PRODUCTION NOTE

University of Illinois at Urbana-Champaign Library
Service to Remote Users

Lorraine J. Haricombe

Issue Editor
Library Trends, a quarterly thematic journal, focuses on current trends in all areas of library practice. Each issue addresses a single theme in depth, exploring topics of interest primarily to practicing librarians and information scientists and secondarily to educators and students.

Editor: F.W. Lancaster
Managing Editor: James S. Howell
Publications Committee: Leigh Estabrook, Janice Del Negro, Monica M. Walk, Betsy Hearne

Library Trends is published four times annually—in summer, fall, winter, and spring—by the Graduate School of Library and Information Science at the University of Illinois, Urbana-Champaign, 501 E. Daniel Street, Champaign, IL 61820-6211.

Subscription: Institutional rate is $75 per volume (plus $7 for overseas subscribers). Subscriptions for an individual are $50 (plus $7 for overseas subscribers). Registered students may subscribe for $25 (plus $7 for overseas subscribers). Individual issues are $18.50 (shipping included); back issues other than those from the present year are $10 (plus shipping). Claims for missing numbers should be made within six months following the date of publication. All foreign subscriptions and orders must be accompanied by payment.

Address orders to: University of Illinois Press, Journals Department, 1325 S. Oak Street, Champaign, IL 61820. For out-of-print issues, contact University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106. Postmaster: Send change of address to University of Illinois Press, 1325 S. Oak Street, Champaign, IL 61820-6903.

Copyright © 1998 by the Board of Trustees of The University of Illinois. All rights reserved. Printed in the U.S.A. ISSN 0024-2594. Periodicals class postage paid at Champaign, Illinois.

Authorization to photocopy items beyond the number and frequency permitted by Sections 107 and 108 of the U.S. Copyright Law is granted by the Board of Trustees of the University of Illinois, provided that copies are for internal or personal use, or for the personal or internal use of specific clients and provided the copier pay a fee of ten cents per page directly to the Copyright Clearance Center (CCC), 222 Rosewood Dr., Danvers, MA 01923. The CCC code for Library Trends is 0024-2594/88 $0.00 +.10. To request permission for copies for advertising or promotional purposes, or for creating new works, please contact the Graduate School of Library and Information Science, Publications Office, 501 E. Daniel Street, Champaign, IL 61820-6903.

This journal is abstracted or indexed in Library and Information Science Abstracts, Current Contents, Current Index to Journals in Education, Information Science Abstracts, Library Literature, PAIS, and Social Sciences Citation Index.

Procedures for Proposing and Guest Editing an Issue of Library Trends

We encourage our readers to submit ideas for future Library Trends themes, issue topics are developed through recommendations from members of the Publications Committee and from reader suggestions. We also encourage readers to volunteer to be issue editors or to suggest others who may be willing to be issue editors.

The style and tone of the journal is formal rather than journalistic or popular. Library Trends reviews the literature, summarizes current practice and thinking, and evaluates new directions in library practice. Papers must represent original work. Extensive updates of previously published papers are acceptable, but revisions or adaptations of published work are not sought.

An issue editor proposes the theme and scope of a new issue, draws up a list of prospective authors and article topics, and provides short annotations of the article's scope or else gives a statement of philosophy guiding the issue's development. Please send your ideas or inquiries to E.W. Lancaster, Editor, Publications Office, 501 E. Daniel Street, Champaign, IL 61820-6211.
Service to Remote Users

Lorraine J. Haricombe

Issue Editor
This Page Intentionally Left Blank
Service to Remote Users

CONTENTS

Introduction
Lorraine J. Haricombe

Remotely Familiar: Using Computerized Monitoring to Study Remote Use
Thomas A. Peters

Services to Remote Users: Marketing the Library's Role
Ann Wolpert

Remote Library Users: Needs and Expectations
Rosemarie Cooper, Paula R. Dempsey, Vanaja Menon, and Christopher Millson-Martula

Off-Campus Library Support for Distance Adult Learners
John A. Niemi, Barbara J. Ehrhard, and Lynn Neeley

Remote Users of Health Sciences Libraries
Phyllis C. Self, Barbara A. Wright, and Jessica L. Waugh

Web Information Services at the University of South Africa: A Work in Progress
Sandra Hartz, Brian Paterson, Dorette Snyman, Lisa Thompson, Louise van Heerden, Marza Vorster, and Ansie Watkins
Service Perspectives for the Digital Library: Remote Reference Services
Bernie Sloan 117

Cutting Out the Middleman: Patron Initiated Interlibrary Loan
Barbara G. Preece and Thomas L. Kilpatrick 144

Making Choices in the Virtual World: The New Model at United Technologies Information Network
Bradley Gulliford 158

Online Services to AT&T Employees
Ina A. Brown-Woodson 172

About the Contributors 180
Introduction

LORRAINE J. HARICOMBE

Remote users are not new to libraries. Ancient libraries provided portable catalogs that enabled patrons to "browse" the library's holdings without setting foot in the library. At that time, librarians were largely familiar with their clientele. Since then, new and emerging technologies have enabled them to expand their services to include a wide range of support to their users. Too, their clientele has grown and now includes the fast growing group of remote users. Kalin (1991) correctly points out that libraries cannot presume to know who their clients are anymore. Remote users cannot be neatly packaged. They come from a wide variety of backgrounds, skills, and expertise. Remote users, in particular, are challenging libraries in new ways to rethink their mission and their services.

Technology empowers people. Increasingly, library users have remote access to online information, they can publish from their desktop, and they carry laptops when visiting the library. A mere "point and click" provides fast and direct access to information and eliminates the need for long or inconvenient trips to the library. The diminution of time, space, and distance also plays a key role in customer satisfaction provided all systems are stable, reliable, and responsive. The hyperbole applied to new technology heightens the expectations of what libraries should be doing for their users, making it very difficult for them to provide anything less.

Ancillary to new and emerging technologies is the change in the user population. A young and sophisticated group, the Net Generation has grown up with computers and is comfortable with technology as a natural component of life (Noble, 1998, p. 51). This group's expectations are
colored by its dependence on computers to solve everything 24 hours a
day, 7 days a week.

The significant growth in information technology allows more people
to become independent users of information sources. The convenience
of remote access, browsing, retrieval, and document delivery means that
patrons can use libraries without the help of a librarian and without physically
visiting the library.

Ironically, this trend toward disintermediation has led to increased
levels of assistance by librarians as they engage in new roles to provide
technical support and navigation among the waves of Web sites. Working
this closely with remote users will force librarians to build new alliances
with their patrons. In doing so, libraries will be better able to identify
their needs and design appropriate support services. Interestingly, while
remote users do not physically come to the library, they do have high
expectations of what libraries ought to offer. Those users most likely to
tout the advantages of remote access are the ones who are least likely to
avail themselves of library sponsored instructional sessions. Notwithstand-
ing this, remote users depend on librarians to provide around-the-clock
support.

Many libraries have optimized the available technology to enhance
existing services to users, or they have expanded their outreach to better
support their remote users. For example, several interlibrary loan units
enable their users to directly access other libraries’ OPACs, including re-
trieval and document delivery from other libraries’ databases. Similarly,
libraries support users’ direct access to numerous vendor databases and
other information resources, eliminating the need for interlibrary loan
staff to mediate such transactions. Technology also provides opportuni-
ties to design and introduce new services. In the early 1990s, San Diego
State University revolutionized reserve services by changing from a paper-
based operation to electronic reserves (e-reserves). Many libraries have
since joined this trend to provide remote access to their electronic re-
serve room in the United States and elsewhere. Valid library users enjoy
remote access to reserve readings, retrieval, and delivery of full-text read-
ings despite ongoing concerns about copyright and fair use in the online
environment. Remote reference and online bibliographic instruction are
added examples of support to remote users. One example is the UWIREDS
project at the University of Washington, which supports educational ac-
tivities of its student athletes.

Academic libraries specifically have been challenged to rethink their
role as the “heart and soul” of campus. Distance education students ex-
pect equitable library support from the parent institution. To accommo-
date this need, partnerships among academic libraries, distance educa-
tion centers, public libraries, and special libraries have grown to provide
online support to distance education students.
Current awareness services, including manipulation and customization of information, are added examples of online support to remote users. Information technology provides all libraries with opportunities to enhance or expand their services beyond the traditional. Because librarians now provide access to external databases, they have been transformed from information gatekeepers to information gateways. Directing and guiding users in their selections of sources and managing and organizing information to meet specific information needs are support services that libraries now have to merge into an electronic environment to meet the needs and expectations of remote users.

In his article, Peters, known for his work in transaction log analysis, explores the value and the limitations of computerized monitoring as a tool for libraries to gather information about their remote users. Transaction analysis has long been in use to monitor remote access. Today, Web server log analysis and Web client log analysis complement the more traditional monitoring of remote access. Peters claims that computerized monitoring of remote access is valuable insofar as it provides critical information about the use of information, rather than demographic information about the users. What can one learn from users who have been liberated from the physical library? In what ways have remote users' information-seeking behaviors been impacted by remote access and how can libraries "mine" that information to improve the online support for the remote user?

Wolpert's article describes the difficult and complex issues academic library administrators face in marketing the library's role in higher education. Fueled by the expectation that technology will offer new low-cost educational models, university administrators are attracted to the lucrative market of nontraditional students in distance education centers, ensuring added revenue but requiring no added infrastructure to fully support their needs. Underlying the complex issue of securing online support to remote users are the political, economic, institutional, and organizational dynamics involved in providing parallel systems of library support to on-campus and remote students alike. Using the business/corporate model, Wolpert compares library services to remote users with a new "product line" that libraries need to develop creatively and market in the new and competitive information infrastructure. Despite these challenges, Wolpert contends that dependence on the all-digital library for research and high-quality library support presents more problems than had been anticipated.

Being user-oriented implies knowledge of the users and catering to their needs. Historically, libraries have been thought of as being service-oriented, though not necessarily user-oriented. In their article, Cooper, Dempsey, Menon, and Millson-Martula discuss the importance of defining the users and their needs. Defining remote users' needs will help
library staff to provide services targeted to meet these needs. The authors discuss the importance of customer satisfaction in judging the extent to which library services match their needs. They assert a strong correlation between knowledge of the customer and customer satisfaction. Libraries cannot hope to satisfy users with a one-size-fits-all approach. Remote users expect a quality of service as good as that offered to on-site users. Cooper et al. discuss remote users within the context of distance education. The change in the delivery of distance education has impacted what services libraries should offer fee-paying students at remote sites. Writing from the librarian's perspective, they offer distance learning at DePaul University in Chicago as a case study to highlight the various components libraries need to support distance education students and faculty. In conclusion, they provide useful service recommendations for remote users and distance learners, including implications for library staff roles.

Writing from the perspective of distance education administrators, Niemi, Ehrhard, and Neeley describe the needs and expectations of distance education students, especially adult students engaged in higher education at remote sites. Aimed at helping librarians become more familiar with the characteristics and needs of adult learners, the article also discusses specific support services distance education students require. They challenge libraries and library schools to shift their focus and to optimize the technology to support the new emerging mode of higher education in the online environment.

Remote users are diverse in their needs. Self, Wright, and Waugh describe information services to remote users in health sciences libraries. Their article integrates "old-style" technology with new technologies to support health science professionals in remote clinics and health centers. Formerly restricted to health care professionals, health sciences information databases now serve professionals and lay persons alike, challenging health sciences librarians to explore their users' needs and expectations. Several examples of accommodations to remote users are offered including networking of libraries, training, on-site consultation, electronic outreach services, and full-text journals. Despite the lack of qualitative evaluation studies on remote user services in the health sciences, the convenience of remote access to information seems to override other problems remote users may have. Reflecting on twenty-five years' of services to remote users in the health sciences, the authors conclude that several elements ought to be included for successful outreach initiatives, namely users, collections, document delivery services, training programs, and ongoing evaluation programs.

With strong support from the government, the new information infrastructure advocates access to electronic information in all libraries and schools in the United States. Unfortunately, this is not true for many libraries in other countries. Hartzer, Paterson, Snyman, Thompson, Van
Heerden, Vorster, and Watkins provide a unique perspective of the difficulties and progress in planning online support to students at a large correspondence university in South Africa. The University of South Africa (UNISA) recently received major funding to enhance its mission of open and distance learning in an electronic environment using Students Online (SOL). The university library seized the opportunity to design new online services to support its clientele in cyberspace. The article provides an overview of the steps the library has taken so far. The difficulties of library skills training are discussed from the librarians' and the users' perspectives, including electronic delivery in a Third World environment. Several strategies for training are explored—e.g., a team-based approach, partnerships with faculty to provide five-day workshops, and online tutorials. The newly established Electronic Text Centre at UNISA is intended to centralize a variety of online support services to faculty and students twenty-four hours a day, including training, navigation, current awareness services, and full-text databases.

While remote reference services remove geographical and physical barriers in the virtual library environment, these services pose new challenges for the library and the reference librarian. Sloan's article explores the human aspects of library services and the importance of human interaction despite the trend toward disintermediation in remote access. Using several examples of interactive remote reference services, he discusses their pitfalls and benefits with special reference to selection of hardware and software, training of users, and integrating remote reference into standard reference activities. Focusing on the importance of the human interaction amid increasing waves of technology, Sloan proposes a remote reference service model that combines video-based and e-mail-based reference services to extend that human touch. He strongly advocates the need for evaluation of the remote reference services model to ensure that the users' needs are met.

Document delivery via interlibrary loan units may have experienced the impact of technology before any other library service. Less than two decades ago, the fax machine was considered to be "cutting edge" technology in document delivery. Today, interlibrary loan units increasingly use electronic methods to "deliver" the document. Touting the benefits of unmediated services in the interlibrary loan unit, Preece and Kilpatrick describe their model of unmediated online support to remote users at Southern Illinois University (Carbondale) within consortial structures. The article provides useful information about workflow, workload, evaluation of the service, and customer satisfaction.

Providing remote access to users who have traditionally received processed, customized, and packaged information has its own challenges. Gulliford describes the impact of the transition from decentralized mediated services to centralized unmediated services at United
Technologies Information Network. The significant increase in accessible electronic databases empowers their users to choose, search, and compare information best suited to their specific needs. To better support their users in the virtual library environment, the physical library was replaced with a document delivery unit, remote reference, and desktop technical support. In short, the traditional role of the special librarian has been transferred, in part, to the end user. The reorganization also redefined the role of the special librarian from being reactive to providing proactive services—e.g., information navigation, training, analyzing information, evaluating information, and other outreach initiatives.

At AT&T Information Services, library services are outsourced to external vendors to provide online support to AT&T employees. Brown-Woodson describes various stages of the evolution of online services at AT&T from a library-based operation to increasingly more partnerships for outsource services, including interlibrary loan and document delivery. The article points to several important components in evaluating customer satisfaction that libraries need to consider in outsourcing, including timeliness, costs, accuracy, and content relevancy. Important criteria in selecting electronic resources are system compatibility, content and presentation, purchase/lease options, cost structures, archiving, system security, and licensing. The quality of the external online services is measured in its success in meeting the needs of the internal customers.

The challenge for librarians seems clear—new technology, remote users with higher expectations, and a new information infrastructure that threatens the future of traditional libraries. If libraries are to thrive in online environments, their services and resources must be rethought in the terrain of cyberspace. This issue of Library Trends offers an exploration of prospects, challenges, and newly created services at various libraries providing online support to remote users.

REFERENCES
Remotely Familiar: Using Computerized Monitoring to Study Remote Use

THOMAS A. PETERS

ABSTRACT
Computerized monitoring has been used for decades to study the behavior of remote users of online library resources. The older method of using transaction log analysis to study how remote users interact with online catalogs and abstracting and indexing services recently has been complemented by the use of Web server log analysis to study how remote users navigate into and through library-created and library-supported Web sites. The technique is particularly well suited to the task because the behavioral data can be gathered unobtrusively without interrupting the user's search for information because, compared to in-library use, it is relatively easy to identify discrete search sessions, and remote users are much more reliant on computerized library systems than are in-library users. For remote library users, content, context, and assistance all are delivered through the same channel and interface. The diffusion of remote access techniques and behavior among the information-seeking population raises some fundamental questions about the nature of access. The two goals of this article are to review what computerized monitoring has revealed about remote use and to examine some of the larger issues raised by remote access.

DEFINITIONS
There is a fundamental profundity concerning remote access to library resources that can be easily forgotten in the whirl of digital library development—i.e., remote access brings library resources and services into...
the workplaces and dwelling spaces of information seekers and users. Rather than spend time in the library, the user now has the viable option of easily bringing the digital information into her or his more familiar dwelling place. On this count, the impact and efficacy of the photocopier on the end-user's interaction with information pales in comparison. Information in the form of digital packets is now being delivered to the places where people actually live and work. In the real world of physical libraries, we carbon-based creatures had to lug our minds to a more-or-less centralized information resource—i.e., the physical library, a pillar of the community, the heart of the campus. Remote access to digital information may be changing the mental landscape of information seeking and use forever.

This profound change that we conveniently call remote access has caused some segments of the user population to swear off the full-service, real-world library. If it is not online and remotely accessible, they will do without it. Some of our former in-library patrons seem almost gleefully liberated. Although as librarians we may lament this apparent triumph of convenience over comprehensiveness, we also need to respect this powerful emotion and try to learn from it.

When the topic of remote access is raised in professional discussions, often the focus of attention quickly settles on the concept of remoteness. Remote access usually is defined as any computerized access to library resources and services from outside the physical confines of the library building or buildings. The question concerning remoteness is a good one that should be applied with equal scrutiny to the second word in the phrase "remote access." Remote access to online information resources should challenge us to rethink the meaning of access. Access is nothing but pure potentiality until realized as use. Retrieval and use of information are the measurable proofs of accessibility. Access also happens to be a very complex potentiality. It encompasses both pre-retrieval and post-retrieval behavior, learning, and processing. In emerging digital libraries, access will have little to do with distance. In a few decades, we may look back and conclude that an exponential increase in the demonstrable accessibility of library information (at least for those with access to computers and telecommunications connections in remote locations) was the dominant success story for the remote access movement of the 1990s. The idea of remote access to information is more about access than about remoteness.

Online remote access began with dial access to online catalogs and vended indexing and abstracting services. Since then, remote access to content has expanded rapidly, and usability has improved dramatically. On the other hand, remote access to library services has just begun, if we discount the use of the telephone to gain access to reference services. Hazen (1998) argues that, until now, remote access to distant print-based,
text-bearing devices has some inherent weaknesses. "From the user's perspective, all off-site resources are similar in that they must be chosen sight unseen, requested in accord with special procedures, and received only after a wait" (p. 97). Hazen suggests that, from the perspective of a human browser, close-at-hand physical collections of books and journals are eminently more browsable than remote access to electronic text-bearing devices and their surrogates, including indexing entries, abstracts, and bibliographic records. Recent technological developments, however, offer new opportunities for liberating the human act of browsing from its physical limitations. "Electronic images that complement and enhance bibliographic records may allow users seeking remote holdings to approximate, and in some cases improve upon, the sorts of quick inspections that they have traditionally conducted at the shelf" (Hazen, 1998, p. 98).

A remote user is anyone who uses library systems, services, and resources from a location outside the library proper. Some remote users may never have been in-library users, while others are crossover users who continue to come into the physical library to complete certain tasks. Lakos (1998) presents a useful and interesting overview of the challenges faced in trying to identify and count the users of a computer network. Rather than classify remote users based on how they connect to the online library system, perhaps we should classify them based on the content and services to which they have remote access. Although graphical interfaces and multimedia content appear to be gaining ascendancy, character cell versus GUI (graphical user interface) may be another way to think about modes of remote access.

Remote access facilitates both the synchronous and asynchronous transfer of information. Historically, libraries have concentrated on asynchronous scholarly communication. The author writes the book, chapter, or article, some time passes, the library acquires the item, some more time passes, then the reader reads, assimilates, and applies the knowledge contained in the item. Usually the author and the reader are removed in terms of both space and time. The text-bearing device (e.g., a book) functions as the vehicle for asynchronous scholarly communication.

Synchronous scholarly communication existed long before the creation of computers. Classrooms, faculty offices, and conference venues are sites where synchronous scholarly communication typically occurs. Librarians generally show little interest in synchronous scholarly communication, probably because of the sheer volume of this type of communication, the need to record it for posterity, and because synchronous scholarly communication may be qualitatively different than the fixed scholarly texts acquired and organized by libraries.

Librarians tend to conceptualize and understand computer networks as a technology for more efficiently and effectively disseminating and archiving asynchronous scholarly communication. For example, it is much
easier to deliver a full-text journal article to a community of users as an ASCII text than as ink on paper—assuming that the computer hardware, software, and network are in place and functioning. Our conceptualization, however, tends to ignore the possibility that computer networks not only will enable remote access to fixed scholarly texts, but also that they break down the technological impediments to a confluence of synchronous and asynchronous scholarly communication. The resilience of the social impediments to such a confluence is another matter.

**Computerized Monitoring**

Computerized monitoring entails the use of computers to monitor human-computer interaction. Often the same computer that stores and delivers information to humans also captures, stores, and perhaps analyzes data about interactions between itself and human beings (possibly mediated by other computers on a network). The technique is a good way to unobtrusively study the online information-seeking and use behavior of remote users. Transaction log analysis and Web server log analysis are two main areas of computerized monitoring research of interest to librarians involved in providing service to remote users. Transaction log analysis, a traditional type of computerized monitoring, has been practiced in library environments for over thirty years. Peters, Kaske, and Kurth (1993) provide an annotated bibliography of the first quarter century of transaction log analysis. Web server log analysis and Web client log analysis are two newer methods that have matured rapidly in the last three years. Server logs capture behavioral data at the server end of client-server interactions, while client logs focus on the perspective from the client end of things. Although Web managers and advertisers are leading the way in the development of Web log analysis methods, library-based applications of these new data gathering and analysis methodologies are beginning to appear in the literature.

Computerized monitoring has been used for decades to study the behavior of remote users of computerized library systems. The technique is particularly well suited to the task; because the behavioral data can be gathered unobtrusively without interrupting the user's search for information; because, compared to in-library use, it is relatively easy to identify discrete search sessions; and because remote users are much more reliant on computerized library systems than are in-library users. Computerized monitoring can occur in the same online environment where the actual information-seeking behavior occurs. The most advanced computerized monitoring software can collect, analyze, and apply data without upsetting the online environment or its inhabitants.

Computerized monitoring of human-computer interaction in digital library environments does have some limitations. Because the technique focuses on observable behavior, it captures little direct information about
the thought processes, desires and intentions, or outcomes and levels of satisfaction of remote users. Computerized monitoring alone is not a good indicator of the satisfaction levels of remote users. Sometimes the frustrations of remote users can be inferred from transaction log data, but usually it is difficult to determine from logs alone if users are satisfied with the outcomes of their remote sessions with digital library information systems. When it comes to satisfaction, it is better to ask than to infer.

Both the range and venues of behavior exhibited by humans looking for, and using, information to meet a need or complete a project are impressive, often extending far beyond their online interactions with computerized information systems. Once the person goes offline to continue the information project, computerized monitoring fails to collect data about that behavior. Furthermore, humans do not leave the real world when they go online to gain remote access to online information resources. The real-world behavioral aspects of online human information-seeking behavior (e.g., vocalizations, facial expressions, and distractions in the local real-world environment) usually cannot be captured by computerized monitoring software modules.

**Behavioral Traits of Remote Users**

The promise of computerized remote access to library resources and services is being built on the murky pilings of real-world in-library use. A group of remote users is a different type of entity with different behavior patterns than a group of in-library users, even if a substantial number of individual users belong to both groups. Several researchers have used transaction log analysis to test the hypothesis that, in a digital library accessible twenty-four hours per day, seven days per week, the diurnal information-seeking rhythms of people seeking and using information will be different from what we observe of real world information seeking and use. For example, Lucas (1993) used transaction log analysis to test the assumption that remote users search online catalogs when libraries are closed or when there is low internal use. This assumption underpins two expected advantages of remote access: expanded hours of access and reduced peak loads on the system. In general, Lucas found that remote searching from the New York metropolitan area of an OPAC was distributed more evenly over the course of the day and the week than in-library searching.

The research results reported by Kalin (1991) indicate that dial-access use differs from network use in many ways. Of the three main types of users (in-library, dial-access, and network), dial-access searches tend to be the least successful. Instruction in the use of an online catalog still tends to rely on human intermediaries and paper-based guides rather than on-screen help. This situation hampers dial-access users.
In their study of the transaction logs generated by remote users of the MELVYL system, Millsap and Ferl (1993) found that remote users seemed to have difficulties constructing search arguments acceptable to the system, typing their arguments correctly, choosing search terms that resulted in some retrievals but not too many, and choosing the appropriate database. Successful instances of refinements or acts of limiting initial retrievals were rare.

Chapters ten through twelve of Peters (1991) present the results of a study of transaction logs generated by dial access users of LUMIN, the WLN-based online catalog then in use at the University of Missouri-Kansas City. Analyses were conducted by search type, zero-hit rates, usage rate for advanced search features (truncation and scoping), and likely causes of problems. Temporal aspects of all dial access searching and dial access subject searching were examined. Comparisons were made with an earlier study of in-house public usage patterns at the same location. In general, Peters found that dial access users of the online catalog were using it much differently than in-library users. The typical causes of no-hit searches tended to be of a higher order (e.g., a record for the item sought was not in the database) than the typical in-library causes of zero hits searches (e.g., the user made a typographical error).

Ferl and Millsap (1996) found that, whereas 53 percent of the remote search sessions contained at least one search statement that retrieved zero hits, it was 72 percent for the number of zero hits for in-library search sessions. For in-library search sessions that contained at least one subject search statement, 82 percent contained at least one zero-hit search statement. Nearly half (46.8 percent) of the first search terms entered during in-library subject search sessions retrieved zero hits. In-library users who performed subject searches were five times more likely than remote users to enter subject terms and phrases that would initiate long searches, the type of search that is either restricted or prohibited because of anticipated heavy processing demands on the system. For nearly all of the eight categories of errors and inefficient searches, the percentage of in-library search sessions containing these errors was higher than the percentage of remote search sessions, and the error rates for in-library subject search sessions were even higher.

A few studies have detected little or no difference between in-library and remote users. For example, Snelson (1993) found that remote use of the DRA online catalog system was comparable to traditional in-library use. Perceptions of accessibility also were comparable to those of in-library users. Snelson concluded that users have accepted remote access as a viable means to conduct library research. No statistically significant differences were found in information source accessibility, browsing behavior, task variety, or satisfaction.

Computerized monitoring of remote use has not focused on the de-
mographic characteristics of remote users. For example, we do not know in general if remote users are in-library users who now perform more of their information seeking outside the library, or if remote access has captured (or recaptured) another service population for libraries. Survey research is more helpful than computerized monitoring in this realm. Dow (1989) studied the impact of remote access on formerly exclusively in-library users, finding that remote users go to the library about as frequently as they did before they began remote access, but they use the library less as a place to work, use the professional staff less, and browse less in the physical library.

The survey research findings presented by Adams and Bonk (1995) include five clear mandates for libraries planning and implementing new or reconfigured networked information environments. First, the most common obstacle to the use of electronic information resources, as reported by faculty members, is lack of knowledge about what is available. Second, user training is considered by faculty members to be a high-priority need. Third, faculty readiness, in terms of necessary equipment and interest, to access electronic information resources is almost universal. Fourth, faculty members indicate an attraction to e-mail as a mode of communication and a strong desire to initiate various library functions and services via e-mail. Fifth, campuses must provide universal access to campus computer networks for the campus community.

Remote access has encouraged users to think differently specifically about online information. The online system has become a destination in itself rather than a reference tool for identifying and locating print-based information contained in some physical location. Well over a decade ago, Sack (1986) predicted this transformation, noting that outside the library the online catalog undergoes a mental metamorphosis into a research tool in its own right. The appearance of large quantities of full-text online has accelerated the trend of thinking about remote resources as destination resources.

Remote access involves more than a straight link between a remote user and a digital library. Denise Davis, who works with the Sailor Project, the statewide library information network for Maryland, has noted that a completely networked information environment must acknowledge four basic elements: local users, local resources, remote users, and remote resources (Smith & Rowland, 1997). These four elements result in a complex multi-dimensional online information space for savvy remote users.

Within the last few years, some structured analyses of library Web server logs have been undertaken. Through an analysis of the HTTP (hypertext transfer protocol) server logs of use of a virtual map library, McGlamery (1997) found that the “service” pages on the digital library site were often visited and used. In some instances, because of transaction log analysis, librarians are able to know more about virtual users than about real world
users. McClamery concluded that computerized monitoring can answer at least four basic questions about users of a specialized digital library: (1) Who are the users? (2) Where are the users on the IP address map of cyberspace? (3) What are their primary interests? (4) How do they move through the digital library? McClamery feels that the answers to these questions are necessary in order to determine how to provide useful digital library services.

**Some Issues**

As the online information environment becomes richer and more robust for remote library users—now comprehending full text and library services (e.g., reference) as well as catalogs and indexes—the methods of computerized monitoring must develop rapidly to keep pace with the changing online environment and to deliver on the decades old promise of this technique. Enduring questions remain about the technique, however, especially as it is applied to remote users of computerized library systems. Is unobtrusive uninformed computerized monitoring a fundamentally unethical unprofessional way to treat remote users? What can observations of remote behavior tell us about the needs, wants, and satisfaction levels of remote users? What should be the basic units of measurement and analysis, and how can those units be consistently defined and measured across the plethora of studies and automated library systems? What is the best way to apply the insights and knowledge gained from computerized monitoring? Should the primary emphasis be on educating remote users or on improving the virtual library structure and interface? What role will librarians play in this not-so-brave, not-so-new world in which the processes of information creation, dissemination, and use (including the analysis of use) all have become increasingly computerized? As distance education and scholarly communication shed their professorial classroom and asynchronous monastic garb in favor of collaborative learning, exploration, and real-time communication in virtual information environments, will library services to remote users be able to adapt and survive in this ultimately more integrated, fundamentally human, information environment?

Will the primary clientele for a specific digital library please stand up? Computerized monitoring of remote access use of digital library resources and services may be utilized to monitor the relationship of use by affiliated and unaffiliated users. While most libraries remain essentially parochial in terms of their funding (if not their outlook), remote access has converted some users into global seekers of information. The physical location of the information no longer is of primary importance. Remote access makes the user feel like the remotely accessible resources are local. They are all there on the user's screen. Often they can be downloaded (legitimately or illegitimately) to the user's own hard drive. For
example, when a user accesses OCLC's WorldCat database, she does not feel like she has been wafted to Dublin (neither Ireland nor Ohio), but rather that the resource has been made manifest in her own present cyberspace.

The concept of remote use makes sense only in the context of a local collection designed to meet the needs of a locally defined primary user population. Because all of us (except a few Dubliners) are remote users of databases such as OCLC's WorldCat, none of us are part of such a locally defined user population. Studying remote users and use makes sense only as long as local users and use makes sense. Will the center hold? The fading of distance as a variable affecting the accessibility of information eventually will force libraries to re-examine how they define their primary clientele, and how they are funded to provide remote access to information.

Remote access seems to be expanding the potential user population for specific resources that perhaps were previously considered local resources. Who can argue with a movement that is enabling computerized academic information resources to find their largest possible user population? Ranganathan's principle of a reader for every book continues to apply.

To the library profession, remote access is disconcerting for several reasons. First, for the foreseeable future, there will be more information available offline in terms of both depth and diversity than will be available online. Most usage studies, however, indicate that, if use is an indication of popularity, remotely accessible online resources are very popular. Second, online remote access presents some formidable service issues for libraries. Putting full-text online is a piece of cake compared to developing usable, useful, and used online services. For example, most pilot projects for e-mail based reference services have not been heavily used by "netizens" with reference questions.

From the perspective of service providers, remote users are disembodied, resulting in a loss of almost all nonverbal clues. Libraries suddenly are forced to confront the realization that many of their real-world service programs (especially reference) rely quite heavily on actually seeing and "reading" the users. Although it could be argued that snail-mail and telephone reference services already had to confront the challenge of providing library services to disembodied users, snail-mail reference service never has been wildly popular, and telephone reference service still provides a human voice, which alone provides an amazing array of nonverbal clues that can inform service. The emergence of remote access as a viable alternative to in-library use has created some fundamental service concerns. What do we need to know about remote users and/or remote use in order to provide good remote resources and library services? Do online information use environments open up new library service opportunities?
Libraries, like all structures of recorded information, exist to enable and facilitate the asynchronous transfer of information between two or more human beings. The quest for asynchronous information transfer is the engine that drives the development of technologies for recording information, from papyrus to optical storage media. As a mediator of asynchronous information transfer, however, libraries have developed a panoply of synchronous services, including desk reference, telephone reference, instructional services, story hours, and circulation services. Although remote access does not upset the basic asynchronous transfer of recorded information (actually, remote access via computer networks makes the asynchronous transfer of recorded information very efficient), it does upset and challenge these synchronous, mediated, enabling library services. The challenge or threat of remote access to these synchronous mediated services is not to the basic asynchronous nature of the transfer of recorded information.

A third service challenge posed by the remote access movement is the sudden threat of the diurnal diffusion of use of library collections and services. Some observers of the remote access movement either are worried or hopeful that the use of digital library collections and services will be available twenty-four hours a day. Some studies of remote access to online catalogs refute this hypothesis unless the remote users live in metropolitan areas (e.g., New York, Las Vegas, or New Orleans) already noted for diurnally diffuse human behavior.

Despite the fundamental challenges of providing library services in digital environments, some librarians are predicting that remote access to information resources will lead to a renaissance of library services. The user's perception of the library will shift from that of a warehouse of text-bearing devices to more of a think tank of librarians who have recorded many flight hours in cyberspace. The library will come to be perceived as the repository of research expertise rather than as a repository of research materials (Brunning et al., 1989): "As information products proliferate, the problem of source selection increases, as does the need for the librarian's expertise in guiding and advising researchers in this basic but often misunderstood first research step in the electronic environment" (p. 8).

Rather than merely trying to translate existing library services into new digital environments, perhaps we should engage in a little market research to learn the needs and wants of remote users of digital libraries. We probably will find that remote users want services just off the traditional visible range of library services on the broad spectrum of information seeking and use. On the short end of the visible spectrum of traditional library services, remote users will want more start-up service help. The mundane service questions of the real library (Where are the restrooms? Where's the change machine?) are being replaced by the
mundane service questions of the virtual library (How do I get connected to your digital library? How do I download the Adobe Acrobat Reader?). On the long end of the visible spectrum, remote users will want help with managing and applying what they retrieve. Rather than only studying how people find and retrieve information, we also need to pay attention to what they do with it after retrieval. Library services to users of information at the post-retrieval stages of their information seeking and use may be a growth industry in the next decade. DeBruijn and Matheson (1987) observed that remote access has raised concerns about the philosophy of reference service, primary and secondary clientele, and free and fee-based services. In the early days of remote access, librarians often turned to academic computing services to answer the technical questions posed by patrons. Is the provision of technical expertise and advice part of the present and future role of the academic library?

For academic libraries, remote access to library collections and services will be required to interact with the distance education movement. For example, Cutright and Girrard (1993) explored the challenges to libraries resulting from the distance education movement. They describe EOIN (Eastern Oregon Information Network), developed to provide off-campus students with dial access to CD-ROM indexes, interlibrary loan, and e-mail. Unfortunately, some distance education systems focus almost entirely on replicating the traditional classroom experience rather than trying to meld the classroom, lab, and library experiences into an integrated online learning experience.

What remote access is doing to the physical library as an information-seeking space also eventually will happen to the physical classroom as a learning space. Oddly enough, classroom learning in physical space always has been more communal and group-oriented than information-seeking in physical libraries. It is ironic that one possible outcome of the broad movement toward remote access to digital library resources is that, in cyberspace, information-seeking may become more communal and collaborative.

Regardless of whether our emotional response to the prospect of remote access is characterized by celebration or by anxiety, we should not concentrate on remote users and their unwillingness to come into libraries. Rather, we should concentrate on the possibilities of “close use” of information. Close use is the other side of the remote access coin. Remote users are rusticking information seeking and use back into their classrooms, labs, dorm rooms, offices, and homes. Librarians should applaud, aid, and abet this movement. The challenges for libraries presented by these new modes of seeking and using information not only center on how to provide services for remote users, but also on how to organize, deliver, and present information in virtual environments where information seeking and use are not confined to a separate place and an
experience apart but have become an integrated component of teaching, learning, and living.

Computerized monitoring can and should aid this re-orientation toward the role of information. Many computerized monitoring projects to date have focused primarily on the use of a specific resource or Web site rather than on obtaining a gestalt overview of human behavior in an information-rich online environment. One main problem with site- or resource-centric computerized monitoring is that it effectively precludes any study of the post-retrieval use of information by remote access users. Most computerized monitoring cannot determine what the end user is doing during the intervals between clusters of keystrokes and mouse clicks. Ultimately, the pauses in the flurry of keystrokes are where human knowledge and meaning emerge. The user may be reading (a time-honored form of post-retrieval processing), cutting and pasting some of the retrieved information, or simply heading for the refrigerator.

Computerized monitoring and remote access seem to be forming a symbiotic relationship, in that they enable us to embrace similar goals and ways of understanding information use. Both computerized monitoring and remote access challenge us to focus on events, transactions, and behavior rather than on persons, their demographic traits, texts, and text-bearing devices. We should be classifying remote users based on their information-seeking and usage patterns, needs, and desires, and not on the basis of more traditional demographic characteristics. Dividing online browsers into the spiky and the loopy is fair and useful (Canter et al., 1985); dividing them into groups based on age, gender, and other demographic categories is not very useful. Computerized monitoring can and should be used by librarians as a management information system. We need to learn how people use the resources and services that comprise the digital library, not necessarily the traditional demographic qualities of our user population.

The idea of remote access has played an important role in the theory and development of librarianship. Aveney (1984) notes that the history of librarianship can be viewed in terms of a gradual movement toward increased remote access. Consequently, librarians have had to abandon the concept of collection-based services. Do people want to congregate in information-rich environments, such as libraries, or was the co-location of materials and people merely a medieval necessity we have been slow to shuck? What are the chains that link people to information and to other people? Distance may be a barrier or a defining thoroughfare. Seamless access to information may make it more difficult for humans to assimilate it.

Upon first inspection, it appears that physical distance never was an integral component of human interaction with information. Remote access has everything to do with access and little to do with distance. Although it was little more than an impediment, the variable distance be-
tween information objects and the user (or potential user) helped the individual to cope with an information-rich physical environment. Despite the rapid developments in remote access to electronic resources, the patterns and limits of human attentional focusing are not changing nearly as rapidly. Humans still want and need to be highly selective in what they bring within their ken and to what they pay attention. The battle for human attention to information, erroneously referred to in the vernacular as the "battle for eyeballs," will be won in the trenches of human nature, not in the vast deserts of cyberspace. Human attention still exacts a non-economic price that must be paid in order to obtain something useful from ambient information.

What we really want and need to know is the thought processes of people seeking and using information. Computerized monitoring cannot yet provide direct reports from that front. As seeking information becomes less arduous, the library profession will turn its attention to the use of information. The problems of information storage and retrieval may become an interesting aspect of a historical era. We will cease worrying and wondering about remote physical access and become mesmerized by the mental terrain of the information user. Users of information do not go forth and explore a new information space. Rather, they somehow allow new information to enter their own personal always-present clearing. Using information may be akin to falling asleep. It is a letting go of the self that ironically refreshes and enhances the self.

The diffusion of remote access techniques and behavior among the information-seeking population raises some fundamental questions about the nature of access, use, privacy, and confidentiality. The anonymity of use of academic library resources, services, and systems may be in danger. There are some advantages to having ongoing tailored relationships between the library and individual users. Perhaps it is time for the profession of librarianship to seriously consider developing client files. Digital library users would have the option to opt-in to these client files in order to receive more sustained tailored online resources and services.

It is true that, via computerized monitoring, we can easily know more demographically about remote users than in-library users without bothering to ask. But that should not interest us. Ultimately, demographic information about remote users is not very useful. It will not help us improve the digital library experience. In the context of digital library services, demography teeters on a suspect, perhaps even prejudicial, study of reading habits. From demographic information we paint an assumed information need landscape for each individual person. Why not just learn how to learn about their actual information landscapes? This is where the promise of computerized monitoring of remote use and users begins to manifest itself.

The value of remote access is not that it overcomes distance, but that it changes the role of scholarly information in the intellectual lives of the
user community. The way people interact with scholarly information appears to be changing, and remote access to computerized information resources seems to be a principal cause. In the end, as in the beginning, we need to ask some fundamental questions. What do we really want or need to know about remote use or remote users? The goals and modes of applying the knowledge acquired via the analysis of behavioral data about remote users should guide the future development of computerized monitoring techniques and programs.

