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Envisioning Online Services

DO YOU HAVE a mental image of the online system you search? Perhaps you picture a giant filing cabinet, with each drawer representing an online service, each folder a database, and each piece of paper a record. Or maybe you see a cafeteria, where new information comes in, is processed into something palatable, and is laid out to be viewed, selected, and paid for. Many people visualize a physical library, where both browsing and the use of catalogs help them locate books and magazines that contain useful information.

To enhance understanding, we naturally transform abstract problems into more comfortable, concrete images. The richness of metaphors helps us to understand a new thing in terms of something familiar. In just a few words we can understand one thing in terms of another or comprehend the real in terms that cannot be literally true.

However, the complex problem of information retrieval is difficult to represent with a single metaphor or in one set of pictures. Even if all users share common experiences, a particular image such as that of a library may not be the first to come to each person's mind.

New Internet metaphors

Ruth Palmquist, associate professor, Graduate School of Library and Information Science, University of Texas at Austin, has been researching what metaphors are being used to explain the Internet and, in particular, the World Wide Web. Also, she is gathering web users' reactions to these metaphors, surveying which appeal to different users.

Palmquist searched Information Science Abstracts (ISA), Computer Database, and Magazine Index for arti-

cles about the Internet or web, examining how they use metaphors to convey function and power. These three databases index articles from different (but overlapping) literature bases—in ISA, library/information science journals; in Computer Database, computing journals and magazines; and in Magazine Index, general interest magazines.

Palmquist and her team examined 100 titles from each database. Not surprisingly, metaphors abounded. She found metaphors were used in 70% of the Computer Database articles, 65% of the Magazine Index articles, and 55% of the ISA articles. Despite the ubiquity of Netscape Navigator, Microsoft Explorer, and the oft-used superhighway, the metaphors are hardly limited to highways or navigation.

Palmquist categorized metaphors into major families. ISA articles use the following metaphor families to describe the Internet:

- Travel (20%): "road map," "highways," "toll booth," "road kill";
- Buildings/Politics (15%): "village," "town hall," "library";
- Anthropomorphic (15%): "rich-poor," "dreams," "wet feet," "fear & loathing";
- Commerce (14%): "marketplace," "profiting," "publishing";
- Space (12%): "outer limits," "cyberspace";
- Frontier (12%): "homesteading," "tracking," "true grit";
- Fire/Water (6%): "surfing," "stream," "flames"; and
- Animals (6%): "spiders," "spinning," "dragon," "roar."

Palmquist is now gathering web users' reactions to these metaphors and asking for other favorites.

Articles indexed by the various databases vary greatly in their Internet metaphors. Those regarding travel or exploration are used in 44% of the articles from ISA but in only 15% of the other databases' articles. Metaphors regarding commerce, politics, and place are used in 29% of ISA articles but only in 16% of Computer Database and in

2% of Magazine Index articles. By contrast, Computer Database articles emphasize anthropomorphic metaphors (43%), as do Magazine Index articles (23%), though those articles from general interest publications most often use "other" (those that "defied classification") metaphors (25%).

The contrasting metaphors in these literatures suggests that librarians may not be speaking the same metaphorical language as many of their patrons. This may be natural in professional literature, where we can choose images most meaningful to our specialized audience. However, in software design and user instruction we must translate these into metaphors that are meaningful to others.

GUIs for all

The metaphors examined by Palmquist may have been used primarily to describe the web experience in writing. If a metaphor used by one author is not understood by readers, those readers can find another explanation or develop their own metaphors. But graphical user interface (GUI) software must incorporate comprehensible metaphors for software functions, then translate those metaphors into pictures. The trash can (developed by Macintosh) for deleting files is now familiar to most computer users, but more complex or less common functions may be limited to a particular application.

GUIs incorporate metaphors in two ways. Most commonly, the metaphor is embodied in individual icons. The icons are presented in rows on a screen, usually without relationship to each other, e.g., a trash can represents the delete function, a magnifying glass represents search, and a stop sign is used to interrupt processing. The overall concept of an application is not represented pictorially; icons replace function keys or commands and rely on easily identifiable pictures that suggest each discrete function.

