1.0 Introduction

Remote users are no longer a small segment of library users. [1] From electronic workstations in their offices and homes, scholars and students access library OPACs and commercial indexes, connect to distant Internet systems, and download information using file transfer protocols that were uncommon just a few years ago. They ask questions of reference librarians through e-mail, requesting answers via fax machines. Remote users are no longer limited to just dial access; they surf the Internet to locate resources that meet their needs. Library staff have become remote users of a variety of systems, including other libraries' systems. Staff are challenged to use new electronic capabilities to enhance traditional methods of bibliographic instruction and to reinvent themselves and library services.

Do libraries have a mission to educate remote users about their electronic information resources? At least one librarian has written that end-user instruction is unnecessary due to the development of increasingly user friendly systems and the growing computer sophistication of users. [2] But is reliance on users' hands-on experience really best? It is a logical extension of bibliographic instruction programs to extend libraries' teaching activities into the remote electronic information resources arena. The growth of high bandwidth connections that will provide users with access to interactive digital video and audio capabilities will increase libraries' opportunities to reach and teach remote users. If we do not utilize these new technologies to add value to the information we provide by demonstrating and teaching our unique skills in the electronic arena, we will have lost an opportunity to make ourselves and our libraries part of the electronic future.

As the trend toward the virtual library continues to accelerate, the knowledge that a library physically houses must be made electronically available to its remote users. As libraries move toward a user-centered focus, their perspective must change: it is not users that are remote from libraries, rather it is libraries that are remote from users. [3] Services needed from these remote libraries will be defined by future users to help them deal with an increasingly complex information environment. Consequently, the question of how best to identify, contact, selectively disseminate information to, and teach remote users should already be an important consideration when planning library services.

How can we effectively train remote users of electronic information resources? This paper examines the categories and
information resources? This paper examines the categories and characteristics of remote users, training challenges, and ways that emerging electronic capabilities can be used to enhance traditional bibliographic instruction methods.

2.0 A Short History of Remote Access

Remote access can be defined as access through electronic means (e.g., dial access or network access) to library resources (e.g., OPACs, bibliographic databases, full-text databases, and numeric databases) and library services (e.g., reference, interlibrary loan, and document delivery) from a location distant from the physical site of the library that provides these resources.

Remote access to libraries did not start with the electronic era: 19th century printed book catalogs allowed patrons to check the library’s holdings in their homes or offices. However, at the turn of the century, card catalogs began to replace printed book catalogs, and this was no longer possible. [4]

Electronic remote access began in libraries with dial access through modems to commercial databases in the late 1960s and early 1970s. In 1972, for example, Dialog began commercial operation with 3 databases. By 1975, 300 databases were available; by 1980, that number had grown to 600 databases; and by 1984, it had increased to 2,400 databases. [5] The latest edition of the Gale Directory of Databases lists 8,261 unique databases and subfiles available through various vendors today. It points out the growth in the size of the databases over the same time period: the "average database in 1975 contained 173,000 records, and reached approximately 500,000 records in 1985. The average database entry in 1993 has 739,188 records." [6]

According to the same source, the searching of word-oriented online databases on the major U.S. systems increased from 750,000 searches per year in 1974 to 51.78 million searches per year in 1992.

It is not surprising that remote access to online databases began to increase rapidly in the early 1980s coinciding with the widespread availability of personal computers in the consumer marketplace. Libraries' introduction of OPACs in that period, followed by locally mounted databases, further accelerated the remote access trend. The rapid growth of the Internet in the late 1980s and early 1990s also significantly increased remote access of library electronic information systems, as Gophers and World-Wide Web servers were added to OPACs.

3.0 Types of Remote Electronic Information Resources

With the burgeoning number of electronic information resources, it is useful to have a method of grouping them in order to discuss them. These resources be grouped in many ways. One way is to group them by their form of data representation (i.e., words, numbers, images, or sounds). This system does not adequately allow for resources such as computer bulletin boards, e-mail, and electronic conferences. Nor does it adequately account for software archives that include public domain software, special help software, and shareware. Another means of grouping is by region and country of origin. A third method groups resources by subject categories. [7]

For the purposes of this paper, I have adopted Cuadra's classification of databases into "reference databases" and
"source databases." [8] The former category includes bibliographic citation databases that refer users to printed publications. The latter category contains databases that contain original (i.e., source) information, such as numeric databases containing statistical data, textual and numeric databases, full-text databases, and software. This terminology can be extended to non-database electronic resources on other types of systems, such as Gophers, and the term "electronic information resource" will be used instead of database.