REFERENCES
Services to Remote Users: Marketing the Library's Role

Ann Wolpert

Abstract

Distance learning is an emerging educational market of compelling interest to higher education. Driven by economics and enabled by innovations in educational technology, this new market presents significant marketing challenges to academic libraries. Libraries should approach support to distance education as a new business opportunity, utilizing techniques of market evaluation and analysis. Close alignment with faculty and administrators, together with meaningful performance measures, can position academic libraries to provide appropriate educational support while improving awareness of the importance of libraries as a competitive advantage in distance education.

Introduction

As they approach the end of the millennium, colleges and universities are engaged in an extraordinary investment in technological innovation. Educational technology has become an irresistible force on large and small campuses across the land, infiltrating institutions to a degree that rivals the level of corporate investment in information technology over the past decade (Cunningham, Tapsall, & Ryan, 1998, chap. 2).

Educational technology is a compelling investment for higher education for a number of reasons. The marketplace demands computer literate workers, and students must be introduced to computing technology while in school if they are to succeed in the workplace. Faculty can conduct research more easily and collaborate more productively if they...
have access to colleagues and research data via the Internet. And, as has been the case in the corporate world, an institution may well expect lower administrative support costs in a computing-rich environment.

For many academic institutions, the prospect of increased revenue from distance education plays an equal, if not greater, role in this technology investment decision. The revenue streams presently being realized by established continuing education and distance education institutions are significant, and forecasts for growth in this educational arena are consistently optimistic. The Western Governors University, the University of Phoenix, Britain's Open University, and Florida Gulf Coast University are representative of institutions that have already made serious investments in the success of this new form of higher education. Many other colleges and universities can be expected to seek much-needed revenue from distance education (Blumenstyk, 1997a, 1998).

Higher education also needs flexible capacity. After two decades of declining enrollments, the children of baby boomers now threaten to swamp colleges and universities. In another decade, the cycle will go bust again (Western Interstate Commission for Higher Education [WICHE], 1998). The difficult economic climate in which these market swings must be managed is well documented. Rapidly escalating tuition costs have brought market resistance and drawn unwelcome attention from the political arena. Physical expansion is increasingly problematic for many institutions. A declining federal research base must cover a growing number of research-oriented universities. Competition for grants and individual philanthropy is on the rise. These trends combine to place relentless pressure on institutions to find new sources of revenue and new low-cost educational models. Distance education is such a model.

As a practical matter, education at a distance has been available for many years. Correspondence schools, public television, training videos, and satellite download programs are familiar examples of educational opportunities available to those who live and work at a distance from traditional institutions of higher learning. Until recently, such educational alternatives held minimal interest for traditional higher education, and academic libraries had little reason to provide support to the students of these programs. As a result, academic libraries have, by and large, only recently turned their attention to the challenge of supporting this community of learners.

The rapid expansion of educational computing has dramatically altered the prospects for, and interest in, post-secondary distance education. Whether the prospect of distance education is imminent or distant, academic libraries dare not ignore this change. In his classic work on innovation, Peter F. Drucker (1985) describes in detail the transforming role of technological innovation on industries and market structures (chap. 6). Although academic libraries are not accustomed to thinking of
their products and services as an “industry” with “markets,” Drucker’s insights are both enlightening and relevant to contemporary libraries as they seek to define a relevant role within the emerging phenomenon of distance education.

Like most venerable institutions, academic libraries are justifiably proud of their strengths. The current model of academic librarianship has developed over the past 100 years as a sustainable strategy for providing cost-effective information service and products to resident communities of scholars. Yet Drucker provides compelling examples of similarly stable industries that were plunged into crisis by changing markets—almost overnight. The U.S. health care system, long distance telephone service, and mainframe computing are among the industries that went, in less than a decade, from confident secure stability to a scramble for survival.

In describing the ways that seemingly solid enterprises can find themselves suddenly challenged, Drucker (1985) points to the convergence of previously unrelated technologies as one significant driving force for change (pp. 84-85). Information technology, for example, was created from the convergence of telecommunications, desktop computing, and client-server technology, and one need look no farther than the industries of insurance and banking to appreciate the profound transformation wrought by these converging technologies. Just as information technology transformed consumer banking and insurance work (Evans & Wurster, 1997), so too will educational technology transform education.

Rapidly changing environments always provide both opportunity and risk. Technology based instruction is clearly an emerging growth market for higher education, and academic libraries will, of course, develop service models and staffing patterns to meet this new demand. Perhaps the greatest challenge librarians will face is in managing print collections and traditional resources so that they remain high-value assets to students off, as well as on, our campuses. In this endeavor, librarians will be obliged to confront the pervasive belief that everything distance learners need to know is (or soon will be) online. Just as teaching at a distance is a new “product line” for faculty, so too is library service at a distance a new “product line” for libraries. Digital resources are but one medium of many available to libraries to meet the needs of students learning at a distance.

THE MATURING OF HIGHER EDUCATION

Colleges and universities, like the traditional academic libraries they support, can be understood in a business sense as maturing organizations. The life cycle of a successful enterprise generally follows a predictable path to maturity. In the early years of its existence, an organization will struggle to establish a place in the market. Once established and secure, the successful enterprise will grow quickly, often faster than the growth
rate of the population or the economy. Success inevitably draws competition and, as competition enters the market, growth rates flatten. At the end of the life cycle, a mature organization is characterized by significantly slowed growth and greatly increased competition. For obvious reasons, every industry seeks to defer the onset of this unhappy state. Nevertheless, banking, publishing, utilities, and the automotive industry are prime examples of industries that have slid, like higher education, into maturity.

Fortunately, the phenomenon of business maturity has been the subject of intense interest and study for many years, as have strategies for forestalling its onset and restarting growth curves. One proven technique for delaying industry maturity is that of innovation in products and markets. Advances in technology routinely generate new products to serve existing markets and, likewise, new markets can be created by new technology (Porter, 1985, chap. 5).

Sound recording is an example of an industry in which technology has driven growth in both products and markets. The sound recording industry has been remarkably successful at introducing new improved technologies for listening to recorded music. In less than forty years, the industry has moved from monaural records to stereo recording to 8-track tapes to cassette tapes to music videos to CDs. Each technological innovation increased the quality and stability of recorded sound and launched a new wave of purchasing activity by those who enjoy music. New markets were also created by these new technologies and, today, music videos, high-quality sound systems in cars, and portable listening devices are ubiquitous in the marketplace.

Educational technology is viewed by many in higher education as the key innovation that will jump-start dynamic new products and markets in the higher education industry (see Patrikis, 1996; Noam, 1995). Distance education will expand existing markets in continuing education and open significant new markets of older and nontraditional students. The strategic importance of educational technology is unquestioned in many academic sectors, and these sectors are investing heavily in the necessary technological innovation. If technology can create new markets for higher education through distance education, and competitors are entering the market on all sides, few institutions will have the option to ignore the opportunity.

It is worth noting that higher education also expects to upgrade its own internal work efficiencies in the process. In this they are encouraged by their relationships with the business community which, for nearly two decades, has been engaged in a massive investment in business computing. During this period, business computing has absorbed nearly 50 percent of total capital investments in American industry (Schrage, 1997). These expenditures have been based on the theory that investments in
information technology lead to more and better information, which in
turn leads to increased productivity and better decisions. Although this
interest in providing computing capacity in lieu of staff is a relatively late
arrival on academic campuses, it has now been adopted with enthusiasm.
Just as companies have had to learn to work with smaller support staffs, so
too has higher education.

Academic libraries have worked hard to adapt to this new technology-
driven environment. Confident of their value to education, but preoccu-
pied with stunning escalation in materials costs, academic libraries have
nevertheless attempted to chart a new course that includes educational
technology and support for distance education. Experiments abound,
and the literature of library and information science reflects these experi-
ments with a growing number of how-to articles and anecdotes. For the
moment, librarians are focused primarily on delivering traditional library
services to the distance learning environment. Such products and ser-
vices as online reference, electronic reserve reading, network-accessible
databases, document delivery, and Web-based information competency
tutorials are the current focus of support.

The noted author John Diebold (paraphrased in National Research
Council, 1994, chap. 2) has described three phases of change that follow
the introduction of technological innovation. In the first phase, people
do the same work as before but new tools change the way the work is
done. In the second phase, the work itself changes as a result of techno-
logical innovation. In the third phase, society itself begins to change as a
consequence of the innovation. Academic library strategies for support-
ing distance education are currently at phase one of Diebold's model—
i.e., using the power of educational technology to do the same work as
before. Librarians have yet to understand how work itself might change.

ACADEMIC LIBRARIES

Libraries have always faced challenges to giving users what they need,
even when the user community was contained on a physical campus. Since
the establishment of academic libraries as a shared resource, responsible
librarians have struggled to achieve the appropriate balance between cost
and convenience, security and easy access, preservation and use. In the
current decade, constraints on resources have increasingly pitted tradi-
tional library products and services against the customer-oriented expec-
tations of contemporary higher education. The saving grace for academic
libraries was, until recently, their monopoly position on campus.

The World Wide Web is currently emerging—in the minds of many—as
a reasonable competitor to the academic library especially for under-
graduate education. The attraction to students is undeniable as is the
appeal to cash-strapped administrators. The idea of the Internet as li-
brary is a pervasive, if superficial, picture that is fueled by advertising
baskets of which libraries can only dream. In the “library” of the World Wide Web, no facilities are needed and seating is unlimited. Access and search engines are available twenty-four hours a day. Students can find whatever they need whenever they feel like working. Articles will be sold for pennies. Reference works will be accessible for a pittance per view. Chapters of books might cost a little more, but the student can put all these costs on a credit card. Intelligent agents will respond to natural language, retrieving precisely what the student wants and suggesting alternatives he or she has not considered. Resources will be so easy to use that no instruction will be necessary. Faculty will devise new inexpensive forms of scholarly communication, wresting control of disciplines from the old guard and opening intellectual dialogue to both “haves” and “have nots.” Electronic storage will be the norm, ending once and forever the need to store print books and journals.

It is difficult to overstate the appeal of this scenario in an age of scarce resources and technological determinism. It appears to shift book and journal costs from overhead to the student himself/herself, it seems to reduce head count and labor costs, it provides equal access to information resources from any location—on campus or off. More importantly, it offers the cost-swapping so important to justifying massive investments in all those new technologies whose need is unquestioned but whose value is not yet obvious.

In real life, of course, nothing is ever quite so simple. Popular culture, current news, vanity publishing, and hobbies dominate the free resources on the Web. Much of what was once free is now for sale, or experimentally subsidized by advertising, or time delayed to protect value. On the Internet, as in print, high-value content derives from well-established creation and production systems, no matter the medium or delivery channel. The Web complements academic libraries and makes available the much needed material of current news and popular culture, but the primary material of academic libraries, and the educational and research programs they support, is neither free nor yet readily available on the Internet. Intellectual property is still property, and those who own or control valuable intellectual content expect compensation in the medium of the Web as they do in any other.

Just as there are strengths and weaknesses for print media, so too are there possibilities and liabilities in relying on digital information to support education and research. The fact of the matter is, academic libraries provide an important and valuable array of services to their communities beyond that which can be retrieved online. Perhaps it is a symptom of libraries’ former monopoly position that these institutional contributions are no longer highly visible or routinely touted. Some of these services have been taken for granted for so long that they have become nearly invisible.
Since 1975, Theodore Levitt (1975), marketing guru of the Harvard Business School, has urged organizations to have a properly defined, thoughtfully articulated, business purpose. The chief reason why enterprises stagnate, Levitt believes, is because of a failure to develop a sustaining reason to exist. Railroads stopped growing because they decided they were in the railroad business rather than in the transportation business. The film industry nearly folded, escaping decline only when it decided it was in the entertainment business rather than in the movie business.

Avoiding stagnation is no easy task, particularly for organizations—like academic libraries—that have been successful over a long period of time. Levitt offers a variety of tips for avoiding this unhappy state, two of which are especially relevant for librarians. First, managers must never fall prey to self-deceiving assumptions, the most notorious of which is believing that there is no competitive substitute for an industry’s major product. And second, managers must constantly reject the tendency to assume that efficiency in tasks (production counts or activity measures) can ever substitute for a customer-oriented vision. Requirements for success, he believes, include a powerful commitment to succeed, the willingness to push beyond narrow goals to define a broader business purpose, and a compulsion to do the things that will make customers want to do business with you.

What are the sustaining business purposes of academic libraries? And when did librarians stop articulating those purposes? While librarians may buy and catalog books, this is hardly our defining business purpose. In fact, academic librarians make at least five high-value core business contributions to their institutions:

1. **Librarians are responsible for managing and leveraging the institutional resources that are devoted to educational and research information support.** Predictability of costs is highly valued in the educational arena. Colleges and universities, unlike many other kinds of businesses, cannot increase sales in the middle of a semester. In carrying out this resource management task, librarians have not only enabled institutions to allocate a fixed budget amount to buying content, they have accepted responsibility for managing student and faculty expectations about the availability of such resources. As a neutral academic department, librarians ensure that information resources will be available to the students and faculty on an equitable basis, regardless of individual or departmental wealth. Resources are leveraged in several ways. By reducing unnecessary duplication, academic libraries deploy the available resources over the broadest possible base. In addition, standard interlibrary loan practices among libraries enable access to other library collections on a no- or low-cost basis that would otherwise not be available.
2. Librarians contribute to the timeliness and quality of scholarship by making it possible to locate and use needed information, wherever it may be. Librarians have developed techniques and standards for organizing and accessing information. Union catalogs, OPACs, databases, and indexing and abstracting services ensure that everyone in an institution can see what had been published or purchased and find what is needed. Because of standards developed cooperatively across libraries, the organizing principles of one library system or database will apply across all other library systems. In training students to use information resources, libraries impart a lifelong skill. Organizing materials by a variety of access points enables scholars to browse collections by topic or author, providing productivity benefits to the individual and the institution—i.e., if one item is unavailable, another might meet the scholar's need, and the ability to browse supports the serendipity factor—an important element of cognitive discovery.

3. Libraries document advances in the educational and research disciplines of greatest interest to an institution.

Academic libraries provide a freely available, readily accessible, record of individual and group contributions to the advancement of ideas and knowledge. Authors and their institutions are permanently acknowledged for their contributions to disciplines, and this record contributes directly and indirectly to academic careers and institutional success. Promotion and tenure, research funding, and professional opportunities are closely linked to an individual's publication record. Balanced copyright laws, for which librarians have lobbied long and hard, encourage and protect publication while permitting educational fair use. This repository of ideas provides a durable authenticated base upon which subsequent generations of scholars can build as new knowledge/technology opens new possibilities of discovery or insight. The availability of a relevant existing body of knowledge, together with the tools to locate and use that knowledge, contributes immeasurably to academic productivity in both education and research.

4. Academic libraries guarantee the survival of knowledge beyond one generation.

A shared collection is more difficult to destroy than a collection controlled by one individual, and redundancy among geographically disparate locations provides important long-term protections against natural and man-made disasters. A strength of print as a medium (which digital has yet to match) is that it has been a durable, efficient, and easy to manage medium requiring no special equipment to read. By policy, most libraries adhere to standards of patron privacy, allowing the independent pursuit of scholarship without judgment or obstructive cost across disciplines and generations. Knowledge survival ensures that a culture has roots and spares society the cost and effort of recreating techniques and reinventing technology.
5. Academic libraries contribute to the culture of intellectual pursuit. Libraries provide a locus for research. They are a window on new ideas, a sponsor of lecture series, a host of exhibits and exhibitions. They symbolize the rigor of academic programs and are an enduring manifestation of the benefits to society of education and research.

These business purposes are not constrained by geography nor are they medium-dependent. If these values begin to describe an academic library's basic business purpose, it becomes clear that distance education presents two separate but intertwined challenges. Librarians must determine how to integrate the tremendous advantages of digital information into existing resources and services while simultaneously deciding how best to support the needs of students who are learning at a distance. If librarians can be successful at the first, it will facilitate our success in the second, but they are not the same.

Distance Education Strategies

For academic libraries, delivering support to distance education is far from seamless. With the possible exception of networked databases, nearly every traditional product and service offered by academic libraries is incompatible with educating at a distance. Distance learners cannot study in the library between classes. They cannot go to the stacks and browse, or access on-campus databases, or reserve a carrel. They cannot visit the reserve book room or check books out. They cannot walk up to the reference desk and ask a question, sign up for a bibliographic instruction program, or photocopy an article. If distance education proves to be the educational and economic bonanza that so many are predicting, how will academic libraries contribute to, and afford, this new educational future?

In considering these challenges, it is important to distinguish between strategy and objectives. Objectives are the desired end result, while strategy describes a plan for getting there. Objectives characterize what a library needs to do, strategy describes how it will be done. Constantinos Markides (1998), of the London School of Business, has been studying established organizations for a number of years, with the goal of understanding how existing firms successfully approach new opportunities. He has concluded that the biggest obstacles to strategic innovation in established organizations are in the organization itself (Markides, 1998). In general, established organizations face four institutional attitudes:

- We are having a good time and doing okay financially. Why should we change?
- Even if we recognize the need to change, what should we change to?
- How do we know we will pick a winner? And what happens if we're wrong?
- How do we get everybody to jump together? How can we manage the transition to the new (or operate in a dual mode)? (p. 33).
These are good questions for libraries confronting distance education. The answers are revealed in the market positions librarians choose. Libraries obviously have a new customer segment in those who are, or will be, learning at a distance. Do libraries want to cede an emerging growth area to other players? Librarians suspect that distance learners’ needs for library products and services will be different from those of on-campus students because their educational experience will be physically and pedagogically different. Can libraries be sure that the educational advances created to serve distance learners will not migrate to on-campus education? Educational technology most certainly gives librarians new ways of producing, packaging, and distributing library products and services. Are there techniques and efficiencies that will improve service to the on-campus community?

Markides (1998) offers several strategies for getting past such attitudes, two of which will resonate with academic librarians. First, he says, established organizations must develop techniques to overcome what he calls the “inertia of success” (p. 34). Questioning core business strategies is very difficult when things are going well. As a result, most organizations do not challenge their way of doing business until a crisis hits—at which point survival takes precedent over innovation. To overcome the inertia of success, managers must do two things: (1) carefully and consistently monitor business activities, over time, and be alert for early warning signs that a core strategy may be weakening, and (2) be inventive and create a positive crisis when necessary. They must also use major milestones, important institutional events, or changing programs to introduce new strategies.

The second insight Markides’s (1998) research provides is in organizing for implementation (p. 39). Any new strategic innovation will, of necessity, compete with established activities for managerial attention and resources. Managers must make a commitment to support actively the new strategy up to, and including, convincing others of the importance of its success. Managers must then provide the strategy with its own independent institutional resources. Finally, managers need to develop an environment that encourages and supports integration. Cross-functional teams, temporary assignments, targeted recognition, and rewards are among the proven techniques for establishing an organizational context that promotes integration.

Strategies for addressing distance education should also include more of the traditional components of business strategy (Corey, 1992) such as finance, quality, and marketing; each of which must be developed, discussed, and negotiated.

**Market Segment Strategy**

The most fundamental question for a library entering the distance educational arena is that of market segments. What products will be de-
livered to what customers? Unlike the average for-profit business, an academic library usually has only limited options in choosing what markets will be served. Distance education may offer libraries somewhat more flexibility in those markets in that programs will sometimes be explicitly designed to require minimal library support.

**Financial Strategy**

How will the library approach the long- and short-term financial requirements of distance education? What services will be included within tuition, and what will incur an additional fee? What level of start-up costs are involved, and who will cover them? What is the impact on database licenses, and how will the extension of services be financed and managed?

**Quality Strategy**

Will the quality of library services to distant students be at the same level as that provided on campus? How will quality be measured? How will student satisfaction be measured? What staff training is required to achieve desired quality?

**Marketing Strategy**

Basic elements of marketing strategy include product planning (what product "packages" can be developed), technical assistance (how will students know how to access, download, and migrate through the library’s resources), and communications (how will students learn more broadly about the library and its services, and how will they give feedback to the library).

Some distance education will be, in reality, distance training. Self-contained courses will use workbooks (or their equivalent) and competency testing. While an academic library can always create new service models for such educational programs, there will normally be very little reason to devote scarce resources to such a narrowly focused program.

Libraries must have an abiding role, however, in the education of students who are expected to learn traditional values of critical assessment, independent discovery, and rigorous thinking. Whether students are on campus or at a distance, these essential qualities of higher education can only be acquired through exposure to the ideas and insights of others. The challenge for librarians is to find new ways to work with faculty to achieve this end as effectively in off-campus education as they have in on-campus education.

**Servicing Market Segments**

Academic librarians have been remarkably successful in developing a highly productive, cost effective, closely aligned service within their educational institutions. Librarians have made it possible for faculty to assume that libraries will solve all library-related teaching problems with
grace and efficiency. And now, just as libraries need their attention, faculty are themselves distracted by the challenges and demands of teaching in a new environment.

If librarians are not accustomed to working in a highly volatile environment, neither are faculty accustomed to working on camera, or negotiating performance royalties, or managing a class discussion in a chat space. Faculty who must deliver educational products to students both on campus and at a distance can be expected (perhaps not unreasonably) to care more about production values, revenue sharing, time management, class control, and re-purposing of intellectual content than about the library and its problems.

The cost efficiencies of traditional academic libraries are imbedded in the historical service model of the on-campus print and physical library. In this model, librarians could effectively service a wide variety of customer segments from a one-size-fits-all facility. For example, a journal subscription served multiple functions—i.e., faculty current awareness; graduate student browsing/trolling; background for undergraduate research papers; monitoring faculty contributions to, and impact in, their disciplines; and long-term and in-depth faculty research interests.

The historical service model also spares traditional libraries responsibility for all their costs of operation. Self-service access to databases and stacks keeps labor costs down. The parent institution was typically responsible for both storage (shelving and buildings) and infrastructure costs (heat, lights, furniture). Much of this model changes in the digitally designed distance education environment.

Distance education requires far greater clarity about market segments (Steinbach & Lupo, 1998). Digital content is licensed for specific constituencies and may not be available to those off campus without additional cost. Digital storage and distribution may be assigned to the library’s operating budget, not covered by the institution. When self-service access to the collections is not an option, books must be paged and shipped. Photocopies cannot be made for students without payment of royalties. Time-honored ways of dealing with required and/or reserve reading may cease to work.

Perhaps the greatest challenge academic libraries face in distance education is in the potential loss of “brand identity.” When students and faculty must visit the library to find what they need, the value of the library’s products and services is immediately obvious. As a result, the library creates an identity that is clearly linked to the quality of the experience and the applicability of the resources to the problem at hand. Through many transactions, and over time, the library patron develops a sense of the quality, relevance, and distinction exhibited by the library. This identity functions much like a product or company brand name (Farquhar, 1989). Once a scholar or student becomes comfortable with the predictable re-
sources and services of a particular library, he or she may never be truly comfortable switching to another “brand.”

Many academic institutions recognize the value of the “brand identity” that resides in a high-quality on-campus library. Any college or university that tours prospective faculty through the library, or brags about its library resources in its promotional material to students, recognizes the brand value concept. These same institutions may not understand the importance of maintaining that identity in the distance education environment, however. Academic librarians, like brand managers in business, must identify ways to carry their competitive advantage into the distance education environment.

One emerging threat to libraries’ brand identity is in the retention of visibility and credit for the services and products they provide to distance learners. Where the physical library world provides constant reinforcement to the relationship between the library and the material and information a patron needs, the virtual library permits a patron to bookmark a site within a library’s electronic collections and never again be reminded of how that product or service is made possible. For Web-based products that are licensed to IP addresses, a student or faculty member may never even know that their library has made the product available in the first place. Even course support may be problematic. Unless a library has created a recognizable “look and feel” that clearly identifies its work, the work may not be attributed to the library.

Libraries must become substantially more sophisticated about packaging, advertising, and promoting their valuable resources. They must work with faculty to develop course support that reflects positively on the faculty, the institution, and the library. There is reason to believe that academic libraries will benefit one another from their collective efforts in this arena. Research into the behavior of brands and brand equity suggests that strong brands in a product category provide reflected benefit to other products in that category by creating market expectations.

THE CHANGING VALUE CHAIN

Another issue academic libraries must confront in distance education revolves around the place of the library in the overall academic value chain. The traditional campus-based value chain in higher education is vertically integrated. Faculty conduct research which informs and advances their teaching and course design. Departments and schools create degree programs around the knowledge, strengths, and interests of their faculty. Libraries both acquire and make accessible the resources that support faculty research, educational programs, and degree requirements of the institution. Students (customers of the value chain) gain a measurable advantage from being on campus in close physical proximity to faculty, academic departments, classes, and the library. The traditional
educational process values self-motivated discovery on the part of students and faculty and assumes that libraries and librarians play an important—and sometimes essential—role in education.

The new emerging value chain in education is significantly different from that of the familiar campus-based model in that it introduces strong horizontal elements. First, institutional resources are being shifted away from traditional campus-based values, such as staff support for faculty or strong local library collections, and into technologies that vastly enhance personal communication and information exchange outside the institution. Faculty are enabled and encouraged to use these technologies to collaborate with colleagues in other organizations. Library collaborations make it possible for faculty to identify and access the resources of a virtual global library. While this shift in resources prepares an institution to provide technology based education at a distance, it also creates unintended consequences. Faculty develop loyalties to their discipline at the expense of their institution. Students taking courses may never develop a sense of identity with, or loyalty to, the institution. Interlibrary borrowing may skyrocket with no apparent increase in the quality or quantity of research.

Second, there is increased institutional interest in the ownership and management of intellectual property created within the institution. Many educational institutions in the United States are currently reviewing their intellectual property policies in anticipation of the day when the line between articles, chapters, lectures, course ware, computer-based models, and other intellectual products of higher education blurs, and all copyrightable works become interchangeable bits—available for reuse and repurposing. The intersection of distance education and information technology drives these conversations and brings special attention to the importance of library participation in intellectual property policy and management. Although existing copyright law does a good job of protecting the interests of education and libraries, these laws and license agreements are not especially helpful to the needs of distance education. Among the intellectual property management possibilities and priorities currently under discussion on campuses are shop-rights for faculty and within home institutions, mutual cooperation in rights assignment, and attention to the fundamental goals of open communication of intellectual advances.

Third, on-campus education has traditionally valued self-motivated intellectual discovery. Libraries' collections, research laboratories, language clubs, study groups, seminars, author series, book groups, and related aspects of campus life enrich and motivate intellectual life in colleges and universities. Some forms of this intellectual life will adapt readily to the information technology environment, but distance education is more apt to emphasize the forms of learning that result from group discussions, where students educate each other from their own experiences. While
libraries can and will strive to meet the course-related needs of students enrolled at a distance, it is less clear how those students' interest in self-motivated discovery will be served, particularly if they lack proximity to appropriate collections.

**Value-Based Performance**

The need to develop meaningful performance measures for distance education support represents yet another issue of importance to academic libraries. Traditional library service measures have focused on resource consumption and collection growth. Data such as total costs, materials expenditures, size of staff, and number of monographs and serials have been, and continue to be, reasonable measures to assess the strength of collections-oriented libraries (Kyrillidou, Rodriguez, & Stubbs, 1997). Unless students being educated at a distance can access collections and staff with the same ease and convenience as on-campus students, however, the metrics are less meaningful to distance education. System up/down time, database relevancy (especially full-text), document delivery response times, telephone support (including toll free calls), online finding aids and coaching tools, and course-specific Web-based services and products may be more meaningful to students learning at a distance than is the number of monographs added to the collections.

Libraries must achieve an understanding with their institutions that enables both to monitor the contributions and costs of this new form of educational support. Most incentive-based programs are intended to encourage faculty experimentation with distance education and manage risk to the institution. Contributions of, and implications for, libraries may be overlooked. Seemingly simple decisions, such as the distribution channels elected, can have major ramifications for libraries. For example, if a continuing education student registers with an entity other than the college or university itself, that student may not be qualified to access licensed library resources. If the entity of registration should be a for-profit organization, fair use exemptions are lost to that program for faculty, students, and the library.

The role of an educator in distance education is different from that of the classroom educator. When classroom teachers characterize their work, they typically describe their students' personalities, the classroom dynamic, and their own performance in front of the class. The new distance educator, on the other hand, has been characterized as being a manager of resources (Tugend, 1997). Lectures are recorded or selected and distributed, textbooks or workbooks assigned, guest video conferences arranged, additional readings pointed to, a chat space managed. These tasks may not be comfortable ones for faculty, and they may not be familiar with the policy, legal, and regulatory implications of their choices.
Librarians, on the other hand, are already highly skilled resource managers. Through education and experience, they understand that the information they manage exists on a continuum between reach (i.e., how many people can use it) and richness (i.e., the size, malleability, and interactivity of the information itself). Librarians have valuable experience to bring to the distance educator, both in content choices and in the ramifications of extending those choices. Distance education students expect reach as well as richness, as disgruntled Florida Gulf Coast University students have pointed out (Blumenstyk, 1997b, p. A23). Publishers expect to be compensated for reach that exceeds copyright law or license agreements (Fisher, 1995). Libraries must initiate conversations on campus regarding the expectations of students and faculty for rich content as well as wide reach and be prepared to discuss alternatives to achieve desired ends. Failure to recognize and negotiate the tradeoffs between reach and richness may ultimately jeopardize the institution's goals.

Two Myths of Distance Education

Myth #1: Distance Learners Don't Need On-Campus Services

A significant institutional attraction of distance education relates to the expectation of adding revenue without adding capacity. As with the economics of airlines, the economics of higher education revolve around the need to fill slots. With too few students, the school has excess capacity and loses money. With too many students enrolled, the school has to scramble to add capacity to meet the needs of the over booked. The compelling attraction of distance learners is that administrators assume their needs can be met without adding infrastructure capacity. While doubling the size of the student body on campus would have monumental consequences for the infrastructure, adding the same number of students who never come to campus, or who come to campus when other students are not around, means adding revenue without adding capacity.

Unfortunately for libraries, this assumption is unlikely to apply to their work. To illustrate the dilemma, one can compare the support typically provided to an on-campus course with that which might be expected by an off-campus class.

A representative sample of the support an on-campus course typically might receive from a library includes:

- timely selection and acquisition of materials to support related or supplemental reading by individual participants in the class;
- placement of required reading on reserve for the class;
- obtaining recommended reading suggested by the instructor;
- instruction in the location and use of relevant library print and electronic resources;
- access to course reviews from prior year students;
copies of prior year exams;
availability of syllabus and course notes;
bibliographies and pathfinders on relevant topics.

In addition, if the course requires a research paper, researched oral report, or other out-of-class independent investigation, the library will expect to obtain and organize material with insufficient quality and quantity to support that student research activity.

A comparable off-campus course could receive the following support from the library:

- create a scalable, secure, password-protected Web-based environment into which class-specific materials can be placed;
- acquire technology, train staff;
- as necessary, obtain rights or pay royalties;
- scan required reading into this secure environment;
- mount CD-ROM databases on a network server or convert to Web-based subscriptions;
- work with the instructor to ensure that she/he can use the technology;
- work with the students to ensure that they can use the technology;
- ensure the systematic removal of all copyrighted material from the environment at the end of the class;
- create research instruction guides and Web pages to provide research assistance to students who are unable to receive instruction on campus;
- establish an online reference capacity or office hours for phone assistance to off campus students with research questions;
- create and enforce policies for lending circulating material to students off campus;
- determine who will pay to ship circulating materials to students off campus;
- arrange for document delivery suppliers to provide photocopies of articles (preferably negotiating a discount); and
- re-negotiate contracts with online database vendors to provide legal access for off-campus students as necessary.

This may not be adding seats to the library, but it is hard to argue that it is not adding costs. The institution may choose not to provide library support to distance learners that is comparable to that which is available to on-campus students, but then the programs will not be comparable.

Myth #2: Digital Publishing is Making Libraries Obsolete

The growth of digital media is exciting and impressive (Lesk, 1995). Enabled by open architecture and powered by an astonishing variety of contributors, the World Wide Web is a communications vehicle the likes of which the world has never seen. It seems not unreasonable to think that scholarly communication, and the finding tools of research and
education, should migrate rapidly and eagerly to this new inexpensive communications platform. Why, then, is this migration not happening with all possible speed?

Scholarly communication is a large complex integrated system, as the Andrew W. Mellon Foundation (1997) conference on Scholarly Communication and Technology so well illustrated. Any systems analyst knows that the older and more imbedded a system is the more difficult it is to understand and change. The "Year 2000" problem (computers that will malfunction because they read the year 2000 as the year 1900) is a prime example of the difficulties encountered when one needs to change large complex integrated systems. But not all large complex integrated systems are computer based. Others are political (tax codes), institutional (organizational dynamics), and economic (global supply and demand). Like the Year 2000 problem, the complex system of scholarly communication that provides research and learning support to higher education contains interlocking but distinct layers of activity, each of which has its own motivations and economics. The parties interested in this system are authors (scholars and researchers), publishers, institutions of higher education, and libraries.

Authors are far from unanimous in their support of digital publishing. An author's perspective begins with the central importance of being favorably judged and positively recognized through the editorial peer review process. Authors want to be published in familiar predictable sources because they expect their work to contribute to the success of their careers, to be readily available to their colleagues and students, and to be maintained for posterity.

Publishers, likewise, are not unanimously in favor of digital publishing. A publisher's primary interest is in the market impact and financial viability of its publications. The economics of publishing encourage publishers to focus on generating sales and/or advertising revenue that are sufficient to cover their revenue expectations. In a competitive environment, a publisher must have a clear market strategy for digital publishing to justify the additional costs of operating in a dual environment.

Higher education has two interests in scholarly publishing. It expects the scholarly publishing system to disseminate advances in knowledge for the benefit of society at large, and it relies on the scholarly publishing system for peer review of faculty-authored works. Post-secondary education has historically retained no rights to the content of scholarly publishing, yet it pays (directly and indirectly) for much of the output. Higher education has reason to expect that scholarly publishing therefore, should provide affordable digital alternatives, and it is not interested in assuming the financial burden of poorly conceived or badly managed digital publishing ventures.

The driving interests for libraries in the publishing system are that it
should be affordable (especially in year-to-year growth rates), predictable (to achieve economies of scale in handling), environmentally stable (for low preservation costs), and durable (the same information can be used many times without changing). In addition, the intellectual property rights that protect the intellectual creations of authors should not unfairly penalize the shared-use model (especially for older materials), nor should it place libraries or their institutions at risk because of the behavior of those who use libraries. Once purchased, the content should become the permanent property of the library, and it should be able to be used indefinitely, by an unlimited number of individuals, for scholarship and research.

With these perspectives in view, one sees why the migration to the all-digital library has not occurred. Faculty are disinclined to publish in untested, possibly impermanent, digital publications. Publishers are focused on economics and impact and disinclined to risk the loss of reputation, revenue, or market share. Libraries are concerned about permanence, fair use, and the total institutional cost of digital formats. Academic institutions may wish to seize on the digital format as an answer to the spiraling costs of scholarly publishing, but it is clear that issues beyond simple format must be addressed and resolved before digital can fulfill its promise.

CONCLUSION

Distance education is driven by economic and market needs of higher education and enabled by innovations in educational technology. Educational technology is expected to generate new markets in continuing education and to spark an interest in higher education from nontraditional students. Major high-visibility investments have been, and are being, made in distance education, ratcheting up the pressure to succeed.

Support to distance education is a new product line for academic libraries. While distance education offers exciting new service and product opportunities, libraries should approach the opportunity as a business might approach a new business opportunity, utilizing techniques of market evaluation and analysis.

Academic libraries will need to recognize that they do not hold a monopoly position in distance education as they do in the campus environment. Reaffirming their core business purposes will help them stay focused, and borrowing marketing strategies from business will help them plan for, and introduce, new products and services. Distance learners will require support from on-campus libraries and librarians, and it will be important to work closely with faculty and administrators to design, fund, and provide services.

Distance education changes the traditional value chain of higher education. Institutional resources are shifted away from established campus-based values. Institutional interest in the ownership and management of intellectual property is heightened. Self-motivated discovery-based learning
may be displaced by learning through shared experiences in group discussions. Academic libraries must develop meaningful performance measures that document the costs and contributions of libraries in this new environment.

Finally, the all-digital library is substantially more problematic than originally anticipated, and the Internet is not a reasonable substitute for high-quality library support to distance learners. Institutions that take advantage of the resource management skills and experience of librarians will have an undeniable competitive advantage in satisfying the needs and interests of their distance education students.

REFERENCES


Remote Library Users—Needs and Expectations

ROSEMARIE COOPER, PAULA R. DEMPSEY, VANAJA MENON, AND
CHRISTOPHER MILLSON-MARTULA

ABSTRACT
Libraries of all types are providing an increasing number of resources that users can access from remote sites. Academic libraries, in particular, are becoming partners in their parent institutions' distance learning programs. As a result, library staff now work with remote users (both students and faculty) with their own unique characteristics, needs, and expectations. To promote user satisfaction, library staff need to better understand users and their needs as well as enable users to meet those needs. This article provides a particular focus on remote users in an academic environment.

INTRODUCTION
As libraries approach the beginning of a new century, they are encountering numerous developments that present both challenges and opportunities. While the list of developments is a lengthy one, key developments include: a user-centered orientation, a team-based work environment, steady or diminishing resources, and more pervasive technology.

Related to a focus on users is the need to identify more clearly, and better understand, groupings of library constituents. This becomes particularly essential in light of the ever-increasing integration of technology. It is no longer sufficient to be concerned solely with the issues of access versus ownership, how to pay for an increasing number of electronic information resources, the equipment needs to provide access to technol-
ogy, or the physical facility in which to do so. Rather, library staff should focus on who is using electronic information resources, how they do so, and what are their needs and expectations.

It is a given that library staff should differentiate between on-site and remote users. In addition, they need to recognize the various groupings of remote users as well. The user who may be a few buildings away from the library on campus encounters a situation different from the student or faculty member participating in a distance learning curriculum involving a distance of hundreds or thousands of miles. Likewise, the user who has never before used electronic information resources brings a different set of needs and expectations than does the veteran user who may have established an effective relationship with library staff. Thus, staff will realize that a one-size-fits-all approach is likely to fail. For this article, the authors have defined a remote user as any individual accessing electronic library resources from any site outside a library without regard to physical distance or enrollment in a formal curriculum.

REMOTE USERS

On-campus remote users are likely to be highly motivated, possess significant experience with library research and familiarity with electronic resources, and demonstrate relatively high success in using information technology. Like distance education students, they have less time for study. Consequently, they need education in more intense doses. Distance education students are also highly motivated and exhibit ambition due, in part, to their typically older age and a sense of maturity that is often associated with having a family or a well-established career. While some distance learning students may already be familiar with the library, many possess limited experience with library research and are unfamiliar with electronic resources. Likewise, their technology backgrounds may be more limited, and they may have less access to technical computer support (Rosenquist-Buhler, 1996) with the bulk of their experience gained in the work setting.

CUSTOMER NEEDS AND EXPECTATIONS

Needs should generally be more objective than either wants or demands. As a result, these needs are likely to be at least partially based on reason or logic. These are elements that are instrumental; if people do not have their needs met, they may fail to achieve a goal.

Expectations are the standards against which a vendor’s or service provider’s performance should be judged. How does one define expectations? Expectations are assumptions about the likelihood of something occurring. Alternatively, they reflect anticipated performance.

Customers tend to hold expectations that can be considered quite basic. Of greatest importance to customers is a basic solid performance
and that promises are kept. Customers desire a quality service or product provided in a friendly and courteous manner. Customer service expectations fall into two categories: (1) service as an end result or outcome that involves reliability or the ability to perform a promised service both dependably and accurately; and (2) service process, which consists of the following dimensions—assurance (the ability of staff to convey a high degree of trust and confidence based on knowledge and courtesy), responsiveness (a demonstrated willingness to help customers and provide prompt service), empathy (providing willingness, individualized attention to customers), and tangibles (the appearance of physical facilities, the amount of equipment and staff, and the degree of communication that exists between the service provider and its customers).

Each dimension of expectations is likely to involve two service levels. The first is the desired service level or what the customer hopes to receive—a blend of what can and should be. The second represents the adequate service level—that level of service a customer finds acceptable.

It is relatively easy to state that customers define service quality as the discrepancy that exists between their expectations or desires and their perceptions of experiences. What is more challenging is the identification of those service quality elements that customers indicate are the most significant. This is an area in which a discrepancy often exists between the perceptions of customers and service providers. While the theory concerning customer needs and expectations in general is extensive, little empirical data regarding library customers seem to exist.

