
A Model for Planning and Providing Reference Services Using Internet Resources

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ABSTRACT

INTERNET RESOURCES ARE SIMILAR in function to many print and electronic resources with which library users are familiar. Despite this similarity in function, and sometimes in form, between network resources and traditional information sources, users are often intimidated by this network medium: What is available? Where is it? How do I get to it? Once obtained, the sheer quantity of information that can and is stored in electronic form confronts users with the need to filter and organize it for personal use. Librarians, based on their training and experience, are the most appropriate intermediaries to assist in connecting to and understanding these network resources. This article discusses the development of practical strategies for mediation between Internet resources and potential users.

INTRODUCTION

The dream of the "electronic library" is coming closer to reality because of the capabilities for information access that electronic networks present. Already the Internet and BITNET encompass a vast array of information resources that are increasingly being used both by librarians and the users they serve. The passage of the National Research and Education Network (NREN) bill ensures development of a national infrastructure that will provide increased access to national computer networks by both academic and public institutions. BITNET is being absorbed into the Internet. The phrase "Internet

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resources" used in this article refers to the Internet and BITNET resources. Libraries have been identified as a key location for public access to these networks.

More users are finding that network resources complement their traditional information-seeking behavior. The networks allow them to communicate with their colleagues in ways that supplement paper correspondence, telephone conversations, and professional conferences. As the potential of the Internet as a publishing medium begins to be developed, electronic journals (e-journals) are gaining legitimacy as conveyors of the scholarly record.

In a recent study, a group of experts—moderators/editors of scholarly electronic conferences (e-conferences) and e-journals—observed the active use of e-conferences to establish collaborative research and publishing efforts and to exchange information crucial to research projects. Most importantly, a trend was identified of users using electronic communication to replace traditional communication via telephone and postal services (Kovacs & Kovacs, 1991).

Many network resources are similar to traditional sources and services with which librarians and researchers have familiarity. For example, data files, electronic texts (e-texts), and e-conference archives are comparable to online full-text databases. E-conferences—which include discussion lists, electronic newsletters, mailing lists, electronic forums, interest groups, and so on—parallel professional conferences and their activities and proceedings. Electronic journals are equivalent to print journals in terms of format and content. Library catalogs and other bibliographically oriented databases mirror the print and locally based systems with which users are familiar.

Despite this similarity in function and sometimes in form among network resources and traditional information sources, users are often intimidated by this network medium. What is available? Where is it? How do I get to it? Once obtained, the sheer quantity of information that can be, and is, stored in electronic form confronts users with the need to filter and organize it for personal use.

LIBRARIANS' ROLE

Librarians, based on their training and experience, are the most appropriate intermediaries to assist in connecting users with these network resources. Librarians have been at the forefront of using the Internet to provide useful resources to their own discipline. A recent study also shows that a significant number of reference librarians have begun to use the Internet resources in providing reference services to users.¹

It is most appropriate that librarians mediate between the user and information resources in a network environment just as within

a print environment. Our professional role has traditionally been to identify resources, enhance modes of access to them, and enable users to connect with, and use, appropriate sources. Network resources provide an opportunity for us to extend ourselves professionally within this new medium to provide meaningful service to our users.

Hierarchy of Information Skills

A hierarchical model of information skills is offered as a framework by which librarians can design services to mediate use of network information sources by their users (see Figure). The model suggested was initially proposed by Mulder and Campbell (1991) for developing a user instruction program. However, it has also been used in the broader context of strategic planning of information services by a reference department (Schloman, 1993).

