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The Human Response to Library Automation

Janice Kirkland
Issue Editor

University of Illinois
Graduate School of Library and Information Science
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.

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Introduction

JANICE KIRKLAND

In a recent cartoon, an information desk attendant directs a library user with the comment: "Books? Oh yes, to your left between the videocassettes and the computer software." Such jokes are but one of many signals alerting us to the fact that libraries, which used to be quiet places for people and books to come together, seem to be metamorphosing into places for machines with all that machines require, and remain only secondarily places for books and people.

The subject of this issue is how people—meaning those who use libraries, who work in libraries, and who manage libraries—are reacting to the introduction and growth of automation. It is a subject which needs careful scrutiny, because automation radically alters that access to information which is a library's raison d'être, and can also radically alter quality of work life for those who devote their careers to providing such access. We need to ensure that the impact of technology on both access and people is primarily a positive one.

We must not emulate the smiling lady in the limerick in which "they came back from the ride / With the lady inside / And the smile on the face of the tiger." We wish to enjoy the ride while avoiding the sharp teeth of technology, but how can we go about it?

In the articles in this issue of Library Trends, the contributors explore the question of the human response in both formal and informal terms, and in general and specific contexts. They allow us to view people coping with change: Bill Miller's and Bonnie Gratch's reference librarians assimilating methods of using and teaching new databases while evading burnout; Meg Scharf's and Jeannette Ward's Florida students using two online catalogs at once; Nancy Brodie's bilingual
Canadian government workers consulting an online catalog system not intended to be one.

We hear people speaking out about the effects of automation, from Dorothy Jones's well-educated paraprofessionals to Ann de Klerk's and Joanne Euster's research library directors. And we receive resources and advice for responding positively to the effects of automation on personnel in an analysis of participation from Mike Marchant and Mark England; a review of ergonomics from John Olsgaard; and a retreat process from Linda Dobb and Janice Kirkland.

The research of several of the contributors supports the possibility that automation may be less of a danger and more of an asset in human terms than some observers have thought. Paul DuMont and Rosemary DuMont's pilot study on gender presents the possibility that neither sex is negatively affected in upward mobility by technology, while Keith Cottam surveys library "intrapreneurs" who regard technology as opportunity, and Lynn Magrath reports on public library users who depend on their system as a central community information resource.

If there is a consensus among the articles in this issue, it seems to be that people in libraries are adapting to automation but are feeling the stress of change as they do so, and that in many cases they are aware of responses which are needed but which have not yet materialized, especially in the areas of increased participation and communication. It is the editor's hope that this issue will serve as one means of providing such communication and will assist with successful responses to library automation.

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Making Connections: Computerized Reference Services and People

WILLIAM MILLER and BONNIE GRATCH

The term computerized reference services, once synonymous with online searching of external databases, now encompasses a much broader range of activities. As the concept has broadened, so has the role of the librarian as an intermediary. The end user's role has also broadened from that of passive recipient to active searcher. Problems of cost, instruction, standardization, space, and security have never really been resolved, either for librarians or for end users, and these problems continue to hamper the full development of computerized reference services.

The last issue of Library Trends which dealt with reference service was published in 1983. Since that time, the increased availability of computerized reference services has forever changed the map of reference. Graduate students, given a list of arcane or partial citations to identify in a bibliography course, can now side-step many traditional printed tools and complete their assignment using OCLC or RLIN. Undergraduates flock to their library's BRS/After Dark, Wilsonline, or InfoTrac terminals for term paper citations, and refuse to accept more traditional search methodology. Faculty members and business people increasingly do their own end user searching in their offices and homes without actually entering a library at all. Such developments, unthinkable several years ago, are now a fact of life and entail a variety of opportunities as well as dilemmas for the reference community.

As one would expect, library literature has burgeoned with articles, conference proceedings, and unpublished reports on computerized reference. Increasingly, this literature focuses not just on technology but also on the connections between technology and people—both staff and
patrons. In the 1983 *Library Trends* volume, only two articles discussed online reference services, but both of these acknowledged the human interface. Thelma Freidcs (1983) pointed out that the computerized reference situation mandates the librarian's involvement at every stage, from formulating the question to evaluating the result, thereby providing both a model for the patron and an educational process for effective literature searching (p. 463). Bruce D. Bonta (1983) made the point that the maturing of online reference service will allow librarians to realize the inherent value of their intermediary roles, and he also drew attention to the instructional role in teaching end users to do their own searches. His article summarizes the debate at that time about whether end user searching would deprofessionalize the reference librarian's role.

As we leave the 1980s we face a confusing panorama of technologies and concepts embodied in such phrases as "end user searching," "gateways," "CD-ROM," "vid-tele-reference," "CAI for BI," "optical and video discs," "expert systems," "artificial intelligence," and the "scholar's workstation." This is a world not envisioned in 1983. This article will survey and describe the technological developments which have affected the reference function since that time, and discuss the effects of the computerized reference environment on the administration of reference service, including the effects on librarians and on users. Online public access catalogs, although obviously an important part of the computerized reference environment, are defined as outside the scope of this article because they are treated extensively elsewhere within this issue of *Library Trends*.

**ONLINE DATABASE SEARCHING—BIBLIOGRAPHIC UTILITIES**

Two basic kinds of online database searching may be identified and discussed in terms of their effect on the reference process and on the user: (1) searching of the bibliographic utilities (OCLC, RLIN, WLN, UTLAS); and (2) searching of "subject" databases created by a variety of database producers and generally made available to the public through commercial search services (DIALOG, BRS, ORBIT).

The earliest major computerized reference tools were the cataloging database of OCLC (originally named for the Ohio College Library Center which fostered the database), and soon thereafter the databases of the Western Library Network (WLN), Research Libraries Information Network (RLIN), and UTLAS (originally University of Toronto Library Automation System) in Canada. Although OCLC was designed as a cataloging rather than as a reference tool, reference librarians had realized its value for reference services by the mid-1970s, and began lobbying to have terminals placed in public service areas for both librarian and public use.

The problems encountered with public access to OCLC (and the other "cataloging" databases) were similar to the problems and opportunities inherent in all computerized reference sources. Terminal avail-
ability was greatly restricted by OCLC in order to control traffic on the network; the cost of terminals, especially for smaller libraries, was a major factor; and there was considerable fear of machines on the part of public service staff. It was not until the early 1980s that public service librarians' use of these tools became common. A study of articles indexed in *Library Literature* for the period 1970-82 yielded only twenty-seven items which discussed both OCLC and RLIN, and only three of these dealt with the use of RLIN at the reference desk (Stratford, 1984). Baker and Kleugel's (1982) study of the reference use of OCLC surveyed sixty-three ARL libraries' main reference departments by telephone and found that only twenty-four reference departments were equipped with their own OCLC terminals, and of those twenty-four, only nine allowed direct patron access (p. 380). A more recent review of the published literature describing the use of RLIN at the reference desk describes the paucity of solid research articles about its reference use and claims that "although most authors ably inform us of the potential of RLIN, very few have tested that potential in any meaningful way. The resulting impression of usefulness does not yet justify the expense of placing RLIN terminals at the reference desk" (Bennett, 1986, p. 476).

**SEARCHING VERSUS TEACHING**

A classic dilemma faced by reference staffs dealing with the cataloging databases was whether to act as intermediary for the public or to make the terminals directly available to the public. Even where terminal availability was not a problem, there remained the question of cost (especially for RLIN searches), and the question of teaching the use of OCLC's idiosyncratic searching keys. Nevertheless, at many libraries, public use terminals were made available, and lengthy instructional materials were created by librarians.

In those libraries which did offer public searching, faculty and students discovered that with a modicum of training, they were empowered to do research which obviated extensive reliance on more cumbersome printed tools. For many library users, OCLC was the first "computer" ever encountered, and its availability established in their minds (rightly or wrongly) that libraries were in the forefront of automation.

For reference librarians, the advent of OCLC and its cousins was equally important. For the first time they found themselves the stewards of an important and impressive new technology with a corresponding increase in their self- and public image. For many reference librarians, instructing patrons about the use of OCLC, once they had mastered it themselves, constituted a first experience with bibliographic instruction; now they had a vital instructional role to play involving a prestigious new technology.

**ONLINE SEARCHING: COMMERCIAL DATABASES**

The other side of the online-searching coin during the 1970s and early 1980s involved the great variety of databases created by both
for-profit and nonprofit companies and government entities and made available to libraries primarily through the "supermarket" commercial vendors—principally DIALOG, BRS, and SDC-ORBIT in the United States. Their development and introduction into the reference service mix were roughly contemporaneous with the availability and dissemination of OCLC services, although their impact was not as widespread in most libraries.

To a greater extent than with the cataloging databases, online searching of the "subject" databases began in libraries as a back room operation in which librarians functioned as guru-intermediaries performing mysterious searches. Online searching in the early 1970s was primarily common in special libraries, where charges could be built into the cost of company products or covered from grant funds. Academic libraries tended to pass along all or a large part of the online searching costs which resulted in limiting the number and extent of online searching activities.

For those students and researchers who could afford it, online searching in the 1970s did offer a revolution in search capability, with its powerful subject, Boolean, and full-text access. The searching power of the software was a revolution after the cumbersome search keys of OCLC which offered no subject access at all. As a result, the reference librarian was empowered to cut through much tedious manual searching and in some cases was able to discover information which traditional manual searching of printed sources could not have yielded except perhaps through serendipity. This capability enhanced the quality of the reference interchange, and in many cases librarians felt that their prestige was enhanced as well.

The first national conference on online services occurred in 1979, and, in 1980, Fortune reported on the online industry's 600 databases. There was a notion abroad that the growth of databases would be exponential, and that printed indexes, in many cases, would disappear. This has not happened primarily because the volume of searching did not increase to the extent once predicted. The major factor which has inhibited the growth of online searching of commercial databases in academic and public libraries has been cost. Royalties to the database producer, per-minute search charges to the vendor, and telecommunications costs combine to make such online searches highly expensive, especially for academic, public, and school libraries which are not funded for open-ended costs and are not in the for-profit sector. The usual answer has been a partial or full charge back. However, the average user continues to be unwilling to spend large amounts of money to secure information. As a result, most online searches have continued to be performed by trained reference searchers, supposedly in the patron's best interest, because he or she was likely bearing a large share of the cost. The stakes, for many years, were simply too high to entrust the keyboards to the public.
This "priesthood of searchers" was not viewed universally as a bad thing in the library profession. Indeed, it was viewed by many as a way to gain recognition as a profession distinguished for its specialized skills. The notion of public dependency was perceived as a positive good which would place librarians more in line with the medical and legal professions, whose members themselves would be dependent on librarians for information which they could not locate themselves.

Others in the profession were not sure about the value of exclusivity. Frick (1984) argues against allowing patrons to become dependent on intermediary expertise, as it results in "technostress." Instead, she saw the librarian's role as fostering self-help, shifting from expert-authority figure to consultant. Norman Stevens (1983) stated:

If online database searching is to become fully integrated into every day reference service in all libraries, some drastic changes in our way of thinking, the marketing of such services, and our methods of operation will have to occur. Until the terminal is located at the reference desk and not isolated in a small closet at the back of the reference department and all reference librarians, and not just a select few, use it on a regular basis, online database searching will be of limited value. (p. 78)

Another article reports the findings of a survey of ready-reference use of online databases in 1982. Of the sample of 1,290 librarians from all types of libraries, 43 percent did not use online searching very much or at all at the reference desk, and of the 57 percent who did, most of them were also the people responsible for the regular, in-depth online searches (Hitchingham et al., 1984).

The early 1980s also witnessed the first of the consumer-oriented, multipurpose online services, the Source; the practice of, and copyright concern about, downloading; and the introduction of the "user friendly" online services BRS/After Dark and DIALOG's Knowledge Index. Database vendors introduced these alternative, fixed, or lower cost online services primarily to extend their markets by making online searching more available and affordable. They were intended for the end user but in fact were used chiefly by librarians to extend accessibility and control costs. These systems have been moderately successful at extending accessibility to databases, and have opened up searching as an end user service, although, even with the simplified searching techniques required, librarians find that some people still need considerable instruction. A new dimension has emerged for the reference librarian's role as instructor.

Through the mid-1980s the problem of end user accessibility to databases continued to vex the profession and was the central theme of RASD's Machine Assisted Reference Section at the summer ALA conference of 1985. A 1981 ALA survey of 985 libraries revealed that 72 percent charged a fee of some kind, most commonly in academic libraries (ALA, 1982, p. 56). No one really knew how to resolve the issues of cost, staff time, and machine accessibility. Peischl and Montgomery (1986) captured the issues in the following statement:

Nothing is free; some services are offered as traditional fare while others, such as external online searching, may carry a direct user fee. This question is not
only philosophical, but very practical because each service bears an opportunity cost; that is, if you choose to do one thing you give up the opportunity to do something else. Therefore, if a library chooses to launch a concentrated online retrieval program while enduring fixed overhead costs of space, personnel, and operating budgets, something else must give and not be done. Few reference services have had the luxury of additional resources to launch a new service. Therefore, stress has been added and priorities have changed, *de facto* rather than formally, as more searching is requested. (p. 350)

The usual compromise was a two-tiered searching program in which patrons paid for in-depth online searches in whole or in part, while the ready-reference searches were paid for by the library as a normal part of reference service, if and when such searches were conducted. In this way costs were tightly controlled, staff time tightly scheduled, and searching maintained as a professional activity rather than as an end user one.

**Optical Disc Technology**

The log-jam regarding end user access to databases is currently being broken by the implementation of optical disc technology. Such technology offers much of the power and features of online searching at a fixed cost. The amount of searching is open-ended, and the patron can more easily use the simplified search systems without much instruction. While not an online tool, it appears to be a free online searching system to the end user, thus attracting users and potentially expanding reference tools to a wider audience. Some claim the impact of CD-ROM (compact disk-read only memory) to be as significant for reference service as online searching was in the 1970s.

This new technology began to appear in libraries in 1985 in the form of InfoTrac, a microcomputer-based index to (at that time) some 900 popular periodical titles stored on a video disc. Users quickly adopted InfoTrac and it became popular immediately. Much has been written about InfoTrac, both pro and con, although few dispute its popularity (Kleiner, 1987). No matter what its limitations, it is truly an end-user reference tool, requiring virtually no instruction, although some advocate the need to make users aware of its limitations and its place in an overall search process (see for example Van Arsdale & Ostrye, 1986). InfoTrac now offers full-text access to the last three months of the *Wall Street Journal*, and in its new compact disc format allows access to ERIC, Disclosure, and other CD-ROM databases all through the same workstation.