This paper will primarily focus on the first category—electronic information resources containing bibliographic citations. However, it should be noted that there are many electronic information resources marketed directly to consumers for which libraries provide no instructional support. In the future, libraries may choose to become active in providing access to and instruction in these resources also.

+ Page 8 +

4.0 Who Are the Remote Users?

Elizabeth H. Dow, in her 1988 dissertation, found that nearly 80% of remote library users were between the ages of 24 and 54. [9] This suggests that remote users are more likely to be graduate students, faculty, staff, or researchers, rather than typical undergraduate students.

As more undergraduates bring their personal computers and modems to the university, they are creating a vast new group of remote users. As remote use grows, librarians are faced with BI problems similar to those encountered in training end-users within the library. A body of knowledge has been accumulated about teaching end-users to search OPACs, online databases, and CD-ROM databases in the library. While this knowledge base is valuable to some extent in understanding and dealing with remote users, much research remains to be done. Sally Wayman Kalin has done groundbreaking work in identifying the needs and habits of academic remote users. [10] However, further investigation of this topic is needed.

4.1 Categories of Remote Users

It is useful to identify four general categories of academic remote users:

1. Affiliated campus users (traditional academic users).

2. Affiliated off-campus users (research center personnel, distance education students, and users at other institutions in the same university system).

3. Unaffiliated local users (community users).

4. Unaffiliated distant users (anyone with Internet access).

This paper will primarily address the needs of the first two categories, although as library policies allow, the same training techniques would also be applicable to the last two categories. Since access problems are a significant factor in instructing remote users, it is necessary to consider the modes of access typified by these different categories of users.
The users in category one (affiliated campus users) often have access to network-connected workstations in dormitories and campus computer labs that allow them to connect to campus computers and Internet computers. Those living off-campus usually rely on dial access to campus computers via modems.

Category two users (affiliated off-campus users) often have access to computers on the university system network, but some may need to utilize dial access.

Category three users (unaffiliated local users) typically rely on dial access.

Finally, category four users (unaffiliated distant users) either access Internet-connected computers either via dial access or via workstations attached to local networks.

4.2 Characteristics of Remote Users

Reva Basch has classified electronic users into broad categories with identifiable traits. [11] This paper will adapt some of her terminology, which was based on fee-paying clients, and apply it to the academic milieu.

4.2.1. The Technologically Challenged Remote User

These remote users are usually newcomers to computer terminals and electronic information resources. The faculty members in this category have expertise in the research methodology of their subject areas, but are frustrated by the technical problems of access. They are interested in results rather than in the operation of the computer or the mechanics of searching. The students in this group are not yet fully computer literate, and they frequently experience anxiety about both the means of access and the research process itself. These users need "electronic counseling" to reassure them, to help them through the technical problems of remote access, and to encourage them to seek further help when needed. [12]

4.2.2. The Techie Remote User

These remote users are aggressively computer literate and are eager to explore the possibilities of cyberspace. They are interested in the technological aspects of telecommunications and techniques of remote access, but may not be familiar with the subject area they are researching or with effective search techniques. They are more interested in the means rather than the end.

4.2.3. The Research-Naive Remote User

These remote users are technologically sophisticated enough to surmount the problems of access and gain entry into library systems. Once connected, students in this group encounter problems with particular electronic information resources. For example, they may not know the scope and coverage of a resource, or they may not be able to construct a search strategy that includes all the possible ways of expressing the concept that they are searching for. Faculty members in this group usually understand information retrieval principles, but need assistance with the terminology of an unfamiliar subject area.
Many users in this category are confused by the enormous wealth of available electronic resources. Librarians have a real opportunity to provide a service here and, in doing so, to establish their role as navigators of the electronic information universe. End-users, overwhelmed by numerous information resources, want to know techniques for winnowing out unreliable and less useful information. Librarians need to establish themselves as the best equipped professionals to assist in this task.

5.0 Challenges of Training Remote Users

Working with remote users presents some interesting instructional challenges that call for new high-tech solutions. This section discusses two types of major challenges: (1) providing procedural knowledge, such as accessing and capturing the needed information; and (2) providing conceptual knowledge, such as teaching effective information retrieval strategies.

5.1 Procedural Knowledge

A key task for libraries is helping remote users, who are using different hardware and software platforms, operating systems, and telecommunications software, to effectively access electronic information resources.