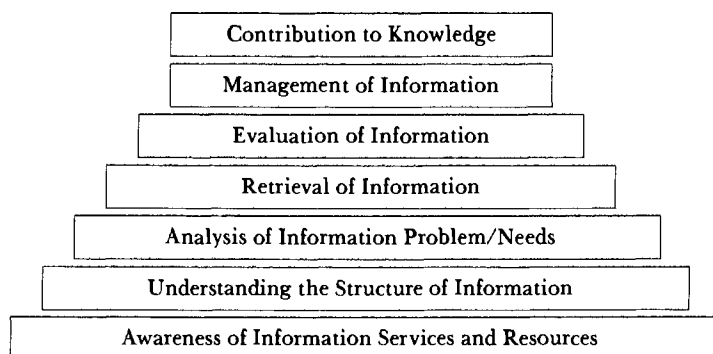


Figure. Hierarchy of information skills

The specific application of the hierarchy presented here is for the planning and provision of information services using the Internet resources. The hierarchy is particularly useful because it delineates the types of information needs users have and suggests the skills and services necessary to satisfy those needs. In the network environment, users face the tremendous diversity and disorganization of network resources plus the need to learn new protocols for access. Librarians' professional training and experience uniquely prepares them to perform a mediating role between users and network information resources. The following is a discussion of the levels of the hierarchy and how these relate to users' needs for network resources and the librarian's role.

Awareness of Information Services and Resources

Knowing what is available on the networks probably poses one of the biggest challenges for librarians and users alike. In order to serve users at this level, librarians need to familiarize themselves with the types of network resources available and decide for what these might be used. As indicated earlier, the types of available electronic resources parallel what is known in the print world. Full-text resources include data files, journals, electronic texts, and electronic conference archives. Interactive access to experts is provided through electronic conferences and their various forms (e.g., electronic conferences, newsletters, mailing lists, interest groups). Bibliographic sources are identified through library catalogs and various types of indexes to the literature.

As in the print world, a given information resource can often serve different information needs. Sometimes a user will be well served to be made aware of and directed to an existing source. At other times, the librarian may be aware that the resource can be tapped to obtain specific information. For example, a graduate student in English literature might be looking for information on current research on *Finnegan's Wake*, artificial intelligence, AIDS, or the works of Jane Austen. The reference librarian might provide this student the best service by informing him or her of the existence of an electronic conference on any of those subjects.

E-conferences are a great way to "connect" with current thinking in the field by identifying experts and those with related interests. However, when that same librarian is asked if an audiotape for Gaelic language training exists, she or he might search the archives of that e-conference to provide the needed information. In this actual case, a nearby library held the material but locating it was made difficult by not having the actual title of the audio tapes, which were in Gaelic. A search of the Gaelic-L@IRLEARN e-conference archives retrieved several titles.

In providing service at this level, librarians will need to promote the existence of network resources to their users. This may be handled through established library communication channels (e.g., library newsletters, library guides, reference desk service, individual consultation, and bibliographic instruction). The library's existing electronic connectivity with users provides another valuable communication link. The library might promote the availability of network resources through an electronic newsletter or campuswide information server. Specialized messages might be sent to appropriate departments for distribution through their local area network. A type of "reader's advisory role" is possible for librarians who work with a specific clientele. As those librarians find potentially useful new

resources through their own electronic conferences or explorations, they can notify individuals who might be interested. The "forward" function available in most e-mail software makes these alerts very easy to pass on to selected faculty or students.

Understanding the Information Structure of a Discipline

Just as the structure of the print literature within a given discipline differs from that in another, electronic resources can have a different flavor as well. Librarians working with users in specific disciplines will need to gain an understanding of the forms of network resources that are developing in those areas. For example, in the humanities, significant efforts are being made to make literary texts available through the Internet. For example, the works of Shakespeare are being put into electronic form by scholars participating in SHAKSPER@utoronto. The works of Dante and other literature are also available from a variety of Internet sites. In the social sciences, data files, such as the Institute for Research in Social Science's Public Opinion Item Index, are being made available on the Internet. In biology, the data files of the Human Genome Mapping project are made available to participating scholars. These are just a few examples of information and data that are being made available through the Internet.

In addition to the types of resources that support work within a discipline, access to communication among colleagues within a specialized field reveals characteristics of that area as well. Historically, librarians have been well aware of the role of the "invisible college" in the development of a discipline. It is now possible to introduce students and researchers to "electronic invisible colleges" and for them to observe the development of an idea via an electronic medium.