From a library's perspective, the CD-ROM-based reference tools, though expensive, at least offer end user searching at a fixed and predictable cost. Bartenbach (1987) has explained aptly the primary reasons for the huge success of CD-ROM such as local control; end user access; predictable per search costs; unlimited access; and privacy. He believes that the psychological advantages to users are the absence of a sense of time pressure or concern about costs and more privacy. Some librarians are concerned about the popularity of these tools and their
potential for subverting the traditional activities and educational mission of the reference function because many students prefer these systems to traditional printed indexes and abstracts, even where the materials indexed are clearly inappropriate for the work being undertaken (Van Arsdale & Ostrye, 1986). Patrons, however, have few qualms about the technology, and it is rapidly gaining a strong foothold in libraries. Pemberton (1986) described college students' use of InfoTrac thus: "They learned quickly on their own...took pride in teaching a friend...became repeat customers...refuse to accept an alternate information source...they stand around and wait for it to free up...[They] are voting with their feet" (p. 11). Paula Watson (1988) offers the most poetic description of users' responses to CD-ROM:

Librarians should take into account the delight of the user in this technology. Perhaps a little reminiscent of joy-sticking through Space Invaders, the user opens new worlds of information with the touch of a few buttons. It is the knowledge seeker's own ship to be flown single-handedly and freely to any subject in the universe of information on the disk. (p. 50)

Until recently, compact disc reference sources have been limited to one person per workstation at a time, are not as current as online resources, and are somewhat slower than their online counterparts. These are not disabling drawbacks, especially in the area of currency; those needing total currency can still go online in most cases. The technology for multiple access to multiple databases is making headway in the marketplace. More serious problems for libraries include the cost of subscription to a burgeoning list of compact disc resources, the cost of hardware necessary to access these resources, and the space necessary for hardware and user workstations. Watson (1988) reports that many institutions are using nonrecurring funds to purchase the equipment and initial subscriptions necessary to implement compact disc technology (p. 45). Some libraries which have acquired optical disc products or are planning to do so are also charging or planning to charge for the use of the systems. Others have cancelled or are considering the cancellation of hard copy reference resources, just as had been done when based on online access. Beltran (1987) suggests considering cancellation of expensive cumulative indexes—such as the Comprehensive Dissertation Index—in favor of the CD-ROM product.

Other Areas of Reference Automation

It is possible that librarians have not yet really begun to tap the potential of automation to enhance reference work. One of the most recent developments just beginning to affect reference service is the application of artificial intelligence research and expert systems. There are several products on the market now calling themselves "expert systems," which are microcomputer-based, interactive expert-type programs that provide readers' advisory services, such as "Bookbrain" and "Librarian's Assistant." A few articles have appeared which describe...
programs that suggest reference sources for a particular query, such as the National Agricultural Library's "Answerman" (Waters, 1986). Another describes several programs and operational examples of expert-type systems which greatly improve the user interface for searching online databases and online public access catalogs (Kesselman, 1987). One writer even makes claims that such systems will help remedy the problem of half-right reference service (Cavanaugh, 1987).

Meanwhile, other automation initiatives are affecting library users today. Some current examples of reference automation may indicate the range of efforts underway. At Georgia Institute of Technology, the library has acquired site licenses to mount several online databases on the university's mainframe, along with BRS search software, thus bringing to users the power of online database searching integrated with the library's online catalog and searchable from every campus office and, indeed, from off-campus as well (Drake, 1987). This integration of "external" databases into the library's online catalog is a clear trend. At Ohio State University, the ERIC database and the U.S. Government Printing Office database have been added to the basic online catalog of holdings, and other libraries which are members of the Center for Research Libraries have added that specialized repository's holdings to their own online catalogs. Similarly, libraries have begun to add the holdings of other area libraries to their own databases in one conflated online catalog. Such multi-institutional database building blurs the distinction between institutional holdings and database searches of external resources and constitutes a "mini-OCLC" type of database for interlibrary loan and other purposes, the searching of which does not entail the costs levied by the traditional cataloging databases. Networks are also producing compact disc conflations of member institutions' holdings which the end user can search directly.

An important development in recent years is the involvement of libraries in the archiving and servicing of data tapes from governmental and other entities, especially in the social sciences, from the Inter-University Consortium for Political and Social Science Research. Some libraries merely house such materials while others engage in front-end programming which facilitates use of the data by faculty and students. Such work represents a rather high level of professional involvement in end user activities, and tends to have high public relations value, both for the library and for the academic departments which use the services for research activities and recruitment of graduate students and new faculty.

Librarians continue to innovate in response to automation. Some initiatives which have occurred as a result include community information and referral files which are maintained and updated online and even shared regionally through online catalogs. Librarians have made use of their external database search capabilities in order to create files of database searches on "hot topics" (Jacobson et al., 1984). KWIC and
other key word indexes to title words of works in reference collections enhance access at some libraries and enable reference librarians to maintain much better awareness of the collection and maximize use of materials (Farber, 1987). Finally, it should be mentioned that librarians are using “traditional” microcomputer technology and software both in terms of reference tools such as Value Screen and Trinet Establishment Data, which are available only on floppy disc; and in terms of software to do such things as automate desk schedules and update bibliographies and handouts more easily. Clearly automation in reference has been creatively employed by librarians to produce new tools and services.

**Impact of Automation**

Taken together, the existence of automation has obviously had a great impact on the materials, methods, and conduct of reference services. Computer-based reference has expanded subject access, saved librarians’ and users’ time, and generally improved service. The ability to search by keyword virtually any part of an online or on disc record, allows researchers more creative and powerful access to information than was previously possible, and leads to the uncovering of additional relevant information and resources. Patrons’ expectations have risen as a result of computerized reference sources. However, they sometimes falsely assume that the full-text copy is as readily available as the bibliographic information so easily obtained by database searches. Fortunately, along with the increased bibliographic access to information, librarians have yoked a greatly increased physical access to materials for users through the OCLC interlibrary loan system and other networked I.L.L. arrangements. Now with such a variety of document delivery services, and the promise of an increasing number of online or on disc full-text articles, interlibrary loan, while still the mainstay for most documents not owned by libraries, is but one of several document delivery options. In general, it is probable that had libraries not embraced automation for reference and public service, they would have lost much credibility in the public eye as an information resource, and would be in a much worse position in competing for municipal, corporate, or university funding for traditional materials as well as for automation needs.

Nevertheless, for all of its positive impact, automation has not had the far-reaching consequences which many might have predicted for the reference function for users and for libraries. Reference departments are still structured much as they were ten to twenty years ago, although there has been a trend toward integration of formerly separate online search services into the reference department. Automation activities are still localized in particular positions, such as “coordinator of online searching,” instead of being so widely distributed that they are taken for granted as an integral part of reference service. There is a tendency to
decentralize and to distribute searching activities to the end user, but this trend is tempered by the current necessity, at most institutions, to conduct end user searching in the library, even while the online catalog may be searched in the home or office. In the area of materials, the reference collection still appears identical or nearly so to that which may have been seen decades ago, except that there is also an overlay of online and on disc resources. While most libraries that have acquired optical disc products are locating them within the reference area, at least one has organized a separate compact disc and online reference center staffed for nearly all hours the library is open (Tucker et al., 1988).

The rapid influx of computerized reference tools and the integration of online ready-reference searching at or near the reference desk are probably partially responsible for an increase in the stress and burnout associated with the work of the reference librarian. Little research has yet been done in this area, but the pressure on reference librarians to develop online searching expertise and stay knowledgeable about a large number of reference tools in various formats could only increase the stress associated with burnout and the "struggle to do a job that is never really done" (Smith & Nielsen, 1984, p. 221).

Smith and Nielsen are the only ones to have applied the Maslach Burnout Inventory to a group of librarians so far, and their findings did not point specifically to online searching as a culprit. However they studied a group of special librarians who were probably more attuned to machine-based reference than the average reference librarian. It is no secret that most reference departments of any size (and indeed, many small departments as well) include librarians who are uncomfortable with computerized reference, and who, for one reason or another, simply refuse to make appropriate use of the technology. They exhibit a "subjective stress" that "leads to affective states such as anxiety, hostility, and depression and to decrements in aspects of job performance" (Motowidlo et al., 1986, p. 618. See also Jackson et al., 1986).

Despite any librarian resistance, however, library users are increasingly enthusiastic about machines, with a consequent increase in the amount of help which they need and which librarians render, both at and near the reference desk. Equipment maintenance and troubleshooting exacerbate this stress factor. It is clearly desirable for someone to extend the research of Smith and Nielsen, and of Maslach, Jackson, Motowidlo, and others who have studied stress and burnout in groups such as nurses and teachers, and investigate not only the general phenomenon of reference burnout but also the place that computerized reference tools have in the hierarchy of stressors affecting reference librarians. The ultimate goal would be to develop mechanisms which could defuse computerized reference service as a stress-related issue for some reference librarians.
INHIBITORY FACTORS

Cost
Many factors enter into the process of retarding a more meaningful integration of automation and end user involvement with automation into the reference function. The chief one continues to be cost. Automation generally entails costs which libraries find difficult to bear. Hardware, software, telecommunications, and maintenance costs are budgetary items over and above the traditional personnel, operating, and materials costs. While such costs are slowly being factored into library budgets, they are still beyond the means of smaller libraries, and they eat into a finite pie of resources of even the largest libraries at a time when most find it difficult to maintain enough money for traditional expenditures. As a result, many libraries have not taken advantage of desirable new technologies.

Security
In some cases, automation involves the handling of a paper printout which can be treated like traditional library material, or the examination of a screen of data which cannot be tampered with. But in many other cases automation involves the handling not only of computer hardware but also of floppy discs and laser discs. This introduces numerous opportunities for mayhem which have inhibited the acquisition of some tools and the use of others. Libraries experience the same kinds of problems with automated reference tools which they have previously experienced and been unable to come to grips with in terms of multimedia educational resources.

Materials kept on reserve or in locked or secure areas are not as useful or as highly-used as materials which are freely available. Stolen discs render hardware useless, and microcomputers subverted to personal or malicious use render library software and information resources useless. Vendors and database creators have been slow to recognize such problems. At this writing, the need for a "jukebox" to provide control of and multiple access to laser discs has been recognized but not yet totally resolved.

Instruction, Staff Time, and Standardization
Some years ago most reference librarians assumed that the introduction of automated reference resources would mean a diminution of the need for labor-intensive instruction. It is now apparent that for the most part the opposite is true. Nearly every automated reference tool differs from every other, standardization of format and search languages is almost nonexistent, and the nature of automated access entails a merciless propensity to yield no search results, regardless of the brilliance of the search strategy, if there is the slightest spelling or logical error. Machines also tend to need constant attention in a way that books
do not; systems need to be rebooted; printers restocked with paper; and users guided continually in the idiosyncrasies of what, in broad terms, are relatively simple systems to use.

As a result of these factors, automation of reference may not always save librarians appreciable amounts of time, although it has undoubtedly made their work more effective in many cases. Its effect on bibliographic instruction has resulted in the promotion and use of new modes of instruction, such as computer-assisted instruction and compact disc interactive technology. New questions about instructional strategies and a new "curriculum" of instructional content areas are also being raised. More recent is the movement in academic libraries to design and teach courses in information literacy. There is some relief from ineffective, labor-intensive orientation tours, where institutions use microcomputer-based or mainframe programs which contain floor space plans and orientation information. But mostly there is an increased need for instruction in the use of online and on disk systems which vendors tout as being transparent, and constant need to instruct users about the place of databases in a research strategy—i.e., a single database does not an entire search strategy make. Some librarians worry that the easy availability of such databases, in online or disc form, actually narrows rather than widens many a patron's options if they restrict themselves to what can be gleaned quickly and easily through the nearest automated information resource.

END USER SEARCHING SUCCESS AND SATISFACTION

The notion that end users should do their own searching and should be taught to do so by librarians has been a controversial one in the literature. There is a large body of material on the topic, primarily concerning efforts to instruct end users, assess user satisfaction, and report on the success of end user searches compared to intermediary searches. One longitudinal study over eleven years compared MEDLINE transaction logs of several groups—faculty, graduate students, and a mixture of staff from a school of pharmacy and a department of pathology. Its findings reveal that the convenience of terminal location affected use, that convenience of doing online searches was more important to end users than the quality of search results, and that end users prefer to learn from a colleague, by trial and error, or (lastly) one-on-one from a search intermediary (Sewell & Teitelbaum, 1986). Peischl and Montgomery (1986) analyze some of this research and conclude that, for most types of users, the responsibility for quality searches rests with the library, because infrequent or disinterested users do not perform effective searches. Even in the corporate environment, where end users do more online searching and perhaps have more incentive to be conscientious, intermediary librarians are of value to the searcher (Peischl & Montgomery, 1986, p. 349). Perhaps what can be gleaned from the research on end user searching is that users' library research behavior
can be affected by end user searching; that there are many libraries that have had a fair amount of success in teaching end users; that end users value the service more for its convenience than for the quality of the results; and that most librarians feel that the best situation for high-quality, cost-effective retrieval is a team effort search by a librarian-intermediary with an end user present. With the increasing use of optical disc services, however, the proportion of searches during which a librarian-intermediary is likely to be present will decrease, and the onus for high-quality searching will fall more and more on the database and search-software producers, and, of course, on the end users themselves.

**CONCLUSION**

The existence of online catalogs and the availability of other automation products in libraries have raised user expectations and appetites. There will likely be increasing public pressure on libraries to provide such products for public use, even as librarians who would like to do so worry about both costs and the pedagogical wisdom of making such products available, especially in an unmediated environment. The effects of the computerized reference environment on librarians are great. Many authors describe an enhanced role with more prestige associated with automated information retrieval skills, and some other writers draw attention to the increased work load and pressure on reference librarians to acquire a subject specialization and learn a variety of online and on disc search protocols. A few even proclaim the loss of prestige and function as the role of the online search intermediary is consumed by the independent end user of online search services. And still others describe future scenarios with reference librarians as information access and retrieval consultants.

Whatever the new generation of technology may be, the essential questions for librarians will probably remain the same. Do we push ahead or react conservatively? Do we stress end-use or mediation? Do we teach or try to remain uninvolved? Are we instructors with an important proactive role, acting as consultants to our clientele, or are we CD-ROM disc jockeys slinging whatever technology is current? How do we find the resources to be innovative and take advantage of automated reference tools while continuing to support "traditional" or "basic" services? Are we up to the challenge posed by our own innovation?

Perhaps the most candid answer available at the moment is that both librarians and end users are on a technology express, and the stops have yet to be announced. We know only that new technologies in reference increase the need for acquisition of new skills and continuing education on our part; that they provide the potential for better service to the public if properly harnessed; that users have more control now of their information searching and have additional high tech choices; and that this progress brings with it a variety of problems not only in terms
of money, space, and security but also in terms of choices we have to make concerning our own role in the reference process. We have no choice but to tackle these challenges and resolve them as they occur, for the benefit both of the users and of our own profession.

REFERENCES


Side-by-Side: Users React to a Second Online Public Access Catalog

Meg Scharf and Jeannette Ward

In the spring term of 1987, the University of Central Florida (UCF) Libraries staff was faced with developing an ongoing instruction program for using a second online public access catalog. At this point UCF was in transition from CLSI, which had served as a catalog and circulation system to NOTIS's public access catalog, LUIS. In this phase of the library's transition, the users found two clusters of different catalog terminals, side-by-side, near the building's entrance and no card catalog. LUIS was to be the library's catalog while CLSI was to remain the library's circulation system. The CLSI system, in use since 1982, featured remote access and traditional access points (author, title, subject) to bibliographic records. LUIS could be considered UCF's second generation catalog (Hildreth, 1987), since it featured authority files and access to holdings of eight other university libraries, in addition to traditional catalog records and access. Presently (Summer 1988), the number of LUIS terminals available to the public has increased. The number of CLSI terminals has been reduced, relocated to a less visible area, and labeled as "circulation information." The transition to the NOTIS circulation module is being studied, but no definite date for implementation has been determined.