Edwards and Browne (1995) report that library staff tend to emphasize empathy, tangibles, and customer/staff relationships. Yet, academic library users tend to attach greater importance to reliability and responsiveness. Library users hold expectations for concrete indicators such as the rapid delivery of interlibrary loan materials or the consistently good working order of online equipment. The latter assumes even greater importance for remote users. A 1994 study conducted by Evans Library of Texas A & M University (Coleman, Xiao, Bair, & Chollett, 1997) provides corroboration. Using SERVQUAL, an instrument designed to measure service quality based on a customer’s minimum, perceived, and desired levels of performance, library staff learned that the almost 200 respondents identified reliability as the most important dimension while empathy was the least important. As such, users both expect the most and tolerate the least concerning reliability of service. Again, this is likely to assume even greater importance for remote users.

Library staff with a good understanding of needs and expectations and their relation to customer satisfaction will experience greater success in satisfying their customers. However, the goal should not be simply to meet expectations but rather to exceed them by surprising and delighting customers. To do so, library staff must attempt to both manage and
redefine customer behavior and expectations. For some, this has the negative connotation of creating needs for a service or product developed more for the sake of the vendor or service provider than for the customer. What is actually involved is a market-driven focus manifested in creativity or innovation that develops a new product or service to address previously unmet or unrecognized needs. For this undertaking to succeed, library staff must possess a superior understanding of customers linked with the library's capabilities. We must understand our customers' behavioral needs, their overall attitudes, the environment in which they use services and products, and their perceptions of how services and resources compare to those of other service providers.

Does the practice of expectations management result in a favorable payoff for libraries? The literature does not reveal an answer to this question. However, a survey of expectations management practices of British service firms was conducted in 1993 (Pitt & Jeantrout, 1994). Over one hundred key marketing decision makers responded and shared their perceptions. They believed that attention to expectations management resulted in higher levels of customer satisfaction, greater market share, a better understanding of the relationship between pricing and expectations, and greater overall understanding of their customers' expectations gained from regular customer contact and research.

Another essential component is a major educational effort on the part of library staff. Staff need to be honest with library users in educating/informing them as to what libraries can or cannot provide and what the costs, both monetary and other, will be to provide the desired services. This element is especially critical in distance learning environments where remote users may possess less loyalty to the "home" institution and may be willing to shop around for the needed resources provided in the most user-friendly manner.

A key fact to remember, and it is especially applicable with regard to remote users, is that library customers are not only service recipients but they are also service providers. In virtually every service delivery transaction, the customer brings two types of information and/or effort (Kelley, Skinner, & Donnelly, 1992). The first is customer technical quality, which involves any labor performed by the customer or information that she/he provides. The customer also brings functional quality, or the interpersonal aspects of customer behavior (such as courtesy, friendliness, and respect) during the service transaction. While the first type is likely to assume greater importance in a remote access environment, the second type has relevance for activities such as telephone conversations, e-mail communications, and telefax transmissions.

Thus, library customers actually assume the role of partial employees of the library. Since customer dissatisfaction is often due to the customer's behavior, customers need to understand their role in the service delivery
process. Library staff can assist customers in attaining this goal by employing the socialization process. By providing customers with behavioral guidelines that apply to a library, staff enable users to adapt to and come to appreciate the library's values, norms, and required behavior patterns. Many libraries have developed statements of guiding principles, beliefs, or values, and these can greatly facilitate the socialization process.

Satisfaction

Satisfaction is the state that results after a library user has favorably or positively experienced a service or product. It can be quantified and basically represents the degree to which a library has met a user's needs and expectations. Satisfaction is based on the concept of disconfirmation, which represents the gap that exists between customer expectations and service performance. This gap, in turn, can develop from a customer's perception of the relationship between expectations and performance. Thus, perceptions generally assume greater significance than actual service performance or quality. Researchers (Zeithaml, Parasuraman, & Berry, 1990) have identified four gaps: (1) between actual customer expectations and management's perception of customer expectations, (2) between service quality specifications and management's perception of customer expectations, (3) between service delivery and service quality specifications, and (4) between service delivery and external communications relating to it.

The concept of satisfaction is similar to an escalator. As customers get better treatment which, in turn, leads to a higher level of satisfaction, they raise their level of expectations, demand better treatment, and motivate libraries to strive even harder. While this situation presents library staff with a challenge, it can also create a win/win situation in which libraries gain valuable support from their constituents. While satisfaction is a concept that is based upon past performance, it also involves a forward-looking component. Libraries can use instruments that define what their users want or record user experiences and levels of satisfaction. In addition, library staff should also attempt to anticipate changes in their customers' values and preferences by identifying those external forces that reshape customers and their values (Freid & Freid, 1995).

Perhaps the most significant caveat relating to satisfaction is the tendency to dwell on satisfaction as meeting, not exceeding, customers' expectations. Rather, library staff need to attempt to move beyond satisfaction by exceeding user expectations and by addressing customers' desires for innovation and creativity.

A University of Michigan study (Stewart, 1995) revealed that customer satisfaction in the United States is declining. Key reasons given for this situation are inadequate awareness of rising customer expectations and the view that customer service is a cost that detracts from corporate results.
instead of promoting services as being an investment. Another factor is the considerable wave of corporate restructuring that has affected all areas of U.S. society, including higher education and libraries. Reorganization often has a direct impact on a library’s ability to provide customer service.

To help companies focus on satisfaction, the business school of the University of Michigan and the American Society for Quality Control created the American Customer Satisfaction Index (Fornell, Johnson, Anderson, Cha, & Bryant, 1996). Designed as a customer-based measurement system for evaluating and enhancing a company’s performance, this instrument measures the quality of goods and services provided by over 200 firms in more than forty industries. The ratings are based on interviews conducted with about 250 current customers of each company. In this index, overall satisfaction is based on perceived quality and value. Another element is customer expectations based on prior experience with the product or service and a projection of the vendor/service provider’s ability to deliver quality in the future.

Whether or not a library chooses to implement such an instrument is not necessarily significant in and of itself. What is essential, however, is that staff give considerable thought and attention to the concepts and issues involved.

SERVICE TO REMOTE CUSTOMERS IN THE NONLIBRARY ENVIRONMENT

In private industry, there are some businesses that involve the need of remote access by their customers. Examples are banking, Internet service providers, and the retail catalog order industry. What can library staff learn from these vendors? While one would expect the catalog order industry to have conducted research in this area and have implemented fairly developed programs, the literature does not seem to indicate this.

Banaghan (1997) reports that, among Internet service customers, technical support has become increasingly important in that 60 percent of users believe that twenty-four hour help desk support is important. Are library staff ready to provide this level of support? One possibility would be for library and information technology staff to share help desk responsibilities.

Providers of remote banking services have learned that the right mix of products and services offered at the right price are key to success. However, of equal, if not greater, importance is a variety of distribution channels and means of access (Fredrick, 1995). According to Fredrick, consumers desire not only the distribution channel of their choice but also the ability to switch distribution channels and use the most convenient access method. Thus, access becomes critical so that it will result in greater convenience for customers. It may be that remote customers actually define service in terms of accessibility.
Remote service providers have also found that remote customers are likely to have relatively few interactions with their employees. These customers have become, in effect, invisible. Thus, the challenge for remote service providers has become one of maintaining and strengthening their relationships with customers who may never step inside a bank, store, or library. Because remote customers attach such importance to the method of access, this has major implications for customer loyalty to the service provider or vendor. As technology tends to depersonalize service, so too does customer loyalty become weakened ("How Do You Maintain Service Quality...," 1993). In a remote environment, offering a high level of customer service remains the sole way of building up customer trust and loyalty.

**Needs of Remote Library Users**

Remote access is not a new phenomenon for libraries; staff have long communicated with their users in writing or via telephone. What is new is the rapidly increasing number of library customers who access resources from remote sites exclusively or in conjunction with on-site visits.

Until relatively recently, libraries' principal experience with remote access users involved OPACs (Online Public Access Catalogs). With modems, users were able to dial in from buildings on campus as well as from off-campus sites.

Kalin (1991) characterized remote OPAC users as individuals with high expectations whose appetite has been whetted by the convenience of remote access. As a result, they may tend to become somewhat impatient as they demand constant access, user-friendly systems, no breakdowns or waiting, and speedy document delivery. Kalin found that remote users expect a customer-business relationship with the library and view an OPAC as a product that should perform as advertised.

deKock (1993) found that remote OPAC users encountered new problems and formulated new queries. These, in turn, required staff to develop new skills in the areas of technical support.

Remote OPAC users tend to encounter two categories of problems: (1) those involving the technology required to provide access; and (2) search protocols and OPAC interfaces. The former requires the user to master equipment and telecommunications software in order to deal effectively with situations such as line noise, telecommunications problems, and incompatibility of equipment or software. The second category involves more traditional problems such as system structure and commands. These categories also apply to the full range of electronic information resources that users of all types of libraries are using to a greater degree. While the second category often has online help available to assist the user, the first category requires either technical support from a staff member or the user's own resourcefulness to resolve problems. One key fact to remember is that problems of the first type—i.e., relating to technology—often
are due to factors beyond the library's control. This is an area in which library staff need to communicate clearly to users the extent of library responsibility. Doing so should diminish the likelihood of users forming unrealistic expectations or holding the library responsible for their dissatisfaction.

In the case of remote access, the paramount factor involves the quality of service associated with a particular electronic resource or service. Thus, the key element is likely to be a human one that involves a personal relationship between the user and the staff member. Because remote users are most likely to require point-of-need (or just-in-time) help, there is a great need for assistance and instruction (Rosenquist-Buhler, 1996). An appropriate service would include print handouts, electronic help pages, perhaps search demos in video or via satellite, or individual consultation via e-mail, telephone, telefax, and mail.

To provide this type of assistance effectively, libraries need to hire staff who are knowledgeable, enthusiastic, and patient. This effort should be viewed as a staff-wide public relations campaign requiring a team effort of the entire staff, not just those in public services. Staff need to promote the resources available and keep users informed of new systems and system enhancements/modifications. All staff members should receive the training needed to become instructors in system interaction (Rosenquist-Buhler, 1996). The staff must be able to engage in effective and extensive user communication and, of course, function as troubleshooters for hardware and software.

Lusher (1996) states that campus remote users comprise a unique category all their own. The challenge for library staff then is to provide a range of support services that blend services provided to in-house users and those offered to long distance-remote users. Examples of such services include handouts designed from a remote user's perspective, a handout dealing solely with technical access information, and electronic reference. When remote users call in with searching problems, staff could log on to the network or resource and recreate the search.

While the preceding sections deal with remote users or customers in general, the remainder of the article addresses a subset of that population—i.e., users in a distance learning situation.

THE DISTANCE LEARNING CONTEXT

Slade and Kascus (1996) defined distance education as the independent mode of study characterized by the physical separateness of learners and teachers and the use of print, mechanical, or electronic devices to convey the course content (p. xvi). For well over a hundred years, correspondence courses have existed in the United States, relying on communication through the mail between learners and distant instructors. By the late 1960s, distance learners had access to radio and television
programs, telephone tutoring and conferences, and, more recently, telefacsimile transmissions. Teaching packets for these telecourses included study guides, audiotapes, videotapes, and CD-ROMs. Both correspondence courses and telecourses are still being offered, along with courses providing even greater degrees of interactivity, such as those using e-mail, audio conferencing, and videoconferencing.

With the increase in personal computers in the home, Internet courses are growing in popularity. In this asynchronous form of distance education, students determine their own schedule and location for studying. Such courses can include instructor-directed discussions, exercises, or projects using electronic mailing list managers, Usenet newsgroups, or HyperNews (a hybrid of the mailing list manager/newsgroup), as well as other Web-based technologies.

However, recent advances in computer and telecommunication technology have made two-way interactive video available through compressed video transmission over telephone lines or through the Internet at relatively low cost. This low-cost, highly interactive synchronous technology can be combined with asynchronous discussions over the Internet/Intranet to expand the degree of interactivity between students. Institutions of higher education have found this an inexpensive means of expanding programs into suburban and rural areas, thereby increasing enrollments. Moreover, lifelong learning is increasing in popularity among adults with work and family responsibilities.

It is difficult to estimate enrollment figures for distance education. However, one can gauge the extent of distance education in the United States by looking at the numbers of institutions offering such courses and programs as listed in the Web catalog of the Globewide Network Academy. This clearinghouse of distance education information shows listings for more than 10,000 courses and degree programs offered by nearly 400 institutions worldwide as of July 1997. Approximately 300 of these are U.S. institutions. According to Noam (1997), electronic distance education is provided by some 150 schools in the United States using seventy-five satellite channels (p. 6).

Students

Distance learners range in age from high school through traditional-aged community college, undergraduate, and graduate students to adults and older adults. However, listserv discussions of the demographics of distance learners in urban/suburban and rural settings show anecdotal support of the demographics noted on Peterson’s Distance Learning Web Page—most students who enroll in distance education courses are over twenty-five years old, are employed, and have previous college experience. Over half are female. As a group, distance learners are highly motivated.
Their course completion rate exceeds that of students enrolled in traditional on-campus courses.

Listserv discussions also note that a higher percentage of white women participate in distance programs than are enrolled in the traditional on-campus courses at the same institutions. Distance learners also tend to be part-time students. Technical distance education classes show higher enrollments of men while all other distance education classes show higher enrollments of women without regard to location (urban, suburban, or rural).

Living at long distances from the sponsoring institution might be the primary reason for taking distance education classes in rural settings. However, listserv comments about the reasons for taking distance education classes in urban/suburban settings ranged from “convenience” (many employers, such as hospitals, bring distance education courses into the workplace) to “it’s the only option they have” (specialized courses might not be offered any other way). Other reasons include confinement to the remote site for various reasons, such as lack of transportation, disability (their own or that of someone they care for) and, most often, job or family obligations. Comments noted that some students simply chose not to drive to campus for various reasons, but they will take courses on campus (often simultaneously with a distance education course) if the course is not offered through distance education.

Distance Learning and Library Services

What is the relationship between distance learning and academic libraries? A 1996 survey of the 119 members of the Association of Research Libraries shows the extent to which major U.S. academic libraries are providing services for distance education courses. Of the seventy-four respondents, forty-six (62 percent) indicated that their institution is participating in distance education programs, primarily through interactive video technology (forty of the forty-six). All but three of the libraries provide services to support these courses. Half provide instructional support assistance to the faculty for the development of distance education courses (Snyder, Logue, & Preece, 1996).

Course Design

The literature reveals that any early expectations of a smooth transition to teaching in the interactive television context evaporate quickly in the heat of exposure to this medium. Alley (1996), who taught a first-year physics class using distance education for the first time in 1995, was bewildered by his first encounter with the instructional technologies available to him: “I was soon to discover that the class could not be taught within conventional boundaries of thinking and course design” (p. 49). He made significant changes to his course that led to an overhaul of his approach to teaching.
Alley expected students in the revised course to go beyond the general facts and principles of the discipline. Students experienced how professional scientists use computers and Internet access on a daily basis by searching the Internet, using video simulations on CD-ROM, contacting physicists by e-mail, and using PC-based productivity software.

The availability of Internet access, multimedia instructional software, interactive video technology, networked access to information resources—all these have dramatically changed the nature and teaching methods involved in distance education. Teaching faculty need to reeducate themselves to make use of these powerful technological tools in their classrooms and to change their teaching styles and methods accordingly. Shaughnessy (1995) suggests that academic librarians, in turn, will need to participate on instructional design teams so that libraries can deliver appropriate library resources to remote students as integral parts of their learning as opposed to the supplemental readings approach.

Not only does the redesign process drain faculty energy and time, but it can also mean a loss of control in the amount and scope of material to be covered. One science professor believes that interactive television (ITV) technology creates a lag time or "coefficient of friction," allowing faculty to achieve only 80 percent of what they could in a traditional classroom.

A nursing professor finds that the dynamics of classroom participation require constant attention. She reworks the course continually, experimenting with different spatial arrangements to improve group interaction. Some classroom arrangements prevent easy discussion among more than six students. Other interactive television systems are not capable of carrying overlapping voices in an informal discussion, thereby creating a choppy interaction. This presents a challenge because her field, ethical issues in nursing, requires an environment of rapport and trust. This professor and many of her colleagues make an effort to alternate teaching between the sites to foster students' comfortable participation. However, it can be frustrating to travel to the distant site if there are few students in attendance, especially given the inevitable absences among these employed adults with family responsibilities.

One aspect of understanding faculty expectations for teaching is to recognize that gender differences may shape approaches to technology. Brunner (1991) claims that: "Women wish for small appealing objects that allow them to collaborate, to create, to share their work, and to integrate their work and home lives. Men wish for magic wands that give them enormous power, fabulous speed, and infinite wisdom" (p. 133).

Libraries can accommodate, to some extent, the wish for speed and power. However, the systems available will never match the ultimate fantasy of tapping the world's wisdom effortlessly. Brunner expresses concern that the masculine (and business) vision of distance learning as a means of more efficient delivery of education will supersede the vision of
bringing different kinds of people together and collaborating to make up their own minds about ideas and events. Brunner calls for a balance between the “masculine” fantasy of ever-increasing power and speed with the “feminine” fantasy of increasing connectedness and support for genuine inquiry. If we expect women and men to relate to technology differently, we will likely develop a layered approach to providing support services.

The most significant danger to libraries from the ITV environment is that the added complexity of teaching might crowd out instructors’ attention to issues that have never yet been adequately addressed—issues such as information literacy skills. It is all too easy for instructors to assume that the additional materials they bring into the distance learning classroom, such as slides and videotapes, adequately replace individual research in terms of stimulating interest.

DISTANCE LEARNERS AND LIBRARY SERVICES

Decades ago, when many institutions of higher education offered correspondence classes, they simply mailed students easy-to-follow instructions. As the off-campus education programs became more sophisticated, the institutions sent packets of information that included lectures, photocopies of reading materials, and assignments. In order to complete many of these assignments, students needed to seek help at a nearby library. Those institutions that belonged to a consortium almost always referred students to the closest consortium library. In most cases, the parent institution library staff had made no prior arrangements with the library that was actually expected to provide the services.

Academic librarians tried to support these distance education students by compiling bibliographies or research guides and by providing photocopies of required readings and interlibrary loan services. In many cases, this was a hit-or-miss process.

Within the past ten years, however, the situation has improved, at least in theory. The Association of College and Research Libraries (1990) underscored the parent institution’s responsibility “for providing support which addresses the information needs of its extended campus programs” in the revised and updated Guidelines for Extended Campus Library Services.

According to Shaughnessy (1995), distance learning programs are “distance and time independent, customer focused, and more relevant to the needs of the work place...” (p. 1). Academic librarians, already heavily challenged by technological advances, must face the unique needs and expectations of these students. Millson-Martula and Menon (1995) argue that, because an academic library’s various constituencies possess differing needs and expectations, it is inappropriate to use one group’s information needs as the principal guide for determining services offered to all users. In other words, librarians need to understand the unique needs of distance learners when providing services to them.
Higher education faculty and students approach distance learning with the expectation that the experience will be the same as experiences they have had in traditional educational settings. Both faculty and students also expect that their research and informational needs will be the same as for courses and programs taught in traditional settings. Faculty expectations change rapidly with experience in distance learning. In addition, these expectations serve to set, readjust, or reinforce student expectations. Thus, library staff must understand the opportunities that distance learning programs present in order to anticipate and help shape realistic remote user expectations. This requires open and proactive communication, flexible and creative use of resources, and a change in roles for library staff in order to avoid making distance learners second-class citizens.

A Case Study

Ledo (1994) reports on a 1990 survey of external (remote) students enrolled at the South Australian College of Advanced Education (SACAE). While the survey did not address the issue of student expectations directly, it was quite revealing regarding the relationship between remote students and library services.

The thirty-five respondents included twenty-two undergraduates and thirteen graduate students, all of whom resided in Whyalla. Not only did they use other libraries more than the SACAE library, but they also used the whole range of libraries available in the city (college, nursing, public, and educational resources). Implications of this behavior include a critical need for the “home” library to establish formal cooperative arrangements with the other service providers. In addition, remote users need to become aware of the services, resources, and facilities available to them in local libraries. The respondents also indicated that convenience, not the availability or lack of resources, was the key factor in their use of other libraries.

The SACAE library distributed to all remote students a booklet describing the “home” institution’s library services. However, students reported little face-to-face contact with the home library’s staff. This likely contributed to the fact that the students made little use of reference services or online search services. It may also have been a factor contributing to the students’ use of other libraries.

Finally, the study revealed an extremely interesting and surprising situation. The undergraduate respondents considered their friends and colleagues, not a library, as their primary information sources. This situation should provide the home library with an outstanding opportunity to learn about their students’ needs.

Distance Learning at De Paul University

The Curriculum

DePaul University is located on five campuses in the greater Chicago
area. As part of an initiative by the North Suburban Higher Education Consortium of the Illinois Board of Higher Education, DePaul installed its first interactive television classrooms during the 1993-94 academic year at three campuses. The ITV technology is a fully interactive video and audio system in which students at the “receiving” site view television monitors showing an instructor at a remote location on one screen and their own classroom on another. ITV also allows instructors to use videotapes, slides, and presentation graphics software. The instructor and a technical staff person have full control of the direction and focus of the television video and audio production. As a result, they can choose to put students on camera to speak with the instructor or other students.

DePaul's most common use of ITV technology is to link sections of classes (primarily in computer science) between its campuses in Chicago's Loop and in Lincoln Park on the north side of the city. Far fewer courses link a DePaul campus with remote sites such as community colleges, high schools, and hospitals in the outlying suburbs. The university's goal is to expand the number of complete academic or professional programs rather than individual course offerings in the distance learning environment. However, at present, most students who take a course at a distant site have either taken courses previously on a DePaul campus or are enrolled simultaneously in courses on campus and at remote sites.

**Library Services and Resources**

DePaul's Lincoln Park campus library is home to collections in the liberal arts and sciences, and its downtown library focuses on business and computer science. DePaul is part of the ILLINET consortium of over forty academic libraries in Illinois with cooperative borrowing arrangements for students and a common online catalog. In addition, most distance learning students are employed full time and have access to special libraries provided by their employers.

DePaul distributes nearly seventy electronic databases and a growing collection of full-text electronic journals as widely as possible beyond the five campus locations. Some resources can be accessed only in one specific campus library, others at any library, others on any networked computer in the university, others from remote computers using an Internet SLIP connection, and still others from remote computers using only a modem and telecommunications software. This confusing array of resources changes and expands continually to improve access and system reliability.

**Study Design**

The authors focused on courses between a DePaul campus and a remote site because the challenge of delivering library services to students is greater when they attend a class at a non-DePaul site. The DePaul programs currently involved in these efforts are primarily the School for New
Learning, which offers interdisciplinary undergraduate and Master's programs for returning adult students, and the nursing graduate program, whose students are also primarily experienced adult women who have been out of formal education for many years. Both programs have successfully integrated education in library research and computer skills into appropriate courses.

Ten faculty members (three men and seven women) have taught courses between a DePaul campus and a remote site. The disproportionate number of female faculty is due to the predominance of women in nursing. Two of the faculty are part-time adjunct professors, and the other eight are full-time faculty. No faculty member has taught more than four courses in the four academic years since the interactive television classrooms were installed.

The authors surveyed twenty-four graduate nursing students at non-DePaul sites over the course of one year. For the first two quarters, the authors used an open-ended questionnaire. In the third and fourth quarters, the authors asked students to rate specific library services as exceeding, meeting, or failing to meet their expectations. Because all of the students surveyed were female, the authors were not able to analyze gender differences in expectations. However, the literature indicates the existence of such differences, and library staff should take those differences into account when anticipating both student and faculty needs.

Information on faculty expectations was similarly limited. The authors conducted an informal e-mail survey and telephone interviews with six faculty, monitored four electronic discussion lists, and attended panel presentations at conferences on distance learning.

Needs and Expectations

Based on the literature and the authors' experiences, the authors inferred that student expectations about course requirements derive from their instructors and become clarified through experience with grades and discussion with peers. Becker (1968) analyzes the subtle calculus students use to judge what will be required from them to earn the desired assignment score or course grade. The authors also inferred that distance learners have the same research and information needs as the on-campus learners in the same class, although the emphasis on certain services might vary. Students will expect their instructors to be aware of the resources and services of the library, and they will expect the library to support whatever their instructors tell them to do. Therefore, the authors focused primarily on faculty expectations and perceptions of student needs as opposed to direct student input regarding their expectations.

Faculty Expectations

In addition to their early expectations of a smooth transition to teaching in the distance learning context, faculty who have struggled to adapt
to the challenge of distance education carry expectations in two other relevant areas: (1) the library research/information acquisition process, and (2) remote use of the library.

Faculty expectations about library skills that distance learners develop are founded on older assumptions about how students learn to use a library. The process of gathering information or reviewing the literature on a particular topic is a matter of professional socialization rather than explicit instruction. This informal socialization differs across disciplines. When asked about his expectations for student research, one professor replied that he taught the "regular science research process." He provided students with a handout of research tips and suggested, as a way of developing a topic, that students "fan through current journals" or pursue a personal interest.

Most faculty were full-time students in traditional programs and used a library with some degree of comfort on a fairly regular basis. They often worked as graduate research assistants and developed strategies for library research based on minimal faculty explanation, plenty of peer support, and help from reference librarians. This method works well for full-time students with several years to learn the ropes. However, it presumes a professional interest in acquiring research skills that may not be present in the distance learner population. It also presumes that students will have enough contact with faculty to develop a feel for the influential journals in the discipline, and that students will have access to print materials for browsing.

Faculty expect distance learners to use an academic library, and they make no distinction between the skills needed by a student on campus and one at a remote site. Faculty expect graduate students in particular to use a research library, given that distance learning makes education more convenient in other ways. This expectation may be at odds with the promotion of distance education by university administrators emphasizing convenience, especially that of taking classes near a student's home or office. The faculty impression that students want a "drive-in education," rather than being affiliated with the university, may be a result of self-selection of a group of students for whom travel time is a major factor in the choice of university.

Most faculty believe that a combination of handouts (developed by themselves or by librarians) and peer explanations are sufficient to address students' needs in negotiating their options for library use. One faculty member mentioned the effectiveness of using live demonstrations for in-class library training in the ITV environment. One respondent found that her colleagues in distance education tended to let students fend for themselves in developing the best strategies for library use. In a context like DePaul, where most distance learners have taken, or are taking, courses
on campus, faculty are not likely to expect students to need assistance in making the transition to distance learning.

Faculty of all ages perceive online resources as a "luxury" that eliminates the need for traveling from library to library in search of pertinent material and that permits awareness of a wider range of valuable sources than were available to them as students. However, given overloaded students' need for convenience, faculty are concerned about the quality of resources used. In the absence of efficient library document delivery, students may be confronted with the difficult choice between traveling to use an appropriate collection, paying high prices for commercial document delivery, and settling for full-text popular sources at a local public library or information provided free on the Internet. If faculty and librarians fail to both motivate students to find "core and critical" items and provide adequate delivery services, students may resort to cheap and convenient sources. However, thoughtful faculty also recognize that making students aware of the full range of material available can lead to increased frustration when the actual resources are not accessible without excessive student effort.

Faculty noted that some students who choose their topics carefully have success relying exclusively on electronic sources. For example, research on problems in the ethical use of computing could cover topics such as privacy, security, or electronic commerce, for which substantial material is available online at no cost. In addition, the background material in ethics and philosophy is largely in the public domain and can be found online or at any public library.

Technically adept faculty also recognize that student access to library resources depends on the power of their home computers. They hear complaints from students if needed resources are available only at the library rather than at networked computers in labs where students can use word processing and e-mail. Many students lack a computer at home but have access at work. Many companies now have Internet capabilities but not the SLIP access needed to use the university's domain name for access to proprietary databases. In light of such technical obstacles and an increasingly complex information environment, these faculty expect to depend more on free public databases in the future, especially as access to full-text journals grows.

Student Expectations

When registering for distance learning courses, the students we surveyed did not expect them to be different from other classes they had taken on campus, and they did not change that expectation by the end of the courses. All students expected moderate to extensive use of library services, and those expectations were met. On-campus students surveyed in the same interactive video class had the same expectations as the re-
mote students. Thus, it seems that the nature and level of a program or course, and previous experience within a program of study, will set student expectations about the need to use the library for assignments, even before the instructor has the opportunity to reinforce or adjust those expectations with his or her own expectations about assignments.

Expectations Regarding Library Services and Resources

During its second term of offering distance learning courses, the nursing department adopted a statement entitled "Department of Nursing Policies & Procedures for Distance Learning Courses" (DePaul University, 1996). Statements such as this, even if only used internally by faculty, can do much to set or reinforce student expectations about library use: "Mutual interaction between students and faculty is required at every session, therefore attendance (on-camera participation) is mandatory. Classes meet evenings and weekends on a weekly or bimonthly basis to accommodate the needs of adult learners. However, you must also allocate time for independent work between sessions. Courses may include lab, clinical, or community service projects as well as presentations, papers, and exams" (p. 1).

Most of the distance learners surveyed said that they needed library services and expected to complete the same assignments as they would on campus. However, distance learners might need different delivery mechanisms or emphasize different services. The availability of other providers of library resources and services colors students' expectations about library services. Moreover, people in the medical, legal, and corporate worlds are accustomed to having libraries perform more services for them.

Accordingly, when asked what library services they expected, two of the distance learners indicated that they expected a service offered by special libraries—i.e., literature searches performed by library staff. One changed her expectations, doing the searches herself, while the other went to a nonaffiliated library and had the search done there. While libraries serving distance learners could consider meeting such expectations, it is important to consult with faculty first to ascertain that such services will not hamper academic goals. For example, students who must develop a thesis should not be led to think of the literature review as separate from the process of finding fruitful areas for research.

Students also expected online database access and extended library hours. These expectations were met, but not always by the home institution library alone. Students who needed extensive access to medical journals met those expectations by going to an academic medical library. The nursing department's policy statement suggests two such libraries with extensive medical journal collections and suggests querying individual libraries for policies and hours of operation. The communication of this
statement to students through faculty, syllabi, handouts, or verbal orientation might have led the student expecting extensive access to medical journals directly to an academic medical library.

When the authors asked students if specific services met expectations, the majority indicated that they did not use, or were unaware of, most of those services (which the open-ended questionnaire did not list). Nonetheless, half of those students were satisfied overall with the services provided, while the other half predictably had no opinion. The students who answered the open-ended questionnaire indicated that the level of library service performance met their expectations, which related to literature searches, online database access, and extended library hours. If nothing else, a survey can be a useful tool for making users aware of services and resources. That awareness alone might serve to increase satisfaction.

Most students used more than one library to do the assignments for their distance learning courses. While over half of the respondents used DePaul's main campus library, other libraries used included the remote site libraries (community college and hospital libraries), academic medical libraries, and public libraries. Only half of the respondents indicated use of the remote site libraries even though 75 percent indicated satisfaction with those libraries; 25 percent had no opinion. Again, the nursing department's policy statement may do much to set expectations about library services: "Do not expect the distant site libraries to have adequate holdings of advanced level materials. DePaul University or your local library may be able to obtain items for you through interlibrary loan systems, but you must allow a minimum of two to three weeks for delivery" (p. 2).

Library staff must recognize students' use of other libraries and help them understand what academic, public, and special libraries can do for them. They also need to recognize the burden that this use of services places on those libraries. Thus, the host library should have formal written agreements with site libraries as well as with heavily used, unaffiliated libraries to provide some form of incentives or compensation such as reciprocal service or borrowing, fee payments, database access, or the purchase of materials or equipment.

The way in which the institution promotes the distance learning program will also color students' expectations. If the institution's marketing stresses the benefit of not having to travel into the city, students might have the impression that they can complete the entire program without driving to campus. Trips into an urban area especially are a problem. There is likely to be less resistance to a trip to another suburb, even involving a greater distance, in order to avoid problems with finding and/or paying for parking, a lack of familiarity with the route, etc. Students from the northern suburbs drove to Wisconsin to use a library rather than drive into Chicago.
In DePaul's urban environment, and especially in programs like nursing in which most students are women, these problems can be compounded by anxiety about personal safety. During the process of choosing the first site location for DePaul's distance learning nursing courses, one administrator chose the non-urban campus of a community college over its other urban, but non-Chicago, campus because she had been told that students do not consider the urban site very safe.

Student access to computers with modems at home or at work can provide the convenience of doing varying amounts of research without leaving the home/work environment. One professor estimated that half of her students had access to a computer with a modem and some kind of Internet access. Of students completing the more detailed survey, 75 percent had Internet access, although only 25 percent had Internet access through a DePaul SLIP account. SLIP access provides an increased number of databases, basic reference sources, electronic reserves, and full-text electronic journals.

Whether a distance learning course or program requires students to have Internet access and provides a SLIP account has a tremendous impact on student and faculty expectations and satisfaction with library services.

One professor commented that being able to at least start one's research at home also has the rather unexpected effect of making students excited to get into the library. One way of looking at this effect is to consider that the expectation of finding specific items helps overcome the logistical problems of traveling to the library as well as problems with time away from work and/or family responsibilities. Those who have a more defined objective (i.e., specific items identified at home that they know will be available in the library) may be more willing to make the trip, being more or less guaranteed of finding useful material, and better able to estimate the time it will take.

Library staff should add to all of these expectations the same ones that traditional students exhibit—i.e., that any electronic resource is better than a similar print resource; that databases should contain the full text of articles; that the Internet and listservs will suffice for research on almost any subject. In addition, students who have experienced smaller institutions and libraries expect more one-on-one attention.

**RECOMMENDATIONS**

Just as the article thus far has two principal sections—one dealing with remote users in general and the other with distance learners—so too do the authors' recommendations. The key fact to remember is a somewhat ironic one. As technology has vastly expanded the range and ease of information access, it has done so at the expense of depersonalizing the process. A possibly unanticipated result has been that remote users of all types have expressed the need and expectation for personal contact and
one-on-one help. Library staff will need to focus on their relationships with students, faculty, and other libraries if they are to successfully meet and exceed the needs and expectations of all remote users. The major needs and expectations of all remote users are summarized as follows:

Remote User Needs
1. constant, around-the-clock access to online databases mounted on user-friendly systems;
2. twenty-four hour help desk or technical support;
3. a personal relationship with library staff in the nature of a customer-business relationship; and
4. extensive information describing specific resources and the full range of services available at the “home” library.

Distance Learner Needs
1. a greater range of services provided by library staff, such as conducting online database searches and preparing packets of information, with less emphasis on self-service;
2. to use a variety of libraries in addition to the “home” library to complete their academic assignments; and
3. to learn what other libraries can do for them.

Implications for Library Staff
1. identify discrete groups of users;
2. differentiate between the needs and expectations of on-site customers and those of remote users as well as within the total population of remote users;
3. gauge users’ needs and expectations using means such as interviews, focus groups, surveys, and the like;
4. help socialize customers to understand and act out their role in the service delivery process;
5. inform/educate users of services available from the home and other libraries and their respective costs; and
6. establish formal relationships with other libraries to provide services and resources to distance learning students.

As staff realize success in meeting and exceeding these needs and expectations, they will notice a corresponding change in their roles. Staff will develop greater expertise in providing technical support in addition to search assistance. They will also likely join faculty in developing applications of educational technology in the classroom in addition to the library.

The librarian’s professional role will no longer be that of intermediary between consumers and commodities but rather between learners and resources provided to expand their knowledge and skills. Freddolino (1996) found that a quality learning environment depends on relationships with the local site, the sponsoring institution, and technology. This
is because high technology makes personalized attention and individualized service increasingly important. When using technology to advance library services, library staff must be sure not to sacrifice personal attention for efficiency. For example, for smaller classes, individualized research consultations (whether in person, on site, on campus, via telephone with a toll-free number, over two-way interactive video, or over desktop televideoconferencing software) may meet expectations of personal attention and provide more satisfaction than a more efficient group library instruction session, regardless of how it may be offered.

While e-mail reference, electronic request forms, Web page posting of library distance learning policies, and Web-based library instruction have their places in providing services to remote users, the personal contact that a live voice or face can provide during telephone or two-way televideo reference transactions is important in meeting student expectations and needs. Hiring one person to be responsible for distance learning services and making this person's e-mail, voice-mail, fax number, and face known to all in the distance learning program is another extremely important means of providing personal attention, even though the library services to distance learners are most often actually provided by the library departments that provide those same services to on-campus students.

The same innovation and awareness are needed in relating to faculty. Redesigning courses can be a time of learning and excitement, as it was for Alley and Repp (1996). It also means reduced control and a surrender of some measure of independence. Library staff need to take advantage of the course redesign process by making faculty aware of their willingness to share expertise and to enter into partnerships when appropriate.

With or without distance learning programs, many institutions of higher education are evolving into learning communities that are student-centered. To support this trend, library staff must be successful in both meeting and exceeding the ever-changing, ever-increasing, and ever-varied needs and expectations of all students and faculty. Consequently, academic library staff must assert themselves as key players in the learning process, thereby changing their roles from information providers to educators. Library users, especially those who are remote, deserve no less.

REFERENCES


How do you maintain service quality when customers are getting their products delivered electronically? *American Banker, 158*(166), 14A.


Off-Campus Library Support for Distance Adult Learners

JOHN A. NIEMI, BARBARA J. EHRHARD, AND LYNN NEELEY

ABSTRACT

The phenomenal growth in the number of adults enrolled in graduate level classes that are delivered through distance education methods, such as video teleconference technology, has implications for library support services. The authors discuss adult learners and higher education provided in a distance delivery format, case studies centered on these adult learners, the library service and support needs specific to this segment of the learner population, the distance adult learners' expectations of library service support, some potential online resources, and the implications for library services to enhance this nontraditional learning environment.

INTRODUCTION

As higher education moves into the twenty-first century and is forced to reach outside the physical boundaries of the university or college campus, technological change is impacting the delivery of education to distance adult learners. Today's communications technology, specifically video-teleconferencing distance education (VTDE), is enabling institutions of higher education to reach populations in a variety of settings such as business, colleges, hospitals, and prisons. In particular, rural communities are now able to receive educational offerings similar to those available in urban areas. Courses that would not normally be offered in one location due to lack of potential enrollment are now simultaneously embracing learners at several distant sites (Ehrhard & Schroeder, 1997).

John A. Niemi, Department of Leadership and Policy Studies (LEPS), Northern Illinois University, DeKalb, IL 60115
Barbara J. Ehrhard, McHenry County College, U.S. Highway 14, Crystal Lake, IL 60012
Lynn Neeley, College of Business, Northern Illinois University, DeKalb, IL 60115
© 1998 The Board of Trustees, University of Illinois
Currently there are over 1,000 educational institutions in the United States offering some type of distance learning programs (Lozada, 1997). Experts estimate that, by the year 2007, approximately 50 percent of learners enrolled in higher education courses will take courses through distance education (Kascus, 1994). Like traditional younger learners, distance adult learners require ancillary services, especially library services, to help them conduct research and fulfill their assignments. In today's world, learners can rapidly access library databases through their personal computers. The librarian's role is to assist such learners by demonstrating how to use data services and how to narrow searches in the most efficient manner. The purpose of this discussion is to help librarians become more familiar with the characteristics and needs of adult learners and to assist librarians in dealing with this category of learners.

THE ADULT LEARNER

Who are these adult learners who are moving steadily into distance education? Almost by definition, the adult learner is one who returns to study, on a full-time or part-time basis, after a period of time spent in other pursuits. As a result, he or she brings to new learning a rich background of life and work experience. This background includes the wide range of roles that adults fill: employee, spouse, parent, citizen, and community or church worker. In general, then, and in contrast with younger learners, adults possess sophisticated insights culled from their knowledge of the world of work, from the skills they have acquired there, and from the relationships they have developed with other people at work and in their personal lives. These insights make it easier for them, as learners, to recognize how ideas can be transformed into action and how theory can be transformed into practice outside the classroom.

Another way in which adult learners differ from younger learners is that their goals are often more clear-cut. That is, adult learners are likely to identify, with some certainty, the things that are important in their lives—i.e., the careers to which they want to devote their energies, the skills they wish to acquire, the persons they aspire to become, or the kinds of relationships they hope to build with others. Also, adult learners are more likely to prioritize the forces competing for their attention. Of course, there are some adult learners whose goals and priorities are poorly defined.

A third way in which adult learners are likely to differ from younger ones relates to motivation, which is closely linked to goals. That is, adult learners often feel impelled to take an active part in their own learning, and they are more willing than younger learners to make sacrifices in setting goals for themselves and in striving to reach them. There are many reasons for this superior motivation. Often adult learners are able to devote only part of their time to study because of the demands of full-
time or part-time jobs and the obligations of spouse or parent. Time is very precious to them and, when they decide to devote some of it to further study, they take that study seriously. Moreover, adult learners are often motivated by a desire to advance in a job or to make a career shift. On the other hand, younger learners tend to take their studies less seriously.