The first thing that all types of remote users need to know is how to access the target system and how to reach technical support services for it. The logon procedures for either network access or dial access are necessary first steps. Technical details needed for dial access users include the proper terminal emulations supported or required by the system, parity bits, baud rate, and other technical settings for the communications software. Network-connected users need to know how to obtain accounts with the campus computing system, how to logon to campus network servers, and how to use the sometimes obscure commands and special features of their campus network. Both types of users need clear explanations of error messages and prompts. It is extremely important to tell users how to reach assistance by providing phone numbers for immediate help with frustrating problems.

It is critical that library instruction staff work closely and cooperatively with the campus computing center in order to provide support services to remote users. Computing centers typically provide technical support, such as how to get started with the correct communication software settings appropriate to the dial-access user's hardware platform, and libraries provide assistance with searching and using electronic information resources.

Should librarians develop the expertise to diagnose and advise users on complex technical problems related to hardware and software platforms? Debate concerning electronic user support services focuses on the "one-stop shopping" approach versus the "complementary role" approach. The one-stop shopping approach proposes that librarians should develop in-house technical support for handling the needs of remote users as well
as providing support for searching and using electronic information resources. The complementary role approach envisions librarians working cooperatively with the campus computing center personnel to provide remote user support. Based on their unique configuration of resources and needs, libraries may choose to implement one approach rather than another, or they may view this debate as a continuum of choices rather than as an either-or decision.

5.2 Conceptual Knowledge

Helping remote users develop a conceptual model of how information retrieval works is the central challenge of user instruction for remote users, just as it is of any user instruction program. The remote user needs to learn to conceptualize his or her information need and to think in terms of how an electronic information resource is organized in order to develop an appropriate search strategy. The user must also understand the limitations of the system in order to evaluate search results. Were the search terms the best ones to use to exploit the strengths of the system? Does the electronic information resource represent all relevant research in the subject area?

If the user does not understand the scope and nature of the electronic information resource, he or she runs the risk of assuming that it holds absolutely everything they need to know and that any search will turn up all relevant citations. More than in the print environment, the librarian working in the electronic environment needs to help the user recognize that the electronic information resource is a tool that the user controls to gather and evaluate information. In order to do that, the librarian must explain the tool's limitations, purpose, and proper use.

5.3 Teaching Searching to Remote Users

Successful efforts to teach effective searching techniques have often employed interactive, one-on-one, point-of-use instruction by reference staff working with end-users. Until advances in technology supply us with similar interactive electronic capabilities, providing general instruction to a potentially vast group of remote users with unknown levels of sophistication and learning styles will require creative use of existing instructional technologies. Much more research needs to be done to identify how remote users actually search electronic information resources and how best to address their needs.

A study at Hofstra University has suggested what end-users do not need to know: advanced search techniques such as nesting concepts, using an online thesaurus of descriptors, and anything beyond the most basic Boolean search strategy. [13]

5.4 Helping Remote Users to Capture and Manage Information

To support effective remote use of electronic information, libraries need to address the wide variety and complexity of the hardware that dial-access users are utilizing to download information as well as the vagaries of the different kinds of communications software that they employ. It is extremely important that library instruction staff work closely and
cooperatively with the campus computing center in order to provide this type of support service to remote users. For example, while the computing center might typically provide communication software and instruction in its use, librarians can teach users how to manipulate downloaded information and how to format it for use in word processing, spreadsheet, or bibliography software.

Network access presents its own challenges in capturing and downloading information to an individual's workstation via network software such as the NCSA Telnet drivers. In this case, librarians providing support for remote users need to address the technical details of capturing and downloading data from network systems and to provide help in formatting the data.

6.0 Methods of Training Remote Users

Specific strategies and teaching techniques should be developed with the needs of different types of remote users in mind. Current methods of training include providing self-study materials; individualized instruction; and various forms of group instruction, including remote online workshops, local hands-on workshops, demonstrations, and classroom lectures.

6.1 Self-Study Materials

Traditionally, many libraries have maintained packets of instructional guides, help sheets, pathfinders, brochures, and other printed handouts that are available to mail out to remote users upon request. These packets typically include an instruction sheet on how to access the OPAC and other local databases, a sheet explaining Boolean searching concepts and techniques, and a sheet giving system-specific search commands and tips on using a particular resource.

With the advent of campus-wide electronic networks, one of the easiest methods of distributing these instructional guides is to add them to a campus or library Gopher, where a user could easily access them and either read them online or download the information. One problem frequently encountered with this process is the length of the instructional guide. Users seem to prefer brevity, and a useful rule of thumb is to limit electronic versions of help sheets intended to be read online to no more than three screens.