The University of Central Florida, Orlando, is one of nine universities in the Florida State University System (SUS). The first classes began in October 1968 with an original enrollment of 1,948 students. Current enrollment is 17,284 with 627 faculty offering over 150 degrees.

Automation History

The library was using automation to process books prior to its
opening in 1968. All cataloging information was entered on a Flexowriter, which produced reels of punched paper tape. The University Computer Center produced complete catalog card sets from these tapes. The Flexowriter data were also used to develop a database for the circulation system. When library materials began circulating in 1968, an Addressograph system was used. Plastic "credit cards" with each item carried the item's accession number. The student's identification card along with the item card were put through the circulation equipment which imprinted the information onto paper. These circulation slips were taken to the computer center daily where keypunch operators produced punched cards which were batch processed. The computer center generated complete, ready-to-mail overdue notices, fines information, and book bills using these three components: (1) bibliographic information from the library's Flexowriter; (2) circulation information, including the borrower's Social Security number and the accession number from the computer center's keypunch operation; and (3) the university's records which included Social Security number, name, and address of the borrower.

In 1972 the university upgraded from a Harris computer system to a large IBM computer. Library personnel went through the first of many conversion projects. Plastic cards required for the Addressograph machine were replaced by 80 column keypunch cards that included title and accession number. This included removing the card and pocket from every book and replacing it with a larger pocket and keypunch card. These new keypunch cards were generated from the database that was still being produced from the Flexowriter.

A library staff member recalls, "the first time we were sent to the stacks, it was fun. It was a release from regular work, like a school holiday. We worked in teams and each person seemed to take the work personally. People worked long hours cheerfully." Library staff dealt with the typical problems in any conversion project—e.g., cards for which no books could be found and books for which no cards had been produced. The collection at this time was 90,000 items. The advantage to this conversion was that keypunch cards were produced at the circulation desk at the time of checkout. Computer center staff no longer had to keypunch the information from printed slips produced by the Addressograph equipment. The circulation reports were still batch processed daily and notices and bills were processed weekly.

In 1974 the University Computer Center switched from keypunch to magnetic tape for processing which once again required the entire collection (over 150,000 items) to be recarded. Veterans of the first conversion project found this second effort to be "more regimented, more formal, less fun."

In 1976 the library joined SOLINET and began producing catalog card sets on the OCLC system. The archival tapes from the OCLC system could not be read into the library's circulation system by the
computer center. Therefore complete catalog information continued to be entered into the Flexowriter to produce the circulation database.

Between 1977 and 1979 UCF established a CLSI circulation system. During the negotiations and implementation a complete retrospective conversion of all bibliographic information into OCLC was completed. At this time the computer center still could not read the OCLC tapes into either the old circulation system or into the CLSI circulation system. By 1979 the computer center was able to use the information from the old circulation system to create the CLSI database and produce bar codes for 230,000 items. Library staff for the third time were sent to the stacks to physically “convert” every item by bar coding it. Although some still felt, “reconversion was an adventure, a break from regular work,” many now had the attitude that, “it was an intrusion on the important ongoing work of the library professionals.” At least one staff member felt strongly enough to request that the director “hire temporaries for every move and conversion project.” However, most remember the prevailing attitude toward the moves and conversions as, “just doing what had to be done.”

In 1980 CLSI circulation was implemented. Circulation information was now available online and public terminals were available to provide circulation information and supplement the card catalog. By 1981 the library was cataloging on OCLC with an immediate interface to CLSI and stopped filing cards in the public catalog. By 1983 the entire card catalog was physically removed and twenty-four CLSI terminals were available for public and technical use. In addition, annually produced microfiche (COMcat) of the catalog by author, title, and subject were available, as well as remote dial access.

By 1984 the library had upgraded its CLSI hardware twice and was negotiating for a major hardware expansion and software enhancements. In fifteen years the library had grown to over 250,000 volumes and survived three major conversion projects as well as several complete physical moves. The staff had developed an ongoing catalog instruction program that included printed materials, online help screens, a catalog assistance desk, and demonstrations.

**AND THEN CAME LUIS**

For the fiscal year 1984/85, the Board of Regents requested, and the Florida State Legislature approved, a proposal to automate the catalogs at all nine SUS Libraries:

- Florida A&M University, Tallahassee
- Florida Atlantic University, Boca Raton
- Florida International University, Miami
- Florida State University, Tallahassee
- University of Central Florida, Orlando
- University of Florida, Gainesville
- University of North Florida, Jacksonville
University of South Florida, Tampa
University of West Florida, Pensacola

The proposal specified and appropriated the funds to create a Florida Center for Library Automation (FCLA) whose primary mission and scope should be to automate state university libraries (Florida Post-secondary Education Planning Commission, 1988, p. iv). To carry out this mission, FCLA was to implement NOTIS software as an online catalog at all SUS libraries.

Working closely with FCLA staff, each university library developed the specifications and methods of loading their catalog information into the MARC-based NOTIS system. The NOTIS system is located at the North East Regional Data Center (NERDC) on the University of Florida, Gainesville, campus. All users are connected by telecommunications to this single system. This is not a union catalog, as each institution has a separate section of the database; but access procedures and help information are uniform. Moving between the nine universities' library catalogs is quite easy.

The technical problems of taking UCF's catalog information, partly from OCLC MARC records and partly from CLSI titleform (non-MARC), were solved and the database was loaded and library staff trained in NOTIS by May 1986.

The library began a "phased rollout" of the new catalog during summer 1986. NOTIS terminals were installed at the reference desk where the public could use them and be instructed or assisted if necessary. The terminals were also installed in the Library Instruction classroom where students and other groups were given demonstrations. At this point the staff was concerned with user reaction to LUIS and expected a modicum of the same resistance that had accompanied the initial use of COMcat and CLSI in previous years, but the initial response of this small group of LUIS users changed librarians' expectations. Now the concern was that the overall response would not be resistance but confusion, or, even worse, apathy. Several questions and comments were repeated by the slowly growing numbers who had seen LUIS demonstrated: "So why are you bothering to replace CLSI?" and "Does this contain abstracts or index entries for journal articles?" and "So this is just like the other catalog." These comments led us to believe that user expectations were high for a new system, and that the presence of new terminals led users to expect that the new catalog would perform very differently from the old catalog. Coincidentally, a suggestion box was made available to the public at this time. The box is prominently displayed with a large bulletin board for the library's responses at the library's only exit. During the public introduction of LUIS, not a single question or comment appeared in the box about LUIS, CLSI, or the side-by-side catalog arrangement.

Because NOTIS implementation was a statewide effort, UCF was asked to participate in a statewide publicity effort. The target date for
statewide introduction was set for the week of September 15, 1986. The total system had 3,426,214 records; UCF had 266,478 (Florida Center for Library Automation Technical Bulletin, 1986, p. 3). Some libraries were developing high-profile publicity campaigns intended to generate high public awareness of this new development. These libraries had card catalogs and wanted to introduce an online public access catalog (OPAC).

Librarians' experience at UCF with LUIS users on a limited basis brought us to the realization that we could not conduct a high-profile publicity campaign. Unlike schools introducing the first automated catalog, UCF could not generate awareness without heightening expectations. A unique position as a library initiating a second online catalog meant that our part of the statewide publicity campaign would be problematic—our goals needed to be different than those of libraries instituting their first online catalog.

Goals in publicizing LUIS at UCF were:
1. To induce trial and acceptance of LUIS by students, faculty, and staff at UCF while minimizing confusion over the existence of two online catalogs in the library.
2. To generate awareness on campus and in the community of the legislature's role in establishing the Florida NOTIS statewide system.
3. To update the local legislative delegation on the progress of SUS library automation.
4. To reinforce awareness of the UCF library and the resources and services that complement LUIS.
5. To support, with SUS colleagues, the systemwide publicity campaign for LUIS.

So instead of balloons, banners, T-shirts, wine and cheese parties, and other publicity activities used by some SUS libraries, UCF used a four-page campus newspaper insert as the chief publicity tool. In keeping with the goal of reinforcing awareness of the library, the insert featured campus "celebrities"—faculty, staff, and students—using LUIS to obtain library materials. When the twenty campus figures came to the library to have photos taken and to use LUIS, many of them commented that they were accustomed to hearing: "So why are you getting rid of the old catalog?" and "Doesn't this one have magazine articles?"

In addition to the newspaper insert, the library LUIS instruction program had signs made to clearly identify LUIS and CLSI, had developed collateral material explaining the use of both systems available at service desks and terminal locations, displayed a modified version of our ALA poster session called "The Future is Now" (Linsley et al., 1986, p. 19) which explained the transition of the catalog, added LUIS instruction to the library instruction classes, and increased staffing at the reference desk.
Prior to the public introduction of LUIS, some library staff had started planning research projects to determine how best to introduce a second OPAC and what problems users would have with two online catalogs during the transition. However, lack of time caused by the NOTIS implementation schedule being controlled by forces outside the library prevented in-depth research in this area. Based on past experience with both staffing a catalog assistance desk and giving online catalog demonstrations, it was decided not to offer these services.

Catalog demonstrations were given at the beginning of the semester. Librarians were stationed in the library instruction room where students could come, individually or in groups, for a personalized demonstration. Despite heavy publicity, attendance was minimal (see Table 1). Catalog assistants were stationed next to the main cluster of catalog terminals and, as numbers of questions declined, began to approach students who appeared puzzled.

Students—and statistics—had indicated for a long time that there was “nothing to it” when using the OPAC and those with problems turned to the collateral material or the reference desk staff even when catalog assistance was available. An ongoing publicity and instruction program was considered important since the CLSI system had to stay because it would still be used as the library’s circulation and reserve system.

Although information outside of the library’s previous experience could not be gathered before the LUIS introduction, research into what problems two OPACs caused and how best to provide user instruction was now considered. Since the library had no budget to conduct research, the Marketing Department chair in the College of Business, Alvin C. Burns, agreed to help. During the spring term 1987, library staff worked with the Marketing Department and developed a user survey with the library objectives of: (1) determining how users learned the LUIS and CLSI systems, (2) determining user satisfaction with both systems—especially LUIS, (3) determining the extent of difficulty users had in identifying and understanding the differences between the two systems.

The survey instrument combined the library’s needs with other goals of the marketing research class. The methodology and student-designed survey were directed by Marketing Department faculty.

The survey, coordinated by graduate assistant David Fields and Alvin Burns, was conducted by a Marketing Research 3613 class during two weeks in May 1987. At that time seven CLSI terminals were next to seven LUIS terminals located on the entrance floor of the library near the reference desk. Each group of terminals was identified by large overhead signs and individual signs on each terminal as well as the appropriate collateral materials.

Systematic sampling was used to select survey respondents from those entering the UCF Library. Student administrators were stationed
at the door to the library and approached every third person entering. The student administrator first qualified the respondent with two questions: Have you used one of the computerized catalog systems here in the library in the last six months? Would you be willing to take about five minutes and fill out a questionnaire? A negative answer to either question meant that the selected person was thanked and not given a survey. Those answering positively were given a survey. The software only analyzed the questionnaires of those who answered all thirty questions—i.e., those who were familiar with both CLSI and LUIS. Of 200 catalog users surveyed, 125 knew about the existence of two different catalogs and had used both.

**FINDINGS**

The typical student respondent was identified as: male (63 percent), Business Administration (45 percent) or Arts & Sciences (30 percent), Senior (47 percent), full-time student (88 percent), in sixth consecutive semester on the UCF—Orlando Campus and currently enrolled in a class requiring library research (58 percent), and had used both online catalogs.

We wanted to know how students were learning to use and distinguish the side-by-side catalog systems. Table 2 shows an area which surprised us. It shows that 76 percent of the respondents used printed material to learn CLSI while 38 percent learned about LUIS the same way. We were not surprised at the numbers for CLSI. In fact, a printed CLSI flip-chart, which the reference department had prepared and extensively distributed, had proved extremely popular. We were surprised because one of the strengths of the new system, LUIS, was the ease of learning it from help screens, yet over one-third of the users relied on the printed material. In fact, prior to the implementation of LUIS, the FCLA Public Services Committee surveyed forty-two libraries using LUIS and found that only four had prepared printed instructions for users. Since some SUS librarians indicated a need for the printed instructions, FCLA wrote, printed, and distributed them. Before the
survey, we had been sure that the LUIS help screens would ensure nonuse of the printed LUIS material by all but remote-access patrons. We can now speculate that the necessity of independent learning of the CLSI system from a printed chart conditioned patrons to check for printed instructions at the terminal. Or we can agree with the conclusion of research on OPAC instruction at Northwestern, that while librarians may think a system is user-friendly, not every system will be friendly to every patron (Nielsen & Baker, 1987).

When we asked students to compare the relative ease of learning each system, respondents indicated that the new LUIS system was easier to learn than CLSI. Since increased user-friendliness was one of the features we were happy about with LUIS, the results were not surprising (see Table 3). A vast majority of the respondents (90 percent) indicated that LUIS was either "easy to learn" or "very easy to learn" compared with 74 percent feeling the same way about the ease of learning the CLSI system. Actually, the only surprise with this finding was that 10 percent of the respondents found LUIS "difficult" or "very difficult" to learn to use. We can only surmise that these results might be a vestige of resistance to OPACs, but since the library has not had any card catalog as an alternative since 1983, that would be hard to substantiate.

Respondents were asked to rate the ease of using both systems. Figures for ease of use roughly equaled those for the ease of learning both systems. While 90 percent of the respondents felt that LUIS was easy to learn, 88 percent felt it was easy to use. CLSI was found easy to learn by 74 percent compared to 61 percent who felt it was easy to use.

This mirroring of the ease of learning statistics validates respondents' perception of LUIS as the more user-friendly of the two systems.

In spite of the fact that the respondents felt that LUIS was easier to use and learn than CLSI, the average numbers of uses of each system by respondents were very close. Students were asked how many times during the summer semester they had used each system. The average number of times CLSI was used was 12.4 and LUIS, 14.7. The physical arrangement of the two systems contributes to the similar numbers of uses. The main banks of terminals for both systems are side-by-side, and, despite signage, the terminals look similar. The type of information gained from both catalogs is approximately the same, and the difference in the two systems was not perceived as great enough for respondents to walk from one terminal to another, or to purposefully seek out one system over the other on a regular basis. As long as both give bibliographic information and item locations, the facts that LUIS is more user-friendly and CLSI contains current circulation status were not perceived as important enough to outweigh convenience. Differences in the two catalogs were not enough to make the respondents move from whichever terminal was at hand.