Adult learners do have certain advantages, but there are problems, too. Often, they fear change and the demands placed on them by instructors who do not always comprehend the anxieties that they feel in the new situation. These anxieties are compounded in adults who have experienced failure in school and who associate learning with unpleasant memories of unsympathetic teachers, tests, low grades, and punishments. Sometimes they have a low self-concept that causes them to shrink from exposing their ignorance to others and to dread further failure.

The physiological changes wrought by the aging process may also create difficulties for the pursuit of learning. These changes include deterioration of sight and hearing, loss of energy and strength, decline of memory, and a lengthening of reaction time. Clearly, not all adults age at the same rate or display the same characteristics as they age. Nevertheless, the changes (or the fear of changes) might create anxieties that interfere with learning. However, there is a counterpoint to this rather dismal picture. It is the enormous adaptability of human beings who face new challenges. In the case of adult learners, their high motivation often causes them to forget their handicaps when they get caught up in the excitement of new learning.

DISTANCE EDUCATION CASE STUDIES

At Northern Illinois University (NIU) in DeKalb, Illinois, among the first courses to employ VTDE was a graduate-level course in human resource development (HRD). This VTDE course has been taught each semester since Spring 1995 by the same professor on the NIU campus and at several different community colleges. This course, indeed the HRD field itself, draws learners at Master’s and doctorate levels from adult education, counseling, instructional technology, and management. The pollination of ideas that occurs among learners in these fields is enhanced by the addition of students from business, public administration, and other departments. The classes were anything but homogenous. They consisted of American and foreign nationals and part-time and full-time learners. Their experience ranged from little to none to already having an impressive record as HRD professionals.

The classroom from which the course is telecast houses a VTDE system that is encased in two 35-inch television sets, including a main camera. From the broadcasting site where the instructor is located, a signal is sent via T-1 telephone line to the community college site. The following week the process is reversed, and this alternating process continues
throughout the course. In this way, the instructor maintains the face-to-face contact with learners that is essential to the building of good relationships. The VTDE system includes a touch screen menu pad that permits the instructor to use the camera to zoom in on learners while they are speaking, to run videotape or slides, or to run a computer application program. Another integral piece of hardware is an advanced overhead projector known as a document camera, which is used to display excerpts from the textbook and supplementary materials. Also, the document camera permits the instructor to project handwritten messages to the remote site.

This VTDE course has a two-fold purpose: (1) to provide an overview of theory, research, and practice relating to individual development, career development, and organizational change; and (2) to acquaint students with the potential and complexities of the VTDE classroom, so that they can employ it confidently and intelligently as a delivery system in their own work setting. In this classroom-laboratory, learners receive a book of readings to supplement the textbook, paper copies of transparencies, study questions that serve as advance organizers for the next class, and case studies and simulations designed to relate theory and research to practice. Guest HRD experts either attend a class at one site or interact with learners by telephone (audio-conferencing) from their homes or offices. Assignments included the keeping of journals in which learners reflect upon their classroom experiences, their readings, and the operation of the VTDE system. These journals are useful to the instructor in monitoring the progress of learners, discerning their problems, and assessing the strengths and weaknesses of systems.

Summative evaluations of the HRD course revealed that, in the years 1995 and 1996, about 90 percent of the learners reported that they were satisfied with the teaching of the HRD course via distance education. These findings are thoroughly documented in Niemi, Owens, and Ehrhard (1996, 1997).

What distance learners expect of libraries is the ability to: search periodical indexes, abstracts, CD-ROMs, and bibliographic services such as ERIC; do electronic book check outs and renewals over the telephone (toll free); deliver photocopies, the results of literature searches, government documents, and microfiche duplication; access answers to research questions; access tables of contents from professional journals; internally track and deliver all interlibrary loan services; and establish an electronic feedback system. An electronic information bulletin board would permit librarians not only to solicit feedback from their learners but also to coordinate and manage document delivery services to provide access to online service from remote sites and to manage e-mail communications.

Also, these distance learners want to know how to login to the main campus computer library from their PCs at home, work, or extension site,
to make database selections, to conduct expanded database searches, and
to obtain guidance as to which resources work best under which situ-
tions. They do not want to read manuals, but they do want access to
catalogs, reviews, biographies, statistics, and information on how to evaluate authors, books,
ENCYCLOPEDIAS, DICTIONARIES, PERIODICAL FULL-TEXT ARTICLES, CATALOGS, REVIEWS,
bibliographies, statistics, and information on how to evaluate authors, books,
and journals—especially Internet sources.

DISTANCE LEARNERS’ EXPECTATIONS OF LIBRARY SERVICES

The library expectations of learners, as revealed in the literature,
demonstrate a great need. The ACRL “Guidelines for Extended Campus
Library Services” (Association of College and Research Libraries, 1990)
emerged from the belief that most libraries were not offering support for
their distance education programs (Kascus, 1994). Kascus surveyed mem-
bers of the American Library Association (ALA) to examine the extent of
support for off-campus and distance education programs in the curricula
of schools of library and information sciences. Although the ALA first
recognized the inadequacy of library support services for off-campus learn-
ers as early as 1931, only 33 percent of Kascus’s sample recognized the
need to expand their curricula to address the support of off-campus and
distance education learners. Of the library schools sampled, 36 percent
did include topics on library support in their 1991 curricula, but few real-
ized the growth and impact of distance education on support services for
off-campus distance education learners (Kascus, 1994). Kascus’s study
also examined the attitudes of library deans and their directors regarding
the issues surrounding off-campus services. Findings indicated that sup-
port for off-campus distance education programs has been minimally rep-
resented and has had a low priority for most library school deans and
directors. Based on these findings, Kascus concluded that libraries should
be more user-centered rather than library-oriented.

Burge (1991) analyzed two studies that explored the relationships
among libraries, distance educators, and distance learners and found that
librarians were totally isolated from the distance education environment.
In her 1991 keynote address at an off-campus library services conference
in Albuquerque, Burge stressed the urgency of librarians playing a more
participatory role in distance education and re-establishing themselves as
educators. Burge argued that one key principle underlying the relation-
ships and responsibilities that operate to maintain effective graduate level
distance learning is that the relationship between the learner and librar-
ian must be collaborative in nature.

Throughout the literature, it is clear that off-campus students have
had to fend for themselves when attempting to access relevant library col-
lections and services (Burge, 1991; Kascus, 1994; McHenry & Bozik, 1995;
Stephens & Unwin, 1997). Comments like “We’re not getting the litera-
ture” and “Not having the material is a problem” have been common
statements at off-campus sites (McHenry & Bozik, 1995). In situations where there has been no convenient library access, books and articles have been mailed directly to learners. In this new technological age of digital computing, faxing, e-mail, and scanning, distance learners need connecting to remote data services, including how to differentiate among the myriad databases and how to use information databases.

Although many academic libraries compile packets of course-related readings, deliver reserve collections to remote sites, and provide interlibrary loan services, few have offered the complete array of library services that are available at the campus library. Off-campus services that should be enhanced are Web access, full-text retrieval, speedy document delivery from the publisher to the computer, online reference, and electronic communication. Also, e-mailing and chat rooms could improve socialization among students and compensate for the lack of face-to-face contact between learners and instructors.

**Potential Resources for Distance Adult Learners**

Many libraries, corporations, and professionals use resources available on the Internet daily. Some of these sources include: WorldCat, a database of 37 million bibliographic records; LibrarySpot, a 24-hour virtual library resource center which brings reference sites together with periodicals, online texts, and library information; ABI/Inform, containing full ASCII text of many articles; ECO (Electronic Collections Online) meeting archival needs nationally; EDGAR (American Securities and Exchange Commission filings of America's largest corporations) database; DIALOG; America OnLine; CompuServe; Internet data servers and news groups (free government statistics and industry performance measures); and electronic subscriptions to *Newsweek* (quarterly CD-ROM video magazine), *Wall Street Journal* [<http://info.wsj.com>], *Wall Street Journal Classroom Edition* [<http://info.wsj.com/classroom>], and Dow Jones Services [<http://www.dowjones.com>].

In the VTDE classroom, learners could benefit if they had access to Internet listserv discussion groups and World Wide Web bookmarks that are related to the study of human resource development and distance education. Lebowitz (1997) stated: “While the student population is becoming more computer literate, it does not necessarily follow that they are information literate.” Thus, dedicated and knowledgeable personnel are needed to direct learners to use the Internet and its subsystems effectively. A few of the listservs and bookmarks that could be of value to learners are:

- **EDSTYLE**, the Learning Styles Theory and Research list;
- **NEWEDU-L**, the Newer Patterns in Education List which discusses education broadly, including delivery systems, media, collaborative learning, learning styles, and distance education;
• DEOS-R, the Distance Education On-line Symposium for Research, co-sponsored by the American Center for the Study of Distance Education and Central Michigan University, whose purpose is to provide a forum for scholars in the field of distance education who are specifically interested in exchange relating to research in distance education;
• DEOS-L, the free international discussion forum about distance education established to facilitate discussion of issues presented in DEOSNEWS, a bi-weekly international electronic journal about distance education as well as other issues of interest to distance education;
• NBEA, the national business education association, which is a forum for NBEA members to share ideas on curriculum, teaching techniques, and other areas of business education;
• http://www.yahoo.com/education/distance_learning provides links to a wide variety of distance education resources and information;
• http://www.uwex.edu:80/disted/index.html links to distance education resources from the Distance Education Clearinghouse at the University of Wisconsin Extension;
• http://www.cde.psu.edu:80/PSUToday/PSU2U.html has related links about courses and upcoming conferences;
• http://www.cde.psu.edu/ACSDE, from the American Center for the Study of Distance Education at Penn State, contains links to a variety of publications, conferences, and other resources;
• http://www.edie.cprost.sfu.ca/~rllogan/bm_dl.html has over seventy-five distance education links and descriptions.

CONCLUSION
The combination of widely available technological resources with the features of electronic media and the common characteristics of adult learners forms an exceptionally good mix for educational success. Most of the technology and resources are available 24 hours daily for learners who are willing to take responsibility for their own education. Libraries and library professionals could be at the nexus of this wonderful set of opportunities and circumstances by making a few simple shifts in emphasis to facilitate the needs of the growing segment of distance adult learners. The two critical emphasis shifts that could alter librarians' activities with, and importance to, the distance adult learner are responses to student needs and empowerment of the adult learner and the library professional.

Effective use of electronically distributed information resources and search or query protocols for those resources could empower librarians to provide enhanced services and better information access than this group of learners has ever previously experienced. Clearly the information resources, search engines, data retrieval methods, and full-text materials are, and have been, available; however, some learners who desire the information contained in these sources are unaware of their existence. Other
distance adult learners have had even greater frustration or more disappointed expectations because they were at least vaguely aware of these resources but were ignorant as to how to use them. The distance adult learners' education could be particularly disrupted by these frustrations because of the influence of their individual nature and experience.

The distance adult learners' educational process could be made more successful through libraries and librarians assuming a more assertive stance toward raising the adult learner's awareness of the potential rewards to be gained with a little patience and a personal computer, thus frustration and ignorance would be overcome. Another way in which librarians could further the distance adult learner's education would be to compose and distribute some standard research protocols for electronic information access. These two modest changes, which are well aligned with distance adult learners' tendencies and preferences, could significantly alter librarians' roles in serving them.

SELECTED ONLINE LEARNER RESOURCES

EDSTYLE, the Learning Styles Theory and Research list. To subscribe, send an e-mail message to listserv@maelstrom.stjohns.edu. In the body of the text write "subscribe EDSTYLE first name last name" (omit quotes).

NEWEDU-L, the Newer Patterns in Education List, which discusses education broadly, including delivery systems, media, collaborative learning, learning styles, and distance education. To subscribe, send an e-mail message to listserv@uhccvm.its.hawaii.edu. In the body of the text write "subscribe NEWEDU-L first name last name" (omit quotes).

DEOS-R, the Distance Education On-line Symposium for Research whose purpose is to provide a forum for scholars in the field of distance education who are specifically interested in the exchange in research in distance education. This listserv is co-sponsored by the American Center for the Study of Distance Education and Central Michigan University. Listserv members meet and share information with their peers undistracted by the general commentary and questions appearing on DEOS-L, the International Distance Education On-line Symposium. To subscribe, send an e-mail message to listserv@cniuvm.csv.chich.edu. In the body of the text write "subscribe DEOS-R first name last name" (omit quotes).

DEOS-L, the free international forum about distance education established to facilitate the discussion of issues presented in DEOSNEWS (a bi-weekly international electronic journal about distance education as well as other issues of interest to distance educators). DEOS-L is provided by the American Center for the Study of Distance Education (ACSD) and the Pennsylvania State University. To subscribe, send an e-mail message to listserv@lists.psu.edu. In the body of the text write "subscribe DEOS-L first name last name" (omit quotes).
AEDNET, the Adult Education Network, is dedicated to adult education discussion. To subscribe, send an e-mail message to listproc@pulsar.acast.nova.edu. In the body of the text write “subscribe AEDNET first name last name” (omit quotes).

NBEA, the national business education association, is a forum for NBEA members to share ideas on curriculum, teaching techniques, and other areas of business education. To subscribe, send an e-mail message to majordomo@list.thompson.com. In the body of the text write “subscribe NBEA first name last name” (omit quotes).

http://www.yahoo.com/education/distance_learning. This Web site provides links to a wide variety of distance education resources and information.

http://www.uwex.edu:80/disted/index.html. This Web site links to distance education resources from the Distance Education Clearinghouse at the University of Wisconsin Extension.

http://www.cde.psu.edu:80/PSUToday/PSU2U.html. This distance education Web site has related links about courses and upcoming conferences.

http://www.cde.psu.edu/ACSDE. This Web site is from the American Center for the Study of Distance Education at Penn State. It contains links to a variety of publications, conferences, and other resources.

http://www.edie.cprost.sfu.ca/~rhlogan/bm_dl.html. This Web site has over seventy-five distance education links and descriptions.

REFERENCES


Remote Users of Health Sciences Libraries

Phyllis C. Self, Barbara A. Wright, and Jessica L. Waugh

ABSTRACT
Providing information services to remote users is not a new concept for health sciences librarians. Most health care professionals practice in hospitals and clinics remote from a health sciences library. However, trends in today’s health care management systems, education initiatives, and the rise in consumerism challenge health sciences librarians to evaluate and extend their services more than ever before using new technologies. This article explores the variety of innovations in service models implemented over the last twenty-five years that health sciences librarians have initiated to extend library services and information beyond the walls of the library.

INTRODUCTION
Gone are the days when a health sciences library was the sacrosanct property of the physician. Describing the increasing use of health sciences libraries by allied health professionals and the lay public, Estelle Brodman (1974) predicted that libraries would need to keep pace with the demands of these consumers, in addition to those of their traditional client, the physician.

Since Brodman’s article, the literature is increasingly concerned with the new definition of the health sciences library user and, of late, much of the attention focuses on the latest breed of health sciences library user—
i.e., the remote user or the person (provider or lay person) who seeks medical information off-site via computer. The expectations of this new breed of user and the accommodations (both traditional and innovative) being made to meet those needs by health sciences libraries as described in the literature will be the focus of this article, in addition to several challenges facing health sciences libraries in their attempts to meet these needs in the digital age.

**WHO ARE THESE “REMOTE USERS” OF HEALTH SCIENCES INFORMATION?**

The people who constitute this class of health sciences library clients include the traditional academic health care provider, such as the physician faculty member; the nonacademic health care provider, such as the community physician or allied health practitioner; and the nonhealth care consumer.

The “Generalist Initiative,” in a counter-reaction to medicine’s trend toward the reductionist thought dominating medical education, encourages the selection of primary care medicine as opposed to specialty medicine. According to Pruessner, Hensel, and Rasco (1992) generalist medicine would be ideal for the physician willing to accept “all persons and all problems,” the doctor with a “taste for complexity, for jagged edges and sudden leaps” (pp. 232, 235). The Generalist Initiative leads to the dispersal of physicians and physicians-in-training to rural areas remote from health sciences libraries in academic health science centers. Because physicians-in-training need someone to oversee training, the initiative also gives rise to a new role for the already practicing rural doctor—i.e., “affiliated preceptor” or the off-campus professional who oversees the experiential educations of health professional students intending to practice in similar rural circumstances. These rural generalists, as well as their students, are in need of ready access to a broad range of medical literature; yet, they are frequently hundreds of miles from the nearest health sciences library.

In today’s digital age, the Health Sciences Library must take its cue from the Generalist Initiative for Physicians when identifying its clientele and designing appropriate information access programs. Health science library users can no longer be “reduced” to field physician or academic physician—emerging nonphysician groups in need of information have narrowed the gap with physicians in terms of their medical information needs. Efforts to provide medical information to the non-academically based provider are increasing in numbers; studies such as Ellen Hall’s (1995) indicate that nonphysician providers, such as physical therapists, have an increased need for medical information as they branch out from hospital-based practices to private practices. Community health workers, such as public health nurses, need access to information while in the field; outreach efforts on the part of health sciences libraries now attempt to
capture this newer group of clients (Self, Sayed, & Henry, 1997). To satisfy the demands of today’s workforce, many allied health degree programs are now being offered as “distance learning” formats (for example, Virginia Commonwealth University, in the summer of 1998, initiated a doctoral program in health related sciences, based on the university’s successful executive master’s program in health administration which takes place solely online). Programs like these take into account that the “full time” nonworking graduate student is becoming an anachronism; the population profile trend in higher education is the mature professional who desires higher education but not at the expense of sacrificing employment status. Students of such programs will have information needs transcending the traditional trip to the health sciences library, because most of them will be either physically remote from such structures or consider themselves too enmeshed in daily work needs or family life that taking the time to actually visit the library would be inconvenient or even prohibitive.

Perhaps the last frontier to be explored by the health sciences library is that of nonhealth provider consumer need. The general public, more educated than ever in matters of disease and wellness, is seeking information in areas that Estelle Brodman described as historically restricted to providers. Consider that in the course of an hour-long television drama we might see three pharmaceutical advertisements for prescription medications; obviously, exposure to information once off-limits is increasing exponentially. News magazines and television shows are increasingly sophisticated in their presentations of disease and wellness issues. Today’s average citizen can hardly help but be more knowledgeable about health than the citizen of a decade ago. With this barrage of information, the public is encouraged—almost pushed—to question and explore the information resources available. The average public library is not equipped to handle the sophisticated questions generated by the health information advertisements, articles, and news clips found in today’s magazines and television shows. So, more and more frequently, consumers are coming to the same information as well as those who provide their care, and health sciences libraries are expected to meet their demands as well.

Perhaps the most fascinating trend in information retrieval involves the element of “convenience” and the idea of time conservation. Studies show us that the health care provider needs information at the patient’s bedside or exam table; the doctor is unable to desert a patient to walk or drive to the nearest information source. Now we see that even nonprovider users living within commuting distance to a health sciences library are preferring the comfort of home or the convenience of the office in which to conduct research on health issues. Often called “invisible users” or “disconnected users,” these varied clients represent the future, and meeting their needs is a major goal of the health sciences library’s mission. Though they are unseen and disconnected, the expectations of remote users are clear.
Expectations of Users

Through various studies, focus groups, and self-report questionnaires, users tell us that they want services such as free access to the information highway and training on how to navigate the Internet and exploit various software packages.

Studies conducted in rural areas, such as Gerald Lundeen's (1994) study of the information needs of rural Hawaiian practitioners, highlight problems common to all but the most connected academic physician: equipment shortage (computers, phone service, modems); resources (funds, directories, statistics); time for seeking information; and simply not knowing what information is available and how it might be accessed. Kristen Shelstad's (1996) report on the information needs and expectations of practicing general surgeons in New Mexico indicated that biomedical literature was considered an important continuing education topic to a majority of respondents, as were learning the new techniques for accessing information. Both rural and urban New Mexico surgeons cited practice demands as a barrier to information retrieval (reaffirming the need for "point of contact" information availability) but also admitted to "computer illiteracy" as a significant hindrance. Shelstad (1996) proposes that "medical libraries need to establish and maintain proactive outreach programs headed by professionals who can make information services available...." (p. 493). This would appear to be the case not only with rural practitioners, but even those a few blocks away from a health sciences library. If we concur that even urban professionals, located close to information resources, prefer the convenience of "point of contact" information access, then the library outreach of the future must include not only outreach programs to remote users but outreach to those close by.

These needs for remote information access do not free libraries from responsibility, however, because these users also want the personal touch—i.e., speedy responses from library staff when questions or problems arise during their explorations in digital information; document delivery services remain in demand by users, remote or otherwise. As with traditional users, remote users also want accurate answers to clinical questions; easy access to medical publications written for highly trained specialists often increases uncertainty and generates more questions for the health sciences librarian. A driving need continues to be "quality filtering" of the mass of information available. What are we doing to meet their needs and expectations?

Accommodations to Remote Users

Providing information services to unserved health professionals or remote users has been a major driving force for health sciences librarians for decades. Many accommodations to these health professionals have been tried, and simple approaches have been successful. In the early
1980s, the University of Wisconsin-Milwaukee Medical College of Wisconsin Libraries implemented an "Information on Wheels" outreach service program. Much like the public library bookmobile, a mobile cart, loaded with professional books and journals, is taken weekly to the hospital unit and outpatient clinic of the Milwaukee County Hospital and Froedtert Hospital (Glick & Blackwelder, 1986). The driving force behind this innovation was the hospital nursing staff which needed medical information but could not leave nursing stations or patient bedsides to visit the health science library. This technology-free program remained viable and successful for several years after its conception.

For health professionals in nearby clinical sites, two programs which have met with success are the "Literature Attached to Charts" (LATCH) and Clinical Medical Librarian (CML) programs. The LATCH program was established at Washington Hospital Center in Washington, DC, in 1967 to provide specialized information to any health care practitioner attending the patient. The LATCH program provided the services of a librarian to analyze, search, and retrieve relevant literature to assist health care teams in the diagnosis and treatment of patients. This literature was made available to the entire health care team by attaching it to the patient's chart (Sowell, 1978).

The rise of interdisciplinary teams participating in clinical rounds provided the opportunity for librarians to consider developing a more direct way of disseminating information in nearby and remote clinical sites. Based on the "Clinical Pharmacist" model, the University of Missouri-Kansas City (UMKC) School of Medicine established the first CML program in 1971 through a grant from the National Library of Medicine. Medical librarians began to accompany physicians and medical students on clinical rounds to deliver relevant literature to health practitioners and to participate as active members of the health care team (Cimpl, 1985). Both the LATCH and CML programs have met with varying degrees of success. Although well received by the health care community and implemented at a number of institutions, both programs require ongoing resources that few libraries can afford and few hospitals are willing to financially sustain.

The aforementioned innovative informational programs focused attention on information dissemination to clinic or hospital health care providers who, although geographically within reach of a health sciences library, were unable to make use of the resource because of time constraints and patient acuity issues. If these providers required assistance with medical information services, what were the needs of those in remote areas far from medical schools and health science libraries? Further, might this barrier to information access prove problematic for recruitment and retention of providers in remote, rural, and underserved areas?

Tentative answers to these questions emerged from the Carnegie Commission's study (1970) "Higher Education and the Nation's Health:
Policies for Medical and Dental Education" which suggested that a potential reason for maldistribution, recruitment, and retention of primary care providers in underserved areas was due to the provider perception of professional isolation (Carnegie Commission on Higher Education, 1970). Following recommendations in the Carnegie Commission's study, Area Health Education Centers (AHECs) were established in a number of underserved communities. With the goals of improving accessibility, quality, usefulness, and efficiency of health care providers in medically underserved areas, the AHEC programs employed a variety of educational incentives to attract and retain health care personnel (Fowkes, Campeau, & Wilson, 1991).

During the twentieth anniversary of the national AHEC system, Donald A.B. Lindberg, director of the National Library of Medicine, stated, "we see a natural alliance between the NLM's mission, as the world's largest library of health sciences, to provide biomedical information services to the health professions, and that of the AHECs to provide education support for medical practitioners and other health professionals" (Lindberg, 1991, p. 15).

Several states—Arkansas (Wilson 1993), California (Jensen & Maddalena, 1986), North Carolina (Davidson, 1982), North Dakota (Bandy, 1978), and South Carolina (Mangiaracina & Sawyer, 1976)—included library programs as an important component of their AHEC programs (West & Howard, 1977). Faced with limited information resources, these early AHEC library programs were instrumental in forming consortia and other cooperative relationships which became an integral part of the national biomedical information network. When describing the North Carolina program, Thibodeau and Gillikin (1989) state that "the operative words for AHEC libraries are networking and sharing" (p. 697). The North Carolina AHEC Library and Information Services Network has, over time, developed a library network that today includes twelve AHEC libraries staffed with highly trained librarians providing a full range of library services. In their continuing quest to address the health information needs of North Carolina health professionals and students, the AHEC librarians provide training programs in the use of computers and information technology—a role they see as "likely to increase in importance as technology advances" (Thibodeau & Gillikin, 1989, p. 698).

Not all states have been as successful in developing a library network as part of the statewide AHEC program. Consequently, other strategies were developed to meet the needs of the remote user and the goals of the various academic health sciences centers. One strategy to extend health sciences services to community practicing physicians was through membership programs. The first such program was offered by Cleveland Health Sciences Library (Cheshire, 1972) and followed by other institutions like the University of Miami School of Medicine (Williams, Lemkau, &
Burrows, 1988). A similar program supported by grant funding from New York State and its hospital participation fees is the Western New York Hospital Library Services program. The program contracts with the State University of New York of Buffalo’s Health Sciences Library to provide computerized literature searches; interlibrary loan of journal articles, books, and audiovisuals; and interlibrary loan referrals (Birkinbine & Bertuca, 1991).

Perhaps the most innovative program to reach the rural physician was the Circuit Librarian Program initiated by the Cleveland Health Sciences Library under the direction of Robert Cheshier and Sylvia Feuer. Set in northeast Ohio, this circuit librarian program served five community hospitals ranging in size from 48 to 327 beds (Smith, 1976; Shelly, 1977; Feuer, 1977). Equipped with computer, fax machines, and Internet connections, today’s circuit librarians not only search the biomedical literature but provide on-site computing support training for accessing the Internet and NLM’s biomedical resources. Having proven its success, the idea has been managed from academic health sciences centers as well as hospital libraries of various sizes and in many states (Pifalo, 1994). The current Directory of Circuit Librarian Programs indicates that there are approximately twenty-six programs active in 1995 in Canada and the United States (Pifalo, 1995).

Following the birth of the AHEC initiative, several other health education trends were engendered in the late 1970s which would move health care education and the need for library services to remote sites. Developed and implemented more extensively in the 1980s and early 1990s, ambulatory-based health education and problem-based learning integrated clerkships and clinical experiences into medical school and other disciplines’ curricula and encouraged the use of preceptors remote from the academic health sciences centers. These new trends in health care education created the task for both academic health sciences center libraries and hospital libraries in rural areas to address the information needs of a new population of remote users—i.e., preceptors and students at remote clinical sites.

The National Library of Medicine took the lead and addressed the challenges faced by all types of health sciences libraries in reaching remote users in its 1989 plan, “Improving Health Professionals’ Access to Information.” While previous efforts had been placed on networking libraries, this plan sought to improve information access “by NLM and all of the libraries in the Regional Medical Library (RML) network...establishing direct contact with the whole spectrum of health professionals who are the ultimate users of biomedical information services....” (p. 11). As a result of this plan, the RMLs and the libraries in their regions were to act as representatives and agents for NLM information products and services, thereby creating a “field force.” Funding was made available through
"access" grants and contracts to help connect the individual user to resources of the national RML network, or newly named National Network of Libraries of Medicine (N/NLM), utilizing modern electronic and telecommunications technologies. In addition, the plan's recommendations focused on "expanding intramural research and development at NLM, including... the development of new or enhanced information products and services to meet the needs of health professionals" (p. 11). This included accelerating the development of Grateful Med® as a convenient and powerful access vehicle for individual users of MEDLARS®. Further, the scope of DOCLINE® would be expanded through the development of linkages with Grateful Med® which would provide documents directly to health professionals in a timely and cost-effective way through the N/NLM's interlibrary loan operations. Significantly, the authors of the plan recognized that training health professionals to use technologies, such as Grateful Med®, to search MEDLINE® was an important component of this new initiative (National Library of Medicine, 1989).

For an ever-expanding base of remote users unable to leave offices or hospital units, traditional in-library training sessions were inconvenient at best and impossible to attend for many. The Claude Moore Health Sciences Library at the University of Virginia addressed this problem by offering an alternative to in-library training through a program called "Housecalls." The "Housecalls" program delivers the library's regular information management training in an office or departmental setting within the Health Science Center (Feldman & Kochi, 1994). Other institutions (Pifalo, 1994; Mazmanian, Banks, Self, & Hampton, 1997) successfully combined elements of the Circuit Rider Librarian program with teaching Grateful Med® to remote users.

Through NLM's outreach grants and contracts, librarians have demonstrated the library's role in health care practice and positioned themselves to be leaders in developing health information systems such as the Texas Tech MEDNET demonstration project. Utilizing interactive telecommunications technology, MEDNET provides physician consultation, medical information transmission, and continuing education to isolated practitioners in over twenty-five rural hospitals. The project librarians are information specialists. They provide information packets containing MEDLINE® searches and relevant articles to support continuing education programs. They are also educational programmers who develop curriculum programs and locate supplemental information resources. Ultimately, they are learning consultants combining various resources in individualized information packets (Moore & Hartman, 1992).

In addition to outreach grants and contracts, the National Library of Medicine offered a series of NLM/NSF Connections grants. The goal of these grants was to encourage expansion of network connectivity and use of the Internet for hospitals and health-related organizations. Combin-
ing this funding with private funds established the Arizona Health Information Network (Anderson, Haddix, McCray, & Wunz, 1994). This project, like others mentioned earlier, demonstrates institutional change and adoption of technology originating from librarians.

Successful projects to reach remote users are built on developing a strong network of resources based on a tradition of successful service. The Georgia Interactive Network for Medical Information (GaIN) is such an example. Established in 1983 through an NLM Resource Project grant to implement a library automation project, today GaIN provides a model network for transmitting health information to over 1,000 health practitioners and an active membership of sixty institutions (Rankin, McInnis, & Rosner, 1995). Many institutions attempted similar projects with varying success to create online services that would bring research materials to remote locations (Algermissen, Helton, & Smith, 1992; Woods & Coggan, 1994).

Thus, developing outreach services in conjunction with an AHEC network is a continuing theme. In 1994, Virginia established its first AHEC librarian position and, in conjunction with that, the Southside Health Information Consortium (SHIC). Serving a thirteen county region, the SHIC circuit rider librarian provided on-site consultation and training and served as an information technology specialist for participating agencies (Banks, Thiss, Rios, & Self, 1997). Also in that year, the Denison Memorial Library at the University of Colorado Health Sciences Center, working with the Colorado AHEC, initiated its outreach program for the growing number of unaffiliated or underserved users thereby taking library services and training to the mountain slopes of Colorado (Muellenbach & Lyubechansky, 1996).

Geographical regions such as the greater northwest face somewhat different challenges than rural states like North Carolina and Virginia. In order to reach frontier preceptors and students participating in clinical sites in the five state region of Wyoming, Washington, Alaska, Montana, and Idaho (WWAMI), the University of Washington Health Sciences Libraries implemented a new partnership in 1996 called the Rural/Underserved Opportunities Program (RUOP) with their health sciences schools. In the RUOP program, students spend six weeks with rural physicians between their first and second year of medical school and serve as teachers to their preceptors to connect and use the Internet (University of Washington, Health Sciences Library, 1996-97 Annual Report). Although using students to reach preceptors shows potential, little to no evaluation has been conducted to measure the success of this service model.

Several health sciences information networks exist to meet the needs of specialty groups of remote users. With the rise of HIV/AIDS cases for example, hospital and academic medical libraries initiated information service programs targeted to health professionals serving the HIV/AIDS populations. Funded by the Virginia Health Department, the Virginia
Commonwealth University established an AIDS Resource Library serving health care practitioners in the six HIV/AIDS Resource Centers throughout the state (Self & Turman, 1995). Recognizing the needs of HIV/AIDS patients and their families to have access to clinical trials and the most current therapeutic information, the National Library of Medicine, for the first time, began to provide monetary awards to projects contributing toward access to HIV/AIDS information. Such diverse entities as the Philadelphia AIDS Information Network, the New North Citizens' Council of Springfield, Massachusetts, and the Southeast Florida AIDS Information Network (SEFAIN) at the University of Miami School of Medicine have benefitted from these funds (Burrows, Perry, Tylman, & Lemkau, 1994).

In 1974, Estelle Brodman stated: “Since health sciences libraries are mirrors of their societies, changes in the outer world cause the same changes in their reflected world” (p. 61). With increased access to health care information, the health care paradigm has been transformed. Consumers are taking a more active role in their health care. A variety of community health information networks have been established to meet the growing need for consumer health information, providing print and audiovisual materials directed to the consumer. Perhaps the most well known consumer health information network established by a health science library is the Ellen Gartenfield Health Information Network (EGHIN) in Miami (LaRocco, 1994). Over time, these networks and library service programs change to deliver information more conveniently to the consumer—i.e., consumer libraries in shopping malls (Goldberg, 1989)—and to use the developing World Wide Web. Building on the phenomenal growth of Web utilization by consumers, two initiatives led by health science libraries capitalized on the Web as a means to deliver information directly to consumers (i.e., MEDWEB <http://www.gen.emory.edu/MEDWEB> by Emory University Health Sciences Center Library and Health Web <http://www.uic.edu/depts/lib/health/hw/consumer> by the Committee on Institutional Cooperation health sciences libraries). Greater use of the World Wide Web is expected to deliver health information to all groups of remote users including health practitioners and members of the public. Managed care and academic institutions see the provision of information services as an important marketing tool. Innovations such as the University of Iowa's “Virtual Hospital” reach across former geographical and institutional barriers and empower consumers to make their own health care decisions (http://indy.radiology.uiowa.edu/).

WAYS THAT SERVICES HAVE BEEN ENHANCED

Health sciences librarians have continued to enhance library services using technology. Even before the development of the World Wide Web, institutions like the University of Tennessee, Memphis, sought to take advantage of their campus-wide network to provide value added services.
Through an electronic menu system, users were able to request photocopies, interlibrary loan, computer literature searches, sign up for workshops, and a variety of other library services twenty-four hours a day (Bellamy, Silver, & Givens, 1991).

Today, health sciences libraries have taken a leadership role in designing systems that incorporate electronic outreach services within the emerging national information infrastructure. Nine libraries in Mississippi developed the Mississippi Health Science Information Network (MisHIN) to develop a statewide multidisciplinary state-of-the-art electronic infrastructure to support the health sciences information needs of all health care professionals in the state regardless of location or affiliation. Headquartered at Rowland Medical Library at the University of Mississippi Medical Center (UMMC), Jackson, MisHIN expansion plans include “developing a coalition of information providers cooperating to increase membership, add new services, provide Internet connections and extend services to all areas in the state.” Libraries play a major role in the development of these electronic networks to disseminate knowledge-based resources and to integrate these resources into the delivery of continuing health professional education (Seltzer, Borland, & Patterson, 1996).

Today’s rapidly changing information technology—especially the Internet—is making Brodman’s Library Trends article predictions a reality. This is particularly true with the narrowing knowledge gap she noted between the health care professional and the layman. Even the National Library of Medicine has acknowledged this new lay user. In his March 1998 testimony to the House Appropriations Sub-Committee on Labor, HHS, and Education, Donald A. B. Lindberg noted that, in addition to use by traditional health care providers, “the more profound change is that the public—consumers, patients, parents, and other patient advocates—can now use MEDLINE® to learn more about their own health and about how the results of medical research can affect it” (U.S. Congress, 1998, p. 1623).

The development and expansion of the Internet and the World Wide Web have provided health sciences librarians with unexpected opportunities to reach the remote health care practitioner with the use of free Internet Grateful Med® and PubMed®. Released in 1997 by the National Library of Medicine, PubMed® permits the remote user to search the PubMed® database of bibliographic information, which is drawn primarily from MEDLINE® and PREMEDLINE® and links to full-text journals at Web sites of participating publishers. Whereas in the past the remote user was able to search MEDLINE® and request copies of articles from local health sciences libraries which may have taken weeks for delivery, today the remote user is able to obtain articles minutes after conducting a search on PubMed® over the Internet. This database shows great promise for the rural practitioner as well as the health consumer.
In addition to the use of the Web by the National Library of Medicine, health sciences libraries use the Web to disseminate pathfinders, navigational tools, tutorials, and access to their library catalogs and databases. Telemedicine—sometimes referred to as Telehealth—extends the resources of the library beyond its walls and demands partnerships between the library and health care practitioners to provide real time interaction with patients and practitioners using a myriad of multifunctional technologies and high bandwidth distribution systems. Institutions like the University of Cincinnati, collaborating with Ohio State University, Case Western Reserve University, and other partners, developed “NetWellness,” a consumer health information service delivered via the World Wide Web, offering a large base of medical experts to provide on-line consumer health information (Guard, Haag, Kaya, Marine, Morris, & Schick, 1996).

EVALUATING SERVICES

Burnham and Perry (1996) raise questions about the effectiveness of promoting health information via Grateful Med® and Loansome Doc®. There are no long-term studies indicating that health professionals who have received training as part of the numerous grants and contracts offered by the National Library of Medicine continue to use these services once the projects have been completed.

There are limited evaluation studies performed on remote user services. Most are quantitative studies, counts of interlibrary loan transactions, and reference queries. Those studies are based in libraries located within hospitals. The reason for the small number of studies is possibly due to the fact that many reported remote user projects were funded as demonstration projects requiring minimal evaluation reports and usually quantitative studies of document delivery or pre- and post-project questionnaires (Banks et al., 1997; Dorsch & Landwirth, 1993). A more in-depth assessment was performed by University of Texas Health Science Center at San Antonio (UTHSCSA) comparing information use by physicians in two distinct locations—a large, isolated, rural region and a large urban county with multiple medical and research centers including UTHSCSA (Bowden, Kromer, & Tobia, 1994). Common themes emerge in each of these studies.

Remote user services universally are plagued by poor and costly telecommunication connections and lack of on-site technical assistance and support. Initially, remote users lack necessary skills needed to access library services and, once trained, often lose those skills due to lack of use following the initial training. Despite these problems, remote users consider access to information improved through project intervention.

Through a recent NLM-funded project, the National Laboratory for the Study of Rural Telemedicine at the University of Iowa developed an infrastructure to study the use of telecommunications technology in the
practice of medicine in both rural and urban settings. Their studies focused on telemedicine—the use of communications technology in the practice of medicine and the “use of advanced telecommunications to improve access to information, enhance learning opportunities, and achieve higher levels of international competitiveness” (Kienzle et al., 1995, p. 37). Several questions should be answered in the final report. Was the specific knowledge of the provider changed or enhanced by telemedicine? Was there a measurable change (better or worse) in patients’ health status, functioning, or quality of life because of the telemedicine application? Is telemedicine a cost-effective alternative to current practice? Is it financially feasible to implement telemedicine on a widespread basis? What factors facilitate or inhibit rural practitioners’ use of telemedicine? Finally, does telemedicine help recruit or retain rural health care workers (Kienzle et al., 1995)?

CONCLUSIONS AND NEW CHALLENGES IN THE DIGITAL ERA

As in 1974, health sciences libraries continue to face the challenge of devising new ways to provide information and to keep up with advances. These challenges are faced, usually at higher costs, while maintaining traditional information services and resources for an ever-expanding mix of users. Four major themes challenge health sciences librarians to meet the information needs of the remote user in the digital world: the evolving health care management systems, advances in technology, more demanding informed consumers, and fair use of digital information. Overarching these four themes is the ever-present demand for both librarians and health care practitioners to do more with less, decreasing the amount of time professionals can devote to stay abreast of the latest information and latest technology. Health care practitioners face greater demands to keep abreast of the latest therapeutic modalities while simultaneously keeping health care costs at a minimum. Combined with the growing demand to see more patients, health care practitioners have little time to devote to information seeking and even less time to gain and maintain new information technology skills. The rapid advances taking place in technology compound these problems and challenge even sophisticated users to remain literate with the changes. Further complicating the life of health care practitioners is today’s informed consumers coming to them with the latest available research and questioning their treatment plans.