The Gopher itself can be a useful self-instructional tool. Academic libraries have been working with campus computing centers to construct gophers that will enhance the user's ability to locate and explore electronic reference books, e-journals, bibliographic citation databases, Usenet newsreaders, and other wonders of Gopherspace. A list of well-constructed Gophers was posted to the PACS-L list, and an examination of any one of these gophers will illustrate the potential for using a Gopher as an information tool for remote users. [14]

Network hypermedia software, such as World-Wide Web servers and Mosaic clients, feature user-friendly interfaces, links to diverse types of network resources, access to digital multimedia information, and full-featured interactive help. These tools make it possible for users to discover electronic information resources on their own. So much information is already available electronically that users need to be allowed to learn on their own through guided exploration and to create their own paths
through cyberspace.

Reference librarians should also be prepared to send user help tips as text files directly to remote users' workstations via e-mail or file transfers; however, an easier alternative is to establish an anonymous FTP or Gopher site on a campus network server that is accessible to all remote users. For example, a joint project of the University Library and the School of Information and Library Studies at the University of Michigan has established a Clearinghouse for Subject-Oriented Internet Resource Guides, and made these guides available via anonymous FTP, Gopher, and the World-Wide Web. [15]

As more fee-based systems become available to remote users, instruction becomes even more essential to enable users to employ these electronic resources in a cost-effective manner. For this purpose, modular self-paced workbooks can be developed and made available for a fee on a cost-recovery basis. Printed workbooks can be made available for pick-up or mailed out, and electronic versions can be provided in the various ways discussed previously.

Libraries are making online tutorials from publishers available on their networks so that users can employ them prior to utilizing an electronic information resource. These computer-aided instructional programs have become more useful as they have become more interactive. For example, SilverPlatter has excellent tutorials for the ERIC and PsycLit CD-ROM databases that go into far more detail than ordinary printed library handouts.

Another training option is computer-assisted instructional programs developed by the library. These programs can be made available on diskette so that they can be picked-up at the library or mailed out, or the programs can be sent electronically to users' workstations. With this approach, library staff can tailor instruction to the unique set of resources available from their site. Unfortunately, the development of these programs is time consuming, and, in many cases, the need is obviated as the quality of commercial tutorials available from publishers improves.

Emerging technologies for delivering instruction, such as on-demand video, offer interesting possibilities for the future. Once commercial ventures provide this service to users' homes, libraries may be able to use this delivery mechanism for instructional purposes. One can imagine a scenario in which users will be able to call up on-demand tutorials for learning how to utilize remote electronic information resources of all kinds.

6.2. Individualized Instruction

For users who can come to the library, library staff could offer individualized instruction sessions that would be tailored to meet a particular user's needs. By appointment, the user could consult with library staff members, and the user could quickly get hands-on experience with remote access techniques and develop a mental picture of how electronic information resources are designed and function. This basic understanding would help combat the common misconceptions of remote users and enable users
to become more effective researchers.

Currently, technological tools (e.g., e-mail, telephone, and fax) are usually used in individualized instruction to help remote users to solve specific problems, typically technical problems that must be resolved immediately (e.g., an indecipherable system prompt or error message).

Emerging technologies provide exciting opportunities for individualized instruction. Online consultation via interactive digital video would provide an electronic means to teach remote users that would truly extend the library's reach beyond its walls, while giving users their most preferred means of learning: real-time, one-on-one interaction with a librarian who is an expert in using electronic information resources and managing data from them.

6.3. Group Instruction

If remote users can come to the campus, workshops are an effective instructional technique. Workshops may be held at the library or elsewhere on campus. They are most effective when hands-on training can be offered so that the two basics of user training can be covered: how to access electronic information resources and how to use them. When equipment is not available for hands-on training, demonstrations are useful to show groups of remote users the techniques of online access and searching. Classroom lectures, although better than no instruction at all, are woefully inadequate to teach online skills. Slides or overhead transparencies can be used to simulate the screens that the user will encounter, but a hands-on approach or a live demo is much better.