However, to portray an entire application, GUIs may go beyond icons to present a virtual metaphorical space, with related objects representing different



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ONLINE DATABASES

functions within the application. For example, a desktop may be pictured to represent a personal finance program. A checkbook icon may be clicked to bring up a bill-paying function, and a pen or pad of paper might be used for editing. The depiction of a metaphoric space does more than provide an easy way to implement a particular function—it goes to the heart of understanding a program's total capability. Its success is influenced by the cultural, experiential, and personal background of each user.

GUIs for online searching

GUI software for online systems is now common, as are specially designed web versions using icons. Those traditional online systems have begun to use both levels of metaphors: individual icons to represent discrete functions, as well as an extended virtual environment. The use of individual icons is by far the most common (and easiest). However, it is not always easy to represent complex online functions in a pictograph, and two systems rarely represent them the same way.

Newsnet's Baton, for example, uses the image of a hand for the retrieve function and a torn sheet of paper with lines of writing on it to represent articles. Together they take on added meaning—a hand holding a torn sheet represents retrieve articles; eyeglasses represent scan; clicking on a camera opens and closes capture files. Help is invoked by clicking on a question mark.

ProQuest Direct uses a paper with one corner folded back to represent articles and binoculars for search. Search assistance is offered by clicking on a combined deer stalker's cap and magnifying glass, while pricing tips are called up with a dollar sign.

DataTimes EyeQ uses a dart in a bull's-eye for search and binoculars to view results once a search is completed. A magnifying glass over a paper file folder is used to view or modify personalized files. A finger tapping a bell invokes customer service.

In each example, the chosen pictograph conveyed the desired function to the system designer. Except in the Baton example, in which icons are joined to create more complex functions, the icons bear little resemblance to each other, let alone to an overarching metaphor or theme. Moreover, many widely recognizable icons are culturally dependent.

New extended metaphors

The extended metaphoric environment is less common in information retrieval. Even Netscape's well-known navigation metaphor is not fully elaborated in its icons or screen displays. Engineering Information Village may be the most reported recent example of an extended metaphoric space for information retrieval (see "Moving to the Information Village," *LJ*, March 1, 1996, p. 29-30.)

The rich metaphor of a village leads to more metaphors that may be associated with the buildings or activities of a real village. Each related image is used to implement functions or to rep-

Successful metaphors have a rich structure that generates additional related metaphors

resent databases to be searched. For example, government information is represented by a Capitol-like building; a research and industrial park is a light bulb; and career and education information is a mortarboard. The library (which includes access to bibliographic databases) is represented by printed books stacked to resemble a building.

The library as metaphor probably comes to mind most often to *LJ* readers. The virtual library projects funded by the National Science Foundation represent the most ambitious use of the library metaphor to convey how the capabilities of the familiar building might be transformed to a complete electronic environment. The term "virtual library" is now commonly used in the library and information science literature to describe any level of electronic-only access to information resources.

What makes a good metaphor?

According to Kim Madsen of Aarhus University, Denmark, successful metaphors for computer applications have several characteristics. First, they have a rich structure that generates additional related metaphors. A television broadcasting metaphor, for example, has a much richer structure than the metaphor of a "link." From TV

broadcasting you can get to stations, channels, satellites, etc., all of which may be used to describe functions in a complex system.

This structure must be applicable to the real problem, however, and not mislead users by implying erroneous conclusions. Madsen explains that the TV broadcasting metaphor may mislead users into thinking that information is transmitted instantaneously.

Metaphors should be appropriate and understandable to the intended audience. To someone who has never owned a TV, the above metaphor may be meaningless; the metaphor of a village or a farm may be more appropriate.

The literal meaning of a metaphor should be well understood, but there should be a conceptual difference between the reality and the metaphor. A metaphor that is too close to the real object may hinder people from seeing things in a new way. The early online catalogs that replicated the 3" x 5" card format are a good example of this. Similarly, the digital library metaphor may be too close to the real library to expand people's thinking. Perhaps the metaphors regarding travel, navigation, or commerce are stronger for online information retrieval systems than the digital library metaphor.

Meaningful metaphors

How do we find metaphors that are rich in structure, meaningful to our audiences and to information retrieval, but not overly close to the real item in question? Much of the innovative design in computer systems right now is happening in the highly creative world of games. How about a starship metaphor? Structurally it could lead to the captain's quarters, a transporter, worm holes, space stations, etc.! Or consider a mining metaphor, where information seekers could dig out meaningful nuggets of information at varying depths, value, or sizes. The possibilities are endless.

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