Although this article did not discuss copyright issues, “fair use” of health information is in jeopardy with proposed copyright legislation and poses a new challenge to reaching the remote user. Under “fair use,” library users have been able to make copies of an article or a chapter in a book for individual use and study. Information in digital form makes it easier for us to provide information to remote sites but threatens the rights and profits of the creators of information. However, if “fair use” is
discontinued, libraries and users will have to seek permission and pay each
time they browse or wish to use a piece of digital information. Our librar-
ies must be able to provide the same level and quality of access to digital
health information to health practitioners regardless of location as they
have been able to provide with printed materials in the past.

Based on twenty-five years of services to remote users since Brodman’s
article, it is clear that there are several elements required for successful
outreach initiatives. Outreach projects must begin with a needs assess-
ment based on a strong level of local support. It is best if the outreach
program is built on a history of successful prior initiatives or a network
that already exists—e.g., AHEC or the N/NLM. The library program
should include a package of services that include people, collections, docu-
ment delivery services, training programs, and an ongoing evaluation pro-
gram. A service program based on technology must assure the availability
of equipment and trained technical staff to assist users around the clock.

The rapid advances in technology and telecommunications present ma-
jor hurdles in delivering information services and resources to remote
users. These advances also place increased demands on the knowledge
base of users, and librarians challenge them to remain literate with these
changes. These are exciting times for health sciences librarians as tech-


tology brings new service opportunities and challenges to reach remote
users.

REFERENCES

without falling off the cliff of unmanageable technology. Information Technology and
Libraries, 11(September), 259-261.

tion infrastructure for Arizona. Bulletin of the Medical Library Association, 82(4),
396-400.

Bandy, C. R. (1978). Area Health Education Center libraries and medical school libraries:

challenges. Medical Reference Services Quarterly, 16(2), 1-10.

services through a campus network. Bulletin of the Medical Library Association, 79(1),
53-62.


388-393.

Bowden, V. M.; Kromer, M. E.; & Tobia, R. C. (1994). Assessment of physicians’ informa-


Med and Loansome Doc: Why isn’t it working. Bulletin of the Medical Library Associa-
tion, 84(4), 498-506.

AIDS Information Network: A community outreach, specialized information system.
Medical Reference Services Quarterly, 13(1), 1-18.

Carnegie Commission on Higher Education. (1970). Higher education and the nation’s health:


Web Information Services at the University of South Africa Library: A Work in Progress

Sandra Hartzer, Brian Paterson, Dorette Snyman, Lisa Thompson, Louise van Heerden, Marza Vorster, and Ansie Watkins

Abstract

This article outlines the process initiated by the University of South Africa (Unisa) Library to develop online support to its users. Unisa has been offering distance education for more than fifty years. The library has played a prominent role in supporting learning and research through sophisticated systems based on print-on-paper information sources and postal communication. A lack of infrastructure has hindered the development of alternative electronically based service delivery. The article describes how two decisions made in 1997 cleared the way for such development and how the library responded to this opportunity by creating a Web Information Services Team. This team was composed of persons already involved in projects for electronic service delivery. The project's goal was to deliver directly to the user, via the World Wide Web, training programs, current awareness services, and texts in various formats and from various sources to support both learning and research. The team started work on the project in August 1997 and concentrated initially on research and the acquisition of the necessary hardware and software. Toward the end of the year, the first product delivery took place with the launch of the library's Web page, the first Web-based training program, the setting up of a Windows NT server for loading and networking databases, and pilot projects to make current awareness services and commercial full-text databases available to clients online on a trial basis.
INTRODUCTION

The University of South Africa (Unisa) has a fifty year history in the provision of distance education at a tertiary level. The university originally functioned as the parent body for a number of university colleges in South Africa. As these colleges each succeeded in achieving their autonomy, Unisa defined a new role for itself as a distance education university, a role which was recognized in law in 1946. From the start, the university set high standards for teaching and examination, and the rapidly growing library prided itself not only on the size of its collection but also particularly on the quality of its services. The Unisa library now boasts the most extensive collection in South Africa.

Unisa is today by far the largest university in South Africa in terms of student numbers and ranks as one of the world's mega-universities. In 1997, there were 124,212 students registered at Unisa for programs ranging from certificates to doctorates. Most of those students are resident in South Africa and are spread throughout the country. There are also more than 4,000 students from other African countries and 2,200 scattered among the other five inhabited continents of the world. Unisa continues to deliver its teaching programs largely through the medium of print on paper and the postal system. Students of structured courses are supplied with their lectures in print form. They are generally required to complete written assignments set as part of the curriculum, and successful completion of the course is judged by means of a challenge examination written at the end of the academic year. Students must purchase their own prescribed books for use throughout the course, but the library supplies copies of recommended materials that are usually required to be consulted at specific stages during the course. The library has built up a large collection of books, known as the Study Collection, to assist in meeting this requirement. Unisa also offers research degrees at the Master's and doctoral levels. Such students are offered a comprehensive subject librarian service. A subject librarian typically searches the appropriate bibliographic sources on behalf of the research students and supplies them with a list of suitable references from which to choose their own readings. These readings are then supplied on request in print-on-paper form to the relevant student by post.

In the supply of information services to students of Unisa, the use of information technology has thus far been supplementary. The library computerized its administrative processes many years ago and has an extremely sophisticated in-house system for handling requests for information materials for clients for whom the library is remotely located. Bibliographic databases have been loaded on a local area network at the main campus in Pretoria since 1994, but use has been restricted to staff whose offices are on campus and to those students able to visit the campus. The advent of the Internet and the World Wide Web have revolutionized communication. Unisa is not immune to that revolution, and staff in various sec-
tors, including the library, has been investigating the use made of this technology in distance education and considering how best to apply it in our own situation.

The immense size of the organization and the massive investment in the existing teaching model and delivery systems has hindered Unisa's ability to grasp the potential offered by network technologies. The infrastructural and socio-economic realities of South Africa also represent significant hurdles. A breakdown of the student population of Unisa indicates that roughly 49 percent are black, 38 percent are white, 9 percent Asian, and 4 percent colored. Thus 62 percent of the student population comes from traditionally disadvantaged backgrounds and may well lack all the skills that are required to benefit from an electronic environment.

According to a survey conducted in 1996, 48 percent of the student population had access to a personal computer (PC) for use in their studies and 15 percent had access to the Internet. It seems that this number is increasing, especially with the proliferation of "Internet Cafés," "Cyber Connections," and government sponsored "Telecentres" in the rural areas (the first was opened in March 1998 in the Northern Province). The postal service can be unreliable and is becoming increasingly expensive, which gives students an incentive to use alternative means of communication with the institution. E-mail is anticipated to be one such means, as there are daily inquiries from students in this regard. The Internet in general is being used as a medium of communication both by the university itself, with the development of World Wide Web sites, and by students. This paves the way for increased electronic delivery of tuition materials as well as general communication with the students.

While it is important not to further disadvantage students who lack many of the resources that would facilitate electronic materials provision and communication, multimode delivery cannot be ruled out. The students have recognized the importance of computer literacy, and many of them are making an effort to improve their skills.

**The UNISA Library's Web Information Services Team**

In 1997, Unisa made a significant commitment to include electronically based service as a mode of delivery for its distance education programs. The university's senate made two decisions which signaled this commitment:

1. The Students on Line (SOL) experimental project was approved as an operational system. This service gives students online computer access to materials loaded on computers at the main campus. This offers the potential to make study materials for independent learning electronically available. Through the system, students can also contact lecturers, submit assignments, and have access to the library catalog.
2. A contract with a company known as Cyber Connections was approved. This agreement will result in access to networked computers being made available to Unisa students free of charge. Facilities will be established throughout the country. These opportunities are offered in a very competitive environment as the Cyber Connections facilities will not be exclusively for Unisa students and Unisa study material. The quality and content of the Web-based services that Unisa will provide will therefore be crucial to the success of its electronic service delivery.

These developments were seen by the library as an opportunity to take a significant step forward in the sphere of electronic information service delivery to its remotely located clients. In order to make use of this window of opportunity, the library decided to establish what became known as the Web Information Services Team (WIS Team). Six staff members, who already had significant responsibilities for existing or planned Web-based electronic information projects, were appointed on a full-time basis for a period of one year to focus their attentions on those projects. In addition, three staff members, who also had responsibilities for such projects as a smaller part of their activities, were designated associate members of the team along with two persons in coordinating, support, and communications roles. Associating the staff members through this team structure proved to be extremely valuable. The Unisa library is a very large organization, consisting of 250 staff members divided into five divisions. The projects that were brought together in the WIS Team originated in four of those divisions, and persons working on the projects were not always aware of similar activities by colleagues in other divisions. The team brought together members from different parts of the library and facilitated the sharing of ideas and solutions and offered support for problem solving. When the team was constituted, attention was given to team building under the leadership of an organizational psychologist, and vision and mission statements for the group were compiled. Each member set goals for their specific project within the team.

It is important to note that the Unisa WIS Team projects were not designed as a co-ordinated approach to achieve a particular integrated goal. These are a set of projects of diverse origin that were identified as having a common relevance to the delivery of library and information services electronically using Web technology. In this way they support the library’s goal of “service provision ... redesigned through the application of information technology” (University of South Africa, 1996, p. 4). The projects were given more prominence and linked together through the WIS Team in order to take advantage of synergies and to enable the team members to offer one another mutual support.

The following descriptions indicate the motivations behind some of
the Unisa library's WIS Team projects as well as giving some idea of the problems encountered, solutions found, and progress made.

**Library Skills Training Programs Delivered Directly to the User Via the World Wide Web**

The aim of this project is described as being an opportunity for students located at a distance from the university's campuses to acquire library and information skills. This will enable them to use a library and all sources of information available to them in a library and to be information literate students and lifelong learners.

*Background*

Many Unisa library clients (students) come from a disadvantaged school situation where:

- libraries were almost nonexistent;
- available library material was not well used;
- library instruction was not adequate or nonexistent;
- information technology is/was minimal; and
- there is a lack of general computer literacy.

In spite of all these apparently negative factors, a large percentage of students do manage to enter tertiary institutions. Unisa accommodates thousands of these disadvantaged students because of the advantages that open and distance learning offers them.

Introducing new information technologies into tertiary education in developing countries takes more than plugging a computer into the wall. An enormous technology gap exists between the developed and developing worlds. In developed countries, students log-on at home and electronically send completed assignments to a professor's e-mail box. In rural South Africa, many students live in homes without electricity and have not even used a typewriter. In South Africa, it is likely that students will enter a library for the first time in their life during their tertiary education (Swank, Lubbe, & Heaney, 1996, p. 283).

*Categories of Users*

Beginner users could be:

- computer literate users with previous library experience;
- first time users with little experience and no computer literacy;
- first time users with no library experience and no computer literacy; and
- first time adult users with a great fear of appearing ignorant.

The result of this situation is that many of the users of the Unisa library are completely overwhelmed by the library and everything in it. They suffer from severe library anxiety, computer anxiety, and therefore information anxiety. Users are venturing into, and exploring, new territory
and are often not ready for the demands they must face. Finding personal pathways to understanding will help to reduce information anxiety. Access to information is often the antidote to anxiety (Wurman, 1990, pp. 41, 45). Demands that the Unisa Library faces: to cope with an electronic library environment and to understand user needs in this new electronic environment.

A user needs survey was done in 1996, and strong needs were expressed for computer-related training and for library and research skills:

- to introduce electronic library information in an educationally proper and user-friendly way in order to enable the different categories of users to make the "electronic leap";
- to reach students at a distance; and
- to acquire an electronic learning center in order to improve the electronic training situation at the library.

Although the target group for the programs under discussion is first time users, experience has shown that these are not the only attendees of the training.

Unisa Library Training Programs

The Unisa library training program consists of different courses presented for the past four years in contact sessions in the library. The development of the training program was a daunting task as no individual division has the expertise to deal with all the aspects that need to be included in a comprehensive training program. The trainers who present these sessions are all experts from different departments in the library. They are also staff members who work with clients and are therefore aware of client needs as far as library and information training is concerned. These trainers have developed manuals that are issued to students enrolled for the training so that they can keep them for future reference. The text is enhanced with graphics and practical exercises. The contact sessions have been assessed and evaluated by the Bureau for University Teaching as well as being evaluated by participating students. The recommendations and comments from these assessments and evaluations are used continuously to upgrade and adapt the course material and the manuals. The three levels of training in library and information skills are:

1. **Basic library skills.** These consist of bibliographic instruction and library orientation. The first encounter many students have with electronic media is the introduction to the library's OPAC. Immediately after that, one to four training sessions in basic search strategies on the OPAC are offered.

2. **Advanced library skills.** Students are introduced to different general sources of information—e.g., periodicals, dictionaries, encyclopedias, indexes, and so on. Orientation on the location, access, and use of
these various sources is provided. Awareness of the electronic availability of these sources is created. The use of multimedia is introduced.

3. **Elementary research skills.** The recording of information, the reading of text references, and the compilation of an elementary bibliography is covered. The use of subject-related databases and other electronic resources is included.

The momentous development of open and distance learning (ODL) internationally and the re-entry of post-apartheid South Africa into the international community has forced Unisa to enter the competitive market. Online delivery of academic course material is now becoming a priority and, with the development of the SOL program, Unisa is beginning to make its study material available online. The library as a major support service has also started developing its training material in electronic form.

**Development of the Electronic Workbook for the Basic Skills Course**

It was decided to use the printed text of the workbook for the contact course as a basis. The text was converted to HTML, and the graphics and layouts were adapted for electronic training purposes. Changes in language usage, writing style, and subdivisions were necessary to make the workbook more user friendly. The adapted material was sent to the compilers of the original text for final editing and approval of the content. The Bureau for University Teaching was again involved in the process.

The creating of links was an integrated process within the development of the library's Web page. Links were created to other existing information about the library on the Web page. This was done to give depth and width to the content of the training program. The pilot copy was made available on the library's home page four months after it was initiated. Uploading problems delayed accessibility for about three weeks.

**Experience Gained and Needs Identified**

Liaison with the Department of Computer Science and with the Bureau for University Teaching was important. Delays were reduced and standards can be set in this way. Knowledge of HTML, Web page design, programming, teaching on the Web, graphic design, basic teaching principles, and critical path analysis is needed. One staff member involved in course development has since enrolled for a British Open University Internet course on Teaching and Learning Online. Support needed for this development is the necessary software—e.g., link checker, graphics program, HTML converter, and HTML editor. Research about the assessment of study material on the Web and information on Networked Learner Support are components that will keep the development of library training programs at a high standard. No formal assessment of this product has yet been possible, but the feedback received has been favorable. An
overall observation about the program is that it could be more interactive. Work has been completed on converting the advanced library skills course manual to HTML so that it can also be mounted on the library's home page.

**RESEARCH INFORMATION SKILLS**

The Research Information Skills course was developed in response to a request from the Department of Chemistry to the Departments of Information Studies and Library Services to develop a course in effective information retrieval and use for the structured M.Sc. in Chemical Education. Accordingly, the overall aim of the course is for each student to develop the necessary skills for effective retrieval, evaluation, organization, and use of information for research.

The product has been introduced as an elective course for the M.Sc. (Chemical Education) and also as part of the Research Methodology course in the M.Ed. (Environmental Education). The team approach was adopted for tuition materials development as there were a number of parties involved initially. The team included a staff member from the Bureau for University Teaching. Her input as an education specialist was invaluable, and she could relate to the material as someone who was faced with it for the first time. She also provided useful commentary on the layout and on how to make the text as accessible as possible without being patronizing. There were four people from the library, all from the Research Services division, and they assisted in the information provision perspective as well as information literacy. The theoretical component was provided by a staff member from the Department of Information Studies.

The rationale was to produce efficient information users rather than full blown information scientists. Accordingly, a very practical course was developed in which the content of the tuition material is generic, but the exercises are subject specific. However, as it is a course for Master's degree students, there is a theoretical framework to the course, and there are certain concepts that the students should master. It is envisaged that, by the end of the course, the students will be able to apply the theory of information retrieval and use to their research information requirements. The course consists of eight study units:

- Study unit 1 Research and information
- Study unit 2 Information infrastructure
- Study unit 3 Computerized information retrieval
- Study unit 4 Database structure
- Study unit 5 Search strategies
- Study unit 6 Organization and maintenance of information in a personal database
- Study unit 7 Internet: Navigation and use
- Study unit 8 Publishing
There is a five day compulsory workshop where the students can put what they have learned into practice. As the researcher is best able to decide what material is relevant for his or her research, the emphasis is placed upon self assessment and evaluation. To this end, the students must compile a portfolio based on exercises included in the tuition material as well as a final project. The following definition that was developed by Paulson, Paulson, and Meyer (1991) was used as a point of departure for this course:

A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. A portfolio . . . provides a complex and comprehensive view of student performance in context. It is a portfolio when the student is a participant in, rather than the object of assessment . . . it provides a forum that encourages students to develop the abilities needed to become independent, self-directed learners. (p. 60)

In the final project, students will be required to do a comprehensive literature search on a topic related to their research and explain all their reasoning. They must also include examples of search strategies, sources consulted, and so on. Each student will be expected to draw the references into a personal database and compile a sample reference list. Each reference list will be drawn up according to the conventions of the discipline in which the research is conducted. All the activities in the portfolio are designed to assist in the development of the skills and knowledge required for the completion of the final project. The lecturers from chemistry and education, whose students are registered for the course, will be involved in assessment of the portfolio from a subject perspective, and other members of the team from an “information” perspective. The portfolios will be externally examined.

Currently the tuition material is available only in print but, by the end of the year (1998), there will be an electronic version available for those students who have access to the Internet. It is hoped that the interactivity of the text can be enhanced in the electronic version. It is envisioned that eventually the students who are too far away from the main Unisa campus to attend the workshop will be accommodated, either through Internet-based activities or, where database access is restricted, in collaboration with a library that has the necessary facilities.

There are also two computer aided instruction (CAI) packages being developed that will provide additional material for students. These will be distributed on diskette initially and later via the Internet. The CAI packages cover search strategy formulation and database structure.

The following definition of information literacy was used as a frame of reference for the outcome of the course and, in one of the activities,
the students have to substitute the word “researcher” for “An information literate person.”

Information Literacy

An information literate person:

- recognizes the need for information;
- recognizes that accurate and complete information is the basis for intelligent decision making;
- formulates questions based on information needs;
- identifies potential sources of information;
- develops successful search strategies;
- accesses print and technology-based sources of information; and
- is a competent reader.

An information literate person evaluates information:

- establishes authority;
- determines accuracy and relevance;
- recognizes point of view and opinion versus factual knowledge;
- rejects inaccurate and misleading information; and
- creates new information to replace inaccurate or missing information as needed.

An information literate person uses information:

- organizes information for practical application;
- integrates new information into an existing body of knowledge; and
- applies information in critical thinking (California Media and Library Educators Association, 1994, pp. 2-3).

This is the first year that the course is offered and, as such, the project team is aware that there will be problems and pitfalls. It is not yet known how the students will respond to the material or to the portfolio. At the time of this writing, ten students were registered for the course but registration was still open. Other academic departments have expressed an interest for next year. It is hoped to expand the course to accommodate more students, as we consider it increasingly important that, as an academic library, we accept the responsibility to teach people how to find and use information effectively. We consider it preferable to pursue this goal in collaboration with academic departments.

Work Group on Internet Course Development

The Work Group on Internet Course Development (WICD) was established in order to improve the quality of existing Internet training courses offered by the Unisa library and to develop new courses that would meet the requirements of the different types of users found in a university
environment. The work group comprises people from the library who offered training in various aspects of the Internet as well as an education specialist from the Bureau for University Teaching. The point of departure is that the Internet is one of the richest sources of information available and, as information specialists, we have an obligation to teach clients about the Internet as a resource. Owing to a lack of facilities, the Internet training was first limited to Unisa staff members but, on completion of the library's electronic learning center (May 1998), the training was extended to students able to visit the campus.

There are three units that have been developed in the light of interviews conducted with people who had attended earlier presentations. The interviews revealed that many of the units were too advanced for the average attendee, and that they felt that their expectations were not being met. They indicated that they really needed a basic introductory course where they were assisted through each step. In the earlier training, units were offered according to application (WWW, mail lists, newsgroups, telnet, Gopher, ftp), and skills levels were not established prior to enrollment. The consequence of this was a vast range of competencies within groups, and the trainers were often at a loss as to how to deal with the class. A great many of the trainees were also highly frustrated. The three training units currently offered are:

- Internet for new users, which provides a limited theoretical and practical background to the Internet. It covers basic Internet concepts and terminology such as the World Wide Web, protocols, browsers, URLs, and bookmarks. Netscape is introduced in a hands-on session. The manual for the unit is available online, and there are links to sites to illustrate various aspects of the Internet.
- The second unit is an introduction to Netscape where an in-depth explanation is given on the functioning of the Netscape browser. It is recommended that trainees should have a prior knowledge of the Internet in order to benefit from the Netscape unit and an online self-test questionnaire has been designed accordingly.
- The third unit offered is an introduction to finding information on the Internet. This includes searching skills (Boolean operators), search engines, subject directories, telnet, ftp, and how to evaluate and cite Internet resources.

Eventually, all the manuals will be available online in an attempt to meet the training requirements of all clients including those located at a distance from the main campus. It is also not possible to provide classroom tuition to 120,000 students. The course material has been developed with an awareness of the backlog in the education of many of the students, which is why the units are offered piecemeal. The students should
be able to pace themselves, and there is always an opportunity to e-mail questions to the trainers.

Questionnaires have been designed to assist in the evaluation of the training offered so that the tutorial material can be upgraded and adjusted to meet the changing requirements of the users. It is envisaged that the existing units will be increased to accommodate developments on the Internet itself. Training in individual Internet applications will be offered as additional courses to the existing units.

In order to overcome the problem of the wide range of competencies in the classes, it was decided to try to screen trainees by means of questionnaires that they completed prior to registration for any particular course. Before registering for unit 1 (registration is online for all units), the trainees answer a questionnaire designed to establish their competency with regard to the Windows environment. If the trainees do not answer a certain number of questions correctly, they are given an opportunity to redo the questionnaire or they are encouraged to attend a Windows course offered by the Department of Computer Services. The trainers felt that the students who were not confident enough in the use of Windows would not easily be able to benefit fully from Internet training since Netscape (the browser that is supported by Unisa) is a Windows-based application.

A problem with Internet course development is that updated versions of the browsers are released at regular intervals, and this means that all tutorial matter has to be changed accordingly. A frustration is that adequate warning is often not given that the latest version of the browser is to be loaded on the campus-wide network, and courses have to be changed at very short notice.

The full diversity of the students' requirements for Internet training will not be met by the three existing units, although they are a foundation on which to build. Considering the nature of Unisa's student population, it will be a long time before an introductory unit is no longer required.

**The Provision of a Current Awareness Service**

The long-term purpose of the current awareness project is to provide a substitute for the circulation of new journals to lecturers. The circulation of journals is a valued current awareness opportunity for the academic staff, but it diminishes the availability of the journals. As the library's policy states that it has a "client-driven focus," it was felt that a service to clients should not be discontinued unless an acceptable alternative could be provided.

Various electronic current awareness products have been investigated that could partly provide what the circulation of journals has provided over the years. To be considered, products had to conform to the requirements of allowing the saving of profiles and the e-mailing of search results. They also had to be available via the Internet in order to allow for
the ultimate extension of the service to research students located at a
distance from the university's main campus. Silverplatter, NISC, Ovid, 
Dialog, and Faxon allow the user to save profiles. As no additional finan-
cial resources have been made available for this pilot project, the bibli-
ographic databases to which Unisa already subscribes in CD-ROM format 
are being used for the pilot project. These include Silverplatter products 
such as MLA, LLBA, Sociofile, and Art Index as well as NISC's South Afri-
can Studies, Dialog's ERIC and Philosopher's Index, and Faxon's Faxon 
Finder which is particularly strong in the field of the humanities. Current 
Contents on Diskette is used to provide a service to the science faculty. 
Service providers like Silverplatter have announced that very advanced 
Web-based SDI facilities will be part of their next release.

All the subject librarians received training in the saving and reload-
ing of profiles as well as the other details involved in providing a current 
awareness service and/or training of clients to use the databases them-
sewes in the future. Each subject librarian has identified three interested 
"test clients" for the purpose of this exercise—i.e., lecturers on sabbatical, 
those writing books, or those completing their doctoral dissertations. These 
clients were chosen because of a greater need for a current awareness 
service. Reference interviews were held with these people to determine 
their specific research needs. They were very keen to participate and 
provide feedback. Search strategies were tested on the databases, and the 
results were discussed with the clients. The strategies were accordingly 
refined or expanded. The profiles are saved and re-run when the data-
bases are updated, and the results are sent to clients via e-mail.

At the time of this writing, the pilot project had been up and running 
for three months, and the feedback has been mainly positive. A product 
to serve the needs of the law clients has not yet been identified. The 
strong American bias of some of the products and postage and adminis-
trative delays in receiving updated CD-ROMs have been problematic.

Tables of contents (TOCs) services are also a viable alternative to jour-
nal circulation. UnCover (http://uncweb.carl.org:80) and Ebsco (http:/ /
/www.epnet.com) provide TOCs. Problems have been identified with 
UnCover usage such as the fact that print-outs of TOCs do not include the 
volume and number of the journal and results cannot be sent to the client 
via e-mail. Publishers such as Springer (http://link.springer.de/alert/as-
sub.htm) offer Web browsing of their TOCs for a fee whereas Academic 
Press (http://www.europe.idealibrary.com/) and Elsevier (http://
www.elsevier.nl/locate/ContentsDirect) offer free Web browsing of the 
TOCs of their journals. Elsevier allows the client to select relevant titles 
from the list available on their Web page and then new TOCs are auto-
matically sent to him/her via e-mail.

After the pilot project is completed, the library hopes to offer 
current awareness products to its clients via the library home page
A CAI program to enable clients to use the products independently could also be made available. The role of the subject librarian will still be important with regard to the creation of search profiles and the refining of search strategies.

**UNISA LIBRARY HOME PAGE**

Although a Web page for the library had been planned for some time, the necessity for it became clear in the light of the university’s commitment to making information available electronically to its students. Involvement in Internet training and in researching the Internet for the purpose of writing a training manual offered the opportunity to look at and examine other library home pages. Creating screens for Unisa’s in-house developed Web-based OPAC meant that HTML had to be learned. These experiences built sufficient confidence to start the process of creating a home page for the library. Additional skills were acquired by attending HTML and Web page design courses.

Initially, people in the library had to be convinced of the necessity of a home page, after which staff had to be identified to serve on a drafting committee, the help of a graphic artist had to be obtained, the hardware had to be upgraded, and new software had to be acquired. An HTML editor named HotDog was downloaded from the Internet and evaluated for a period of thirty days after which approval was obtained to purchase it.

**Planning**

The whole project was very carefully planned. The following questions were asked:

- Why does the Unisa Library need a Web page?
- What will the benefits be to our users/clients?
- What will the benefits be to the library?
- What should go onto the Web page (the content)?
- Who will be involved in the compilation?

The first brainstorming session with the Web committee was held where the structure, layout, design, and content of the page were discussed. The content of the page turned out to be a major problem area and consensus could not be reached at first as to what information about the library should be “advertised.” It was necessary to move away from traditional thinking and to focus on the electronic delivery of information to the users/clients. New ways to access library information and services had to be created. Staff had to be made aware that, with the Web technology, existing library resources and services could be presented in new ways—e.g., multiple access points to information.

It was decided that the idea of a library home page had to be sold to all the staff members, therefore each representative on the Web commit-
tee went back to their divisions and formed a committee where a regular progress report about the Web page was given, feedback was gathered from the staff within the division, and contributions for the Web page discussed. Meetings were scheduled at regular intervals where a story board of the layout and structure of the main areas of the Web site was drafted. Changes were made until a point was reached where the ideas could be converted into a Web page. The team all had a look at the page, and more changes were made. By this time the five main pages of the Web site had been decided upon and consisted of the following:

- information about the library (including general information about the library, services offered, information about the various divisions, as well as a staff search facility);
- information about what is happening in the library—e.g., training offered;
- information about available electronic resources and access to the OPAC;
- study information—e.g., links to information on the university's Web page such as the Students On-line system;
- a selection of useful Internet addresses.

Selection of Content

With the finalizing of the layout of the five main pages, it was possible to start gathering content. After the completion of the Web page, it was realized that this was the most important and the most time-consuming part of the Web site development. In selecting content, the following had to be kept in mind: not to try to include every bit of information about the library and to take the clients' needs into consideration. Content was divided into two areas: (1) local information, and (2) remote information.

In the content-gathering process, what was available in print or electronic format was first considered. Printed documentation, such as the library's services and procedures handbook, handouts, and so on proved useful. Documentation already in electronic format was a good starting point. Where documentation existed, it was in WordPerfect and had to be converted to HTML. A program called WPTHTML was purchased for this purpose. Something that had to be taken into consideration was that these documents had to be adapted for online use. At this point the need for an editing team was realized. All documents had to be edited before they could be published on the Web page. A team of people was selected for this job.

Where no documentation existed, staff had to write new content for the project. This was a delaying factor in the whole process as people had other jobs to do and simply did not have the time to compile the necessary documentation. The second area of content examined was remote information. The resources had to be selected and evaluated before they were included.
Presentation of the Information

At this point, it was realized that much information had been gathered that would have to be organized. More story boards were done to establish exactly how all the information would be structured and linked. As the pages were completed, converted, and edited, the graphics were discussed with the graphic artist, ideas were given, and she then designed a graphic that was, in turn, presented to the Web Page Committee for approval. Demonstrations were given from time to time for the various divisions in the library where they were asked for input, and changes were made where deemed necessary.

When everything was finally ready and the page could be uploaded to the university's Web server, a major problem was encountered which had not been foreseen. Some of the file names were in upper-case and, when the page was loaded, many of the links did not work. The reason was that the upper-case file names, which did not pose a problem on the editor which was used, unfortunately were incompatible with the Unix Web server. This meant that the whole Web site had to be rechecked and all the file names changed. In this process it was discovered that not all the graphics displayed properly on PCs with VGA monitors. An alternative text version of the entire Web page had to be designed to overcome this problem. The page was then finally uploaded. Valuable experience was gained from this exercise.

Maintenance

Maintenance of the Web site is a crucial part of the whole Web site design process. A centralized maintenance procedure is used to update information on the library's Web page. This is quite a complex process. The following tasks form part of the process:

- updating local library information;
- checking hyper links;
- adding new information or deleting outdated information; and
- reorganizing or changing the design of the Web site.

Staff in the various divisions had to be made aware of the importance of ensuring that information is current, and a procedure had to be drawn up for updating information. Another problem was the checking of hypertext links. A few link checkers were downloaded from the Internet and evaluated, and it was then decided to purchase Linkbot.

To make the library's Web site accessible in the subject directories and search engines on the Web, the Web site address was submitted to several of these resources. For a long time after the initial completion of the Web page, all changes had to be e-mailed to the Computer Services Department with a lengthy description of the files that had to be changed or added, the location of these files, and so on. This great source of frus-
tration was resolved by obtaining direct access to the university's Web server so that the library is able to maintain its own Web page.

**ESTABLISHING THE ELECTRONIC TEXT CENTRE FOR THE UNISA LIBRARY**

The aim of the Electronic Text Centre is to become the heart of a future electronic library by providing an online scholarly text service of international standard and by encouraging a higher level of computer literacy among our client community. The goals of the proposed electronic text center were formulated as follows:

- to collect and prepare texts for an online text service;
- to provide hardware and software to enable text analysis by computer on campus or remotely via the Internet;
- to provide training and instructed support to clients in the independent and confident application of tools for the analysis and creation of scholarly electronic texts; and
- to make the service available twenty-four hours a day to any client with access to a computer and a modem.

**Need Statement**

The need for a service like an electronic text center came to the fore with problems experienced with the CD-ROM databases that were scattered in different departments throughout the library. They are in several different formats and require different platforms to run on. In these times of decreasing funds, it is impossible to provide hardware and software to support them all. Staff and clients need to be trained to use several different interfaces for all these resources because each package is released with its own search and display software. CD-ROMs are legally and technically difficult to network on a campus-wide scale. If the library were to continue to collect electronic resources in this way, the hardware costs would be prohibitive.

As a distance teaching university in the electronic age, the clients of Unisa library will increasingly develop needs for remote access to full-text electronic resources. In the future, increasing numbers of students will be able to use such access as services offering access to the Internet are developed.

**Benefits**

Unisa is the largest distance teaching university in southern Africa. Our students can benefit considerably from an Electronic Text Centre. It will encourage the development of a new generation of computer-literate clients at Unisa. The aim is that any registered Unisa student who owns a computer and a modem or has access to one should be able to access the Electronic Text Centre twenty-four hours a day at his or her convenience. Online texts are not subjected to library hours or limited to the library building. A client with access to a computer and a modem does not have
to go physically to the Electronic Text Centre to work with most of the
texts that it holds because he or she can access those materials from home.
The Electronic Text Centre can support many simultaneous users, and
texts cannot get lost (Ream, 1993).

In the field of the humanities, there are already several full-text data-
bases available. Although they are expensive, they are one-time invest-
ments, the information will never go out of date, the format of the text is
compatible on all platforms, and the data will outlive the current hard-
ware. In the field of science and technology, the electronic text center
will provide the infrastructure to support distance teaching, the invisible
college, scholarly communication, distribution of research results, and elec-
tronic publishing.

Electronic text allows more flexible use. Hypotheses can be tested
quickly over massive amounts of data—e.g., to count and read in context
the occurrences of a term, or search for the earliest recorded use of a
specific word in the English language, and so on (Seaman, 1994). Having
one software package will have the advantage that users will only have to
learn one interface in order to acquire the skill to search all the databases
(Seaman, 1994). In the long term it will be cost saving because full-text
databases will be loaded on one machine instead of numerous worksta-
tions that will eventually have to be set up to accommodate all the differ-
ent CD-ROMs (Ream, 1993).

An Electronic Text Centre will help Unisa to provide a service of in-
ternational standard to its clients that would enable it to compete with
other institutions on an international level. Electronic hardware and soft-
ware items purchased by Unisa will be evaluated in terms of standards set
by the Electronic Text Centre to ensure compatibility and quality. This
will ensure the accessibility of all full-text resources purchased in the future.

Functions

The Electronic Text Centre will provide a physical facility (in the li-
brary) that is convenient for clients to visit for training and instructed
support as well as a place where full-text databases that cannot be net-
worked (e.g., CD-ROMs) could be consulted. The center should provide
hardware and software that enables computerized text analysis and also
training and guidance in the use of these tools. By this means, networked
electronic books may become a mainstream part of teaching and research
resources at the university and would strongly support distance teaching
(Seaman, 1994).

The Collection and Preparation of Texts

The Electronic Text Centre will collect electronic texts needed for
study and research at Unisa. There are several options for collecting on-
line texts of which the following are the most important:

- Purchasing: The Electronic Text Centre will formulate a collection de-
development policy to control the selection of full-text databases. Texts should preferably be in SGML. The literature databases of Chadwyck-Healey and the Oxford English Dictionary would be great assets. Statistics during a one month trial indicated that frequent access was made.

- **Publishing**: Researchers could, in the future, use the electronic text center to publish their articles, research reports, and even dissertations. The periodicals published by Unisa could be put in the electronic text center. It would also be possible to produce tutorial letters and other study materials and distribute them via the electronic text center's search and display software. Creation of texts will be encouraged by the availability of an electronic text center, because graduate students, lecturing staff, and researchers who are subject experts would publish articles and papers. Archival materials in the Unisa Library Special Collections that are potentially very useful for study and research, but relatively inaccessible, could be made remotely available by means of the Electronic Text Centre.

- **Scanning**: Texts which are not subject to copyright, such as texts published before 1900, could be scanned and encoded to be included in the Electronic Text Centre. The Electronic Text Centre will provide hardware and software to scan documents in various formats for clients who would like to create their own texts. Standards will be formulated regarding issues such as file formats to ensure compatibility and exchangeability.

- **Text Encoding (SGML and TEI)**: Texts should be encoded in a nonproprietary manner. All the electronic text centers which were studied are committed to SGML (Standard Generalized Markup Language) and the **TEI Guidelines**. SGML is an international standard for data interchange irrespective of the software or platform. Because this will also be the standard for the proposed electronic text center, it would be no problem to transfer the data to a more up-to-date system should the current system become outdated. SGML markup could be done with a text editor, word processor, or SGML editor—e.g., SoftQuad Author/Editor.

The Text Encoding Initiative (TEI) has published the **TEI Guidelines**, a two-volume reference source of 1,300 pages that can also be accessed via a search or browse interface at various Internet sites. It provides a full set of tags, a methodology, and a set of Document Type Descriptions (DTDs) that allow the detailed description of the spatial, intellectual, structural, and typographic form of a work (Seaman, 1994). The DTD can be used by a program to parse or validate the tags in a text (Hockey, 1996).

Bibliographic records that refer to the electronic file where the full-text documents are stored should be created so that they can also be retrieved via the library catalog. The SGML tags of the TEI header could be
converted to USMARC and imported into the library catalog instead of creating new records manually.

- Training: The electronic text center will provide training in scholarly tools for text analysis and encoding (SGML and HTML) to enable lecturers and researchers to create their own texts.

Pilot Project

- Web Page: A Web site has been set up for the Electronic Text Centre pilot project. It contains information about the project and links to related remote sites. It is also used to announce news like free trial access periods. The Electronic Text Centre has 12.5 gigabytes on a Silicon Graphics machine to host the Web page and full-text databases.

- Slotow Collection: The Slotow Collection contains documents from the Anglo Boer War and is housed in the Unisa Library Archives. It has been selected for the pilot project because 1999 is the centenary of the Anglo Boer War. Selected texts and images are scanned to be presented in electronic form via the Internet as an example of what the Electronic Text Centre will offer in terms of locally created texts. A flatbed grey scale scanner is used for scanning text with Optical Character Recognition (OCR). For the purposes of the pilot project, these texts, which are initially saved in ASCII format, are converted to HTML. Images are scanned with a flatbed color scanner and stored in jpeg format. They will be linked to the texts which will be delivered in HTML for the pilot project. SGML markup will not be done for the pilot project because of its complexity and because there is no search and display software in place yet. In the meantime, expertise and skills are being gathered to allow ultimately for the creation of quality SGML texts for Unisa's Electronic Text Centre.

Evaluation of a Search Engine

At present, various search and display software packages are being evaluated. Opentext Livelink Search, Verity's Search97, and Site Search are the products on the short list. Each product will be evaluated against the following criteria:

- it should support SGML;
- it should run on a Silicon Graphics machine;
- it should be powerful enough to handle large volumes of texts; and
- it should be flexible enough to be customized according to the clients' needs.

Problems

Although the Electronic Text Centre project has been approved by the university as one of the major fundraising projects of the Jubilee Fundraising initiative, no funds for the project have been raised to date. Commercial full-text databases and search and display software are ex-
pensive. Transcription and markup of texts are painstaking and labor intensive activities requiring highly skilled staff. There is a great demand for technical expertise and much training and marketing still needs to be done. Copyright restrictions prevent the creation of electronic versions of the study materials most heavily in demand. The relatively narrow bandwidth of the South African Internet is another barrier in the way of delivering full-text materials over the Internet.

Conclusion

The model and standards proposed for the Unisa Library Electronic Text Centre are based on worldwide leading electronic text initiatives. It could provide the infrastructure for building a full-text collection which could be exchanged on an international level and outlive the current technology.

COMMERCIAL DATABASES

Together with books, information located in journals forms the most important source for study and research at a university. Off-campus Unisa students currently have very limited access for searching for themselves in any of the bibliographic or full-text databases to which the library subscribes, as these databases are networked only on the main campus in Pretoria owing to licensing and network restrictions.

To meet the information needs of mainly postgraduate clients, the library provides an extensive subject reference service whereby commercial bibliographic databases, together with any other applicable information source, are searched on request by subject librarians. With the improvement of Internet access for Unisa students in South Africa and the growing number of Unisa academics with Internet access at home, it is imperative for the library to make as many commercial databases as possible available to the remote client to allow for faster access to relevant information. Providing direct access to the bibliographic or full-text databases through the Internet will not only speed up the process of obtaining journal articles but will also place the important task of identifying and evaluating relevant articles directly in the hands of the researcher. The Unisa Library is a founding member of the Gauteng and Environs Library Consortium (GAELIC), and this has made resource sharing in the area of shared subscriptions to bibliographic databases possible. The library is taking an active part in investigating shared or joint acquisitions in specific subject areas.

A project has been launched within the Unisa Library with the following aims:

- to investigate, plan, and implement the replacement and upgrading of the existing bibliographic database network infrastructure to provide
for local and remote access via the Internet to the bibliographic commercial databases held by the library for all client groups;

- to evaluate the subscription to, and placement of, bibliographic and full-text databases on the network according to specific criteria as part of the collection development process to ensure the optimum utilization of the database budget.