Librarians will want to integrate these electronic resources into their own understanding of a discipline's information structure in order to be able to convey it to others. Traditionally, librarians have used such frameworks to provide the proper perspective to work with a particular user group and to design services for them. Often these frameworks are presented to students in bibliographic instruction sessions for courses within their majors or through individual consultation. Given the rapidity of change in network resources, attention also needs to be paid to faculty who are interested in updating their understanding of available resources within their own discipline or for interdisciplinary or multidisciplinary areas in which they are interested. This might take the form of workshops for faculty in given departments or disciplines.

Analysis of Information Problems/Needs

An analysis of a user's information need is the central objective of the reference interview, regardless of the setting. In dealing with network resources, reference consultation by appointment is the ideal situation in which to analyze a user's need and the possible resources that might be useful. In addition to a basic understanding of the Internet and its resources, a librarian will draw upon the "tools" that aid in identifying resources. The finding tools include directory resources, such as HYTELNET² and LIBS³, through which users can identify resources and finding services, such as Archie and WAIS. Archie servers can assist users in locating electronic texts, and WAIS servers can assist in locating and searching or browsing electronic texts.

Retrieval of Information

Once librarians and library users are aware of Internet resources, the next step is to learn how to retrieve them. Ideally, they will have an opportunity to receive training in retrieval of information from the Internet. This should include an introduction to what the Internet is, how to gain access, and basic protocols for connecting to remote resources and obtaining files. Such instruction may be available through academic computing services or through departmental programs. Librarians may, however, determine that it is necessary to incorporate this basic content into their instructional efforts—in addition to providing information on specific Internet resources and their use. This instruction may take place as part of reference desk service, although the complexity of the Internet retrieval methods may require a significant investment of time with a neophyte user. One-on-one consultation with users is an ideal forum, albeit a costly one.

Group instruction is the most efficient means to teach access and retrieval from the Internet. Clearly, the sessions are more meaningful to users if hands-on experience can be offered as well. Instruction on specific resources may include developing search strategies and using system-specific commands.

End-user aids may also be useful instructional devices to nurture the self-sufficient or remote user. Users can be directed to front-end programs (already presented in this discussion) such as HYTELNET or LIBS. The Gopher front-end software⁴ can be used to provide user-friendly menu access to Internet resources for users on local library computer networks. The librarians can configure the Gopher front end to provide access to selected Internet resources to users, including information intended specifically for local use.

Electronic conference and electronic journal information requests can be referred to the *Directory of Electronic Journals, Newsletters and Academic Discussion Lists* (Strangelove & Kovacs, 1993), which combines the *Directory of Scholarly Electronic Conferences* (Kovacs et al., 1990) and the *Directory of Electronic Journals* (Strangelove & Kovacs, 1993). These provide directions for subscribing and for archive searching.

Once useful material is identified, users need to know the next step to obtain it—whether it is through electronic file transfer protocol (FTP), traditional interlibrary loan, or commercial document delivery.

The understanding gained from the first three levels of the hierarchy, in combination with the retrieval skill at this level, provide the very essence of the skills necessary to capitalize on Internet resources. Some of the most accomplished faculty on a campus may not have acquired networking skills. Many are aware of the electronic world “out there” and welcome assistance in being brought up to speed in this area so that they can incorporate network resources into their information seeking. Because faculty have the greatest influence on what their students are exposed to and learn, there is added benefit for the library in developing programs that address faculty skill needs.

As one example of an ongoing program, the Kent State University Libraries’ “60 Minute Seminar” series for faculty, highlights a wide range of electronic information sources, including those available through the Internet. Some sessions are team taught with a representative from academic computing services. Most seminars offer hands-on experience. The response has been very positive and has built strong rapport with individual faculty and departments on campus. Additionally, working with faculty, libraries have begun to integrate Internet resources into lectures for graduate students in art, English, ethnomusicology, history, nursing, romance languages, and literature.

Evaluation of Information

One role that librarians play in the use of print resources is to assist users in developing criteria for evaluating the information that they find. The key issues in an electronic environment are:

1. Don't believe everything you read.
2. Who is the author?
3. Is the source credible?

Students, in particular, have a tendency to believe that everything they read on a computer must be “true,” and that information

obtained via a computer represents all that is needed (Estabrook, 1983). Library instructional efforts need to address these misconceptions.

