Rocket eBook licenses a growing number of books from publishers and sells its devices through Barnes & Noble. Encrypted e-books are downloadable to your PC or to the handheld e-book device. So far, the best sellers list doesn't look much different from a big bookstore's list, but textbooks should be a big market soon, as students prefer a single device to a full backpack.

Software enhancements

Information can become usable by tailoring it to a specific purpose and imbedding it in a device, like an appliance. But for students, researchers, and regular users of information, separate information content-imbedded devices will be about as helpful as the separate hot dog cooker and portable hamburger cooker you have shoved in the back of your kitchen cupboards.

It may take a while for the general public—let alone libraries—to accept or embrace any one technology. Perhaps the biggest developments in library information products will be better software to create more beneficial, multiuse products. Online companies and libraries are wrestling with this concept.

Information services in libraries clearly will require a single interface to the most amounts of content. It is too confusing for both staff and users alike to learn a separate system for the online catalog, World Wide Web searching, CD-ROM indexes, and more. At the interface level, all libraries will build a single unified portal to information, smoothing out

the differences among systems, services, and content. Of course, many libraries are already well on their way to this goal, but OCLC will help this process in 2000 with its recently announced WebExpress Service.

WebExpress will allow libraries to design easily one overall interface to provide access to their catalogs, web sites, commercial online services such as OCLC's FirstSearch, and other online databases. The library administrator will use a set of step-by-step instructions to design a consistent look and feel for the library's integrated information services. Each library can build its own links and add specific content or messages. An OCLC WebExpress Service Center on the web will provide assistance, distribute software updates, and disseminate new information content.

Special libraries also will follow this trend of integrating access, helped by new products such as Dialog Corporation's Knowledge Working suite of products. Announced at the Online World Conference in Chicago in October, Discovery is a software product that works from an organization's intranet.

In Discovery, the information professional/administrator selects the internal, commercial online, and web information content and services to be offered to users, customizes the interface for the organization (or departments or individuals), and can monitor the amount and type of use. Automatic updates on specified topics can be set up for each user. As with the OCLC WebExpress system, Dialog's Discovery chooses a web browser as a common interface, gives a central administrator the power to customize it, and provides a consistent interface to the wide variety of information sources and types.

A second new product from Dialog will take that process one step further to continuous customization, offering software that "learns" about the searching preferences and habits of specific users. Dialog's Alert uses intelligent agents to search for and retrieve information based on user profiles. Depending on the users' choices and preferences, the system will suggest additional information on related topics and continue to help a user refine the search.

Where do libraries fit in?

New developments in information technologies and software will have a major impact on both our professional and personal lives. Information content becomes even closer, as it is incorporated into books and phones, even appliances and clothing. The need to select, package, and provide the best content will become critical.

But we will also need access to a wide range of disparate information not tied to a specific task or specific factual need. Libraries will continue to be a major center for such information, whether it comes from the web, other online sources, or print materials. Software developments that help libraries integrate and customize all types of information resources for a wide variety of users will be important in this new decade.

In the longer term, when information access is as natural as getting dressed, librarians' work may be more behind the scenes, creating and organizing useful chunks of information content.