**Existing Database Network**

At the beginning of 1997, the University's Department of Computer Services (DCS) judged the hardware of the library's existing CD-ROM network obsolete and in need of replacement and advised the library to investigate migration to a new CD-ROM network platform. The library's forty-three CD-ROM databases are networked on a system consisting of three 486-DX PCs, seven CD-ROM towers containing forty-two double-speed drives, four 1.7 Gb hard drives using Novell NetWare and SCSI Express, EISA bus architecture, and Ornetix CD-Vision 4.0 as the network management software. Databases are networked only on the main campus in Pretoria.

After consultation with network experts at the university, it was decided to start the migration to a new platform with the purchase of a Windows NT server with 20 Gb hard drive. This server can also be configured to serve as an Internet server for the library. This will enable the library not only to investigate what additional hardware and network management software is needed to replace the existing network, but also to evaluate and test various bibliographic databases on the Internet to build up the necessary experience for providing remote access.

**Investigating Various Options**

The hardware investigation will comprise the following:

- to analyze the current network environment at the university and to meet with various network administrators at the university to identify possible problem areas and open communication channels to discuss them;
- to identify possible database network management software. The library should investigate whether Ornetix CD-Vision still meets the necessary criteria for managing a database network;
- to identify programs to launch bibliographic databases via the Internet. Some bibliographic databases have Internet search software such as WebSpirs from Silverplatter. However, there are other important databases that still run on DOS or Windows software that need a launch program to enable searching. Programs such as Citrix Winframe or W3Launch will be tested; and
- to compile criteria by which these systems and programs can be evaluated.
The server was delivered in November 1997, and the configuration was done during December 1997. During this time, demonstration or trial versions of the network products to be evaluated were obtained, mainly by downloading from the Internet.

**Network Content Investigation**

Providing the technical infrastructure for remote access on the Internet is only one part of the project; investigating what databases should be made available (i.e., the content of the database network) forms the other major part of the project as that will determine whether the library can provide the information resources to meet the information needs of its clients.

Existing Database Subscriptions. The Unisa Library subscribed to its first databases on CD-ROM in 1988. Generous increases in the budget for electronic resources during the first few years allowed the library to add to those subscriptions, and the library currently subscribes to a total of sixty-five databases of which forty-three are networked. Databases were originally placed on the CD-ROM network based on the cost of networking, subject coverage, potential use of the database, and space available on CD-ROM towers. No major revision of the network databases was done in the past three years. Decisions to subscribe to new databases were taken by an ad hoc committee that was convened irregularly.

Electronic Collection Development. As no increase was received for the electronic resources budget for the past two years, yearly increases in the subscription prices put pressure on the library to continue with the same database subscriptions. No new databases could be added to the network without canceling existing databases. As no formal collection development policy for electronic information resources exists in the library, it was decided that the time had arrived for the establishment of a more formal structure to manage the electronic resources budget. In order to do this, the following should be done as part of the groundwork:

- compile a list of criteria according to which existing subscriptions to databases should be evaluated. This will identify databases for cancellation in order to make money available for new subscriptions or placement of databases on the network;
- use the above exercise to finalize a list of criteria according to which all database subscriptions should be evaluated in the future. That will ensure the optimum utilization of the database budget; and
- identify those criteria according to which the placement of databases on the network can be evaluated.

These criteria will be discussed for approval at an Electronic Database Workshop to be held in April 1998 and will be attended by all subject librarians and other stakeholders. During this workshop, a decision will
also be made on the structure and procedures of the committee that should decide on database subscriptions.

Joint subscriptions to bibliographic or full-text databases as part of the GAELIC consortium also necessitate a more formal way to decide about subscriptions to databases, and it is hoped that implementing the above will provide clearer guidelines for decision making and stimulate a healthy debate on joint acquisitions with other libraries.

**Trial Databases**

After the installation of the Windows NT server, it was decided to start with trial access to existing network databases using WebSpirs from Silverplatter. After loading and configuration of the software and obtaining the necessary licenses from Silverplatter, the first eight databases were made available, initially only internally in the library, but later also to all Unisa staff on the main campus. Trial access to remote students will be made available from April onward.

As part of the Gaelic Joint Acquisitions Workgroup investigation, trial access to the ABI/Inform Full-Text database from Ovid was made available to all Unisa staff and students. Access to the database was advertised on the university’s campus-wide e-mail communication system and under the heading Trial Databases on the library’s Web page. Enquiries from Unisa students as far away as the United States, Switzerland, and Israel were received. During this trial period the following will be monitored:

- configuration of the server and the speed of data transfer to users;
- data transfer on the university’s network and the identification of possible problem areas; and
- ease of access to an Internet database located outside South Africa.

**Marketing**

Reaching the thousands of remote Unisa students with the news of the new information service could prove to be a challenge, and all available channels of communication should be utilized to reach as many students as possible. The major marketing tools are Unisa’s student newspaper *Unisa News*, the staff bulletin *Unisa Bulletin*, and the library’s staff bulletin *Bibliovaria*. Flyers, brochures, or bookmarks detailing how to gain access to the database, basic searching techniques, and contact information will be compiled for the various databases. These will be distributed at the library’s information desk, at group discussion classes by lecturers, in the branch libraries, or added to any letters sent to students by the library such as introductory letters to postgraduate students.

**Training**

Although one can assume that students with Internet access at home have the necessary level of computer or Internet literacy to use these databases on the Internet, thousands of Unisa students from disadvantaged
backgrounds will now have the opportunity to search databases previously not available to them. Providing the necessary training for remote users in computer and Internet literacy, as well as database selection, searching techniques, and basic information retrieval skills poses a significant challenge for those involved in user education.

Access Control and User Authentication

The most urgent problem to solve is the system of user authentication and authorization to be used. As Unisa students are spread across the world, it is very important to ensure that acceptable security is in place to enable the library to comply with restrictions set out in the database license agreements. The three main methods of access restriction, user-ids and passwords, IP-address restriction, or the use of proxies will be investigated. It is generally felt that the administration involved in a system of user-ids and passwords for the number of Unisa clients is not a workable model, and that the use of a proxy server, together with IP filtering, will be a better system of access control.

Other Problems Identified

Apart from the problems mentioned that will need to be investigated, various other aspects will also need attention such as:

- support for the remote user by setting up a help desk or an electronic help facility where questions and problems can be submitted;
- design of the Web page that will provide access to the Internet databases;
- setting up an acceptable system of statistical measurement and reporting using a spreadsheet; and
- setting up a formalized system of communication about database news with client groups such as a regular news column in university publications, a news section on the Web page, or maybe a listserv to which registered users can belong.

The Unisa library will, by creating an infrastructure to enable remote access for all its clients to bibliographic databases, provide its clients, for the first time, with the opportunity to satisfy their own information needs and to become experienced searchers for information. The successful completion of this project will enable the library to place access to information in the hands of all its clients.

Conclusion

In the report Business Process Reengineering Project Interim Report by the Unisa library (1998), strong emphasis was placed on the perceived paradigm shift from the traditional library as a physical depository of information sources with high levels of mediation for the clients to an entity lacking boundaries (existing partially in cyberspace) where clients are
empowered to a high level of self-sufficiency in information use. In this paradigm, the client can access the information network from multiple entry points (University of South Africa, 1998, pp. 21, 22).

Although the WIS Team projects are only now beginning to bear fruit, they will in time make a strong contribution toward realizing that paradigm shift. This process will be particularly meaningful for the remote users of the library and will, for the first time, enable them to enjoy some of the same benefits which have long been available to on-campus students.

NOTE
'These racial classifications are used only to point to the various levels of privileges each group had under the previous South African government.

REFERENCES
Service Perspectives for the Digital Library  
Remote Reference Services

**BERNIE SLOAN**

We play a cultural role in the sense that librarians have traditionally applied a broader range of knowledge to pieces of information. I think it's high tech and high touch. Bring in high tech, but give it a human face. And that face is the face of a librarian. (Hathorn, 1997)

**ABSTRACT**

This article will explore the role of the librarian and of the service perspective in the digital library environment. The focus of the article will be limited to the topic of librarian/user collaboration where the librarian and user are not co-located. The role of the librarian will be explored as outlined in the literature on digital libraries, some studies will be examined that attempt to put the service perspective in the digital library, survey existing initiatives in providing library services electronically, and outline potential service perspectives for the digital library.

**INTRODUCTION**

The digital library offers users the prospect of access to electronic resources at their convenience temporally and spatially. Users do not have to be concerned with the physical library's hours of operation, and users do not have to go physically to the library to access resources.

Much has been written about the digital library. The focus of most studies, papers, and articles has been on the technology or on the types of resources offered. Human interaction in the digital library is discussed far less frequently. One would almost get the impression that the service tradition of the physical library will be unnecessary and redundant in the digital library environment.
DEFINING THE DIGITAL LIBRARY—WHERE DOES SERVICE FIT IN?

Defining the digital library is an interesting, but somewhat daunting, task. There is no shortage of proposed definitions. One would think that there would be some commonly accepted and fairly straightforward standard definition, but there does not appear to be. Rather, there are many. And one common thread among all these definitions is a heavy emphasis on resources and an apparent lack of emphasis on librarians and the services they provide.

The Association of Research Libraries (ARL) notes: "There are many definitions of a 'digital library'. . . . Terms such as 'electronic library' and 'virtual library' are often used synonymously" (Association of Research Libraries, 1995). The ARL relies on Karen Drabenstott’s (1994) Analytical Review of the Library of the Future for its inspiration. In defining the digital library, Drabenstott offers fourteen definitions published between 1987 and 1993. The commonalties of these different definitions are summarized as follows:

- The digital library is not a single entity.
- The digital library requires technology to link the resources of many libraries and information services.
- Transparent to end-users are the linkages between the many digital libraries and information services.
- Universal access to digital libraries and information services is a goal.
- Digital libraries are not limited to document surrogates; they extend to digital artifacts that cannot be represented or distributed in printed formats. (p. 9)

One interesting aspect of Drabenstott’s summary definition is that, while there is a user-orientation stated, as well as references to technology and information resources, there is no reference to the role of the librarian in the digital library.

Another report by Saffady (1995) cites thirty definitions of the digital library published between 1991 and 1994. Among the terms Saffady uses in describing these various definitions are: "repositories of... information assets," "large information repositories," "various online databases and... information products," "computer storage devices on which information repositories reside," "computerized, networked library systems," "databases... accessible through the Internet," "CD-ROM information products," "database servers," "libraries with online catalogs," and "collections of computer-processible information" (p. 223). Saffady summarizes these definitions by stating: "Broadly defined, a digital library is a collection of computer-processible information or a repository for such information" (p. 223). He then narrows the definition by noting that "a digital library is a library that maintains all, or a substantial part, of its collection in computer-processible form as an alternative, supplement, or complement to the conventional printed and microform materials that currently domi-
nate library collections” (p. 224). Without exception, each of the definitions Saffady cites focuses on collections, repositories, or information resources.

In another paper, Nurnberg, Furata, Leggett, Marshall, and Shipman (1995) ask “Why is a digital library called a library at all?” They state that the traditional physical library can provide a basis for discussing the digital library and arrive at this definition: the traditional library “deals with physical data” while the digital library works “primarily with digital data.” Once again, a definition that is striking in its neglect of service perspectives. In a paper presented at the Digital Libraries '94 conference, Miksa and Doty (1994) again discuss the digital library as a “collection” or a series of collections. In another paper, Schatz and Chen (1996) state that digital libraries are “network information systems,” accessing resources “from and across large collections.”

What do all these definitions of the “digital library” have in common? An emphasis on technology and information resources and a very noticeable lack of discussion of the service aspects of the digital library. Why is it important to take a look at how the digital library is defined? As more definitions of the digital library are published, with an absence of the service perspective and little treatment of the importance of librarian/user collaboration, we perhaps draw closer to the Redundancy Theory (Hathorn, 1997) in which “the rise of digitized information threatens to make librarians practically obsolete.” People may well begin to believe that, as physical barriers to access to information are reduced through technological means, the services of the librarian are no longer as necessary.

**Human Aspects of the Digital Library**

While considering the future, it sometimes is helpful to examine the past. As such, it might be useful to reflect on Jesse Shera’s oft-quoted definition of a library: “To bring together human beings and recorded knowledge in as fruitful a relationship as is humanly possible” (in Dysart & Jones, 1995, p. 16). Digital library proponents must consider the role of people (i.e., as users and service providers) if the digital library is to be truly beneficial. Technology and information resources on their own cannot make up an effective digital library.

While a good deal of the literature on digital libraries emphasizes technology and resources at the expense of the service perspective, a number of authors and researchers have considered human interaction in the digital library environment. A number of studies at Lancaster University (Twidale, 1995, 1996; Twidale, Nichols, & Paice, 1996; Crabtree, Twidale, O’Brien, & Nichols, 1997; Nichols, Twidale, & Paice, 1997) have considered the importance of human interaction in the digital library. These studies focus on the social interactions of library users with librarians, librarians with librarians, and users with other users. By studying these
collaborations in physical library settings, the authors have drawn some
general conclusions that might be applied to digital library design:

- Collaboration between users, and between users and system person-
nel, is a significant element of searching in current information systems.
- The development of electronic libraries threatens existing forms of
collaboration but also offers opportunities for new forms of collaboration.
- The sharing of both the search product and the search process are im-
portant for collaborative activities (including the education of search-
ers).
- There exists great potential for improving search effectiveness through
the re-use of previous searches; this is one mechanism for adding value
to existing databases.
- Browsing is not restricted to browsing for inanimate objects; browsing
for people is also possible and could be a valuable source of information.
- Searchers of databases need externalized help to reduce their cogni-
tive load during the search process. This can be provided both by tra-
ditional paper-based technology and through computerized systems
(Twidale et al., 1996).

In a paper presented at the Digital Libraries '94 Conference, Ackerman
(1994) stresses that, while the concept of the digital library “includes solv-
ing many of the technical and logistical issues in current libraries and
information seeking,” it would be a mistake to consider solely the me-
chanical aspects of the library while ignoring the “useful social interac-
tions in information seeking.” Ackerman outlines four ways in which so-
cial interaction can be helpful in the information-seeking process:

1. One may need to consult another person in order to know what to
know (help in selecting information).
2. One may need to consult a person to obtain information that is transi-
tory in nature and as such is unindexed (seeking informal information).
3. One may need to consult others for assistance in obtaining/under-
standing information that is highly contextual in nature rather than
merely obtaining the information in a textual format (information
seekers often have highly specific needs and interests).
4. Libraries serve important social functions, e.g., students and/or fac-
ulty meeting each other in hallways, study areas, etc. (socializing func-
tion).

Ackerman notes that these points “all argue for the inclusion of some form of
social interaction within the digital library. Such interaction should include
not only librarians (or some human helper), but other users as well.”

In a paper for the Digital Libraries '96 Conference, Brewer, Ding,
Hahn, and Komlodi (1996) argue that intermediary services should play a
crucial and essential role in the ongoing development of digital libraries so as not to limit the digital library to the role of "passive warehousing." The authors identify three major purposes for intermediation in the digital library environment:

1. Interaction with potential information beneficiaries. (A beneficiary is defined as "any entity acting as an information seeking agent" and can include users, organizations, and software).
2. Interaction with information resources.
3. Mediation between information resources and users to add value during the information transfer process. (Value added services can include "searching, categorization, filtering, translation, publishing, or some combinations of these activities.")

While the authors do not focus solely on human intermediaries (indeed, a great deal of the discussion focuses on software intermediaries), they do make a very strong case for the necessity of intermediaries in the digital library environment and call into question the notion of a digital library as a passive warehouse. Noting that intermediation services "will be crucial to the development of effective digital libraries," the authors establish the importance of value-added services to the digital library.

Matson and Bonski (1997), Hathorn (1997), Ferguson and Bunge (1997), Rapple (1997), and Abbas (1997) directly address the question of whether digital libraries will need librarians. Ferguson and Bunge (1997) quote David Pescovitz as saying (in a Wired article) "no software application will replace a good reference librarian any time soon" (p. 252). Matson and Bonski's (1997) article is titled "Do Digital Libraries Need Librarians?" and Hathorn's (1997) piece is titled "The Librarian is Dead, Long Live the Librarian."

Matson and Bonski (1997) discuss the development of the National Drug Intelligence Center within the U.S. Department of Justice. Based on these experiences, they outline three roles that have been proposed for the librarian in the digital age:

1. the librarian as enhanced service provider in a proactive manner;
2. the librarian as guru of copyright, licensing, and electronic redistribution—i.e., the understanding of what users and organizations actually want to do with information; and
3. the librarian as system interface designer, making use of experience with how library users request, use, and process information.

Hathorn (1997), in an opinion-editorial piece, contends that librarians will have a place in the networked future and discusses two models for the future role of librarians: the "Redundancy Model" (where librarians will no longer be needed since anyone will be able to access information directly) and the "Masters of the Universe Model" (where no one will be
able to acquire any useful information without the intermediary services of the librarian). After interviewing a number of practicing librarians and library educators, Hathorn (1997) opines that the reality will be found somewhere between the two extremes.

Rapple (1997) identifies a number of roles that academic librarians of the future must assume, such as fostering partnerships, providing outreach to students, supporting academic disciplines, and teaching and facilitating information access. In concluding, he notes that “librarians have a strong future in the networked environment...the experience and expertise of librarians will be invaluable for helping in the design of requisite software and hardware and, above all, for mediating—electronically and at a distance—between the information and the user.” Their traditional role of assisting and instructing users will continue as, seeking to forestall user alienation, they endeavor to put a human face on information technology.

Abbas (1997) summarizes a number of roles that others have identified for future librarians:

- librarians as gateways to the future and to the past;
- librarians as teachers;
- librarians as knowledge managers/workers;
- librarians as organizers of networked resources;
- librarians as advocates for information policy development;
- librarians as community partners;
- librarians as “sifters” of information resources;
- librarians as collaborators with technology resource providers;
- librarians as technicians; and
- librarians as individual information consultants.

In the last role mentioned, Abbas (1997) touches on some parallel points made by other authors. Vannevar Bush (1998), in “As We May Think,” discusses a world of information overload, a world where “even the modern great library is not generally consulted; it is nibbled at by a few”. Bush describes a world of increasingly privatized information spaces, a world enabled by his Memex, a world very similar in basic respects to the current/coming networked world of information. While the information may not be stored in everyone’s desk, as Bush envisioned, and instead may be stored in a distributed fashion across the network, the methods of access will continue to involve more privatized and solitary scenarios. In his Memex scenario, Bush (1945) does see a new profession opening up that is strikingly similar to what some others have forecast for the role of the future librarian as individual information consultant: “There is a new profession of trailblazers, those who find delight in the task of establishing useful trails through the enormous mass of the common record.” Bush did not appear to be fond of libraries, noting that “our ineptitude in get-
ting at the record is largely caused by the artificiality of systems of indexing.” While his image of the “profession of trailblazers” did not seem to include librarians, his description of the “trailblazer” seems to very closely parallel the roles that many librarians are assuming as access to information becomes more and more privatized.

Miksa (1996) arrives at much the same conclusion, albeit coming from a slightly different direction. Miksa contends that the modern library is an era-specific phenomenon. The privately held libraries of the past gave way to the publicly held library in the mid-nineteenth century through a combination of economic and social forces. Miksa contends that those forces are shifting and, in doing so, the library will once again be redefined. As access to great quantities of networked information becomes more affordable to more people, Miksa sees the information space once again becoming privatized. He contends that the contribution of the modern library is not so much a physical institution as it is an idea or concept, “that making available to the members of a society the widest possible array of information bearing entities and doing so in a value-added but efficient way with respect to the selection, organization, and delivery of those entities, and with respect to aiding in their use, is absolutely necessary for the society’s survival.” While Miksa sees the centralized physical library gradually fading into the background and being replaced by the privatized information space, he also sees a role for future librarians as “enablers.” Miksa (1996) sees the role of the enabler as “a person who can help others create their own personal space libraries, or families make their own family-space library systems with individual modes for family members, or businesses any one or more necessary personalized information systems.” He also sees the enablers developing filtering agents and becoming publishers of information. He equates librarianship to the writing profession. “While once there were scribes who did all the writing, the ability to write has now spread through society. . .but there are still those who make their living as writers.” He notes, “even though such library creating skills will spread throughout society, so also will specially educated and skilled people who can create such libraries not only be needed but will become very important.”

Reference Services in the Digital Library

As noted previously, many writers have indicated that librarians will continue to have a role in the future of networked information. That future will involve collaborating with users and information seekers, playing an intermediary role, and providing value-added information services, much as librarians do in the physical library setting. In U.S. libraries, the great majority of such collaboration between users and professional librarians is in the reference setting. Reference librarians guide users through an often overwhelming myriad of information resources in both
print and electronic format. Reference librarians frequently play a major instructional role, teaching users to be better able to navigate through the maze of information resources. Reference librarians also offer value-added services, producing instructional materials and written guides to information resources. Because reference librarians have for so long played such roles, this author decided to focus on the concept of reference services in the digital library. The majority of collaborative activities in the digital library will most probably center on the various activities in which reference librarians engage. Indeed, Eli Noam (1997), a Columbia University professor of Finance and Economics, in an essay entitled "Electronics and the Future of the Research Library," notes that "in the past, the library offered a platform for several complementary academic functions—information base, research environment, reference service, and community center. The latter two are likely to become more prominent as the former two functions will decline."

In this section, I will begin profiling a number of experimental projects that have attempted, in one way or another, to test the extension of traditional reference services into the electronic environment. I will also highlight a number of electronic mail reference services to examine how the physical libraries of today are actually moving their services out into the networked world.

By and large, experiments with extending reference services into the digital environment have centered on two electronic media: e-mail and/or video. Electronic reference services in production in today's libraries generally focus on the use of e-mail, most commonly with some sort of World Wide Web interface. Some libraries have experimented with video but generally also have involved text-based services such as e-mail.

The "See You See a Librarian" project (Morgan, 1996) was conducted during Summer 1996 with the primary goal being "to discover whether or not video conferencing technology...could be used in libraries to enhance information/knowledge services." The project was somewhat unique among experiments at delivering services electronically in that it was not limited to a single institution—i.e., participants ranged across institutional boundaries. As an aside, this multi-institutional aspect raises an interesting question: As library services become more networked and co-location becomes less of a requirement, will it become more conceivable that some library services might be outsourced? Noam (1997) hints at this when he suggests that universities in the future might be administered remotely and by specialized subcontractors, adding that "library collections will be offered and managed from a distance by specialist firms." Is it feasible to think that a centralized site at a major institution might be able to provide, at a fee, some degree of services (including electronic reference) to other institutions? In a sense, it could be considered as a natural exten-
sion of library resource sharing—sharing human resources in this case. Regardless of how effective librarians would find such a scenario, it is probably only a matter of time until funding agencies and higher education administrators stumble across the concept as yet one more opportunity for cost-cutting made possible through technology.

The “See you See a Librarian” project title was derived from its use of the CU-SeeMe software for videoconferencing and was broken down into three phases:

1. **Feasibility.** The purpose of this phase was basically to determine if there was sufficient critical mass among libraries and librarians in the availability of the hardware and software required to provide video-based information services.

2. **Librarians on Librarianship.** This phase would involve librarians engaging in discussions with each other for “real time discussions of library issues.”

3. **Librarians Fostering Knowledge.** If, from the first phase, it turned out that there was a critical mass of hardware and software, and from phase two, a critical mass of librarians willing to participate, this phase would involve opening up the discussion to “information seekers needing assistance.”

In summary, the first phase met with some success, with over 300 connections established, with multi-institutional and international participation. But it was determined that the hardware and software resources in libraries were insufficient to reach a critical mass of participants. The scope of the second phase was narrowed to facilitating a real time debate between two librarians on a topic of interest with an audience of passive lurkers using two CU-SeeMe reflectors. Through a listserv, six people were identified who were both articulate and were willing to participate in the debate. Interestingly, none of these six people had access to the applicable video facilities required to conduct a videoconferenced debate. The third phase was conducted on a very limited basis. Morgan (1996) calls the experiment a qualified success and largely pinpoints the lack of a critical mass of qualified librarians with access to the necessary hardware and software, even though the costs of the hardware (inexpensive video cameras) and software (CU-SeeMe is shareware) were relatively minimal.

In another experiment, Sugimoto, Gotou, Zhao, Sakaguchi, and Tabata (1997) tested a collaboration support system (CSS) based on the “librarian’s desk” metaphor. The CSS utilized video, a telephone connection, a shared virtual display, a virtual whiteboard, and an image tool. The researchers tested users’ interactions with CSS and instruction on the library’s OPAC with a control group receiving face-to-face instruction on using the OPAC. The researchers characterized response to the CSS system
as “mostly positive,” but the results seem somewhat inconclusive with the face-to-face group requiring less instruction time than the CSS group. The experimenters blamed the lack of conclusive results on the low quality of the video equipment used in the experiment, noting that “these problems can be solved in future high performance network and computers.” But it would seem that further experimentation with the CSS application would be required before one could be sure that the only problem was inadequate technology.

In experimentation at the University of Michigan’s Shapiro Undergraduate Library (Folger, 1997), in conjunction with the university’s residence hall libraries, librarians conducted trials of providing reference services between the library and residence halls using desktop videoconferencing technologies. The Interactive Reference Assistance (IRA) project began in Fall 1995 and lasted through the 1995-1996 academic year using CU-SeeMe technology and inexpensive video cameras. A significant amount of time was invested in planning and implementation activities, including publicizing the IRA service through the distribution of flyers in the residence halls and advertisements on the campus television system and in local print media outlets. IRA service was offered two evenings a week for two-hour sessions each evening. A librarian in the Shapiro Library would open a CU-SeeMe session with a workstation in the residence hall and monitor the connection to see if anyone was requesting service. Face-to-face reference encounters in the Shapiro library were given priority over video services to the residence hall. The project was well-planned, was based on a good collaborative working relationship between the Shapiro Undergraduate Library and the UM residence halls, and the librarians participating in the project were characterized as being “enthusiastic about the potential of the technology,” all in all a seemingly good recipe for a successful project. But, during the two-semester duration of the project, “fewer than twenty students actually asked reference questions” using the video connection to the Shapiro Library. What were the reasons offered for the relative lack of success of this project?

- One significant problem was mentioned: “the inconsistent quality of the audio and video” connections. Researchers determined that there was insufficient bandwidth in the implementation to provide necessary levels of service.
- Another problem cited was lack of adequate technical support for the CU-SeeMe shareware product.
- Librarians also noted that it would have been helpful for librarians and users to be able to see each others’ screen displays. They noted that “being unable to see and point to the screen...made it difficult to effectively teach the students how to use the library’s resources.”
It was also noted that some students and staff members reported being self-conscious while on camera.

Despite the relatively low levels of use during the 1995-1996 academic year, the Shapiro Library continues to work with providing reference services via video. Acting on the hardware, network, and software problems report in the pilot, the library has been investing in newer cameras and a commercial software package and has been discussing collaboration with the university's computer center to improve the quality of video transmission. The project has also raised interest levels in other libraries on the UM campus with several exploring the possibility of offering interactive video reference services.

The Interactive Reference Service (IRS) at the University of California, Irvine (UCI) is another project intended to test the effectiveness of interactive video reference service (Lessick, Kjaer, & Clancy, 1997). The project involves a videoconference link between librarians at the reference desk at the university's science library and students working one-half mile away in a college of medicine computer lab. The service is offered one hour per day, Monday through Friday. The science library undertook the project for a number of reasons:

- The UCI library has a goal of developing a virtual library by 1999, and electronic services are a part of this goal.
- Videoconferencing technology has the potential to meet the users' needs without requiring them to physically come to the library, an important aspect of the virtual library.
- Library staff found little concrete data on the effectiveness of using videoconferencing to deliver remote library services and wished to generate data on such services.
- The UCI library had already made a significant investment in the development of a technology-rich infrastructure, and so the project could be undertaken without incurring significant additional costs.
- Science library staff had been physically distanced from medical students with the move of biomedical support services away from the medical school in 1994. Librarians had been looking for a way to re-establish effective services to medical students.

UCI Science Library staff ran a preliminary pilot within the library to test the effectiveness of the proposed IRS project. Participants in the pilot program would focus on the following points:

- reliability of the technology;
- quality of video and sound communications;
- the effectiveness of conducting reference interviews between sites;
- whether the service was actually helping users with their research needs;
- whether the service increased effectiveness over standard telephone reference service (an important consideration);
document staff reactions, as well as technical and service issues; and
determine how service could be integrated into daily workflow without
requiring reference staffing increases.

Based on the results of the pilot study, UCI librarians began to plan for
the implementation of the IRS service itself. Planning considerations in-
cluded staffing needs, integration of IRS into the standard reference ac-
tivities of the science library, and promotion and publicity. The project
utilized the Apple VideoPhone Kit, which includes an audio/video con-
nection, a chat window, and a whiteboard (which can be used to display
graphic images including Web pages). A sample screen from an IRS ses-
sion can be seen at <http://www.ala.org/acrl/paperhtm/irs4.gif>.

After three months of experimenting, the librarians arrived at several
conclusions:

- The students appreciated not having to go to the library for these
  services; they appreciated the outreach.
- The students suggested that the IRS reference videoconferencing work-
  stations be placed in a dedicated room to avoid disturbing other com-
  puter lab users.
- While the students appreciated the remote services, they did not like
  having to go to the library to retrieve needed materials.
- Librarians wanted technical improvements such as larger monitors (to
  make it easier to accommodate multiple windows); an audio cue to
  alert them to the presence of someone with a question; a headset mi-
 crophone.
- After initial self-consciousness is overcome, people like to be able to
  see the person at the other end of the conversation.
- Desktop videoconferencing has advantages over telephone reference
  service, especially with the chat and whiteboard facilities.

While videoconferencing promises a great deal in moving reference
services from the library out to the user, most remote electronic reference
services in operation today are based on electronic mail. Three particular
studies (Abels, 1996; Hahn, 1998; Bushallow-Wilber, DeVinney, &
Whitcomb, 1996) provide interesting perspectives on the use of e-mail to
provide library reference services to users.

Abels (1996) discusses the differences between reference interviews
via electronic mail and reference interviews using other media. Over the
course of three semesters, from Fall 1993 through Fall 1994, graduate
students in the University of Maryland’s College of Library and Informa-
tion Science studied online reference in connection with a course on that
topic. In the Fall 1993 semester, the students’ client base was drawn from
participants in a graduate class at the Palmer School of Library and Infor-
mation Science at Long Island University. During the second phase in
the Spring 1994 semester, the client base consisted of “real clients”—i.e.,
faculty and graduate students at Maryland. The client base was drawn from the same pool for the third and final semester (Spring 1994). During the Spring 1994 semester, the students used a "remote reference request form" that could be submitted via e-mail, fax, or regular mail. The clients could choose which form of communication they wished to use. E-mail reference interviews were analyzed based on certain parameters—i.e., interview analysis, message counts, subject and motivation, media used, and student critiques. In analyzing the results, Abels (1996) concludes "on the basis of this project, it is clear that some substantive reference questions can be negotiated successfully via e-mail" (p. 355). While the results were positive, Abels also cautions that further research is needed to see how well e-mail reference works in a real-life setting and where client deadlines, face-to-face reference services, institutional priorities, etc., might compete with the provision of e-mail reference services.

In addition to studying the effectiveness of e-mail reference, Abels also used the study to formulate a model e-mail reference interview. During the Fall 1993 semester, students were not given any guidelines concerning how to conduct reference interviews. It was up to each student to develop an interview strategy. Abels reports that five different interview approaches were used by students:

1. **Piecemeal.** Students asked questions as they occurred to them. The characteristics of e-mail communication seemed to lend themselves to this approach, as it was easy to dash off quick questions or responses to clients without thinking them through.

2. **Feedback.** The characteristics of the medium allowed students to go back and forth between the various stages of the reference interview process.

3. **Bombardment.** Students would string together a series of different questions in one e-mail message, sometimes confusing or frustrating clients.

4. **Assumption.** Students would make assumptions about the nature of the client's information need. Abels (1996) notes that this is not uncommon in any interview process, but the potential with e-mail for longer delays between questions and answers suggests that this approach "is more likely to be used in the e-mail reference interview" (p. 350).

5. **Systematic.** Students used this approach when the client sent an unstructured question. The student would respond in a manner that organized the interview in a structured way. Often students would structure their responses by creating something that resembled forms sometimes used for face-to-face reference interviews.

The results of the first phase of the project suggested that this last approach had the most potential for the e-mail reference interview, as it
forced clients to submit questions using a structured format and to provide information up front that would be useful to the students. This led the students to design a remote reference request form during the second phase of the project. The form designed by the students had three basic sections:

1. **Personal Data.** Information that identifies the client as well as “organization-specific personal information” such as faculty/student/staff status, etc. This section of the form also allowed the client to stipulate the mode in which they preferred to be contacted—i.e., e-mail, face-to-face, telephone, or mail.

2. **Subject Data.** Information that would allow the student to begin formulating search strategies. This information was further subdivided to gain the following information: a description of the subject, the purpose of the request, and relevant resources of which the client is already aware.

3. **Constraints on the Search Process.** This section of the form asked about external constraints (e.g., deadlines, budget, and so on) and constraints involving the information to be presented to the client (e.g., how many references or citations, required format for the references, and so on). This section of the form also asked the client in which format they wished the information to be delivered (e.g., e-mail, regular mail, pick up in person, and so on). Interestingly, Abels indicates that there are some constraints that are not as easy to determine via e-mail as they are in a face-to-face interview—e.g., educational level of the client, reading level, motivational level, and so on.

Finally, Abels uses an analysis of the study to create a model remote reference interview consisting of the following stages:

- **Introduction and Problem Statement.** The client fills in the remote reference request form.
- **Question Negotiation.** This stage is only invoked by the librarian if the original problem statement needs further clarification.
- **Summary.** The librarian prepares a summary of the information need and outlines the characteristics of the required answer.
- **Feedback.** The librarian sends preliminary or final results of the search. The client can let the librarian know if the information need has been met via return e-mail.

Abels (1996) notes that these stages are very similar to the stages in a face-to-face reference interview. She estimates that an e-mail reference interview can consist of as little as three messages: “the problem statement by the client, summarization by the intermediary, confirmation by the client” (p. 354), although it would seem that a very simple query could be handled in two messages—i.e., problem statement and confirmation.
Abels contends that the summary stage "should always be presented in a remote reference interview" (p. 354), but one could argue that in very simple cases this may not be necessary.

Another study by Hahn (1998) "used content analysis of service logs and interviews with staff and users of a successful service to identify...impacts of the communication medium on service provision." Interestingly, while the organization Hahn studied lies within an unnamed library, it offers fairly limited services of a technical help desk nature, answering questions related to network use and communications software. The study poses four research questions:

1. **What is the content of staff and user messages?** Staff generally favored an extended dialogue of back-and-forth messages, while users favored a more direct question-and-answer exchange. Staff tended to think of the exchanges as solutions in response to stated problems, while users tended to think of the exchanges as question-and-answer.

2. **What do participants perceive as the benefits and limitations of using the medium for the type of service provided?** Benefits were viewed from two perspectives: institutional benefits and user benefits. Staff and users saw increased efficiency as the chief institutional benefit and saw improved convenience as the primary user benefit. Both staff and users saw "system vulnerability" (i.e., the e-mail system was undergoing a period of instability during the study) as the chief limitation. Beyond that, both staff and users saw "high dialogue penalties" (i.e., the decreasing usefulness of extended dialogues) as a major limitation.

3. **What problems are created by using electronic mail as the medium for providing a question answering service?** Staff and users both agreed that missing or incomplete information was the biggest problem. Users sometimes omitted information that was essential to answering a query, and staff sometimes omitted essential information in answering queries.

4. **How do participants cope with problems created by the nature of service delivery through e-mail?** Staff and users tended to cope with the "missing information" problem by extending the back-and-forth dialogue. Sometimes they coped by forging ahead without the missing information, although this was obviously not desirable.

Hahn (1998) concludes that there are both limitations and benefits to e-mail reference service. The limitations include "lost time between messages, loss of message richness, and system instability," while the benefits include expanded access to the service, greater convenience for users, and enhanced efficiency for staff due to the asynchronous nature of the medium. Hahn ends by noting: "Whatever drawbacks or frustrations participants may experience, the high use of the service suggests that further development will continue."
In a study conducted in the University Libraries at the State University of New York at Buffalo, Bushallow-Wilber, DeVinney, and Whitcomb studied logs of e-mail reference service offered through the university's undergraduate library. Each transaction from an eighteen month period (January 1993 through June 1994) was studied. Questionnaires were distributed via e-mail with follow-up questions to non-respondents sent by U. S. mail. Research questions included:

- **Who uses e-mail reference?** Graduate students accounted for 44 percent of the activity followed by faculty with 35 percent. Undergraduate use was very low at just 6 percent. As for departmental affiliations, users from the engineering department accounted for 29 percent of the activity, with natural sciences next at 21 percent, with social sciences following up with 16 percent. Males accounted for 75 percent of use while females accounted for 25 percent. About one-third (32 percent) of e-mail reference users submitted multiple questions ranging from two to twelve questions.

- **What types of questions are asked?** Of the reference questions asked, almost three-fourths (74 percent) were handled “using standard reference tools.” The remainder were questions regarding library services and policies (12 percent), the use of the library’s OPAC (7 percent), and suggestions for book or journal purchases (7 percent). In other words, the questions received bore a strong resemblance to the questions received at the library’s reference desk. This suggestion (that remote reference activity is similar to face-to-face reference activity) should be tempered, however, by at least one author’s suggestions that the nature of remote access to library systems differs from access to the same systems from within the library (Sloan, 1986, 1991).

- **When are questions transmitted?** As might be expected, the peaks and valleys of monthly usage closely paralleled the university’s calendar. Most questions were asked on weekdays, with peak days occurring on Wednesdays. A large number (90 percent) were submitted during hours that the reference desk was open, with most coming between 10:00 A.M. and 5:00 P.M.

- **From where are they transmitted?** Most respondents (65 percent) indicated having initiated a question from a campus office. Nearly half (48 percent) reported having transmitted a question from home. Almost one-third (30 percent) had initiated a question from a computer lab. (Percentages add up to greater than 100 percent because a number of respondents asked more than one question.)

- **Do e-mail reference users prefer that medium over others?** A majority of respondents (58 percent) ranked e-mail as their preferred medium. Over one-third (37 percent) preferred face-to-face encounters, only 5 percent preferred the telephone, and none of the respondents preferred using the U.S. mail.
While one can gain helpful information concerning e-mail reference services by reviewing published studies, it is also helpful to look at the e-mail reference services actually being offered by libraries. The following Web sites provide representative samples of electronic reference forms from fifteen college and university libraries:

- Babson College
  http://domino.babson.edu/WEBforms.nsf/Library_Reference_Question?OpenForm
- Ball State University
  http://lib.bsu.edu/refnet2.html
- Brown University
  http://www.brown.edu/Facilities/University_Library/forms/AskReference.html
- Dakota State University
  http://www.dsu.edu/departments/library/asklib.html
- DePaul University
  http://www.lib.depaul.edu/dpu/reference/emform.html
- Embry-Riddle Aeronautical University
  http://amelia.db.erau.edu/Reference/email_requests.html
- Indiana University
  http://www.indiana.edu/~libweb/question.html
- Ohio University
  http://www.library.ohiou.edu/forms/aldenref.html
- University of Alberta
  http://www.library.ualberta.ca/library_html/reference/hss-email.html
- University of California, Irvine
  http://sun3.lib.uci.edu/~srlweb/rqform.htm
- University of Illinois at Chicago
  http://www.uic.edu/depts/lib/libmail/cgi-bin/reference.html
- University of Illinois at Springfield
- University of Illinois at Urbana-Champaign
  http://www.library.uuiuc.edu/rex/reflib.htm
- University of Iowa
  http://www2.arcade.uiowa.edu/commons/e-ref.html
- University of Southern Mississippi
  http://www.lib usm.edu/ref.html

These examples of Web-based e-mail reference forms run the gamut from very simple (e.g., Dakota State University) to very comprehensive (e.g., Babson College). Many do not explicitly call for information that Abels (1996) identified as important in the model remote reference form developed by the LIS students at Maryland. The Dakota State University
Web form (http://www.dsu.edu/departments/library/asklib.html), for example, involves a simple pop-up e-mail form pre-addressed to the reference librarian's personal e-mail account. The form requires no personal data (other than the e-mail address of the sender, which is system-supplied anyway), besides a written statement asking the sender to indicate whether he or she is affiliated with the university. The user has no guidelines about entering the subject data of the request, and there is not a hint that any information on search constraints might be helpful. In other words, it is a form that almost requires a follow-up clarification by default. One might suppose that the simplicity of the form might stem from the fact that DSU is a relatively small university. But this same basic format is echoed at some larger comprehensive universities. Indiana University's (IU) form (http://www.indiana.edu/~libweb/question.html) has more in the way of textual information, but even that is fairly basic. The user at IU merely types in the return e-mail address and then the question. Once again, this does not meet the basic criteria of Abels's remote reference form. The three University of Illinois campus libraries do not require much more. UI-Chicago (http://www.uic.edu/depts/lib/libmail/cgi-bin/reference.htm1), for example, simply requires the return e-mail address and the question. UI-Springfield (http://www.uis.edu:1967/~library/ask.html) requires name, return e-mail address, academic program, and question. UI-Urbana-Champaign (http://www.library.uiuc.edu/rex/reflib.htm) asks for name, e-mail address, phone number, and question. One positive benefit of this minimalist approach might be that the user is not required to invest much effort in getting the process started.