Although there were similar numbers of uses of both systems, satisfaction with LUIS was significantly higher than for CLSI (see
Table 2
Comparison of How Students Learned to Use Each System

<table>
<thead>
<tr>
<th>Response Category</th>
<th>CLSI Number</th>
<th>CLSI Percentage</th>
<th>LUIS Number</th>
<th>LUIS Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed instructions near the terminal</td>
<td>95</td>
<td>76</td>
<td>48</td>
<td>88</td>
</tr>
<tr>
<td>Library class</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Library staff assistance</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Fellow student(s) helped</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>On-screen help and instructions</td>
<td>12</td>
<td>9</td>
<td>56</td>
<td>45</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Totals</td>
<td>125</td>
<td>100</td>
<td>125</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3
Comparison of Ease of Learning Each System

<table>
<thead>
<tr>
<th>Response Category</th>
<th>CLSI Number</th>
<th>CLSI Percentage</th>
<th>LUIS Number</th>
<th>LUIS Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult to learn</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Difficult to learn</td>
<td>30</td>
<td>24</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Easy to learn</td>
<td>70</td>
<td>56</td>
<td>58</td>
<td>46</td>
</tr>
<tr>
<td>Very easy to learn</td>
<td>22</td>
<td>18</td>
<td>55</td>
<td>44</td>
</tr>
<tr>
<td>Totals</td>
<td>125</td>
<td>100</td>
<td>125</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4). LUIS was found to be "satisfactory" or "very satisfactory" by 79 percent while 52 percent felt the same way about CLSI. More telling was the difference in the level of dissatisfaction. LUIS was found to be "unsatisfactory" or "very unsatisfactory" by 12 percent while 30 percent felt dissatisfaction with CLSI. While it could be inferred that some of these respondents may not be satisfied with any existing online catalog, the difference in the level of user satisfaction between the systems is significant. Level of satisfaction echoes the response on the questions of ease of learning and ease of use. LUIS is perceived as easier to learn and use. Therefore, users are more satisfied with LUIS although they are not sufficiently dissatisfied with CLSI to stop using the CLSI system.

We were naturally interested in the confusion caused by having two side-by-side online catalogs. Although student researchers were asked to try to determine a level of confusion, it must be remembered that the respondents were a fairly knowledgeable group of online catalog users—i.e., students who stated they are users of both catalogs. Table 5 shows that 49 percent did not agree with the statement that having two separate online catalog systems is confusing. About one-third (34 percent) of the respondents felt, however, that the existence of two systems in the library was confusing.
Respondent reaction to means of learning a computerized catalog was a category of great interest to us (see Table 6). Printed instructions were found by 57 percent to be a good way to learn, as shown in Table 2, yet 76 percent had learned to use CLSI and 38 percent had learned to use LUIS from printed instructions. Online menus and instruction were felt to be a good method of learning by 75 percent but only 9 percent had used this means of learning CLSI and 45 percent had learned LUIS from online help. Library demonstrations were considered good by 76 percent, yet the library had not offered routine demonstrations on LUIS based on previous low attendance at the CLSI demonstrations. A catalog lesson as part of a required library class was considered by 85 percent to be a good way of learning, yet only 3 percent had learned CLSI in a class and 2 percent had learned LUIS that way.

CONCLUSIONS

Although UCF is a relatively new institution with a history of relentless change and genuine commitment to automation, the staff was greatly concerned about the change from one online catalog system to another. From the point of view of the library staff, the changes were sweeping in scope. However, the survey showed that a sample of the more knowledgeable library users saw a less dramatic change. They found the new LUIS system easier to learn, easier to use, and more satisfactory than the old CLSI system but continued to use CLSI. Many indicated that they found the idea of two side-by-side systems confusing but many more did not. And, although most prefer to learn about online catalogs through printed materials or help screens, some thought that
Table 6
Reactions to Various Means of Learning a Computer Catalog System

<table>
<thead>
<tr>
<th>Response Category</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online help menus and instructions are a good way for new students to learn a computer catalog system</td>
<td>4%</td>
<td>8%</td>
<td>13%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Printed instructions are a good way for new students to learn a computer catalog system</td>
<td>8%</td>
<td>15%</td>
<td>20%</td>
<td>44%</td>
<td>13%</td>
</tr>
<tr>
<td>Special class sessions are a good way for new students to learn a computer catalog system</td>
<td>2%</td>
<td>5%</td>
<td>8%</td>
<td>47%</td>
<td>38%</td>
</tr>
<tr>
<td>Library demonstrations are a good way for new students to learn a computer catalog system</td>
<td>2%</td>
<td>10%</td>
<td>12%</td>
<td>56%</td>
<td>20%</td>
</tr>
</tbody>
</table>

classes would be a good idea. It was more difficult to assess any confusion between the two systems on the part of users since only results from those who use both systems could be tabulated, but a majority of those surveyed were aware of the two systems and the differences between the two.

It must be recognized that the direction for automation adopted at any one time by an individual library may reflect a particular set of circumstances in that university or community which make a specific choice or decision uniquely valid. For that reason it is important to understand the environment that existed at the time the direction was established and to place the library and its decisions in that context. (Beckman, 1987, p. 527)

The decision to move to a second automated catalog was not made at the University of Central Florida campus and was implemented in an atmosphere filled with political and economic concerns. The implementation of the LUIS system differed from that of other participating institutions in Florida because of an awareness of the environment and user expectations. In the best of all possible worlds, we would have had time and resources for more extensive research and planning prior to the implementation of LUIS. In fact, when the decision was made to implement LUIS, plans were begun for a study to help decide the best method of introduction for a second automated system. But time constraints and political concerns dictated that the system be introduced to the public by a specified date, and system and physical constraints dictated the necessity of the side-by-side arrangement of the main terminal banks. With few economic resources available, the generous help of the Marketing Department in the College of Business enabled us to gauge the response of some of the more knowledgeable users to the two
catalogs. Given this particular set of circumstances, which resulted in the side-by-side use of two online catalogs at UCF, the survey results indicated that UCF users readily adapted to overlapping library technology.

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Canadians Use a Bilingual Union Catalog as an Online Public Catalog

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INTRODUCTION

An online catalog in use in the Canadian federal government is based on the DOBIS library management system, and end users in several federal libraries access this catalog. There are special aspects of this use which have not been widely addressed in the literature on online public access catalogs (OPAC). One aspect is that users are both anglophone and francophone, and therefore DOBIS is a bilingual system. Libraries using this system as their own catalog are research and special libraries in the Canadian government, and their primary users are public servants, politicians, and researchers. The system and database are shared with one common bibliographic record for each bibliographic item to which libraries attach their holdings and local information. The system is used for the maintenance of the Canadian Union Catalog by the National Library of Canada (NLC) and contains the holdings of over 200 Canadian libraries in addition to the fifteen libraries cataloging directly on the system. Reference librarians and end users have direct access to this union catalog.

OBJECTIVES

In a literature review, several categories of papers relevant to this study were identified: definitions and analyses of the basic characteristics of an online public access catalog, considerations of OPAC design and use in a bilingual or multilingual environment, and discussions of use of online union catalogs by the public.

By examining use of the Canadian government DOBIS system as a case study, the findings and hypotheses of previous studies are exam-
ined. The case study focuses on use of DOBIS as an OPAC. Data and opinions were gathered through interviews of managers, reference librarians, and users in three libraries using DOBIS as their cataloging system and catalog.

The author also tested several of her own hypotheses. These were:
1. Although a system has not been explicitly designed as an online public access catalog, if made available to users, it will be used as such.
2. End users adapt readily to a shared database/single record concept and like union catalog features.
3. End users are frustrated by source records with no locations.
4. English and French users both adapt to a bilingual system and accept that the bulk of records are in English with English access points.
5. The system could be improved to better meet end users needs by adding OPAC features.

**The Canadian Federal Government DOBIS**

The National Library of Canada acquired DOBIS in 1976 to be used as a cataloging system for NLC and Canadian federal government libraries, to be used as the basis for automating the Canadian Union Catalog, and to produce the national bibliography *Canadiana*. The system was extensively modified by NLC and the Canada Institute for Scientific and Technical Information (CISTI). In particular, network and bilingual features were added. Although DOBIS is an integrated library management system, only the cataloging and searching functions were implemented in the Canadian government. The Canadian government or NLC version of DOBIS now differs considerably from DOBIS/LIBIS or DOBIS Leuven marketed by IBM. In this article, DOBIS refers to the Canadian government installation of DOBIS.

There are two categories of DOBIS user libraries. DOBIS full service users are libraries which use DOBIS as their cataloging system. They input data to the system, receive products, and participate in user committees. The fifteen current full service users are all federal government libraries including NLC and CISTI. DOBIS search service users have search-only asynchronous access to DOBIS through the Canadian public packet switching network, Datapac. There are over 400 search service users. This study focuses on full service users. Three full service libraries were selected for interviews. All three libraries have public access DOBIS terminals. One is a large special library, the Library of Parliament. Another is a medium-sized special library, the library of the Department of Finance and the Treasury Board. The third is a research library, the National Library of Canada. These three are representative of the types of libraries among DOBIS full service users.

DOBIS is a menu driven system with many access points for searching (National Library of Canada, 1986). Each type of access point is stored in a separate access point file. In DOBIS, these access point files
are indexes to the bibliographic database and to the authority file. To maintain authority control in DOBIS, an authority heading is created only once. All bibliographic records associated with that heading are linked to it.

The creation and maintenance of shared files are emphasized. The objective of shared files is to have one common bibliographic record for each bibliographic item. Individual libraries can then attach their holdings to this one record. Similarly, in the shared authority file, the objective is to have one common authority record for each authority heading. System standards, policies, and procedures are necessary to eliminate unnecessary duplication and make the shared files useful for all cooperating libraries. DOBIS has the ability to handle varying levels of records which is an important feature in a shared system since all libraries cannot achieve the same level of cataloging completeness. Other users can change those records to upgrade them both for quality and completeness.

The shared data are stored in the system-level files. However, individual full service libraries may create local files linked to the system-level files or records. These are used for information required by only the local library or for information which may conflict with the shared data. Only users associated with the local library have access to the local-level files. All of these system features and policies have an impact on the use of DOBIS as a public access catalog.

**DOBIS as the Canadian Union Catalog**

Maintenance of a Canadian Union Catalog is part of the mandate of NLC and one of its basic functions since its founding in 1953. Until 1980 the union catalog was a manual card file which included catalog cards for new accessions received from over 200 Canadian libraries. This manual catalog was heavily used by NLC staff as the basis of a national location service, but it was also accessible to the public visiting NLC.

In 1980 the manual union catalog was closed and all new accessions were input online to DOBIS. In addition, a program of machine-readable reporting to the union catalog (MARA) was begun whereby libraries could send tapes of new accessions in the CAN/MARC format to be loaded offline to DOBIS. Source records (e.g., LC MARC, CONSER) are also loaded offline to DOBIS, greatly increasing the match rate for all DOBIS users, and, in particular, the union catalog staff.

Union catalog staff finding a match in DOBIS simply add a library location symbol to the bibliographic record. A sophisticated matching algorithm is used to ensure that offline loaded MARA records match appropriate records in the database. When required to input original records, union catalog staff input a brief record sufficient to identify an item and facilitate offline matching. Staff also review error logs of offline MARA loads. A recent article by Dinberg (1988) explains use of DOBIS for the union catalog in more detail than presented here.
All DOBIS users have access to union catalog information since the single shared record used by an individual full service library also has union catalog holdings attached. The decision to allow asynchronous search-only access through creation of the DOBIS Search Service was made primarily to allow Canadian libraries access to this union catalog information. Since DOBIS was implemented in NLC, a public access terminal has been available to allow patrons access to the automated union catalog.

The DOBIS database contains 5 million bibliographic records. The combination of the presence of source records, many with no Canadian locations attached, and records with union catalog locations results in a complex database. In 1985 the system was enhanced to provide optional user views, one of which was specifically designed for public use. There are three options for record display format and three levels of holdings for display of summaries of records. The preferred options are linked to user sign-ons, but the user may select other options at any appropriate time during an online session.

The search process in DOBIS involves selection of an access point file, input of a search term which may be truncated, and selection of the appropriate term from a 14-line display of terms in the access point file closest to the input term. The access point file display indicates the number of records attached to each access point and selection of an access point brings up a summary of records attached, again in a 14-line display. Both the access point file display and the summary of records are browsable, although the summary of records is not in any logical sequence unless it is explicitly sorted by the searcher.

In the initial design of the system, all records in the database attached to a particular access point are displayed in the summary of records, and there was no way of knowing from the summary screen whether any holdings were attached to the records. Since 1985 there are three options for display of the summary of records.

Only records with local holdings—i.e., holdings of the searcher's library—are displayed. This option is used for all public access sign-ons. The display indicates the number of records displayed and the total number in the database.

All records with system holdings can display, for example, all records with any locations attached. This option is used by interlibrary loan staff and reference staff in some libraries.

With the third option, all records are displayed including those source records with no holdings. In all cases the display includes the number of records displayed and the total number of records.

From the summary of records, the searcher selects an individual record to view. Again there are three optional record displays. In all three displays, if the record is held by the searcher's own library, the local call number is displayed at the top of the display. Other locations can be viewed by entering k.
A brief record, designed for patron use, includes main entry, title statement, edition, imprint, collation, and ISBN and LC card number. The inclusion of two control numbers reflects a compromise. Although control numbers are not needed by the public user, the brief display is also heavily used by union catalog staff for online matching and by interlibrary loan staff, and these control numbers are essential.

A complete record includes all control numbers, names, titles, subject headings, classification numbers, edition, imprint, collation, and notes. Reference staff generally use this display.

An editorial record is designed for catalogers and contains the textual equivalents in DOBIS to MARC tags and indicators as well as subfield codes. In all the displays, each field has a textual label and is displayed on a separate line.

As a result of these optional displays, the end user can be somewhat sheltered from the size and complexity of the union catalog database. However, all users must deal with the full complexity of the access point files. In DOBIS the components of a bibliographic record are stored in different files and only brought together at the time a record is displayed. Therefore it would be very difficult to identify location or holdings information at the access point file level.

DOBIS as an Individual Library's Catalog

As outlined earlier, a patron in a DOBIS full service library has a view of the system which displays all the access points in the system, limits the display of records attached to an access point to those held in his library, and displays a brief record with his local call number prominent in the display. The patron may select other levels of display during his search. The searcher may also have access to local files, but these must be explicitly selected at the beginning of the search.

Is DOBIS, as used in the full service libraries, an online public access catalog? IBM has developed an OPAC module as part of the DOBIS/LIBIS system (McAllister, 1987; Deemer, 1983; Ashoor & Khurshid, 1987), however, NLC has not implemented this module. The public has access to DOBIS through the same searching module used by staff. As described earlier, some modifications were made to this module to facilitate public access.

In a 1985 review article on OPACs, Hildreth (1985) refers to several definitions of an OPAC. OPACs are distinguished from information retrieval systems (e.g., DIALOG) and online cataloging systems (e.g., OCLC). The latter may be available for patron use in some libraries but were not initially designed to be used directly by library patrons and are used predominantly by trained technical services staff (Friedman, 1980). DOBIS is by no means an information retrieval system. Neither was it designed to be used predominantly by technical services staff. Reference and public access terminals were provided at initial installation or shortly after in most DOBIS full service libraries.
Another definition cited by Hildreth (1985) says “online public access means that library users can search a library’s online bibliographic database without the assistance of library staff” (p. 234). Patrons in several full service libraries are encouraged to do this, but some assistance is required by many patrons.

Another common feature of OPACs is the ability of the catalog system to “look into the circulation system”—i.e., provide direct access to circulation status of retrieved items. None of the DOBIS full service users has an automated circulation system yet so this feature has not been relevant.