An e-mail message posted to PACS-L summarized twenty-three responses made concerning workshop teaching methods for an Internet course: thirteen respondents recommended a hands-on approach, six recommended both hands-on training and a demonstration, and only four recommended the lecture/demonstration approach. [16]

"Master" electronic classrooms are superior to traditional classrooms because they are equipped with the latest computer and video technologies. The master classroom at Steen Library at Stephen F. Austin State University is an example of an ideal electronic classroom. It includes twenty network-connected workstations along with five printers encased in soundproof printer stations. There is a network-connected instructor workstation equipped with an overhead projector and a color LCD projection panel for projecting the instructor's computer screen on a large screen for group viewing. The lights in the room can be easily dimmed to an appropriate level for the task at hand. To provide maximum flexibility for teaching a variety of skills and electronic information resources, workstations can access the library's OPAC, all in-house electronic information resources, and Internet resources. The workstations can also access applications software (e.g., word processing, spreadsheet, and bibliography software) so that students can learn to cut and paste the results of their searches directly into their documents. In this way, students and faculty are able to see for themselves the ideal of the "scholar's workstation" in action. In the near future, the number of workstations will be increased to thirty, and these workstations will have access to image and
other multimedia resources, including digital color video and audio sound clips.

Group instruction outside such a classroom setting is best exemplified in the emerging electronic era by the interactive online courses offered over the Internet. Such classes or workshops are announced on PACS-L, NETTRAIN, and LIBREF-L with increasing frequency. For example, a workshop entitled "Navigating the Internet: Let's Go Gopherin'" attracted 17,769 participants from 54 different countries. [17]

7.0 Preparing Librarians to Work With Remote Users

The library should define its role in respect to training remote users. That role should not be developed in isolation from the campus computing center, which often offers a variety of computer courses. For example, the Butler Library at Columbia University defines their role as complementing that of the University's Center for Computing Activities and does not duplicate existing instruction in computer hardware, telecommunications, or basic applications like word processing. Instead, their "focus is on advanced research tools and processes . . . and on specific applications of technology to information retrieval and organization, publishing and communication, and textual analysis." [18]

Librarians working with instructional programs in electronic information resources need to have a broad perspective not only of the resources themselves, but also of information management techniques, electronic scholarship, and electronic publishing.

Staff training programs should focus on providing an understanding of these subjects. Other areas that should be covered include the system-specific commands of relevant electronic information resources, expertise in managing personal databases, and the bibliographic generation of downloaded information.

It is also very important for those working with remote users to understand the user's perspective. They should experience the kinds of problems and system messages that remote users encounter using various means of access, and they should develop appropriate training materials to assist users with any challenges that cannot be resolved.

8.0 Conclusion

One day, new electronic information systems may provide remote users with easier, more intuitive means of searching. For example, search techniques based on statistical weighting (also known as relevance ranking) can produce a list of citations sorted in descending order with the most relevant items at the top of the list. This type of search system is exemplified by Westlaw's WIN. A similar system called TARGET is being developed by Dialog, which "strikes a middle ground between pure natural language relevance ranking systems and Boolean searching." [19]

But even with significant system improvements, the librarian in the brave new electronic world of the future will still play an important role in aiding users "to navigate . . . between information needs and information resource systems." [20]

To return to the three categories of users discussed earlier in this paper, the problems of the "technologically challenged"
may be overcome through improved design of search engines, user interfaces, and information protocols. The "techie" and "research-naive" users can benefit from increased human and computer-based library instruction, and they should be encouraged to explore and effectively utilize the electronic information possibilities of cyberspace. Hopefully, librarians will be able to focus more energy on fostering electronic information literacy by assisting users to develop lifelong skills in retrieving and managing all of the electronic information resources available to them from libraries and other remote sites.

It is important that we continue to explore the use of new technologies to reach out to and interact with today's remote users. But we should also welcome the opportunity to rethink our attitudes and our perspectives in order to reinvent our services in this new electronic environment. As John R. Sack has suggested, we need to move away from the "Ptolemaic" view of the library as central towards the "Copernican" view of the user as central. [21] Armed with this perspective, librarians will be better equipped to utilize emerging technological capabilities to effectively serve their users.

Notes

1. An earlier version of this paper was presented at the Ninth Texas Conference on Library Automation, 3 April 1993.


3. The author would like to thank Tom Wilson of the University of Houston University Libraries for this important observation at the Ninth Texas Conference on Library Automation.


7. Ibid., xxiii-xxvii.


10. See Sally Wayman Kalin, "The Invisible Users of Online


14. Steven J. Herro, "Summary of Well Constructed Gophers," e-mail message posted to pacs-l@uhupvm1.uh.edu, 17 November 1993.

15. Louis Rosenfeld, "New Topical Internet Guides Available," e-mail message posted to pacs-l@uhupvm1.uh.edu, 20 December 1993.


19. Promotional information from DIALOG Information Services, Inc.

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About the Author

Karen Wielhorski, Head of Reference, Ralph W. Steen Library, Stephen F. Austin State University, Nacogdoches, TX 75962-3055. Internet: karenw@sfalib.sfasu.edu.

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