Some Internet resources do not offer useful scope notes up front, nor do they acknowledge the credentials of the producers. We can expect that continuing efforts to describe and classify Internet resources will at least partially address these deficiencies. Instruction or caveats to individuals are called for. Librarians can point out, for example, that many e-conferences and e-journals have no established editing or reviewing process. There is also the possibility that writers simply provide "data" or "facts" based on what they remember while responding to a message rather than consulting other sources for exact information. Most e-conferences are conversational. When asked, most writers will locate an authoritative source to support their statements. The possibility of typos is also a potential hazard for readers who may want to believe everything they see on an e-conference. Conversely, many new e-journals are taking particular pains to ensure that a peer review process is in place.

Management of Information

Librarians are increasingly familiar with aiding users in developing techniques to manage bibliographic information. Working with computer services personnel, a more comprehensive instructional program for managing network information could also be provided. Key skills in information management include:

1. moving information from a remote Internet location to a local computer;
2. online file/directory management; and
3. database and bibliographic software use (e.g., d-Base, Pro-Cite, Reference Manager).

This area presents an opportunity for librarians to cooperate with computer services personnel. Librarians can provide users with some assistance but should also be able to refer them to computer services for more in-depth technical assistance. Likewise, computer services personnel should be able to refer users to librarians for research assistance. Librarians need to be able to inform users about telecommunications software—such as Kermit and Procomm—and how to download files from mainframe computers to microcomputers. These skills are often included in instruction for CD-ROM databases and can be incorporated for network resources in a similar manner. Librarians must also be minimally familiar with the operating systems available on campus mainframes in order to help remote users access

the Internet and other electronic services—e.g., electronic mail account, public Internet accessible terminal, and so on.

Database and bibliographic softwares present a complex issue. The librarian's role can be as simple as making users aware of their existence and value or as complex as helping them to build their own databases. Future developments in software for the scholar's workstation will have a profound impact on how network information can be managed.

Contribution to the Knowledge Store

Finally, librarians will support users as they interact with the electronic medium by contributing to the knowledge base of their discipline. This may be when they are preparing a submission to an electronic journal for which the contributors need to obtain the "instructions for authors," or the users may need to know how to cite an electronic resource for a submission to a conventional print publication. This is an area where librarians will be able to provide assistance.

CONCLUSION

As Internet resources continue to proliferate and connectivity is extended to an ever-widening user group, it is incumbent upon libraries to incorporate awareness of these resources and the means of accessing them into their reference services and instructional programs. The nature of the Internet and the variability of its resources requires time devoted to training of staff and for planning. The hierarchy of information skills is proposed as a framework for identifying the skills needs by staff and users alike and for planning how Internet resources might be integrated into services offered. As users begin incorporating electronic resources into their information frameworks, librarians must be prepared to assist them with traditional information-seeking skills and behaviors—i.e., awareness of what is needed and available, evaluation and management of information, and information regarding additions to the knowledge store. Librarians are familiar with these concepts but need to become familiar with Internet resources and identify ways to incorporate these resources into library services.

NOTES

¹ Diane K. Kovacs and Kara Robinson, Kent State University, and Jeanne Dixon, College Center for Library Automation, surveyed fifty-eight library and information science electronic conferences in Spring 1992. The data show that 37.5 percent of those surveyed have used Internet resources in providing reference services (Kovacs, et al., In press).

² Billy Barron, University of North Texas, compiles a directory of Internet accessible resources which Peter Scott and Earl Fogel, University of Ottawa, make available

via the HYTELNET hypertext front end software for DOS, Macintosh, UNIX, and Vax VMS systems (more information can be obtained by addressing an e-mail message to: <scott@sask.usask.ca>).

- ³ Art St. George, University of New Mexico, compiles a directory of Internet accessible resources which Mark Resmer, Sonoma State University, makes available via L, the LIBS front-end software.
- ⁴ Gopher was developed at the University of Minnesota. It is an interface for a network-distributed database. More information can be obtained by anonymous FTP message to: <boombox.micro.umn.edu>

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