Some libraries require more complete information beyond simple identification and asking the question—e.g., Ball State University (http://lib.bsu.edu/refnet2.html) asks the user to indicate sources he or she has already consulted, which prevents the searcher from reinventing the wheel to a certain extent. Embry-Riddle Aeronautical University (http://amelia.db.erau.edu/Reference/email_requests.html) asks the user to indicate "keywords, significant terms, phrases, synonyms, etc., that describe your topic" in addition to asking for sources already consulted.

Babson College (http://domino.babson.edu/WEBforms.nsf/Library_Reference_Question?OpenForm) presents the user with by far and away the most comprehensive form. This form begins by requesting basic information found on other libraries' forms—e.g., name and e-mail address. But the Babson form goes well beyond these basics in establishing the user's personal profile. The form offers the user a choice of four affiliation statuses: undergrad, MBA student, faculty/staff, or alumni. The form offers the user the option of having the library contact them by e-mail or by telephone and asks for a "good time to reach you." The form also asks the user to enter information on the course for which the information is needed (course name, professor's name, whether or not it is a
The form also requests substantial information regarding subject data, the second element of Abels’s (1996) model form. While the course name is an important element of subject data, the user is also asked to state the “subject area of the question,” picking from a list of potential areas. The form also has a space for the user to supply keywords, significant terms, synonyms, and so on, regarding the subject, as well as a space to indicate sources that the user has already consulted. The Babson form also gathers information regarding constraints on the search process, the third element of the model form that Abels describes. Users can indicate a “not needed after” date as well as the due date for the course project for which the information is needed. The form asks for additional information regarding constraints, including the “level of information needed” (basic or advanced) and the “type of answer preferred” (brief factual answer to the question or “ideas for sources to consult for exploration”) (there is also a space for the question itself). While the more comprehensive form at Babson provides the reference librarian with the information required to make the remote reference process that much more efficient (e.g., it more closely parallels the questions that might be asked during a face-to-face reference interview), the complexity of the form might be off-putting to some students. But the extra work required by the user in filling out the form also has benefits for the user. While the initiation of the remote reference process may be more complex for a user at Babson than, say, a user at Dakota State University, providing the more complete information up front most likely will result in a more effective electronic transaction overall.

REMOTE REFERENCE SERVICES: A MODEL

In a review of electronic reference services, this author reviewed both video and e-mail based services. Each has its own advantages. Among other things, video (especially when done with the proper technological infrastructure) has the benefits of greater media richness and immediacy of interaction due to its synchronous nature. E-mail has the benefits of having a broader base of potential users (due to the more widespread use of e-mail on college and university campuses) and greater convenience in terms of service hours due to its asynchronous nature.

In a sense, one could make the case that e-mail and video-based remote reference services are complementary rather than an either/or scenario. E-mail, at least for the foreseeable future, has the benefit of more complete penetration of the user base, quite frequently all the way to the users’ desktops, whether the users are in labs, offices, dormitories, homes, or even while traveling. E-mail also apparently does not require as significant an investment in additional reference personnel, as there is not a direct demand on a librarian’s time, and questions can be handled on an “as available” basis or even distributed to other library personnel.
In even the most enthusiastic settings, video-based reference services have only been offered for one or two hours a day at most, as reference staff have to be dedicated to the task and tied down to a video-equipped workstation for the duration of the service hours (Lessick et al., 1997). In contrast, many libraries have been able to at least initially implement e-mail-based reference services without necessarily requiring increases in reference staffing. But those (users and librarians alike) with experience with offering reference services via videoconferencing are enthusiastic about the experience. Video reference services appear to come much closer to emulating the ambiance of face-to-face reference services than does e-mail reference.

One comprehensive model for remote reference services for a college or university would offer a scenario where video reference services were offered on a limited scheduled basis, and e-mail reference services were offered on a campus-wide on-demand basis. Due to its staff-intensive nature, video-reference services would be controlled by limiting the number of sites from which such sessions could be initiated. Working with the campus computing center, the library could identify computer labs or remote computer center sites that are equipped for such services or that could be equipped with minimal investment. The key here is to build on existing campus and library technical infrastructures, and to implement such services in locations where basic technical capabilities are at a sufficient level where they do not interfere with service provision (Sugimoto et al., 1995; Folger, 1997; Lessick et al., 1997).

Again, due to the staff-intensive nature, video reference services would be controlled additionally by requiring that they be scheduled. This allows the library to control staff scheduling and to ensure the staff is used more effectively rather than simply sitting by a video workstation waiting for a user to initiate a session. Researchers, such as Folger (1997), have pointed out this ineffective use of staff time. Scheduling these video reference sessions could be done using a Web-based form similar to the form that the University of California, Irvine, uses to schedule research consultations (http://sun3.lib.uci.edu/~slriweb/rqform.htm). In addition to allowing for more efficient scheduling, the use of such a form would also allow the librarian to do some advance preparation by getting some personal data and subject data in advance. With the addition of some information on search constraints, the librarian would be prepared in advance with data for the three elements of Abels's (1996) model form.

1. The format of the video reference service would be similar to the Apple VideoPhone Kit-based service used successfully at the University of California, Irvine (http://sun3.lib.uci.edu/~slriweb/rqform.htm). The user schedules a session with a librarian, goes to one of the authorized remote sites at the appointed time, and opens the session. The
librarian will be waiting and will be prepared to deal with the specific user and the specific request. The librarian will begin the session and use the stages of Abels's (1996) model remote reference interview, as applicable (depending on the nature of the request, some of the stages may have been fulfilled when the user completed the scheduling form).

2. There is a probability that the user's information needs may not be completely met. The user and the librarian can decide during the session whether another video session might be scheduled or whether the session might best be handled by switching to another medium—e.g., e-mail.

3. Finally, while access to the video reference service might be offered from limited specific locations initially, the library should always be alert to opportunities to expanding such access points, as enabled by improvements to the users' technical infrastructure. The ultimate goal would be, of course, to offer such services to every user's desktop, but the implementation of such an ideal must be tempered by the realization that video reference is a labor and time-intensive service. Even as access points are broadened, the concept of scheduling sessions in advance should probably be retained.

Unlike the video reference model, e-mail reference services would have fewer restrictions. The basic restrictions that would need to be built in would be the average-time-to-answer (e.g., telling the user that the service answers questions within forty-eight hours), limiting the service to users affiliated with the institution, and possibly a limit to the types of questions that will be answered (e.g., quick factual answers as opposed to having the librarian do someone's term paper research for them). Another obvious limitation is that the user must have access to e-mail. Beyond that, e-mail reference services would not limit the user to any set location, and the service would not require any scheduling. The user and librarian could collaborate asynchronously, with a user, for example, submitting a question at home in the middle of the night and the librarian preparing a response the next day.

The e-mail reference model would involve the use of a Web-based e-mail reference form. This form would include the critical elements present in Abels' (1996) model reference form: personal data, subject data, and constraints on the search process. The form would be based on the model used at Babson College (http://domino.babson.edu/WEBforms.nsf/Library_Reference-Question?OpenForm). While some might complain that the Babson form is too complex and will put off some users, the reference process as a whole should, in the end, be more efficient than with a simple request form with its attendant need for back and forth messages to clarify the initial request. Some elements would need to be added to such a form to incorporate the limitations listed above—
e.g., an explicit statement that the service is only for those affiliated with the institution, and a statement near the top of the form that makes it clear how promptly a user's question will be answered. The second paragraph of the Ball State University form (http://lib.bsu.edu/refnet2.html) could serve as an example for how such a statement might be worded. It is important that a user's expectations of the service be based on reality, and that this reality be clearly stated. Hahn (1998), for example, notes in her study that users of the help desk were frustrated that the service was not more interactive when it was never intended to be. Explaining this aspect of the service initially can avoid such frustration.

The librarians could be assigned to handle incoming requests as they arrive, or they could check at set times during the day for e-mail requests (once again, see the Ball State model). This model would incorporate both approaches: librarians would be encouraged to pick up incoming requests within their subject responsibility on a time-available basis, but a supervisor would be charged with checking for new requests at prescribed times and assigning those requests to specific librarians. Librarians would have the option of referring these questions to other librarians (with their consent, of course). Larger libraries might consider allowing users the option of directing queries to specific departmental libraries, or even to specific reference librarians, with the understanding that these queries may be reassigned to others where applicable or necessary.

As indicated, the form will incorporate the elements outlined in Abels's (1996) model remote reference form. The reference librarians will incorporate the elements suggested in Abels's model remote reference interview (with some of these stages potentially handled in the initial submission of the remote reference form): introduction and problem statement, question negotiation (where clarification is required), summary, and feedback. Abels (1996), Bushallow-Wilber et al. (1996), and Hahn (1998) all note that a number of the problems associated with the e-mail interview are associated with the elapsed time of the process (between initiation of the request and the satisfactory reply to that query) as well as with the potential for too many back-and-forth messages ("high dialogue penalties"). The goal of the e-mail reference service should thus be to satisfy the user's information needs quickly and with a minimum of e-mail traffic. Abels (1996) considers three messages to be optimal: "the problem statement by the client, summarization by the intermediary confirmation by the client" (p. 354).

E-mail reference staff would also have the option of suggesting a change in medium to the user. For example, the librarian might suggest a phone consultation or video reference interview for queries that do not readily lend themselves to written and/or asynchronous communication.

**Assessment of the Remote Reference Service Model/Scenario**

Jonathan Grudin (1994) cites eight "challenges" for developers of
collaborative systems. How does the proposed remote reference model/scenario stand up to these challenges?

1. The disparity between who does the work and who gets the benefit. At first glance, there seems to be a very disproportionate relationship between who does the work and who gets the benefit. Librarians do all (or most of) the work, and the users get all of the benefit. But by providing a comprehensive remote reference form such as the one used at Babson College and engaging the user in a model remote reference interview, the user is required to invest some time and effort in defining the information need, and the disparity becomes somewhat less pronounced. In cases where a library simply provides an e-mail address for reference requests, this disparity is more pronounced.

2. Critical mass. Critical mass is an obvious problem with respect to the video-based aspects of the model. The critical mass problem is not limited to simply developing a critical mass of users with videoconferencing hardware and software. There must also be a critical mass of users whose telecommunications infrastructure will support effective use of the video-based model. As indicated earlier, users are turned off by poor video transmission quality, and these first impressions may induce a negative attitude toward the video-based model. By restricting access to the video reference service to public service computing sites with sufficient infrastructure, the video reference model has a better chance of succeeding and building the positive experiences that will better enable future expansion. Critical mass is less of a problem for the e-mail-based portion of the model, as e-mail access is becoming more and more ubiquitous on college and university campuses. Another critical mass issue concerns the proportion of library users that also typically uses computer facilities. Rephrased, the question is: What good will it do to offer library services remotely if a critical mass of the people most likely to make use of those services does not readily make use of campus computer facilities? At least one researcher (Vander Meer, 1997) has investigated this concern and has determined that the findings of the study “provide substantial evidence that levels and frequency of computer use are positively related to library use.” The final critical mass issue is user awareness. A system will not be effective until a critical mass of possible users is aware of the potential benefits of the service. In the remote reference service model proposed, the library would need to make considerable effort to publicize the service to potential users. Gradually, word-of-mouth publicity from satisfied users would take hold.

3. Social, political, and motivational factors. The biggest issue here would be motivating the librarians who would be providing the service. A well-organized service that attempts to balance the workload should
deal effectively with most negative associations librarians might have offering such a service.

4. **Exception handling in workgroups.** As the electronic reference interview process potentially involves much back-and-forth communications, exception handling would appear to be built into the process.

5. **Designing for infrequently used features.** The remote reference model would offer a fairly tightly defined service. At the same time, the flexibility of the reference interview would allow for relatively easy integration of infrequently demanded services.

6. **The underestimated difficulty of evaluating groupware.** The subjective nature of reference and information services, combined with the difficulty of evaluating such services when offered electronically, could prove to be a stumbling block. The evaluation of traditional face-to-face reference services is a tricky enough undertaking. The remote reference model should make every effort to incorporate elements that will assist in evaluation. E-mail reference, for example, lends itself to readily archiving each reference interview as it progresses. Apparently some libraries do this now, as the University of Alberta Web form (http://www.library.ualberta.ca/library_html/reference/hss-email.html) contains the following “warning”: “Any information that you submit may be retained for a period of up to a year so that the quality of this service may be monitored.”

7. **The breakdown of intuitive decision making.** As Grudin (1995) notes, “decisions to develop unworkable applications are frequent.” He also notes that “decision-makers are drawn to selectively benefit one subset of the user population: managers.” The same sorts of parallels might be drawn concerning the remote reference services. Decisions might well be driven by library administrators or academic deans based on what they might read in “popular” higher education literature. Decisions must be driven by considerations for the users (students and faculty) and the service providers (librarians).

8. **Managing acceptance.** Grudin makes the point that implementation must be organized from the user’s perspective rather than from the developer’s perspective. Libraries developing remote reference services would be well advised to consider the perspective of the student or faculty member when designing the service. Too often, libraries seem to consider the librarian’s perspective when designing services. The design of the remote reference service must first consider the viewpoint of the user (inasmuch as it makes sense) in order to be successful. Designing such a service from the librarian’s perspective may well result in a system that faculty and students use infrequently.

Grudin and Palen (1995) also suggest that whether a collaborative system is mandated or discretionary may have an impact on the eventual
acceptance of that system. They state that effective systems that can be adopted on a discretionary basis are more likely to be accepted than those systems that are mandated by administrators. The proposed remote reference services can best be described as a hybrid approach. The service must be mandated from the service providers' (i.e., librarians') perspectives. Systems that are established informally on a discretionary basis by reference librarians face many potential problems—e.g., lack of support from the administration and the termination of the project when the interested librarian leaves the organization. By the same token, adoption by users must be purely discretionary (although it would be interesting to hear reactions from users if a library terminated face-to-face services in favor of offering remote reference services).

CONCLUSION

Obviously, library services have a role to play in the electronic/digital/virtual libraries of the future. Such services best manifest themselves along the lines of the remote reference services model. Library administrators and digital library developers alike would be remiss in not including the service aspect in plans and designs for digital library services.

The remote reference services model proposed in this discussion is an attempt to develop a service that combines video-based reference services with e-mail-based reference services in a manner that makes effective use of the advantages of both media. The model is based on observations made by researchers of video-based library services (Sugimoto et al., 1995; Folger, 1997; Lessick et al., 1997), and made by researchers of e-mail models (Abels, 1996; Bushallow-Wilber et al., 1996; Hahn, 1998), and by observations of dozens of e-mail reference forms currently in use in actual libraries (representative samples of which are found in the Web sites listed earlier).

I believe that the remote reference services model can be one significant step toward meeting the challenge outlined by Ferguson and Bunge (1997):

The challenge for reference service in the largely digital library will be how to extend this human touch to highly diverse and widely dispersed clients whenever and wherever they want or need it.

REFERENCES


Cutting Out the Middleman: Patron-Initiated Interlibrary Loans

BARBARA G. PREECE AND THOMAS L. KILPATRICK

ABSTRACT

The interlibrary loan process at Southern Illinois University, Carbondale, has undergone a major redesign since the late 1980s. Central to the redesign has been a move toward empowering patrons by providing them with choice and responsibility. In 1994, the library began facilitating unmediated borrowing from the forty-eight other members of a statewide library consortium through a shared online union catalog and circulation system to enhance service to its users. The elimination of intermediary steps has reduced turnaround time significantly and contributed to increased patron satisfaction. The authors will explain the forces that prompted the redesign, the use of technology, and the impact on staffing.*

INTRODUCTION

Interlibrary loan (ILL) is a phenomenon of the twentieth century, with the majority of its growth and development as a legitimate library service occurring within the last thirty years. Until recently, traditionalists believed that a library should provide materials for its clientele through purchase, if possible, resorting to borrowing from neighboring libraries only as a last resort. The National Interlibrary Loan Code ("Revised Code," 1940) reflects this less-than-liberal approach to borrowing, referring to interlibrary loan as a privilege and limiting it to researchers and scholars. This approach prevailed until changing methods and ideologies finally...
brought ratification of a liberalized code in 1980, which was further liberalized in 1993 (National Interlibrary Code, 1980, 1993).

Several factors together influenced libraries to make this change in ideology. The first was a substantial increase in the volume of publishing that occurred at a time when library funding could not keep pace. Libraries could no longer afford to purchase everything that their patrons wanted or needed. A second factor was the introduction of technology into the interlibrary loan process that increased efficiency in document delivery and reduced turnaround time to an acceptable level. Finally, the introduction of end-user searching of online catalogs, full-text databases, electronic journals, and the growth of commercial document supply services has made materials more accessible than ever before.

Morris Library at Southern Illinois University, Carbondale (SIUC), is representative of hundreds of libraries that have experienced phenomenal growth in interlibrary loan and document supply in recent years. Morris Library is a comprehensive research facility organized into four subject divisional libraries and an Undergraduate Library. It contains more than 2 million volumes and over 12,000 current journal subscriptions with access to numerous CD-ROM and online resources, multiple points of access to the Internet, and state-of-the-art projects in document imaging and distance learning.

Statistics show the phenomenal growth in interlibrary loan at Morris Library in just thirty-two years. In fiscal year 1964 (the first year that ILL records were kept), Morris Library processed 399 interlibrary loan borrowing and lending requests. ILL processing at that time was performed by the director's secretary. By fiscal year 1996, the number had risen to 88,521 filled requests including lending and borrowing. Staff had increased to one professional, five paraprofessionals, and 200 hours of student help. How has Morris Library coped with these phenomenal increases? Certainly, an increase in staff has helped, but other significant changes have had to be made as well. In the 1960s, the TWX was considered cutting-edge technology, and ILL departments across the nation, including Morris Library, adopted it as their own. In the early 1980s, OCLC's ILL subsystem revolutionized ILL, followed soon by fax and ARIEL. In each case, Morris Library implemented these technologies. Today remote access to other libraries' OPACs is being used by a growing number of libraries to speed the interlibrary loan process and deal effectively with the growing volume of borrowing. Again, Morris Library is on the cutting edge. Ironically, as each improvement in ILL access is made, ILL volume increases to negate any relief.

**NAILDD Project**

The North American Interlibrary Loan and Document Delivery (NAILDD) Project (Association of Research Libraries, 1994) introduced
in 1993, addressed the issue of maximizing access to resources while minimizing costs. More specifically, it called for libraries to redesign interlibrary loan and document delivery processes by improving mediated services and introducing unmediated services in a networked environment. It was suggested that libraries could achieve this goal by:

- developing an environment in which users may exercise choice and responsibility;
- serving as a resource for comprehensive collections; and
- providing a gateway to services of other libraries and information providers.

The NAILDD Project designers realized that technical assistance is needed to support this environment, along with a comprehensive interlibrary loan package designed to serve libraries and their patrons. Many libraries began to review local interlibrary loan processes by asking their staffs to envision the "ideal" interlibrary loan environment. By identifying the elements in this scenario, libraries began to successfully reengineer the interlibrary loan process.

REDESIGN

SIUC's Morris Library realized that a redesign was necessary. What factors prompted the redesign? Certainly, increased patron demand for resources had a major impact. For several years prior to 1990, Morris Library borrowed about 5,000 items per year for its patrons. However, in 1990 that number soared to 9,896. By 1993, it had risen to 12,027 and, by 1996, it had risen again to 22,264 (see Figure 1). Another factor that helped to prompt the redesign was the revision of the library's mission statement in 1992 to emphasize patron services: "Library Affairs will assume a leadership role in providing intellectual, bibliographic, instructional, and physical access to information resources. Service to users is the first priority of the library" (Library Affairs, 1992, p. 1).

A third factor was the reallocation of funds to support purchase of photocopies and borrowing fees. As a member of a number of statewide and regional consortia, the library realized the vital importance of sharing resources among consortia members, especially in a networked environment. SIUC plays an active role in the Illinois Library and Information Network (ILLINET), the Illinois Library Computer Systems Organization (ILCSO), and the Big Twelve Plus (BTP). Finally, the library is committed to its use of technology in optimizing access to a variety of information resources for its patrons.

Networks and commitment provide a solid base for redesign of the interlibrary loan process, but these alone are not enough. Heeding the call by the NAILDD Project, and mindful of the library's commitment to its patrons, SIUC's Access Services staff began to investigate ways to:
Figure 1.
respond to the increased demand for access;
provide the service in a timely and cost effective manner; and

Two questions asked of the staff in the redesign process were: How can barriers be removed to make it easier for the patron to request materials? and How can internal procedures be streamlined?

Rather than focusing only on the processing of requests, the staff was asked to review interlibrary loan procedures from the point-of-view of both the external and internal customer. The first project implemented in the redesign effort, and the one that forms the basis for this discussion is the introduction of unmediated patron borrowing from the other forty-eight Illinois libraries that share a common circulation system. While other projects were also implemented successfully, including the use of the interlibrary loan component in FirstSearch and the in-house development of interlibrary loan Web-based forms, the use of ILLINET Online (IO) as a source for unmediated borrowing serves as the cornerstone for the redesign effort.

PATRON-INITIATED BORROWING

ILLINET Online serves as the statewide online catalog for over 800 Illinois libraries that subscribe to OCLC’s cataloging services. It contains over 10 million bibliographic records representing materials held by those 800 libraries and serves as the online catalog for the state of Illinois. It also serves as a circulation system for forty-nine Illinois libraries that constitute the Illinois Library Computer Systems Organization (ILCSO). This group includes all of the state-supported universities in Illinois, several private universities and colleges, five community colleges, a state-supported high school for gifted students in mathematics and the sciences, and the Illinois State Library. The IO circulation module also serves as an interlibrary loan system for ILCSO members, Illinois’ twelve regional library systems, and other libraries holding ILLINET membership. IO serves as a central component of the state’s resource sharing initiative. In 1995, over 600,000 interlibrary loan transactions took place over IO.

While all ILCSO members have the option of letting their patrons use Illinet Online as a source of unmediated borrowing, only five libraries have elected to invoke this option. SIUC implemented the unmediated borrowing option in fall 1993. The use of this service clearly supports three of the objectives of the NAILDD “Overview and Vision Statement” to enable libraries to:

Search a variety of local and remote catalogs.
Transfer a citation into an electronic request or order.
Direct a request or order to . . . a local or remote library ILL/document delivery department. (Association of Research Libraries, 1994b, p. 1)
This service allows patrons to borrow materials from other ILCSO libraries on a "self-serve" basis. Patrons are free to select the library from which to borrow and to check out materials from that library's circulating collection unassisted by library staff. However, with this freedom comes responsibility. Since library staff have not been involved in placing the request, the patron must assume responsibility for monitoring the request's progress and paying any fines or processing fees incurred if the item is not returned in a timely manner.

When the service was implemented in 1993, the library mounted a publicity campaign to encourage its patrons to try this new service. Workshops, handouts, and notices in the university's newspaper announced the introduction of the service. Word-of-mouth and encouragement from library staff to try the service also contributed to its acceptance. While a workshop dedicated exclusively to the self-serve feature is no longer offered, it is one component of the "Interlibrary Loan Workshop" that is offered regularly as part of SIUC's Library Affairs Seminar Series.

Patrons may access ILLINET Online on computers located in SIUC's Morris Library and from personal computers that have a telnet connection in their home, office, or dorm room. Anyone affiliated with SIUC, including students, faculty, and staff, can self-charge, renew, or recall items from any of the member libraries through an easy-to-use pop-up box that facilitates the procedure. SIUC library's Web page provides a link to IO and instructions on how to charge items through IO. If a patron submits a paper ILL request or a Web-based ILL form for an item located in another ILCSO library, an Access Services staff member charges the item to the patron's identification number, notifies the patron of the charge, and sends a brochure explaining the self-charge option.

Once a charge is initiated, the lending library receives a computer-generated page slip indicating that the item has been requested for an individual at a remote site. The library then pages the item and sends it, through the statewide delivery system, to the borrower's home library. If the item cannot be provided, the transaction is discharged, and notification is sent to the patron's home library that the item will not be sent.

Since ILLINET Online does not generate notification letters, the SIUC staff developed a program tied to its ILLWeb Program that produces a notification letter and a book band. This program tracks all borrowing requests and serves as a record of items received from other ILCSO libraries.

This service has had a significant impact on the number of interlibrary loan transactions processed by Morris Library's Access Services staff (see Figure 2). In 1993, Morris Library borrowed 3,048 returnables from other ILCSO libraries. That number rose to 6,430 returnables in fiscal year 1994, an increase of 111 percent. Total filled requests also rose 50 percent during that time period. The number of items self-charged increased again in fiscal year 1995 but not to the extent that it had previously.
This time the increase was by 38 percent and, by fiscal year 1996, the increase had slowed significantly to 19 percent, with 10,642 returnables received from ILCSO libraries. However, one must note that the number of returnables borrowed from ILCSO libraries in 1996 exceeds the total number of requests filled in 1993 by 393 items. Furthermore, the total number of items borrowed (returnables and non-returnables) rose 125 percent between 1993 and 1996. This increase was, of course, fueled by the number of self-serve requests generated by SIUC patrons.

Figure 2.
OTHER REDESIGN EFFORTS

Two other patron-directed projects that were initiated in response to the NAILDD Project and the library’s emphasis on better service to its patrons also contributed to the increase in ILL activity. OCLC’s FirstSearch ILL option was activated in Fall 1994. While the requests received by this option are few when compared to items directly charged by Morris Library patrons, it does provide the option of initiating a request from a catalog and sending it directly to Morris Library’s Access Services Department for processing. This speeds the submission of requests and assures Interlibrary Loan staff that they are working with accurate bibliographic data.

The library also initiated a project called Interlibrary Loan on the Web in fall 1994. It allows patrons who have access to a personal computer and a Web browser to submit interlibrary loan requests from any location day or night. This program began initially as an e-mail messaging system but has been revised to include Web forms that can be easily edited and transmitted to OCLC’s ILL subsystem.

STAFFING ISSUES

How did the increase in filled requests impact staffing? In 1993, borrowing staff in the interlibrary loan unit consisted of one librarian, two FTE paraprofessionals, and seventy-five hours of student help. At that time, divisional librarians did the preliminary processing of requests, and the ILL librarian reviewed and approved each request before it was sent. By 1996, three years after the introduction of the self-serve option, the number of staff in borrowing had changed significantly. It now consists of 3.5 FTE paraprofessionals and 103 hours of student help (including 50 hours of graduate assistant help). The Assistant Access Services Librarian and librarians in the five divisional libraries now devote fewer hours to the ILL process. It is clear that the increase in self-serve interlibrary loans has increased the number of items borrowed, but it is also clear that the self-serve option does not require the extensive amount of professional time required previously to process requests. The emphasis on questioning procedures, streamlining operations, and reallocated resources has resulted in an operation that requires less professional staff time but results in better service. It is the question of better service that prompted the authors to study turnaround time as it applied to the various parts of its operation.

THE STUDY

What was the turnaround time for patron-initiated interlibrary loans? This question of course has many variables:

- Which library did the patron select as the lending library?
What type of material was requested?
Was the request ever filled?

Since the ILLINET Online system is a circulation module of an OPAC, it does not provide the statistics that could have answered these questions. However, we are able to determine the length of time it takes to fill a request once a patron has initiated it. We can also determine what types of monographic formats are being charged directly (nonreturnables cannot be requested through the online catalog). The study began on August 20, 1996, and concluded on December 24, 1996, the course of one semester. Each interlibrary loan request that was filled during that time period was counted and classified according to the following criteria:

- method of submission;
- format; and
- turnaround time.

This process was done easily for the requests submitted through FirstSearch, the Web form, and cards. Items received as the result of patron-initiated requests were considered submitted on the day the circulation record showed that the item was charged. A total of 7,325 returnables were received during the test period including 5,464 items received from ILCSO libraries as a result of the self-serve option (see Figure 3).

**Percentage of Borrows**

**Self-charge vs. Traditional**

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-charge</td>
<td>75%</td>
</tr>
<tr>
<td>(5464)</td>
<td></td>
</tr>
<tr>
<td>Traditional ILL</td>
<td>25%</td>
</tr>
<tr>
<td>(1861)</td>
<td></td>
</tr>
</tbody>
</table>

Total = 7325

Figure 3.
The data clearly show that items received through patron-initiated requests were received more quickly than items requested through typical interlibrary loan methods. Patrons who direct charged items received their materials in an average of 8.4 days. Patrons who submitted the request through the Web, card, or through FirstSearch had to wait closer to three weeks for their materials (see Figure 4).

**PATRON SATISFACTION**

A second part of the study was a survey of patrons who charged their own interlibrary loan materials during a three-week period. A brief questionnaire was distributed to 200 patrons when they picked up interlibrary loans at the service desk. Forty surveys were returned. Despite the small return, the results give an indication of the use of the self-charge feature and patron satisfaction. The questions inquired about the location of the computer used to request materials (library, home, or office), frequency

---

**Turnaround Time**

![Bar chart showing comparison between Traditional ILL and Self-charge turnaround times.]

- **21 days** for Traditional ILL
- **8.4 days** for Self-charge

Figure 4.
of requests, and satisfaction with turnaround time, notification, appropriateness of the materials received, and user-friendliness of the system. A final question provided an opportunity for comments. Of those responding, 53 percent indicated that they used computers in the library to charge materials, leaving the other 47 percent of the respondents divided about equally between home use (25 percent) and office use (22 percent) (see Figure 5). The significance of these data is the fact that almost half of the respondents using the self-serve interlibrary loan service do their work someplace other than the library.

A question concerning frequency of use indicates a group of long-term consistent users. Of the total respondents, 83 percent indicated that they use ILLINET Online to acquire materials from other libraries at least once a week. Another 12 percent indicated that they use it once a month, while only 5 percent indicated that this was a first-time use (see Figure 6).

In general, patron satisfaction was high. Of those responding, 75 percent indicated that they received the requested materials in an acceptable period of time (see Figure 7); 95 percent indicated that they were

---

**Where Transactions Occurred**

![Pie chart showing distribution of transactions]

Figure 5.
**Frequency of Use**

- Once a Semester: 12%
- First Time: 5%
- Weekly: 83%

**Turnaround Time**

- Unacceptable: 25%
- Acceptable: 75%

Figure 6.

Figure 7.
**Notification**

- **Unacceptable**: 5%
- **Acceptable**: 95%

Figure 8.

---

**Accuracy**

- **Incorrect**: 2%
- **Correct**: 98%

Figure 9.
notified promptly of its arrival (see Figure 8); and the correct item was received 98 percent of the time (see Figure 9). Everyone (100 percent of the respondents) agreed that the system was user-friendly and easy to use.

CONCLUSION

While this survey was directed toward a subset of patrons, it is important to note that they indicate overwhelmingly that they are satisfied with initiating their own interlibrary loans. In fact the popularity of this service is clear from the number of items borrowed and the steady increase in borrowing as patrons learn the advantages of self-serve interlibrary loan. More importantly, by cutting out the middle person, we have empowered the user.

A benefit to the library is the reduction in time required of the Assistant Access Services Librarian in processing routine requests. More time can now be devoted to planning, review, and other management responsibilities and to searching of problematic interlibrary loan requests.

As user expectations change, individuals want more materials in a more timely manner and perceive that they can get what they want more quickly by searching and charging what they want for themselves. The self-charge option helps remove many of the barriers, questions, and negative perceptions that pervaded interlibrary loan arenas for many years. Optimized technology, system interoperability, and locally developed programs have heightened patron awareness of available resources. By strengthening our existing alliances, as with ILLINET Online, ILCSO, and BTP, and by redesigning our interlibrary loan operations, we can provide better access to the resources that our patrons need.

NOTE

1 ILLINET is a network of 800 Illinois OCLC-based libraries that share a statewide online catalog, ILLINET Online. ILCSO is a group of forty-nine libraries that use ILLINET Online for local circulation and interlibrary loan operations. BTP is a group of eighteen Midwestern libraries that are committed to sharing resources.

REFERENCES


Making Choices in the Virtual World: The New Model at United Technologies Information Network

BRADLEY GULLIFORD

ABSTRACT
As the services of the United Technologies Corporation Information Network have changed from a traditional library system to a virtual system of World Wide Web sites, a document delivery unit, telephone and e-mail reference, and desktop technical support, the onus of choice in seeking information has shifted onto the consumer. The Information Network must educate and empower its customers who were accustomed to the library as a physical place to check out books, talk to reference librarians, and browse journals. Now customers receive information network (IN) services without going to a special place. Staff time is freed for proactive information delivery, filtering, and analysis, as well as outreach and coaching of customers faced with many new choices. Also considered are issues of security and licensing for a diverse worldwide intranet.

INTRODUCTION

United Technologies Corporation (UTC) provides a broad range of high technology products and support services to the building systems, automotive, and aerospace industries.

Each division has been managed relatively independently, and many of those divisions had libraries of their own to provide technical and business information. Most of these libraries have been absorbed into a single library system, now called the Information Network (IN). The IN benefits from centralized management and support services, but end-users benefit from information service that is corporation-wide in its perspective.
The IN is an agent of technology transfer, offering users (called customers) referrals across divisional boundaries connecting people in different parts of the company working on similar projects. IN also offers browsing and current awareness opportunities for customers to do their own cross-fertilization. The IN is one of the few boundary-spanning operations within the corporation.

For over sixty years, UTC employees have been accustomed to library service dedicated to supplying them with information to do their jobs, whether they were solving an engineering problem, conforming to regulations, or finding new business opportunities. As the universe of information sources expanded, employees found themselves with more options to search increasingly more databases and having to make decisions themselves to initiate search strategies. Information Network staff is available to provide some "plain old library service," but customers who want to proceed on their own have to choose which IN service unit would be appropriate for their needs.

Remote service in some form is not new to the UTC Information Network. Formerly known as United Technologies Library & Information Services (UTLIS), the organization provided telephone, e-mail, and walk-in reference services; an online catalog listing resources in all divisional locations with circulation by mail to anywhere in the corporation; and selected databases available to end-users through a dialup ASCII interface. The change to the new model described by Steele (1997) was not drastic for remote users. Walk-in customers noticed that they no longer had an on-site library to use in the conventional manner, and staff found themselves doing more work by telephone and e-mail, but the stage had been set by earlier advances in service.

For many years, library services at United Technologies assumed the responsibility of searching and supplying information in response to specific requests. Unlike academic libraries which support learning, corporate libraries support achievement of business objectives (which may include applied research). Scientists, engineers, and business executives on the job are not evaluated on their original library research and learning progress but on whether they develop the product or complete the project on time and to the required specifications. Rarely do they have time to browse and ponder. The Information Network must ensure that information can be found or delivered quickly from a large universe of business, technical, and proprietary sources. Staff will do whatever is necessary and ethical to get the information needed into the customers' hands, whether by retrieving, photocopying, and mailing a journal article; searching databases; making phone calls to experts; arranging interlibrary loan; or checking out a book. The IN staff goes the extra mile to help customers in their endeavors. This philosophy of active service is fundamental to the culture of IN.
NEW MODEL FOR INFORMATION SERVICE AT UNITED TECHNOLOGIES

The reorganization of UTLIS/IN and the rationale for it, detailed in Steele's (1997) article, will be reviewed here briefly. Before the reorganization, technical and systems services were centralized, but the collection was housed in nine libraries in UTC divisions, each with reference and circulation staff. The new model called for advanced, analytical, and proactive services to a population increasingly located away from division library sites. To achieve this goal, IN centralized its collections and technical and circulation services to reduce duplication of labor and costs in those functions. Although their libraries shrank to offices with ready reference collections, reference librarians remained in their divisions to provide direct services to their customers. Their computer workstations are laptop PCs, well-equipped for dialup and Internet access, and can be used in their offices or wherever they go. Now called information managers, the reference librarians are freed from routine tasks to perform complex online searches, set up SDI alerts, go out and meet clients and potential clients, make presentations, attend meetings, and participate as full members on certain teams. A few have become research analysts, performing business analyses and writing reports. Centralized services comprise three groups:

- Printed Resources. Performs circulation, acquisitions, cataloging, interlibrary loan, and document ordering from specific requests not requiring verification. Printed Resources draws on the centralized collection and certain full-text databases.
- Global Information Services. Handles ready reference and relatively focused searches. Global Information Services handles routine or time-consuming retrievals such as economic data.
- I-Net Team (named for the Internet and intranets). Identifies, evaluates, and licenses information services available over the Internet for access through the corporate intranets. The I-Net Team designs and implements desktop access to internal and external resources. The team provides technical support through a telephone hotline and frequent contact with customers, vendors, and computing services departments throughout the corporation.

These groups are located in the same area along with the collection and cooperate easily and quickly. Global Information Services can refer a document delivery to Printed Resources; Printed Resources can consult with the I-Net Team in case of technical difficulty. The I-Net Team can ask Printed Resources or Global Information Services to try out a new product.

As remote users come to outnumber in-person users, the centralized services were designed to interact with clients through mail, telephone, fax, and e-mail. Face-to-face contact is still available with the information managers. While information managers serve clients remotely, they are also available as a one-stop point of contact for everything from book re-
newals to extensive reference work. Thus customers have a fourth option—i.e., mediated services—if they cannot or will not use computers.

Another important function of information managers is navigation. Customers can talk with information managers who have a systemwide perspective about search strategies, source selection, document delivery, and anything else customers need to know. Research analysts can offer the same guidance.

**PANOPLY OF SERVICES, PANOPLY OF DECISIONS**

Customers seeking information from the Information Network have many options now. They have access to several different formats of almost everything. They can do their own searching and document retrieval or have IN staff do it for them. They can call on staff to whatever degree they desire, avoiding other humans entirely if they wish. They have alternatives among staff members and groups. Some of those groups provide the same service, distinguished only by degree. Customers have choices, and the onus is now on them to choose. The price of more access and value-added service is more attention to the information-seeking process and more burden of choice on the customer.

Under the old model, each library had a front desk, staffed by a library worker, where everything from circulation transactions to reference interviews were available. Customers did not have to be conscious of how their request was filled or what kind of request it was. They never had to evaluate their information need to determine if it was a simple retrieval from a certain source, a reference question entailing identification and selection of sources, a problem requiring evaluative analysis and commentary, a computer access problem, or a simple circulation transaction. Their visit to the library may have entailed one or more of these.

Customers who prefer to use a single point of contact for everything from book returns to complex reference projects may still do so if they are in a location served by an information manager in an office. However, customers have the option of direct access to a variety of information services if they choose to navigate among the many choices available. For remote users, some of the Information Network services are now available for the first time. Remote users and on-site users enjoy equity as they face the same multiplicity of options.

Information Network staff must educate customers to become end-users while continuing to supply information whether the customer is “educated” or not. Of the three hotlines in operation, two are for supplying information (one to order documents from Printed Resources and one staffed by Global Information Support with extended hours) and one, staffed by the I-Net Team for technical and connectivity problems, incidentally affords opportunities to educate customers. The IN takes advantage of vendors’ offers for end-user training—i.e., arranges and publicizes
the sessions in the appropriate divisions. Information managers spend considerable time educating and re-educating customers in individual sessions on their own computers. Together, information managers, top IN management, and the I-Net Team continue to refine resource descriptions (on IN Web pages, publicity materials, and signage) that will enable customers to make informed choices.

Indeed, customers are implicitly invited to understand information services and what they entail. They have varied backgrounds, and some are better prepared than others to help themselves. Customers walking into Information Network's central facility, when shown directional signs, sometimes reply, "I don't want Circulation. I want to check out a book." Independent customers must analyze their own reference questions to determine if the need is specific enough for Printed Resources, a reference question but routine enough for Global Information Support, or complex enough for an information manager. Global Information Support and the information managers evaluate requests and forward these to each other as appropriate. The services are transparent to the customer, and no customer is ever embarrassed for not knowing exactly where to send a request.