Actual use is probably the best test of the definition. Although all full service libraries have a COM catalog available for public use, in libraries where a public access terminal is available, online access is the preferred access for many users. One Finance/Treasury Board Library user said: “I use DOBIS partly because it’s convenient and partly because I have no choice.” To this user, the COM catalog, which is available, is not a viable choice. Such users are using DOBIS as the public catalog tool for their library.

**Bilingual Features of DOBIS**

DOBIS is used by Canadian government employees and is also a service provided by the Canadian government to other Canadian users. Therefore, in accordance with the Official Languages Act, DOBIS must recognize the two official Canadian languages of English and French.

The full DOBIS dialog is available in English and French, and the user makes his selection at log-on. Because DOBIS is menu driven, the dialog is extensive. The dialog also includes all the field labels in records. A library science terminologist, Rita Belanger, worked on the French dialog in DOBIS and, to a considerable extent, the DOBIS dialog has created a working language for francophone employees.

DOBIS contains records of publications in many languages. English and French publications predominate and there are many bilingual publications, very common in Canadian federal government publishing. Records are coded according to language of publication. However, a DOBIS search cannot be limited by language of publication. The searcher must limit his search to titles of known items in his language of preference or extract items from lists which include multiple languages.

Linkages called “relationships” can be made between records. These are used to link successive titles of a serial or parts to a series. The relationship feature will also allow the searcher to identify other language editions if these linkages have been made by catalogers. This feature allows users and reference librarians to answer the frequently posed question: Is there a French (or English) translation of this work?

DOBIS allows material to be cataloged in either English or French independent of the language of the publication. An item cataloged in French will have notes in French and the French version of access points...
or authorities. In practice, the policy of most libraries cataloging in DOBIS is to catalog French publications in French, bilingual publications twice (once in French and once in English), and other publications in English. Some libraries add English and French subject headings to all cataloging records used. DOBIS allows an equivalence relationship to be made between English and French cataloging records for the same item. Hence one set of holdings may be attached to two equivalent records. The user will see the same holdings information no matter which record he uses. A link is also made between equivalent headings, although two steps are required to retrieve all records attached to both headings. DOBIS standards enforce bilingual cataloging policies and procedures but they do not force full service libraries to do bilingual cataloging. Each library decides in which cases bilingual cataloging will be most useful and allocates its limited resources accordingly.

Neither can bilingual cataloging be expected in source records—e.g., all LC MARC records are cataloged in English regardless of language of publication. Thus, from the user viewpoint, there is no consistent bilingual approach to the full DOBIS database.

Access points are also identified by language. This is particularly relevant for corporate bodies and uniform titles.

A further level of language identification is language of permutation. Corporate names and titles are permuted in DOBIS and there are two stopword lists, one in English and one in French. For instance “pour” (French for “for”) would be a stopword in French but not in English.

Treatment of special characters must be considered. DOBIS inputters use the full ALA character set. A word in French may have different meanings depending on the presence or absence of accents. Accents are ignored in filing in the system and can be omitted from search terms, but they are displayed. More problematic is the use of the apostrophe. In English apostrophes can be ignored in filing. In French they commonly indicate separate words and must be considered. Using the capability for identifying the language of an access point, different sort forms are created depending on the language.

Many of the records in DOBIS are loaded offline from MARC tapes, particularly from the Library of Congress. Language of access point and language of permutation are not features of the MARC format, so the language is set at loading time to a logical default. The default does not handle all situations, so users must often search in two places for French headings, once assuming the apostrophe is ignored and again assuming it is a filing element.

DOBIS has powerful capabilities for bilingual input and searching. However, the search process is heavily dependent on the content of the database. Individual libraries are quite consistent in treatment of material held by their library. But the database as a whole has many inconsistencies which impede searching.
DOBIS USERS IN THE NATIONAL LIBRARY OF CANADA

The National Library of Canada has evolved from the Canadian Bibliographic Centre, founded in 1951, to a full-fledged library with a strong general reference service, the Canadian legal deposit collection, and many special collections. It is a "library's library," but also, because of its strong Canadian collections, it is a research library for Canadian studies. Visiting academics, genealogists, public servants, and students use NLC on-site. NLC's Bibliographic Centre roots are still strong and provision of bibliographic and location information is still a significant part of the reference service. NLC clientele often do not expect to find the publication they seek at NLC. They are seeking information about publications. In this context both the union catalog aspect of DOBIS and the source records without locations are heavily used.

The public has had access to DOBIS in NLC since the pilot project stage of the system in 1978. Patrons can access one terminal in the main reading room twenty-four hours a day although at present the system is only available from 7 A.M. until 8 P.M. But since staff are only on duty from 8:30 A.M. until 5 P.M., this one terminal extends library service. There are at present ten public access terminals in the main reference room. The public can also search DOBIS in all the special collections.

From 1978, patron self-sufficiency in using DOBIS has been an objective. Initially, the public access terminals were so remote from the reference desk, due to wiring constraints, that self-sufficiency was a necessity. Staffing restraints have also forced staff to continue to devise ways to meet this self-sufficiency objective. Public service staff wrote a brief user guide and a quick reference sheet. Staff predefined keys to simplify the log-on procedure. Recent changes in equipment have highlighted problems with this approach. If the keyboard allows staff to redefine or program keys, then patrons can do this too, and many have done this accidentally with unpredictable results. One patron commented: "I have no problems in the system but the problem is getting into it." New user guides were written and placed by the new terminals on a trial basis. Unfortunately the draft version was only in English and a complaint that public documentation was not available in French ensued. Fortunately the terminals are now much closer to the reference desk and reference staff have been close at hand to assist.

Most training of patrons in how to use DOBIS is done by reference staff on a one-to-one basis. A longer training session is given to a researcher who will be using NLC over a period of time. The many one-day users are frequently local university students who are increasingly adept at using online catalogs. A typical library user in Ottawa says: "I am used to online catalogs. I could not go back to cards." Reference staff are planning more formal training sessions to be offered at set times each week to long-term researchers. They feel this will be a more effective use of patron and staff time. The uncertain future of an increasingly costly and unwieldy COM catalog is further impetus for more DOBIS training for patrons.
Many NLC patrons adapt readily to the union catalog aspects of DOBIS, although patrons specifically looking for material at NLC appreciate the local view. Researchers who have used the single entry manual union catalog welcome the multiple access points provided by DOBIS.

In response to the question "How do you feel when you find locations other than NLC or no locations?" one patron replied: "Frustrated, but some information regarding a title is better than none at all." Another researcher explained: "The location function is helpful....One can begin to identify—after a while—particularly good locations for more obscure material and amalgamate these titles for a specific research visit. Consequently, it makes the visit to the non-NLC site more efficient."

NLC patrons log-on to the system in both English and French. A francophone patron points out an inequity due to use rather than the system: "Les terminaux sont presque toujours en anglais lorsque je commence a m'en servir. Il me faut alors effectuer 'log-off' puis 'log-on.'" [The terminals are almost always in English when I begin to search. I must log-off and then log-on to reset the language of dialog.]

After logging on, a patron soon becomes aware that there is more English material than French in the database. When doing a subject search, patrons will likely find more material under English subject headings than French subject headings. One patron perceived: "Les problèmes d'utilisation se situent surtout au niveau des termes de recherche qui sont habituellement en anglais." [The main problem accessing the system in French is with search terms which are usually in English.] NLC assigns both English and French subject headings to material included in the national bibliography, Canadiana. However, other material is cataloged as expeditiously as possible. If an LC record for a French publication is found, it is used and the item is added to the NLC collection rather than waiting in a backlog for French subject headings to be assigned. NLC patrons are also encouraged to use title keywords in subject searching since there is a large amount of material in the collection with no subject headings, particularly official publications. Title keywords have their limitations but they do provide a subject access where none was available in a manual system.

NLC patrons know they have a wealth of information at their fingertips, and with patience and some assistance from staff, they will likely find the bibliographic information they are seeking.

DOBIS Users in the Library of Parliament

The Library of Parliament is a special library with a collection of over 230,000 titles which serves the members of the Parliament of Canada and their staffs as a primary clientele and a demanding one. The library has a research branch staffed by subject specialists in addition to performing the traditional library functions. A retrospective conversion
project is virtually completed and almost all the library's collection is represented in DOBIS.

Staff at the Library of Parliament have a very strong orientation to service to their primary clientele. They try to develop the collection to meet all the clients' needs. Technical services staff are well known for prompt, consistent, and high quality cataloging. Library staff provide enhanced services such as indexing and current awareness. They try to optimize effective use of new technologies. Thus when a local area network, OASIS, was installed in the Parliament buildings, it was natural that the Library of Parliament would consider how to use this network to provide better service to its clientele.

In 1985, the Library of Parliament indicated to NLC, the operator of DOBIS, that they wanted to make their collection directly available to Parliamentarians and their staffs via an online public catalog, and that they were interested in using DOBIS to do so. However, they wanted to offer access only to their own collection and not to the shared union base as a whole. Some of the enhancements they needed were about to be implemented in the optional user views described earlier. However, the Library of Parliament requested additional enhancements: a simplified log-on and selection of language of dialog, a local "help" function, access to a limited number of types of access points, displays limited to the local holdings display and the brief record display, and tailored messages such as "No items are held by the Library of Parliament. Please consult a reference librarian." A project was undertaken to meet all of these requirements except the local help and tailored messages and the Library of Parliament local view was implemented in 1986. The library decided to test the new screens with a limited number of users, primarily library staff and research branch staff who were already using DOBIS. After using this local view for six months and soliciting feedback from the trial users, the library decided the system was still not suitable for remote or direct access by its clientele. In other words, DOBIS was not suitable as a remote access online catalog.

Remote access has been provided successfully to DOBIS/LIBIS in other installations (DeBruijn & Matheson, 1987). Why was the Canadian government DOBIS installation not suitable for the Library of Parliament? The Library of Parliament had a public access DOBIS terminal in its main reference room for several years and provided public access in its branches. But these were controlled situations with experienced users. In fact, these experienced users prefer to use the full union catalog on DOBIS rather than the Library of Parliament view. But the heaviest use of the library is via telephone, not onsite, even though the patrons may be in the same building as the library.

Even when using the local view option, Library of Parliament searchers see all the system access point files. In the name and title access point files there are often multiple entries for the same name or title. These are regularly corrected by online inputters, but new duplicates are
created by offline loading and occasionally online input, particularly by the union catalog. Library of Parliament catalogers identify problems with authority control in the union catalog. The searcher cannot tell at the access point level which form of the access point has been used by the Library of Parliament and at times may assume the local library does not hold the publication he seeks. Although the searcher with access to union catalog holdings may readily identify other locations, Library of Parliament staff want to ensure that their clients are aware of their own collection. Clients need assistance from a reference librarian in identifying substitute publications held by the Library of Parliament.

Library of Parliament catalogers are very consistent in bilingual cataloging and attach only French subject headings to records for French language publications. Thus a user seeking French material on a subject can look in the French subject heading index in the Library of Parliament COM catalog and find all the French publications. In the online database, the French and English subject headings are interfiled and many different cataloging policies are reflected. If the searcher selects an English subject heading because it has the most records attached, he may well miss all the French material held by his own library and be misled by seeing records for other French publications.

The Library of Parliament has used local files for two purposes: to add bibliographic information that is not appropriate at the system level—e.g., a bound-with note—and for access points that it feels are needed by its users but cannot be justified according to cataloging rules. Fortunately system standards have become more flexible on this latter point, and local files are now rarely used for access points. Local files must be selected at the beginning of a search and searched separately. Because of the small amount of relevant information in local files, this second step is rarely fruitful and seldom used by searchers.

There are other capabilities Library of Parliament staff would like to have in an OPAC. They would like to incorporate their special in-house indexes in the same database or system. An OPAC should provide integrated access transparent to the user.

Despite the negative views mentioned earlier of the impact of the union catalog on the utility of DOBIS as an OPAC, present users of DOBIS are used to fast access to a union catalog and would not want to give it up. So one of the requirements of a future system for the Library of Parliament is the capability to send users, based on their sign-on, directly to a union catalog if an item is not in the local catalog.

DOBIS Users in the Finance/Treasury Board Library

The Finance/Treasury Board Library is a special library with a primary clientele of departmental employees. This library has also just completed a retrospective conversion project and its entire collection is represented in DOBIS. There is a diversity of subject interests among the clientele and interests in topics may not be long lived. Most patrons are
operating with short deadlines. With a limited acquisitions budget and space, this library does not attempt to meet all its clients' needs from its own collection. It has an excellent and heavily used interlibrary loan service. Library staff view the library more as an information center than as a research-oriented library. This service philosophy is in contrast to that of the Library of Parliament. This contrast is also seen in the use of DOBIS as a public access tool.

The Finance/Treasury Board Library has two public access terminals very close to the reference desk. Public service staff provide a formal orientation program for new employees which includes an introduction to DOBIS. In the introduction, staff try to make DOBIS less of a mystery and emphasize the content of the database, especially the union catalog features. Employees are given a quick demonstration and invited to ask for help when they come back to use the library. At one time, a more in-depth training in the use of DOBIS was given as part of the orientation program. However, it proved to be a waste of time for all but the steady users of the library. Now training is given on a one-to-one basis when a patron has a need and the interest to use the system. As the use of microcomputers spreads in the department, so does this interest spread. At times there is a need for a third public access terminal.

How do Finance/Treasury Board reference librarians and patrons react to the union catalog aspect of DOBIS? Librarians see complete records and often use the system holdings approach to the system. They know that to meet their patrons' needs they may need to go beyond their own collection. Source records with no locations are also very useful for identifying a source of acquisition for new titles. The public access sign-on defaults to local holdings and a brief record but patrons are instructed how to broaden their search to system holdings. Patrons are very impressed by the easy access they have to the holdings of "the nation's libraries." In practice they are most interested in the holdings of the libraries of "the nation's capital," Ottawa. And since the holdings of many federal government libraries and Carleton University in Ottawa are represented in DOBIS, they can often find locations close at hand. Turn around time for document delivery is the key factor in the utility of the holdings information found in the union catalog. There is no evidence that Finance/Treasury Board patrons find the union catalog confusing. Rather, they see it as a great advantage.

How do Finance/Treasury Board staff and patrons use the bilingual capabilities of DOBIS? There are substantial francophone staff in the departments and the French dialog of DOBIS is used periodically. Library staff try to develop a balanced collection of French and English material. However, most documents in the departments are prepared initially in English and more publishing in the subjects of specific interest (e.g., finance, management) is in English rather than French. Therefore, many users approach the system seeking English publications, either as known items or through English subject headings. Both
anglophone and francophone users experience the frustration with subject headings expressed by one patron: “My biggest frustration is that the subject headings in the system do not match my search terms. I have difficulty making the transition.”

What problems do patrons have using DOBIS? The first problem is logging on to the system. To quote one patron: “It’s always difficult to sign on. I always need help.” Staff have predefined three keys, marked them with colored dots, and devised a very simple instruction sheet (in both official languages) left beside the terminal. New users invariably misinterpret the instructions and staff are constantly trying to think of ways to improve them. Fortunately the reference desk is so close to the public access terminals that the reference librarian can observe any patron difficulties and quickly provide assistance. There have been recent improvements in terminology on DOBIS displays, suggested by public service librarians in DOBIS full service libraries, which have addressed some recurring problems. For instance, the title access point file has been renamed “Title and Keyword,” emphasizing that it is possible to search on keywords in titles. Some patrons approach DOBIS with broad needs and because of the size of the database find: “DOBIS is hard to search for general topics. There are too many hits under one subject.”

DOBIS is based on full screen displays rather than a line-by-line display. When correcting an input error, the searcher must wait for the complete screen to display again. At busy times of the day or when doing particular types of searches, this results in a response delay that may cause the patron to try to reenter data or, in extreme cases, abandon the terminal. Fast response time is essential in a public access environment. Finance/Treasury Board patrons also have difficulties with the size and complexities of the access point files and the idiosyncrasies of cataloging rules. Where is the 1987 Tax Reform White Paper? Cataloged as “Tax reform 1987: the white paper.” Duplicate records are a problem. The patron may find the record he wants but not the one with Finance/Treasury Board holdings attached. In many cases, a capability to limit searches or sort results by date of publication would be very useful.

What is the future of DOBIS as a public access catalog in this library? Library staff would like patrons to have access to the online catalog from their offices. The technical infrastructure for this is not yet available in the departments but soon will be. Library staff realize that if DOBIS is accessible outside the library, they will have to provide a substitute for the hands-on help they now provide in the library. They will need a telephone or online hotline and perhaps a more formal training program. The Finance/Treasury Board Library is in the midst of a search for a stand-alone library system with an OPAC module that they hope would overcome some of the limitations of DOBIS as an OPAC. However, the librarians and patrons would still like direct access to the union catalog.
Union Catalog as an OPAC

This study reports on use of a union catalog as an OPAC in three libraries. What have similar studies reported?

A recent Australian study (Weiming, 1988) reports on use of an OPAC system with union catalog and circulation status information. There was limited positive reaction to the union catalog feature. Only 3 of 175 positive comments indicated they liked the ability to search holdings of other libraries. An initial problem was the inability to search local holdings only, but this capability now exists. Patrons also had problems interpreting the location codes although there was a list of codes at each terminal. There was a need for continuing instruction by staff. On the other hand, there was some demand to expand the union catalog to university libraries from its base of technical institutes. It appears that some users found that the union catalog overly complicated their searches. But those who appreciated the union catalog wanted more. When circulation status was requested in a union catalog search there was a significant delay (sixty seconds) for the information to cross from a local circulation database to the bibliographic database, another barrier to effective use of a full function union catalog.

The University of Guelph has considered a union catalog environment and Beckman (1987) concluded:

Accepting that the most important single requirement of an online catalog in a primarily undergraduate university is immediate access to material needed for teaching or learning purposes, the discovery that a title is at another university is not an essential consideration unless:
— the status of the book is known—i.e., is it or when will it be available?
— the book can be easily retrieved—i.e., the other university is close enough to drive to or there is a transit system which will deliver the book in a few days.
(pp. 534-35)

The DOBIS experience differs from that in Australia and at the University of Guelph in the service objectives of its full service libraries and in type of clientele. A library striving to meet all its users' needs directly does not want to encourage access to other collections. On the other hand, a special library serving diverse interests wants to facilitate access to other collections while recognizing the time constraints of its clientele.

Beckman (1982) interprets Lancaster's (1977) conclusions in reviewing studies of catalog use: "What is not found in the first place a user looks is often not found or used at all" (p. 5). If a library knows its patrons need to use the collections of other libraries and wants to meet this need, providing a union catalog as part of an OPAC is a beneficial service. Even providing the union catalog as an easy second step, as the Library of Parliament and the Finance/Treasury Board Library wish, may not meet this need.

The University of California has identified this need, at least at a corporate level. "If the collections of the University's libraries are to be used as a single collection, and the resources in this collection made
easily available to all students and faculty of the university, a union catalog is clearly an absolute necessity" (Salmon, 1982, p. 352). The University of California designed its MELVYL system as a public access union catalog.

**Bilingual Catalog as an OPAC**

In an article on multinational OPACS, Gossens (1987) identifies several characteristics of OPACs relevant to language: the man-machine dialog, the search process, the display of bibliographic information on the screen, and the storage of data. DOBIS is not a multinational OPAC, but it is worthwhile to evaluate DOBIS against Gossens's analysis of requirements for a multilingual union catalog. The basic requirement is a multilingual *dialog* which is available in DOBIS.

According to Gossens, in a multinational OPAC (which is also multilingual), the patron should have the opportunity to control his *search* area by geographic location and the languages of publications wanted. He should be able to broaden or narrow his search at any stage.

DOBIS is bilingual and, as described earlier, it provides access to the holdings of many libraries. DOBIS provides the capability of broadening or narrowing the location of material under consideration at two levels, the summary of bibliographic items associated with one access point and the system holdings level. (When there are many holdings attached to a record, the searcher can search among these locations for a particular province, city, or library.) A DOBIS search cannot be limited by language of publication. The user must scan titles of the publications found and make his own decisions as to relevance. In the Canadian government environment, most users will use publications in English or French if they are equally available. A user requiring only French material will have some difficulty retrieving material unless his search is quite specific and a French publication exists in this specific area.

Gossens supposes a known item search by title causes few problems and this is true in DOBIS. If the title is in the database, the user will retrieve it in the language he input. The relationship feature will also allow him to identify other language editions.

Gossens also sees no problem with authority-based and controlled access points—i.e., names. Multilingual forms will be provided when appropriate, and the user can work in his own language. DOBIS provides the capability for creating and linking equivalent forms of authority headings in English and French and system standards encourage the creation of the headings. However, the practicality of resource constraints enters the picture, and, in some situations, libraries cannot afford to create these headings.

Gossens speaks of the impact of special characters on searching: "special characters need a unique representation and particular treatment in index building." Again the DOBIS system has addressed this problem but the practicalities of offline loading introduce inconsistencies.
For Gossens the most serious problem for searching a multilingual OPAC is the lack of an internationally recognized multilingual subject heading tool. Fortunately in Canada such a tool is available in English and French if one combines the Library of Congress Subject Headings (LCSH), the Canadian Subject Headings developed by NLC to supplement LCSH in English, and the Répertoire des Véduettes Matières, a translation of the two English lists.

In terms of display of bibliographic information, Gossens suggests that neutral authority headings and those in the language of the patron should be displayed. DOBIS displays all forms used in the system, but access to all forms is necessary to be able to retrieve all records since, in general, only one form is attached to one record. The bilingual cataloging policies in DOBIS are based on those developed by NLC for the national bibliography. They may need some rethinking in an online catalog environment. Gossens feels that the descriptive cataloging data added by the cataloger should be in the language of the publication. In DOBIS this is true for records for English and French publications, but other language material is predominantly cataloged in English. As Gossens suggests, in DOBIS, tables are used so that the coded information is displayed in text in the language of the user.

Storage of data must allow for multilingual authority data as DOBIS does. Language of publication should be coded as should the geographic locations of material. Both are coded in DOBIS. Headings should be identified by language and by the transliteration scheme used. DOBIS identifies language of access point but not transliteration schemes. Two standard transliteration tables are used, one for English forms and one for French. Gossens recommends that index design include special characters and geographic and language qualifiers. DOBIS addresses some of the concerns with special characters by identifying language of permutation. Other concerns of Gossens are handled by using the full ALA character set. Although the language and geographic location are coded in DOBIS, they are not fully indexed thus precluding some of Gossens’s search strategies.

DOBIS stands up very well to Gossens’s requirements. Yet the study of DOBIS use in three libraries identifies some serious limitations in bilingual access. The limitations relate primarily to the content of the database and not the database or system design. The level of bilingual access provided by the database content is directly related to the resources available for cataloging and the service priorities of the full service libraries. These are realities that must be taken into account in any multilingual cooperative endeavor.

CONCLUSIONS

How do the findings of this study support the author’s hypotheses? Although not explicitly designed as an OPAC, DOBIS is being used as such in several full service libraries and in the eyes of many users has
replaced other forms of catalogs. However, assistance from staff is readily available and frequently used, contrary to one of the basic definitions of an OPAC. It is debatable whether DOBIS could be used as a remote access OPAC. Some of the problems with DOBIS as an OPAC have little to do with the user interface of the system itself but relate to more basic aspects such as keyboards and log-on sequences. These basic factors deserve more attention by OPAC designers and implementors.

End users adapt readily to a shared database/single record concept and like union catalog features. End users who have accessed the holdings of many libraries in one search like this feature and do not want to give it up. The shared database causes more problems for searchers because it is so difficult to implement well. Duplication always creeps in and confuses users. Looking ahead to remote access OPACs, library managers of two of the libraries studied have more doubts about user adaptability to union catalog features than was uncovered in interviews with users in this study. End users are frustrated by source records with no locations. There was no mention of frustration with source records without locations using DOBIS.

English and French users both adapt to a bilingual system and accept that the bulk of records are in English with English access points. English and French users have adapted to the bilingual features of the system and seem able to ignore the inconsistencies in the database. However, there is no doubt that, in many cases, they are not retrieving all the relevant records in a subject search, particularly for French publications.

The system could be improved to better meet end user needs by adding OPAC features. Some OPAC features such as optional user views and improvements in dialog have been added to DOBIS and are welcomed by searchers. Additional features such as Boolean search would help reference librarians greatly. But the future system requirements expressed by the Library of Parliament and the Finance/Treasury Board Library go beyond requirements that could be met by DOBIS. The large and complex shared database and, in particular, the access point files are real barriers to patron use. These barriers are difficult to overcome in DOBIS because they are inherent in the basic structure of the system and its use by NLC.

Libraries are moving from OPACs in the library to remote public access catalogs. In this expanded service environment, elimination of barriers becomes imperative. At the same time, libraries must expect increased service demands from the new remote users. And access to other library locations and even the ability to initiate an interlibrary loan are service demands that will come from some users. It is hoped that this study will assist those developing services and systems to meet these demands.
REFERENCES


Library Support Staff and Technology: Perceptions and Opinions

Dorothy E. Jones

A great deal of thought and concern has been expended on the impact of technology on libraries and on the individuals who work there. This becomes clear through any extensive review of the literature. Some very fine minds within the professional library community have produced an impressive body of research and writing. However, it is also evident that the equally fine minds of the support staff in libraries have been so busy dealing with the assimilation process, operational problems, and adjustments needed during the technology-acquisition period, that their ideas and analyses of the situation have not had the audience they deserve.

Paraprofessional and clerical employees comprise the bulk of library staffs and they spend more time working directly with computers than do most librarians. They are a highly educated group of people and well able to verbalize what they see happening to library systems, to individuals, and to the quality of services as the computer-technology revolution progresses. It is extremely important, even crucial, that we listen to people who are at the working center of change. Their voices will contribute to a better adjustment to the new age, to a more thorough analysis of problems, and to a clearer insight into what is actually being done, where we are heading, and whether or not we are going where we really want to go.

Description of the Research

Information for this article concerning the attitudes and views of library support staff toward technological change in the library was gathered by means of a questionnaire (see Appendix). The question-
naire was distributed to the support staff of three academic libraries in the United States: the libraries of the University of California at Santa Barbara; of Northern Illinois University in DeKalb; and of the University of Richmond at Richmond, Virginia. One library is located on the west coast, one in the midwest, and one on the east coast. Two of the libraries are part of state university systems, and one is a private university. The sizes range from approximately 4,700 students to 24,300 students. The library support staff sizes were 149, 79, and 39. In all, 267 surveys were distributed and 133 were returned—a response rate of 50 percent. The response rate was, in fact, very close to 50 percent for each of the libraries involved (58 percent, 51 percent, 45 percent). Percentages such as these, or, in fact, any statistics mentioned in this article for specific or separate libraries, will be given in random order so that no particular numbers or responses can be associated with a particular library. The results of the questionnaire for the most part will be presented without drawing many conclusions. It is the opinion of this writer that statistics are almost never absolute or determinative but are very helpful as indicators. There are always unseen and unknown factors present within the populations surveyed, and every human mind which applies itself to the survey questions will include nonmeasurable and uncalculated interpretations of the questions in its responses.

**Description of the Survey Instrument**

The survey consisted of twenty-five multiple choice questions, some of which required only one answer, but several of which allowed the respondent to check more than one answer if more than one applied (e.g., questions four and twenty). The twenty-five questions concerning technology in the workplace were followed by one page of questions concerning the respondent's personal background in terms of education (kind and amount) and library experience (kind and length). Respondents were encouraged to write comments in the margins as they answered the questions. A special place for comments was also included after question twenty-five. All respondents were promised, both in the cover letter which accompanied each questionnaire and at the end of the questionnaire itself: “Individuals who answer this questionnaire will remain anonymous. Results will in no way be presented or tabulated to reflect negatively on a particular library.”

**Results of the Survey**

*General Observations*

For eleven out of the twenty-five questions asked, the numerical ranking of the response chosen most to that chosen least was the same for each of the three libraries surveyed as for the composite numerical ranking. For example:

**Question 1:** Technology has made my work: ____ Easier; ____ Harder; ____ No change.
The results from each library show the term *easier* received the most checks, *no change* ranked second, and *harder* had the fewest checks. This similarity in ranking order between the composite answers and the answers for each library was true for questions 1, 2, 3, 5, 6, 13, 16, 17, 18, 19, and 22. This would indicate a fair amount of congruity of opinion about technological change among the support staff of these varied academic libraries.

**Educational Background**

Educational background of the 133 respondents is as follows:

<table>
<thead>
<tr>
<th>Diploma or degree</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school diploma</td>
<td>129 (4 respondents omitted question)</td>
</tr>
<tr>
<td>Associate degree</td>
<td>25</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>79 (3 more in progress)</td>
</tr>
<tr>
<td>One masters degree</td>
<td>22 (9 more in progress)</td>
</tr>
<tr>
<td>Two masters degrees</td>
<td>2</td>
</tr>
<tr>
<td>Doctoral degree</td>
<td>5 (1 more in progress)</td>
</tr>
</tbody>
</table>

Percentages of respondents holding various diplomas or degrees are shown in Figure 1. Thirty-one respondents indicated that they had participated in miscellaneous training programs or courses. Subjects of these courses included business and management, computer technology, library science, education, languages, literature, and several others. Of the 133 respondents, fifty-eight (44 percent) said they have at some time taken computer or computer-related courses. Fifty-four respondents (41 percent) have not taken any such courses, and twenty-one respondents (15 percent) did not answer this question.

A listing of the major and minor subjects studied for undergraduate degrees shows a large preponderance of humanities over the sciences. Among the majors listed, there is an approximate ratio of four humanities majors to one science major. This figure is inexact because the boundaries separating disciplines are not clear and are becoming more and more blurred. It is not within the scope of this article to spend a great deal of time sorting and labeling each major subject and then justifying the labels. Suffice it to say that the majority of the support staff respondents have a background in the humanities, but a good many of them are also availing themselves of computer training, information science courses, and business courses as they go along.

**Library Work-Experience**

The following tables and graphs show the responses to the questions concerning length of library service. Of all the respondents, 81 percent had more than three years’ experience working in libraries, and 69 percent of all respondents had more than three years’ experience in the library in which they are now employed. These high rates of experience are similar in each of the libraries surveyed:
Figure 1. Educational background of respondents (4 respondents gave no information)

<table>
<thead>
<tr>
<th>Degrees/Diplomas Received</th>
<th>Library A</th>
<th>Library B</th>
<th>Library C</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Associate</td>
<td>20%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>One masters</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Two masters</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Doctoral</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Percent of respondents with more than 3 years' experience in library work.
74%  82%  85%

Percent of respondents with more than 3 years' experience at present library.
67%  69%  70%
### Table 1
Library Work-Experience Levels of 133 Respondents
(Any part of a year is counted as 1 year)

<table>
<thead>
<tr>
<th>No. of years</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Have worked in present position</td>
</tr>
<tr>
<td>0-2</td>
<td>60</td>
</tr>
<tr>
<td>3-5</td>
<td>24</td>
</tr>
<tr>
<td>6-10</td>
<td>25</td>
</tr>
<tr>
<td>11-15</td>
<td>10</td>
</tr>
<tr>
<td>16-20</td>
<td>3</td>
</tr>
<tr>
<td>20+</td>
<td>1</td>
</tr>
</tbody>
</table>

10 respondents did not answer the questions concerning years of experience.

Most of the support staff have experienced the introduction of new technologies into their work areas and have worked with new technologies for some time. If one postulates that ten years ago very little had yet been introduced in the way of automation, then 41 percent of the respondents have been working long enough in libraries to experience both the virtual absence of high-tech library automation and an extremely strong emphasis on new technology. Fifty-four respondents (41 percent of the total) have had eleven or more years of library work experience.

**Personal Reactions to Working with New Technologies**

In question 4, respondents were given a choice of nine words to describe their feelings about working with computers. They could check as many of the words as described their feelings. Fifty-one respondents checked only positive terms (excitement, enjoyment, pleasure, competency). Fifty-two checked a mixture of positives and negatives. Twenty-six respondents checked only negative terms (tolerance, irritation, dislike, inadequacy, frustration). While “tolerance” is a somewhat ambivalent term when trying to define it as positive or negative, it was placed in the negative category (as denoting some skepticism) to arrive at the positive/negative figures mentioned earlier. However, thirteen of the twenty-six all negative responses had checked only “tolerance” which by itself is not a wholly negative term. Five respondents in the “mixed term” category had checked “tolerance” as their only negative term, all others being positive. So one could interpret the positive/negative balance as follows: fifty-six all-positive responses (i.e., all positive or positive + “tolerance”); forty-seven mixed positive and negative responses; thirteen where “tolerance” was the only response; and thirteen all negative responses. Either set of statistics indicates basically positive feelings mixed with some reservations and a strong strain of frustration. Similar responses are indicated in the answers to question 5:
When I have to learn a new technology I:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Want to learn it, but feel uneasy</td>
<td>56</td>
</tr>
<tr>
<td>Look forward to learning it</td>
<td>67</td>
</tr>
<tr>
<td>Dread learning it</td>
<td>2</td>
</tr>
<tr>
<td>Have no particular reaction</td>
<td>13</td>
</tr>
</tbody>
</table>

In each of the three libraries surveyed, the numerical ranking order of answers was the same with "Look forward to learning it" highest and "Dread learning it" lowest in number of responses.

The responses to question 9 were spread more evenly over the five possible choices than was true for any of the questions discussed thus far:

Question 9: Do you feel that automation basically:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>Number of responses</th>
<th>Percentage of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves people more free to be creative</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>Dehumanizes people</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Does both of the above</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>Does neither of the above</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>No opinion</td>
<td>22</td>
<td>17</td>
</tr>
</tbody>
</table>

It is interesting that the "no effect" answer ranks higher than any single "has an effect" answer. We might digress to look at question 22 concerning whether or not people have been replaced or displaced by machines. Question 22 also drew a strong "no effect" response (76 out of the 133
responses). The responses to both of these may indicate that some of the feared results of automation in the library, such as loss of jobs by transference of activities from people to machines, or diminution of the importance of the individual, are either not happening in the library, not perceived as happening in the library, or, if they are happening, are no longer feared. In the case of question 9, however, while the "no effect" answer draws strong response, there are more people (seventy-
Total years of work at any library is 11 or more years
Total years of work at any library is more than 3 years
Worked at present library more than 3 years

Figure 4.

Figure 5. Personal feelings or reactions concerning working with computers (respondents could check any that applied)

one or 53 percent) who believe that automation does have some effect, either leaving people more free to be creative, dehumanizing people, or doing both. In each library polled, the "dehumanizes" answer is the lowest of the three "does have an effect" responses, and "free to be creative" or "both of the above" are numerically very close.
Question 1: Technology has made my work:

- Better: 60%
- Worse: 10%
- No change: 30%

Question 2: Because of computers the speed with which I accomplish my work has:

- Increased: 50%
- Decreased: 10%
- Remained the same: 40%

Question 3: Computers have made my work production:

- More accurate: 60%
- Less accurate: 10%
- Same as before: 30%

7% to 8% of the responses to questions 1, 2, and 3 were either ambivalent (easier and harder, etc.) or "no answer".

Figure 6. Effect of technology on performance of tasks

**Staff Training for Use of New Technologies**

Support staff opinions concerning the training they receive in the new technologies introduced into their worklife is more definite than opinions concerning philosophical questions.

Question 10: Has the training you received in new technologies with which you work been:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>6</td>
</tr>
<tr>
<td>Very good</td>
<td>23</td>
</tr>
<tr>
<td>Moderately good</td>
<td>57</td>
</tr>
<tr>
<td>Not very good</td>
<td>21</td>
</tr>
<tr>
<td>Poor</td>
<td>11</td>
</tr>
<tr>
<td>Nonexistent</td>
<td>16</td>
</tr>
<tr>
<td>No answer</td>
<td>6</td>
</tr>
</tbody>
</table>
Several people indicated variations in the quality of their training (total of 140 answers from only 133 respondents). The largest number of respondents say their training has been moderately good (fifty-seven). This is also true within each separate library surveyed. If we group the responses, the positive/negative balance looks like this: positive (excellent, very good, moderately good), eighty-six responses; negative (not very good, poor, nonexistent), forty-eight responses. The preponderance of positive over negative was not the same for the separate libraries. In one library, the composite negative responses were slightly larger than the positive. Overall, however, support staff views of training are quite positive but leave plenty of room for improvement. Respondents were very sparing of their use of the term "excellent"—even more so than of the terms "poor" or "nonexistent."

The majority of respondents (59 percent) have at least an undergraduate degree, 23 percent either have or are working toward a masters degree, and many have taken miscellaneous post-high school training programs and courses. Obviously they are a group of people who have been exposed to many kinds of teaching and are well qualified to make judgments which could guide us toward better technology-training programs in libraries.

**Question 12** is similar to 10 but is less personal. It allows the respondents to broaden their answers to include not just their own training, but the climate of opinion gleaned from conversation with colleagues and observation of the whole library training program.

**Question 12**: How would you rate the quality of your library's technology-training program for support-staff?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>Adequate</td>
<td>48</td>
</tr>
<tr>
<td>Inadequate</td>
<td>36</td>
</tr>
<tr>
<td>Nonexistent</td>
<td>25</td>
</tr>
<tr>
<td>No opinion</td>
<td>20</td>
</tr>
<tr>
<td>No answer</td>
<td>2</td>
</tr>
</tbody>
</table>

"Adequate" is somewhat akin to "moderately good" in question 10 and, similarly, received more checks than any other single answer. It also ranked highest at each separate library. However, negative responses collectively outweighed positive responses: positive (excellent, adequate), fifty-two respondents; negative (inadequate, nonexistent), sixty-one respondents. Negatives outweighed positives in two of the three separate libraries surveyed. The positive and negative responses of the third library were equal.

The need for more and better training is supported in another study on automation and library personnel done by Ganga Dakshinamurti (1985) in Canada. Julie Bichteler (1986), who interviewed thirty-two individuals engaged in a variety of computer-based activities, reports:
other systems used by the library was frequently poor to non-existent. The problem appears to be two-fold: available documentation is often misleading, inaccurate, incomplete, or overly complex; and too little time is allowed for studying the documentation. In one library, several new users quit the current series of training sessions. They felt the pressure of their own jobs, which were not getting done, and just couldn't take any more time off. And when the initial training is satisfactory, people are commonly not given enough time to practice what they have learned. (pp. 126-27)

Careful attention both to technology, the good and bad attributes of manuals accompanying technology, and the different learning styles of individuals is necessary to improve the effectiveness of training programs (Baskin & Spencer, 1983; Dayall, 1987).

Question 11 had to do with what training modes support staff felt to be most effective. For this question there was no sameness of numerical-rank order of answers among the three libraries. However, workshops, supervisor teaching, and manuals emerged as preferred learning resources in all three libraries.

**Question 11:** Do you prefer to learn how to use new technologies:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a structured class</td>
<td>21</td>
</tr>
<tr>
<td>In a workshop</td>
<td>57</td>
</tr>
<tr>
<td>From your supervisor</td>
<td>44</td>
</tr>
<tr>
<td>On your own with a manual</td>
<td>41</td>
</tr>
<tr>
<td>From a friend</td>
<td>20</td>
</tr>
<tr>
<td>Not at all</td>
<td>2</td>
</tr>
</tbody>
</table>

Quite a few respondents indicated a liking for more than one learning/teaching vehicle (185 responses from 133 people). It would be interesting to find out how much the preferences are related to the amount and kind of time available during the workday for learning activities. One of the ingredients for success listed in a case study of change management at Northwestern University's Schaffner Library was: “allocation of time for staff development” (Steffan, 1987, p. 129).

The responses to question 7 indicate that support staff on the whole do not feel that they are expected to learn too much too fast; rather, they wish that technology would be introduced more quickly into their work scheme (see question 8). However, there is a fairly strong segment of respondents who feel ambivalent or have no opinion.

**Question 7:** Do you feel that library employees are expected to learn too many new things too fast?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses (from 133 respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>71</td>
</tr>
<tr>
<td>Yes</td>
<td>32</td>
</tr>
<tr>
<td>No opinion</td>
<td>26</td>
</tr>
<tr>
<td>No answer</td>
<td>4</td>
</tr>
</tbody>
</table>

The “No” response to this question was highest at each of the libraries.

**Question 8:** Do you feel the pace with which new technology is introduced into your work area is:
Two people felt that the pace has sometimes been too slow and sometimes too fast.

**Work Performance**

There were three questions that had to do with the individual respondent's feelings about the effect of technology on the performance of his/her work. The response to these questions is generally positive. However, the number of neutral responses suggests that quite a few staff people feel that technology has not made a great deal of difference. Of the respondents, 21 percent said that technology has made no change in the ease or difficulty of their work, 22 percent of respondents said that technology has made no difference in the speed with which they accomplish their work, and 31 percent of respondents said that their work production is neither more nor less accurate than before.

Responses to question 15 reveal a strong opinion (57 percent of respondents) that, overall, technology has improved the accuracy of the records kept in the library.

Question 15: Do you feel that, overall, technology has improved the accuracy of the records kept in your library?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75</td>
<td>57</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>No opinion</td>
<td>31</td>
<td>23</td>
</tr>
</tbody>
</table>

**Responsibility and Reward Changes**

The introduction and assimilation of technology into work patterns and procedures seems to have increased the responsibilities of 55 percent of the respondents without increasing even one paycheck.

Question 18: Do you feel that technological advances have:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added more responsibilities to your job</td>
<td>73</td>
<td>55</td>
</tr>
<tr>
<td>Diminished the responsibilities of your job</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Had no effect on amount of responsibility you carry</td>
<td>51</td>
<td>38</td>
</tr>
<tr>
<td>No answer</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Question 19: If technology has added more responsibility to your job, do you think this added responsibility is reflected in your (check any that apply):

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paycheck</td>
<td>0</td>
</tr>
<tr>
<td>Job description</td>
<td>28</td>
</tr>
<tr>
<td>Respect shown to you</td>
<td>8</td>
</tr>
<tr>
<td>None of the above</td>
<td>68</td>
</tr>
<tr>
<td>No answer</td>
<td>40</td>
</tr>
</tbody>
</table>
In question 18, note that fifty-one respondents (38 percent) felt that technology had added no responsibility to their jobs. Of the answer choices in question 19, only "Paycheck" and "Respect shown to you" could really be construed as "rewards" for greater responsibility. Eight respondents felt they received greater respect because of their additional responsibilities. Adding new responsibilities to job descriptions (twenty-three responses) may constitute recognition but not reward. It could perhaps form the basis for future reward. Most support staff in each academic library felt their efforts and added responsibilities were unrewarded except as these made their work easier (see questions 1 and 2). One respondent commented that there was greater "job satisfaction," but there were more comments such as: Added responsibility reflected in my paycheck? "Definitely not." "Never." "I wish!!!" "Not here!" "Technology...greatly increases productivity and responsibility of the staff operating them. It would be nice if it was reflected in the paycheck."
Personnel Changes

There seems to have been a good deal of fluctuation of personnel numbers and also of the balance between support staff and professional librarians. But the fluctuation patterns are different for each library. For example, in one library, more people reported increased support staff in their departments than any other change. Another library's respondents had many reports of "reduced support staff," and the largest number of respondents in the third library reported "no change." In all three of the libraries surveyed, the support staff tend to feel that the introduction of technology is not the cause of their personnel changes. There is also a strong opinion that people have been neither replaced nor displaced by machines (see question 22).

Question 20: During the past five years your department has (check any that apply):

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased the number of librarians</td>
<td>20</td>
</tr>
<tr>
<td>Reduced the number of librarians</td>
<td>26</td>
</tr>
<tr>
<td>Increased the number of support staff</td>
<td>36</td>
</tr>
<tr>
<td>Reduced the number of support staff</td>
<td>44</td>
</tr>
<tr>
<td>Made no change in number of personnel</td>
<td>31</td>
</tr>
<tr>
<td>No answer</td>
<td>8</td>
</tr>
</tbody>
</table>

Question 21: Do you feel that technology is responsible for the personnel changes indicated in question 20?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>59</td>
</tr>
<tr>
<td>Partially</td>
<td>22</td>
</tr>
<tr>
<td>We had no changes in number of personnel</td>
<td>26</td>
</tr>
<tr>
<td>No answer</td>
<td>11</td>
</tr>
</tbody>
</table>

Question 22: Do you think people have been:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replaced by machines</td>
<td>6</td>
</tr>
<tr>
<td>Displaced by machines</td>
<td>14</td>
</tr>
<tr>
<td>Both replaced and displaced by machines</td>
<td>30</td>
</tr>
<tr>
<td>Neither replaced nor displaced by machines</td>
<td>76</td>
</tr>
<tr>
<td>No answer</td>
<td>6</td>
</tr>
</tbody>
</table>

Question 23 dealt with reactions to staff changes. The response options have been arranged here in numerical-rank order, high to low.

Question 23: Which phrases below describe your feelings about the displacement or replacement of people by machines in your library?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>There has been no displacement or replacement of people by machines</td>
<td>51</td>
</tr>
<tr>
<td>Overall, personnel adjustments have been good</td>
<td>30</td>
</tr>
<tr>
<td>We are no better off than we were before</td>
<td>23</td>
</tr>
<tr>
<td>People are not happy with changes</td>
<td>19</td>
</tr>
<tr>
<td>We have a better organization</td>
<td>15</td>
</tr>
<tr>
<td>People have been treated fairly</td>
<td>10</td>
</tr>
<tr>
<td>I feel good about the changes</td>
<td>9</td>
</tr>
<tr>
<td>People have been treated badly</td>
<td>9</td>
</tr>
<tr>
<td>It makes me angry</td>
<td>4</td>
</tr>
</tbody>
</table>

Twenty-two respondents chose not to answer this question at all. It may be observed that the least personal responses were chosen the most and
the most personal responses ("I feel good" and "It makes me angry") are low on the list. The responses in which the respondent is somewhat personally involved, but only as part of a group (those beginning with "we" or "people"), fall in the middle. The overall response tends to be neutral:

- There has been no displacement or replacement of people
- We are no better off than we were before

or positive:
- Overall, personnel adjustments have been good
- We have a better organization
- People have been treated fairly
- I feel good about the changes

The negative responses were fewest:
- People are not happy with the changes
- People have been treated badly
- It makes me angry

**Philosophical or Social Implications**

Two questions dealt with how support staff viewed the present technological revolution as social history. Do they feel that the human mind is still in control of its creations? Do they feel threatened or manipulated by machines?

Question 16: Do you feel that people are the masters and technology is a tool we are using wisely?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75</td>
<td>56</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>No opinion</td>
<td>28</td>
<td>21</td>
</tr>
</tbody>
</table>

The "yes" responses from each library were highest in numerical rank, though the numerical rank of "no" and "no opinion" responses varied.

Question 17: Do you believe that technology is becoming master, and people are becoming its subjects?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>No</td>
<td>77</td>
<td>58</td>
</tr>
<tr>
<td>No opinion</td>
<td>27</td>
<td>20</td>
</tr>
</tbody>
</table>

In each separate library, the numerical ranking of the answers follows this pattern: "No" is highest, "yes" or "no opinion" are the same or very close. In none of the libraries do the "yes" or "no opinion" options combine to total as much as the "no" answer.

The conviction that we are using new technology wisely and maintaining human control is strong, but there is also a fairly strong cautionary element.

**Administration of the Automation Process**

These questions deal with support staff opinion on how the conversion from manual to automated systems and computerized activities is being managed.
Question 6: Do you believe that most libraries should move into new areas of technology as quickly as they can afford to do so?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>63</td>
<td>47</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>No opinion</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>The question is too simplistic to answer as stated</td>
<td>50</td>
<td>38</td>
</tr>
</tbody>
</table>

There is an assumption contained within the "yes" answer that the new technologies are basically desirable, and we should therefore acquire them as quickly as possible. However, there was a strong 38 percent that felt the question was too simplistic and could not be answered without qualifying statements.

Question 13 is less generalized and focuses the attention of the respondents on the technological progress of their own libraries.

Question 13: How would you rate your library's progression toward automation?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too fast</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Too slow</td>
<td>61</td>
<td>46</td>
</tr>
<tr>
<td>Just right</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td>No answer</td>
<td>17</td>
<td>12</td>
</tr>
</tbody>
</table>

The "too slow" choice is ranked highest in each library polled, and "just right" fell just below it in each case. Support staff seem to feel that we should move toward automation at a faster rate than we are now moving, though a strong minority of respondents (32 percent) feel their own library is progressing at a good and acceptable pace.

Respondents were, however, more satisfied with progress toward automation in their own departments than they were with progress in their libraries overall.

Question 8: Do you feel the pace with which new technology is introduced into your work area is:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too fast</td>
<td>21</td>
</tr>
<tr>
<td>Too slow</td>
<td>51</td>
</tr>
<tr>
<td>Just right</td>
<td>53</td>
</tr>
<tr>
<td>No answer</td>
<td>10</td>
</tr>
</tbody>
</table>

A couple of respondents felt the pace had been sometimes too fast and sometimes too slow, but the "just right" option received the most checks. Of the seventy-two responses indicating a desire for a change of pace, a strong majority (fifty-one out of seventy-two) felt the pace should be speeded up.

When asked which library department had made the greatest technological strides, the cataloging department came out on top in each library. After that there was a great deal of variation among the libraries.
Question 14: In what department of the library do you think the greatest positive technological strides have been made? The composite responses were:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataloging</td>
<td>65</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>13</td>
</tr>
<tr>
<td>Serials management</td>
<td>5</td>
</tr>
<tr>
<td>Reference/research</td>
<td>26</td>
</tr>
<tr>
<td>Circulation</td>
<td>26</td>
</tr>
<tr>
<td>Interlibrary loan</td>
<td>18</td>
</tr>
<tr>
<td>Other (please list)</td>
<td>1</td>
</tr>
<tr>
<td>Patron access</td>
<td>1</td>
</tr>
<tr>
<td>No answer</td>
<td>29</td>
</tr>
</tbody>
</table>

Support staff overall seem to feel that technology has had a greater effect on cataloging departments specifically than on any other single department. However, there were fifty multiple answer responses indicating that a significant number of respondents see equal progress in more than one area of the library. While support staff see technical services collectively as having an edge on technological progress, the awareness of progress in public service areas is strong. Patron access was mentioned specifically by one respondent. Online catalogs and subject-organized periodical databases are no longer “in group” terms. There was, however, some hesitancy on the part of respondents to make statements which presumed knowledge of activities in departments other than their own. This was evident from comments made by some of the twenty-nine people who omitted answering question 14. The numerical breakdown of respondents by the divisions they work in is as follows:

<table>
<thead>
<tr>
<th>Division</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical services</td>
<td>62</td>
</tr>
<tr>
<td>Public services</td>
<td>29</td>
</tr>
<tr>
<td>Subject-specialized libraries or departments</td>
<td>27</td>
</tr>
<tr>
<td>Administration</td>
<td>9</td>
</tr>
<tr>
<td>No answer</td>
<td>12</td>
</tr>
</tbody>
</table>

Six of the respondents work in more than one department. Several respondents omitted answers to this question as well as other questions on the “personal background” part of the questionnaire because they felt it threatened their anonymity.

Decision-Making and Management Style

The responses to question 24 revealed more variance in opinion among the three libraries which participated in this survey than did responses to other questions.

Question 24: Were you involved at all in the decision-making process concerning the incorporation of new technology into your work area? Composite results were as follows:

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>81</td>
<td>23</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>73</td>
</tr>
<tr>
<td>No answer</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>
The feeling of involvement in the decision-making process, as indicated by a "yes" answer, differed radically among the three libraries: library A, 7 percent yes; library B, 24 percent yes; library C, 60 percent yes.

In response to question 25, an overwhelming majority of ninety-five respondents (71 percent) feel that staff should be more involved in decisions.

Question 25: Do you think support staff should be more involved than they are at present in decisions about acquiring new technological devices or systems?

<table>
<thead>
<tr>
<th>Response choices</th>
<th>No. of responses</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>95</td>
<td>71</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>No opinion</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>No answer</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

More than 50 percent of the respondents at each of the separate libraries surveyed felt that support staff should be more involved than they are at present; but the feeling of satisfaction increases (illustrated by "no, I don't think staff should be more involved") as the percentage of involvement increases.

Some of the comments made on the questionnaire concerning staff involvement in decisions follow:

"The librarians do make the decisions...[the support staff] can add valuable input that has been overlooked."

Involvement consisted of "demonstrations of various systems [to us]....Planning by management is minimal because they do not bother to consult the people who do the work...and many processes are left out of consideration because of lack of knowledge of procedures."

"The administration doesn't seem to be aware of how even a small change in one department can affect another department. I think if staff were more involved, or at least informed of changes, they could help anticipate effects...."

"[Support-staff] should be consulted as we are the people who work every day with the computers."

"People will only accept technology to the extent that they are included in the decisions about adding new technologies and to the extent that they are well-trained."

"Support staff should always be consulted about any new type of equipment purchased. Their experience and knowledge is valuable." (This comment is from a staff member who was consulted).

Support staff do not feel that they have been involved in the decision-making process as they should have been. This does not, however, prevent support staff from maintaining positive feelings about the technology itself (see questions 1-4, 6, 8, etc.). Neither does it stifle willingness to work hard and expend extra (and unrewarded) effort to assimilate the new knowledge and skill required by the innovations. This is evident, at least by inference, in the responses to questions 5, 7, 10, 11, 18, and 19.

**COMMENTS AND OBSERVATIONS**

The overall results of the survey indicate an exceedingly positive attitude, even though there is a strong undercurrent of personal frustration and irritation. There is evidence of an intense desire to learn and to
fit into the rapid flow of new technology. Judging from the kinds of responses given to the questions, it seems that academic librarians and administrations should feel confident that the work assigned to support staff will get done and the transition to automation will be made in spite of concerns about health or about the human personality and its ability to handle stress or maintain traditional patterns of social interaction.

There is some concern expressed, both in library literature and in the responses to the survey, that long hours spent exchanging information with computers will cause changes in the human personality. A paper by Julie Bichteler (1986) concerning the effects of changing work environment on information specialists says:

The three programmers who were interviewed all stated that their personalities had changed as they became more computer-oriented. They are more organized and feel themselves to be more efficient. "I’m impatient with unorganized, illogical people." "I feel that my mind works like a computer now."...

They find it hard to communicate with nonprogrammers and vice versa. Some people feel more comfortable interacting with humans through a computer rather than by telephone or face-to-face...."Using E-mail, one talks a lot and then it’s the other person’s turn to talk a lot. Since we get used to operating in little wads of thought, when you see someone in person, you tend to say what you have to say all at once, and then it’s the other person’s turn." (pp. 125-26)

At a less profound level, it is known that the performance level of the computers we work with can make or break a work day and cause one to go home happy or ready for conflict. We also tend to begin thinking in terms of the short-hand language of computers and become irritable when library patrons or fellow workers in other departments don’t know what we’re talking about. These are illustrations of ways in which computers do, perhaps, govern us. Awareness of this may help us to align ourselves with fellow human beings and become more patient interpreters.

The questionnaire does not measure the motivational or causal factors behind the attitudes. Positive attitudes can help people to deal with the inevitable, learn with less stress, and incorporate helpful advances into work patterns. It might be prudent, however, to realize that positive attitudes can sometimes be a cover-up for fear or confusion. Big corporations are driving hard for computer hardware and software sales. The influence of technology advertising, coupled with the conviction that we must appear open-minded, objective, flexible, and progressive in order to move ahead in our jobs, can blind us to the very real problems which fast automation brings to us, fellow employees, and patrons. Even those who are expert in the use of new systems and new technical apparatus cannot help but note the problems caused when all the computers "go down" or note the confusion of patrons confronted by an entirely new procedure for getting what they want from the library. To have a positive attitude and, at the same time, to accept the fact that real problems exist both in the machines and in the education process necessary for the efficient use of the machines will ensure real
progress. Real progress demands careful, thorough education, and education takes time and effort. However, this time and effort will surely be well spent if the technological progress made includes the welfare of employees and the satisfaction of patrons.

During transition periods, there are many decision-making crossroads where we can choose destruction of the past to change the future, or we can choose building upon the past to change the future. Destruction has often, historically, caused trauma which might have been avoided by persistent but gradual introduction of change backed by the conviction that employees who have been intelligent, creative, and conscientious in the past will continue to be so if they take part in the decisions of the change process. Pro-industrial revolution historians of the past usually labeled the Luddites of the nineteenth century as "crazy people" when they opposed industrialization by smashing machines. Some contemporary historians are beginning to see them as realists who were simply unwilling to contribute to the destruction of a present "good life" for themselves and their families by supporting or even tolerating changes which would only benefit some unknown future generation (Noble, 1983; Gray, 1983; Wolin, 1983). Would the Luddites have been so volatile if they had felt that their job security and welfare were of concern to their employers and that they were not to be sacrificed to make other people rich?

We must all, support staff and professional staff alike, try to come to grips with the questions of what we really want or need among the new technological devices. Do we need it, and does it help us accomplish goals or are we simply convinced that anything new will inevitably become a part of our work lives and so we accept and apply ourselves to its assimilation as an act of self-preservation? We must not stop asking the questions: Is it helpful? Does it take us where we want to go? Is it constructive technology which will help make lives better? Perhaps the transitions taking place in these revolutionary times can happen with less sacrifice and more joy if we will listen to the suggestions of staff without first putting up all kinds of defenses. Beth Sanderbeck, describing her experiences as supervisor of a retrospective conversion project which entailed hiring a new staff and working under strict deadlines, writes: "In retrospect I don’t believe I would have done anything different. The same staff members who criticized rules and made accusations were also capable of analyzing and improving procedures. Their suggestions, concerns and hard work made the project a success" (Sanderbeck, 1986, p. 20).

Perhaps the most important contribution to progress and advancement right now would be intensified interdisciplinary discussion among technologists, information specialists, educators, librarians, theologians, and sociologists. We are all part of a revolution which is changing ways of living, ways of thinking, and patterns of conversation and discussion.
Technology is, of course, as old as civilization. Today its novel feature is its planned, systematic development. Technology is no longer the spontaneous creation of an obscure genius, "the Wizard of Menlo Park," but a product of economic and industrial strategies...examples of the penetration of science and technology could easily be multiplied until in the end it would be clear that we have become a society constituted primarily by these two forms. As our ideal of genuine knowledge, science is our theory, while technology, as our ideal of useful knowledge, is our practice. The combination has left its mark on how we live, as individuals and as a collectivity. It has made many necessities mere matters of convenience. Many areas of life are now safer, healthier, and more productive. Above all, our powers have been magnified beyond those available to any previous society....Once we lived expectantly, waiting for the latest scientific breakthrough and technological marvel; now we live somewhat nervously in the shadow of any number of potential, even imminent disasters. Our new society should remind us that technology and science are neither neutral nor independent nor unambiguous. (Wolin, 1983, p. 67)

It is not enough that each discipline discusses the human issues of technology at their own conferences and in their own professional journals. It is necessary that we talk together and listen very carefully to one another. Librarians and support staff taken together will probably, in many libraries, include some of all these specialists. Library workers come from amazingly diverse backgrounds. The support staff members who responded to this survey have a record of 106 completed college degrees and 13 more in progress—an impressive accomplishment and a rich resource. Therefore, we can begin by talking together as a whole library, establishing firm guidelines and goals, sorting out what is best among myriad technological offerings, and devising ways of learning that enhance rather than diminish the human personalities involved.
Appendix

Library Support Staff Views on Technological Change in the Work Place

A Questionnaire

There will be a place for comments at the end of the questionnaire in case you wish to explain or qualify an answer. Also, feel free to write comments in the margins as you work through the questionnaire.

List any technological equipment or processes that have altered your job during the past ten years (e.g., word processor, automated circulation system, a CD-ROM Index, etc.):

Please check the word or phrase that best completes or answers the numbered statement.

1. Technology has made my work: __ Easier; __ Harder; __ No change.
2. Because of computers, the speed with which I accomplish my work has: __ Increased; __ Decreased; __ Remained the same.
3. