
Remotely Familiar: Using Computerized Monitoring to Study Remote Use

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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

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LIBRARY TRENDS, Vol. 47, No. 1, Summer 1998, pp. 7-20

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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. McGlamery 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? McGlamery 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 rusticing 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.

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