The model has only been in place for a few months, and it is unclear if the newness of the service or the inability of the customers to direct their requests appropriately is to blame for their continued need for staff to route requests. Some customers couldn't care less since they drop off all their requests and have them routed by information managers; other customers express a strong desire to understand and interact directly and immediately with Information Network staff or other resources available to them. The latter are empowered by learning how our services work so that they can enjoy the speed, asynchronicity, and serendipity of meeting their own information needs.

Other customers might not possess such a high level of expertise and interest but have enjoyed doing their own searches in printed and CD-ROM resources in the reference areas of their divisional libraries. In the new model, they are expected to learn to access resources online. Parallel to visiting the physical library to leaf through journals and trade periodicals, users now "point and click" to browse the electronic journals on their desktop. These changes require customers to change their information retrieval habits and to gain familiarity with electronic resources. In fact, demand seems to be sensitive to ease of use (for a sophisticated user's perspective on the electronic "remotization" of the library, see van Groenendaal, 1997). The payoff may be that users have access to a greater variety of resources without having to leave their offices but the cost is that users often have to learn several search protocols to search and retrieve information from the various publishers' products. The cost is all the
higher since each publisher seems to design user interfaces differently (Barnes, 1997, pp. 411-12).

In general, customers are presented with more options to access the increasing universe of electronically available information. At the same time, they must learn about resources, examine their needs, and make decisions that will benefit them in this information universe.

The opposite approach to diverse options is for the library staff to normalize them as much as possible, taking back some of the burden electronic resources are placing on the customer. The Information Network has designed databases for years, following a policy of consistency in field naming and screen design. Some of the proprietary products IN uses, such as the TechlibPlus integrated library system, provide for local design options, and IN maintains a strong concern for consistency where possible. On the IN Web site, electronic journals may be accessed from one single page. Many publishers interpose an entry page with options at the location of their e-journals allowing the customer to select from that publisher's titles. The IN believes that its customers should encounter as few intermediate steps as possible between them and the information they need. To do this, the titles on the IN e-journal page have direct hyperlinks to the journal's home page or actual text. The page also has other columns to indicate full-text coverage, presence of abstracts, availability of back issues at the site, and a brief descriptive phrase. Each entry requires human editing and is time-consuming. Differences in interfaces might be made transparent to the end customer, but they are designed at a high cost of considerable staff time. The "15 minute rule" (van der Woort, 1998, p. 60) might be useful for patrons, but how does staff know when to stop labor-intensive detail work? Choices and decisions must be tested and evaluated by staff as well as users.

**TECHNICAL AND LICENSING ISSUES**

As libraries start to emphasize access over holdings, their work will involve rerouting and redistribution of external resources accessed over the Internet. The Information Network negotiates "site licenses" with vendors and publishers to allow access to publishers' servers from individual employees' desktops on the corporate intranet. Contracts are negotiated and finalized by the manager of IN, but the I-Net Team is responsible for investigating details as well as for maintaining all connections, adapting to changes in service, and arranging with vendors for staff training. The I-Net Team handles types of access (IP address, password) and interface customization, and they deal directly with the technical staffs of publishers and vendors once a contract is signed. They also work with the computing services departments of the UTC divisions, each one of which controls the software and support available to end-users in each division. The
I-Net Team serves as a go-between to provide a technical environment where information flows smoothly.

Some information flows are internal. The I-Net Team designs Web pages for Information Network staff to share information (team meeting minutes, upcoming professional conferences, passwords for product trials, collaboration for virtual teams) or for other departments in the corporation as requested. Unlike Digital Equipment Corporation's "Web library" (Callaway, 1998), however, IN does only limited internal document management, concentrating on bringing in outside resources comparable to the way a conventional library brings in books and periodicals.

Contracts and licenses gain higher visibility in the world of electronic information. Acquisitions is no longer a simple matter of paying invoices for familiar products like books. The new function requires negotiating multicustomer agreements of site licenses to bring information products in over the Internet and redistribute them through the intranet. Publishers are concerned about simultaneous multisite access to their products. In pre-electronic times, publishers knew precisely how many books they sold and how their revenue would be calculated. In the new information infrastructure, they demand an accurate count of end-users. Some publishers' contracts specify how many users may be at public workstations, or they expect a one-to-one correspondence between copies sold and end-users. Corporate environments are quite fluid. Employees are reassigned and change offices frequently. Ad hoc teams may involve independent contractors. United Technologies is a large corporation with approximately 180,000 employees. The Information Network knows how many employees are registered patrons in its online catalog at any one time. Many transactions take place with nonregistered employees who might never check out books; however, they do browse public CD-ROM workstations or use IN-licensed desktop services.

Part of the difficulty lies in the loose relationship computing service departments have with end-users and the Information Network. United Technologies Corporation comprises multiple domain names and IP subnets. IP and e-mail addresses can change within a division, and IN has no way of finding out until a user reports a problem. The I-Net Team must report specific addresses or classes of addresses on license applications, and those addresses become the only ones authorized for access. The I-Net Team uses different strategies—from computer programs to telephone calls—to update its master list of IP addresses.

IP address verification is one form of security. Security is a concern for both the publishers and the Information Network. Publishers are extremely concerned about access to users not specified in the contract. They need constant assurance that the intranet not be open to the general Internet public. A significant amount of information on the corporate intranet is proprietary and release of it outside the corporation would
be deleterious. It is the responsibility of UTC IN to assure there is no breach of the security contract that could be harmful to the corporation. While unauthorized release of publishers' data would not damage UTC, IN is under contractual obligation to protect these data. Occasionally the I-Net Team encounters concern from computing services personnel when the team asks them for Internet firewall information—necessary for publishers to secure inflow of data but carefully watched among computer personnel. Because of these corporate security concerns, IN is not considering extranet technology. IN works with vendors and publishers to honor their concerns while still providing full service to end-users. Occasionally agreement cannot be reached with a publisher, in which case IN will look elsewhere for similar services.

The I-Net Team fields constant calls and e-mail messages reporting access problems. The team first isolates the source of the problem. If it is a systemwide or server problem, the team will correct it or refer it to computing services staff at United Technologies Research Center, the facility in which Information Network's centralized resources are located. If it is a problem residing with the vendor or the publisher, the team will contact technical support at that location. Usually the I-Net Team serves as the contact to communicate and resolve the problem with the vendor. Often a contact person is provided by the vendor when the contract is signed, but sometimes the team has had to search independently for a remote ally. If a customer reports a problem which the I-Net Team determines to be due to a local configuration, the team will try to offer instructions or suggestions to fix the problem, but sometimes the team has to tell the customer to request assistance from her/his local computing services support personnel.

A common time-consuming task is tracking down and making adjustments in services designed to route to individual customers. As mentioned above, e-mail addresses change often at United Technologies. Services, such as ISI Corporate Alert, which operate through e-mail and other information intranet "push products," continually run afoul of these frequent changes. Adjusting to these requires human intervention. End-users hardly ever report changes of address. They may not be aware of the change if their system administrator has set up forwarding from their old address. That works well for incoming mail, but their old address, under which they are registered with an outside service, does not appear on their outgoing messages, so the outside service does not recognize them anymore. The I-Net Team must explain this to customers who report problems and must learn what steps to take and then solve the problems. Troubleshooting must be done, but it is a distraction from information service.

Many customers do not have address problems because their division's management simply does not allow them Internet access or even use of a
Web browser for intranet access. This is particularly true in non-U.S. locations. The Information Network must decide how to accommodate such customers (or would-be customers). The information manager on site can do whatever she/he can to serve those customers (which still does not provide for browsing), but IN’s policy is not to be held back by the lowest common denominator anymore. In the past, full consideration was given to the most primitive levels of computer technology; however, with prices decreasing and the gap between most and least advanced users widening, IN has changed its policy in this regard. Division management in underserved areas must choose how much technological support its customers need to access IN services.

Resource description has been a traditional function of technical services. In the electronic environment at UTC, the distinction between functions of Information Network’s I-Net Team and the technical services unit has become more blurred. For example, who handles an “electronic acquisition”—technical services (for ordering and payment of acquisition) or the I-Net team (for electronic services issues)? The same is true for cataloging. The outcome of the latter may be that, as the library becomes more electronic, the electronic services group would assume most of the functions of the entire library with specific departments like acquisitions, cataloging, and hardware maintenance (formerly known as bindery). The old departments would wither away. Currently, the I-Net Team does most of the license and subscription work with Printed Resources (technical services) paying invoices and maintaining financial records. The I-Net Team hopes to serve only as consultants in the future. The boundary with Printed Resources is still in flux.

An important role for Information Network centralized staff is interaction with various information vendors, whether as customers, negotiators of contracts, or technicians maintaining incoming streams of information from outside sources. Unlike a book purchase, which is a once-and-done transfer of possession, a license for online information requires mutual agreement—it is a contract and requires continuous attention like any other relationship. Vendors’ technical support phone numbers are distributed widely among the staff, and more staff see vendor representatives regularly than under the old library model.

Staff members of all departments have become consumers of technical support. Electronic resources have to be maintained in a way that printed resources do not require. Examples of these include interruption in access, networks that go down, change of IP addresses of firewalls, servers that get bogged down, file reloads, and data that fail to arrive in time. The I-Net Team assists or intervenes where possible, but staff members also have occasion to interact with outside services or vendors.

As acquisition of items gives way to license for access, it has become less clear whether negotiation and management of licenses is the respon-
Are electronic information sources simply items in the collection or are they utilities of some sort or are they a new class of entities entirely? The purchasing agent, an employee of the financial services department of the corporation, depends on the I-Net Team to review each contract for technical matters. The I-Net Team deems the contracts to be unremarkable since technical details (compatibility, user authentication, restrictions on electrocopying) have been examined when the product was selected. Boundaries between the I-Net Team and other departments are still being determined. The question we face is: Is electronic access an extension of conventional library functions or a radically different form of library service deserving a special department? Licensing, network support, and interface design will be "the technical services of the future," yet books are not likely to disappear soon. Traditional technical services may stay the way they are and duplicate the content of an electronic access department, or they may expand their scope to include electronic access. If they choose the former, all departments concerned will need to establish common understandings, responsibilities, and procedures.

CONCLUSION

Unless they can get an information manager to handle everything for them—an option not feasible for many—customers are forced to make decisions, choose resources, and plot their own information search strategies. At the Information Network, there is strong commitment to equip the users for this situation. An unanticipated result of the shift to an electronic library is the many roles IN staff are now juggling, including analyst (expertise value adder), educator (teacher), navigator (consultant), and provider (traditional corporate librarian). Between the extremes of insisting that customers learn to fulfill their own information needs and bending over backward to save customers all effort, the two groups must reach a common ground to establish a new kind of relationship.

The analyst role has not been difficult to assume. Information Network customers have been requesting such evaluative service for years. Research analysts employ the services of Global Information Services both to refer routine customer requests and to retrieve information for their own analytical work. Librarians performing reference work for librarians seemed unusual at first; however, some negotiating is taking place as both groups define their roles in working together. Somewhat more political is IN's developing role in knowledge management. As the staff's expertise grows, IN is identifying champions to promote IN leadership in knowledge management throughout the entire corporation. IN staff plan to conduct information audits and train UTC groups to design and implement their knowledge management plans. The analyst role points to the partner relationships IN now seeks with its customers.
Educating users, while not unique to academic libraries, certainly falls naturally within the academic mission. Remarkable among digital libraries with a strong training approach is the Welch Library of Johns Hopkins Medical Institutions, as developed by Nina Matheson (1995). Welch allocates staff resources specifically to training and offers courses in medical information, some even for academic credit. Learning is their mission. Johns Hopkins students, faculty, and staff can also receive reference assistance at Welch. UTC's mission is to produce goods and services and to earn a profit. Learning to use resources is not a primary mission, and employees can devote only limited time to it. Information Network staff, especially information managers, find themselves providing customized training, often to individual customers. Sometimes sessions are offered to larger groups, introducing the Internet or IN services. Online help files and responses to hotline calls are other limited teaching resources that IN employs.

How much are customers' choices due to the remote electronic environment and how much due to Information Network's particular reorganization? Some customers seem bewildered by the new model whether they walk in, talk to an information manager, or send questions and inappropriate requests by e-mail. Even if customers did not have to check ISI Current Contents Connect, Ei Village Journal Shelf, IN's electronic journals page, and IN's listing of hardcopy periodicals to find out about a journal to read, they still have to determine where to place their request—i.e., Printed Resources, an electronic source supported by the I-Net Team or a lookup of data by Global Information Services. Some customers have discovered or created e-mail address groups which they use to send requests for materials or reference service to the entire IN staff. One customer routinely sends such requests to the Information Services group which comprises all employees in computing services, photocopying, artwork and desktop publishing, as well as library services. These customers obviously cannot or will not distinguish between different facets of information service regardless of whether they are electronic or not.

Ideally, a single contact point is desirable for all types of requests. Such a scenario would have increased services where more staff time would be required to mask the diversity and complexity of advanced services to the customer. Such an arrangement is quite beyond the Information Network's budget. However, it raises the issue of whether to allocate funds for purchasing more services or for more staff assistance. IN generally prefers to leverage technology to enable staff to provide high levels of service while still remaining technologically accessible to the majority of its clientele.

One area where technological solutions are always sought is automation to increase staff productivity. Getting information can seem effortless for end-users. Behind the scenes, staff spend hours pulling and pho-
tocopying, keeping records, tracking down and cajoling remote computer personnel, determining and registering new IP addresses. Circulation, of course, entails more than sitting at a check-out desk and scanning barcodes when patrons approach. The Information Network's patrons cannot come to the library, so a mailing service similar to interlibrary loan must be provided for them. Searches must be packaged when they are delivered to the customer. Many of these behind-the-scenes tasks are routine and time-consuming and are thus candidates for automation. Some of them, such as keeping up with IP address changes, may not be thought of as low-skilled, but they are not high-level information service either, causing the I-Net Team to think that such duties might be performed by a support staff paraprofessional. The library literature presages an electronic age when librarians become information navigators (Ojala, 1993; Oder, 1997; Leonard, 1997; McCook, 1997), but such essays make no mention of another possible outcome—i.e., librarians becoming information clerks.

The goal of the Information Network's reorganization was to deploy limited resources to provide the highest level of service to the greatest number of people. Since online and walk-in customers have the same choices, it can be concluded that the remote electronic environment does not allow the user to make unbiased choices. Rather, the remote electronic environment affects those choices or the way they are made.

Because off-site customers cannot handle and examine sources directly, descriptions are critical in remote online service. A short paragraph on the screen may be all that connects a customer to the right resource. The I-Net Team devotes considerable time and effort in choosing the right words for headings and links. The rest of the Information Network staff provide feedback on their own and also engage end-users in the description process. Staff members also spend time describing and explaining IN services over the telephone to customers who have no access. Reference librarians, who are navigators by definition, are not always available for real-time interaction, so navigation is well aided by careful resource description.

The library literature proclaims that, as access is emphasized over holdings and "disintermediation" eliminates searchers' jobs, librarians of the future will become "information navigators" advising patrons about electronic information resources. Certainly, the proliferation of available sources has made professional assistance more important to ensure optimum selection of information resources. If a UTC customer would but ask, the Information Network's information managers, research analysts, and I-Net Team are on hand to discuss information needs, search strategy, and source quality. Some customers are sophisticated enough to ask questions and make demands for formatting and update frequency, sharing responsibility with IN staff for their information support. Information navigators work best with proactive users.
However, Information Network staff cannot restrict their activity to telling patrons where to look. As corporate librarians, IN staff are committed to "doing patrons' homework for them" if patrons request information delivery. Sometimes a file can be downloaded and e-mailed in a few effortless minutes. At other times the data have to be aggregated or formatted extensively before delivery. In the case of data massage, an information manager or research analyst is responsible either for doing the work or seeing it through to its completion by Global Information Services. In the case of an electronic problem, the I-Net Team can be called on but, in extreme cases, information managers will print electronic documents on paper and fax or hand-deliver them. UTC IN does not distinguish too strictly between navigator and provider roles, and it does not position its staff to be only navigators. Occasionally, IN staff are faced with the delicate matter of having to make fiscally sound choices when too much time is spent on customer requests that clearly do not justify the end results.

As the Information Network gives more options to its customers and enhances their choices, it is also finding ways to help manage the burden of choice by working with customers as partners in fulfilling the corporation's mission.

ACKNOWLEDGMENTS

The author is indebted to Noreen O. Steele for the opportunity to write this article and for answers to essential questions. Present and former fellow members of the I-Net Team (Theresa A. Arenholz, Linda M. Jackson, Kathleen S. Kentfield, Mary T. Panek) have found the problems, solutions, and insights on which this discussion is built. The author thanks them for indulging the time to contribute to it. Jean Mayhew, director of Information Services, helped to focus and correct some observations. Observations by Mami Kobayashi in Japan, Donna S. Swarr, Melissa P. Taylor, and other Information Network staff are also important contributors.

REFERENCES


Online Services to AT&T Employees

Ina A. Brown-Woodson

ABSTRACT
AT&T information services evolved from a mainframe computer environment into a client-server open architecture in the early 1990s. This change in computing expanded the online services available to library and information service customers, primarily AT&T employees. This article will describe the stages of transformation that occurred during the change years, and how end-users participated in the transformation process. The topics covered are:

- moving from traditional to electronic services;
- assessing users' needs and expectations;
- library staff as team participants;
- developing vendor partnerships for outsourced services; and
- evaluating service quality.

BACKGROUND
From the mid-1960s until 1984, AT&T operated Bell Laboratories as its premier research unit for the development of technological innovations. Within this research unit, the library organization created an online catalog to replace its book catalog. In the late 1970s, the library organization also established an online cataloging process and installed UNIX as its operating system with C as the programming language. In collaboration with the internal computing center, the library used the local mainframe computer to house its operations in Murray Hill, New Jersey.
In 1984, AT&T deregulated itself from the local telephone companies to acquire the right to enter into the business of computers and computing. Consequently, AT&T became a player in the information industry arena. Over the next thirteen years, AT&T provided a challenging and testy environment for library and information services to grow, downsize, re-engineer, right size, and re-invent itself to meet the challenges of the telecommunication business and its employees' online information needs.

**Moving from Traditional to Electronic Services**

Libraries were charging for their online services as early as 1986. This prompted researchers to query why they could not search online databases for themselves. As an experiment, selected scientists established their own accounts with online vendors, and the library organization served as the major customer to the vendors. The usage was observed and accounted for all users via the library organization. Over a two-year period, it became clear that novice end-user searchers needed assistance for complex searches due to the variation in online database command structures and terminology. Simple author or source verification queries did not pose problems for end-users.

Library computer programmers created an in-house library interface that would simplify the end-users' need to become proficient online searchers. The prototype interface was created for the 1985 International Federation of Library Association's annual conference held in Chicago, Illinois. AT&T Bell Laboratories joined forces with the National Commission on Libraries and Information Services to create the main exhibit for the conference. The "Access Station" created a full service library in a space of 400 square feet. Penniman and Hawkins (1987) described how the corporate library would be reduced in size without shrinking the services provided to its customers through use of technology. Commercial and internal AT&T databases were linked and accessed via this interface. America Online and CompuServe were just beginning to develop at this time. Initially, end-users applauded the new interface. However, response time became slower as more end-users searched among the various databases, especially after lunch time. A new solution was needed to meet the new demands for more responsive online access by end-users.

Since library data had been centralized via the mainframe, the response time became an important issue to end-users. Moving to a client-server architecture means that a decentralized structure is established through several machines that act as "clients" to another machine that serves as the central server. Library processes were separated into the various clients which provided greater memory capacity and decreased delays in response time since transactions were expedited as well. The computer center became the maintainer of the system rather than the
controller of the processor flow. The library programmers began to develop systems for the company's central computer service to emulate.

**ASSESSING USERS' NEEDS AND EXPECTATIONS**

Information specialists surveyed users' needs on various time schedules and utilized multiple methods to determine how to satisfy their customers. Prior to the initial downsizing effort in 1986, the libraries surveyed customers through semi-annual site visits to their technical customers' locations at the department head level. The business and marketing customers and their management were visited on an annual basis. Quarterly paper surveys would be mailed to end-users based on their use of the service during that particular quarter. The users' names were obtained from the billing records from the financial database established to show service activities and which organizations used library services.

During the mid-1990s, the library organization began to explore the potential of electronic surveying of its customers. The response rate was disappointingly low as compared to the results collected via the in-person and paper processes. In 1992 and 1993, the library organization experimented with a site-exit survey among the physical libraries to complement the paper survey results. A library staff member interviewed the end-users as they left the library. Baker and Lancaster (1991) stated that patron interviews have all of the benefits of the questionnaire but tend to be more expensive than other procedures. Information specialists performed the interviews to reduce the costs associated with going to patrons' offices. The other benefit was to learn immediately if needs not met could be rectified quickly.

With the transition to client-server architecture completed by 1995, the library organization decided to move some paper processes to the electronic mode. In 1996, the organization used the electronic survey process among all the customer segments—i.e., technical, business, and marketing arenas. The results showed that more customers did use online services—i.e., AT&T and non-AT&T online services—than were reported in earlier surveys. However, one of the major findings supported the continued need to market the full range of products and services available to employees. Using electronic surveys promoted awareness of library services to nonusers—i.e., employees who did not know about the diversity of resources supported under the library organization's auspices. Monthly telephone interview surveys now supplement the results obtained from the electronic surveys.

**INVOLVING LIBRARY STAFF AS TEAM PARTICIPANTS**

The library organization in 1985 consisted of over 200 employees who represented full- and part-time, as well as temporary, professionals, scientists, and clerical assistants. Through several organizational changes—
i.e., re-engineering, downsizing, and right sizing—the organization found itself in 1995 with only 100 employees. During those ten years, teamwork and group performance became the primary focus for accomplishing work. Library leaders began to empower employees to take on decision-making through the team processes for increasing service excellence and customer satisfaction. Miller (1996) describes the forces that are impacting industrial leaders, such as empowering employees, restructuring of corporations, the proliferation of information, globalization, and the rate of change, and points out that leaders are at the crossroads of the twenty-first century. If leadership fails to lead, organizations will fail and lose their purpose for existing.

Library staff created team performance goals through Total Quality Management processes. AT&T found the business world changing rapidly. Using quality processes provided a new vehicle to implement change and move forward. Kovel-Jarboe (1996) states that “one characteristic of most formal improvement efforts is a reliance on teams to develop and implement improvements in the context of the larger organization” (p. 607). Process improvement committees were developed as employees suggested work processes that could be made more efficient and, subsequently, more cost effective. Occupational status of an employee would not matter because all team members were valued for their input and not their level within the organization. Special quality circles were created among employees who belonged to labor unions to comply with contractual agreements already in place.

Ackerman et al. (1987) provided AT&T employees with their own book on process quality guidelines to increase their acceptance and understanding of quality processes. The book uses Lewis Carroll’s Alice’s Adventures in Wonderland “to describe AT&T’s post-divestiture challenges in an increasingly competitive and global economy” (inside cover). Early in the 1950s, AT&T had created its own statistical quality control handbook, but the content referred to operations in factories. There was a need for a book that would look at “white collar operations” in a similar fashion. Any employee could understand how process improvements could result in increased customer satisfaction.

Establishing Vendor Partnerships for Outsourced Services

During the period of reorganization from 1985 to 1995, the library organization found itself looking to non-AT&T external resources to provide services to its customers. In 1985, the organization used temporary information professionals when hiring freezes occurred. Over time, the expectation was that the temporary status would change to full-time status. This uncertainty caused the library organization to lose many qualified professionals due to its inability to permanently hire its temporary specialists.
By the 1990s, some online services were being outsourced to external agencies due to time constraints imposed on limited library staff or lack of expertise. Prabha and Dannelly (1997) state that the “use of external services is increasing as libraries downsize and streamline their personnel resources” (p. 367). Interlibrary loan and document delivery requests were also outsourced to external vendors. Employee salaries and their benefits cost more than the company wanted to pay. Consequently, outsourcing provided AT&T with a means to move overhead expenses to vendor expenses and reduce the overall budget since end-users paid the vendor expenses from their budgets and not the library’s budget line.

Marcinko (1997) defines document delivery as the transfer of photocopies as well as routing an image to the e-mail account of another end-user (p. 534). As a commercial document delivery supplier, Marcinko has experienced the demands as the outsourced provider for other companies’ document needs. In a study of the fulfillment rates for various suppliers, Prabha and Marsh (1997) reviewed five commercial document suppliers to ascertain how well they fulfilled requests they received through their own periodical holdings.

The suppliers studied were the British Library Document Supply Center, Canadian Institute of Scientific and Technical Information, University Microfilms International, Institute for Scientific Information, and Uncover. The results of this study found that the suppliers that had in-house resources could provide more articles, but the cost of the articles varied with each vendor. The study also showed that libraries would benefit from software that would identify commercial suppliers with their subject matter strengths and periodical title holdings. They also suggested that pricing should be included because libraries still have limits on paying for document delivery: “Of the libraries surveyed, 29 percent wanted the article at no cost. . . nearly 60 percent wanted the article at $10 or lower” (Prabha & Marsh, 1997, p. 557). At AT&T, customers pay for expedited delivery at a premium rate beyond the cost of the article—i.e., by fax, e-mail, or overnight methods. Clearly, time is a major factor for AT&T’s end-users, but price is still an important consideration. Garman (1996) suggests that service providers must find the “right price” to satisfy their customers.

Total quality management processes include supplier management as a vital issue if the goal is total customer satisfaction. AT&T representatives from the Purchasing Division collaborate with library staff to obtain the best pricing for the most content in print and electronic formats. Suppliers who are reluctant to participate in the quality processes are encouraged to do so if they plan to do business with AT&T on a long-term basis. Gilchrist and Brockman (1996) discuss the implementation of quality in Xerox Corporation in the LIS sector in Europe, and they strongly recommend that libraries and information services “need to take quality
seriously, to work sensibly with its suppliers, to objectively evaluate customer satisfaction, and integrate activities and potential within the corporate quest for excellence” (p. 603).

AT&T has been recognized as a quality service provider by receiving two Malcolm Baldrige National Quality Awards from the U.S. Department of Commerce. However, quality processes mean a commitment to continuous improvement for customers and service excellence. In an overview on quality issues in libraries, Shaughnessy (1996) states that “from an engineering perspective, quality means conformance to specifications. . . with a customer or consumer oriented approach, quality becomes a judgment of the customer” (p. 459). From the AT&T viewpoint, quality meant meeting both expectations irrespective of what product or service was under discussion. Libraries in the manufacturing sector participated in the ISO 9000 reviews with the other departments in that environment. The library organization participated in the development of a “best practices” database with one of its customer organizations in the mid-1990s to increase the availability of AT&T successes in quality performance and service excellence.

EVALUATING SERVICE QUALITY

The library organization has four values that it has used as its mandatory components for evaluating the quality of services that AT&T provides itself and those from various external vendors. AT&T’s library customers care about timeliness, costs, accuracy, and content relevancy. Regardless of what survey method or process has been undertaken, these four elements are relevant to the AT&T employees that are served.

Timeliness refers to the customers getting what is required within their time expectations. Cost refers to the price that the customer is willing to pay for the product or service requested. Accuracy refers to the correctness of what is requested versus what is received. Finally, the content relevancy is determined by customers’ subjective view of how the service or product meets their content expectations.

During the ten years of system design, implementation, and evaluation, AT&T library programmers expected the process to be continuously revised and reassessed as new technology became available. In 1996, AT&T decided to select external products for its information systems rather than creating its own as it did in the past. Since the 1980s, the speed of technological change had increased dramatically when inventing in-house systems to meet the needs of the organization at that time. Senior management had announced that Lucent Technologies would be created and separated from AT&T. The size of the new AT&T meant that outsourcing would become the norm in doing business. Consequently, the focus now is evaluating the quality of the external service provider in meeting internal
customers' requirements while being compatible with internal systems. Time constraints and reduced funding have increased the corporation's need to focus on its core businesses and outsource all other services.

Davis (1997) suggests that evaluating system compatibility is only one of many criteria when selecting electronic resources that must be reviewed. Content and presentation are important but "purchase/lease options and varying cost structures are elements," according to this author, that are unique to electronic resources (p. 392). Archiving, system security, and licensing terms for software are included in the discussion of the other criteria essential for acquisition satisfaction and service quality for end-users.

AT&T is now negotiating with its vendors to establish corporate buying patterns for its online services to reduce the need to charge end-users for individual searches and resultant print charges. Customer satisfaction with this development will depend on how knowledgeable and familiar the employee is with online searching and the employee interest in obtaining his/her own information. The internal AT&T Intranet has been established to facilitate ease of access to database resources.

During the early years of outsourcing journal articles, vendors were given a delivery expectation of five days as the acceptable time for delivering requests from AT&T employees. Quick turnaround is possible when resources are readily available. However, the real experience during the first two years was eight to nine days on the average, and customer dissatisfaction occurred more often than was acceptable.

To reduce the delays, customers were asked to pay a premium surcharge for premium handling—e.g., overnight delivery or faxed response within twenty-four hours. The premium charge became another source of dissatisfaction when customers were held accountable for their line expenditures. Consequently, the corporate pressure to reduce the number of vendors and improve buying power was dependent on end evaluation of the vendors by the end-users themselves. Two years of financial negotiations among all parties involved, including computer systems' upgrading and the AT&T Intranet, have resulted in implementation of a simple buying plan. Despite the changes, the end-users' expectation of timeliness has still not been satisfied.

When the library organization moved its major research journal collection to a remote site, it proved to be an excellent budgetary and financial improvement. Yet library customers remained upset about the move for years after it occurred. It has taken a few years of adjustment for some researchers to find that the Internet does not always provide instant gratification on all of their needs—e.g., timeliness.

Search access for some databases became available when the end-users provided a credit card number for a premium surcharge. The library information specialists found that some end-users began to appreciate the specialist's knowledge and expertise shortly after their initial trials
with the Internet. “Easy access” became more complicated when end-users realized that they lack the time it takes to manage the new ways of obtaining information and in meeting their own demands.

CONCLUSION

Shaughnessy (1996) states that “measurement continues to be a major impediment to improving the quality of our libraries...and it will continue to be an issue of strategic importance to librarianship and information science...” (pp. 460, 463). AT&T continues to use customer satisfaction as its primary focus for measuring service quality. The library organization is an integral part of this process, and the employees and change will continue to be key drivers in the process of moving into the twenty-first century of electronic networks and connections.

REFERENCES


About the Contributors

INA A. BROWN-WOODSON is a District Manager, Information Services at AT&T Labs, in Holmdel, New Jersey. She has worked in numerous management positions in libraries and information services and technical publications over the last sixteen years. She is also a Ph.D. Candidate at Rutgers University School of Communication, Information, and Library Studies. She has been a guest speaker at annual conferences for the American Library Association, American Society for Information Science, and International Federation of Information and Documentation. She is a member of the Board of Directors for the Copyright Clearance Center (CCC).

ROSEMARIE COOPER is Reference/Instruction Librarian and the Nursing/Biology/Science Bibliographer at DePaul University in Chicago, where she handles reference, bibliographic instruction, and research consultations for students, including remote library users and distance learners. As a member of the Nursing Department’s Curriculum Committee, she has participated in the National League for Nursing accreditation process at DePaul and has been involved in creating library services for distance learners in DePaul’s graduate and undergraduate programs in nursing.

PAULA DEMPSEY is Head of Reference at DePaul University’s Loop Campus Library in Chicago. Prior to that, she had been pursuing a second Master’s degree in sociology at Loyola University Chicago. She was formerly Instruction Coordinator for the Loop Campus Library, DePaul University. She has presented on library instruction for distance education at the Illinois Library Association annual conference. The ALA Library Instruction Round Table named her article on instruction for multidisciplinary graduate programs in research strategies one of the top 20 instruction articles for 1996. Ms. Dempsey is a social sciences reviewer for Library Journal.
BARBARA EHRHARD is Adjunct Instructor at McHenry County College, Crystal Lake, IL. Ms. Ehrhard is also an on-line Internet curriculum course developer. She is currently completing her dissertation research on learning styles preferences in the distance education environment.

BRADLEY GULLIFORD is one of four project managers on the I-Net Team of the Information Network at United Technologies Corporation in East Hartford, Connecticut. He has contributed articles on Internet resources to the ASIS SIG/LAN newsletter and serves as an Internet consultant to a SeniorNet Learning Center, local churches, and neighborhood organizations.


SANDRA HARTZER is the Pagemaster for the Unisa Library home page and intranet and is the Co-ordinator of Internet Training for the Library. She has been involved with the development of the first OPAC of the Unisa Library and with the selection of a new library system. Ms. Hartzer has visited various institutions in the United States and England. She has recently been responsible for the customization of the new Web-based catalog, OASIS. She has presented several papers at national and international conferences on OPACs and Web-related issues.

THOMAS L. KILPATRICK is Access Services Librarian and Professor at Southern Illinois University, Carbondale. He is co-author of Illinois! Illinois! An Annotated Bibliography of Fiction and two other books on microcomputer resources. He has written journal articles in the areas of Illinois literature, interlibrary loan and document supply, and serials, and writes the “In the Literature” column for Library Software Review.

VANAJA MENON is Associate Librarian at Lake Forest College, Lake Forest, Illinois. She serves on committees of the American Library Association, and has written Customer Expectations: Concepts and Reality for Academic Library Services published in CARL (January 1995).

CHRISTOPHER MILLSON-MARTULA is Director of the Library at Lynchburg College in Lynchburg, Virginia, and has held a number of positions in all types of academic libraries. Active in the American Library
Association and consortia at the local and state levels, he has authored articles on customer expectations, collection development in general, and cooperative collection development in particular.

LYNN NEELEY is the Associate Dean of the College of Business at Northern Illinois University, De Kalb, Illinois. Her responsibilities include curriculum, library resources, and student advising. Dr. Neeley is the President Elect of the United States Association for Small Business and Entrepreneurship, and a member of the Academy of Management Entrepreneurship Division’s AACSB Liaison Committee, and that division’s Executive Committee. One of her recent publications, “Can Technology Really Help Small Business,” was featured in the Green Bay Press-Gazette, September 21, 1998.

JOHN NIEMI is Distinguished Teaching Professor and Professor of Adult Education in the Department of Leadership and Policy Studies at Northern Illinois University, De Kalb, Illinois. As an adult educator, he has taught in Canada, China, Finland, Russia, Taiwan, and the United States. Professor Niemi has published books and research articles on distance education, international adult education, and human resource development. He has been a Fulbright scholar and holds an honorary Ph.D. from the University of Helsinki.

BRIAN PATERSON is a member of the management group at the Unisa Library responsible for Client Services and is the coordinator for the Web Information Services Team. He was University Librarian at Rhodes University in Grahamstown before joining the Unisa Library management team in 1994. Mr. Paterson has visited various tertiary institutions and academic libraries in the United States, England, and Europe in connection with open and distance learning.


BARBARA G. PREECE is Assistant Access Services Librarian and Associate Professor at Southern Illinois University, Carbondale. She is the current editor of Library Administration and Management and award winning author, with her co-author, Thomas Kilpatrick, for their article concerning the impact of serials cuts on interlibrary loan.
PHYLLIS C. SELF is Interim Executive Director of University Library Services and Associate Professor at Virginia Commonwealth University. Ms. Self is also Executive Director for Information Resources and Media in the Office for Information Technology and Head of the Tompkins-McCaw Library, Medical College of Virginia, Richmond, Virginia. She is also a member of several professional library committees and organizations. Her most recent publications include "Bridging the Information Gap for Virginia Public Health Nurses" (co-authored with E. Sayed and J.K. Henry) in the journal *Public Health Nursing* (vol. 14, no. 3, pp. 151-155) and "Notes from the Field" (co-authored with E. Sayed, J.K. Henry, and E. Heath-Hansen) in the journal *American Journal of Public Health* (vol. 87, no. 8, pp. 1376-1377).

BERNIE SLOAN is Senior Library Information Systems Consultant in the Office for Planning and Budgeting at the University of Illinois at Urbana-Champaign. Mr. Sloan was instrumental in the establishment of the ILLINET Online network in Illinois. He is also a doctoral student at the University of Illinois Graduate School of Library and Information Science.

DORETTE SNYMAN is responsible for the administration of all subject-related bibliographic and full-text databases in the Unisa Library at the University of South Africa in Pretoria and manages the project to provide Web access to these databases. Ms. Snyman represents the Unisa Library on the Joint Acquisitions Taskgroup of the GAELIC Consortium.

LISA THOMPSON is an associate member of the Web Information Services Team of the Unisa Library at the University of South Africa in Pretoria. She is responsible for the writing of the Research Information Skills course and is involved in the Internet course development workgroup. Ms. Thompson has been involved in various aspects of library skills training since 1990.

LOUISE VAN HEERDEN is a member of the Web Information Services Team of the Unisa Library at the University of South Africa in Pretoria and is responsible for the investigation into the provision of electronic current awareness services and for investigating the provision of Web page links to journals available electronically.

MARZA VORSTER is Coordinator for Client Development in the Client Services Division, Unisa Library at the University of South Africa in Pretoria. She coordinates and participates in the development of various library and information skills programs offered by the Unisa library. Ms. Vorster has presented papers on user education at national and international conferences. She recently participated in a workshop on Information Literacy.
presented by the Department of Education and the European Union Higher Education Libraries program. She is a member of LIASA.

ANSIE WATKINS is responsible for the development of the Electronic Text Centre for the Unisa Library at the University of South Africa in Pretoria. She has proposed a model and has set up a Web site for the pilot project. At present she is creating a database of full texts and images of archival materials and evaluating commercial full-text databases and a search engine. Ms. Watkins visited various electronic text centers in the United States and England and attended a course, "Electronic Text and Images," presented by David Seaman, at the University of New Brunswick, Canada. She has presented papers on electronic texts, imaging and indexing at national and international conferences.

JESSICA L. WAUGH is a Research Associate in Outreach Services at the Tompkins-McCaw Library, Virginia Commonwealth University in Richmond, Virginia. She is also a bioethics consultant and lecturer. Recent publications include a co-authored article entitled "Commitment to Change" in the Journal of Continuing Education in the Health Professions (vol. 17, no. 3, pp. 133-140).

ANN J. WOLPERT is Director of Libraries for the Massachusetts Institute of Technology. Her responsibilities include membership on the Committee on Copyright and Patents, the Council on Educational Technology, Academic Council, and the Editorial and Management Boards of the MIT Press. Prior to joining MIT, she was Executive Director of Library and Information Services at the Harvard Business School. Ms. Wolpert is a member of the Board of Editors of Library & Information Science Research, and she writes, speaks, and consults on the management of innovation and technology in libraries.

BARBARA A. WRIGHT is Outreach Services Manager at the Tompkins-McCaw Library, Virginia Commonwealth University in Richmond, Virginia.
INDEXING AND ABSTRACTING IN THEORY AND PRACTICE
2nd edition
By F. W. Lancaster

SECOND EDITION FEATURES
MULTIMEDIA SOURCES AND THE INTERNET
Award-winning author F.W. Lancaster has revised his widely used text to address growing complexities in the field. Featured in the second edition of *Indexing and Abstracting in Theory and Practice*:

- New multimedia sources chapter
- New indexing within the Internet chapter
- Updated chapters on text searching, automatic processing methods, and the future of indexing and abstracting
- Nine updated chapters on basic principles and theories
- Modified practical exercises

In addition to use as a text, *Indexing and Abstracting in Theory and Practice* holds value for managers of information services and others concerned with indexing, abstracting, and all related issues of content analysis.

Orders must be prepaid to
The University of Illinois
Major credit cards and checks accepted
ISBN 0-87845-102-1
426 pages
cloth
$47.50 plus shipping
"Library Trends has become the premier thematic quarterly journal in the field of American Librarianship."

Library Science Annual

Both practicing librarians and educators use Library Trends as an essential tool in professional development and continuing education. They know Library Trends is the place to discover practical applications, thorough analyses, and literature reviews for a wide range of trends. See for yourself the breadth of topics covered in the 47th volume.

Service to Remote Users
(Summer 1998) Edited by Lorraine Haricombe

Classification in the Electronic Environment
(Fall 1998) Edited by Geoff Bowker and Susan Leigh Star

Folklore and Libraries
(Winter 1999) Edited by Betsy Hearne

Human Response to Library Automation
(Spring 1999) Edited by Janice Kirkland

Institutional subscription price $75 (plus $7 for international subscribers). Individual subscription price $50 (plus $7 for international subscribers). Student subscription price is $25 (plus $7 for international subscribers). Single copies are available for $18.50, including postage.
Order from the University of Illinois Press, Journals Department, 1325 S. Oak St., Champaign, IL 61820-6903, Telephone 217-333-8935, Mastercard, Visa, American Express, and Discover accepted.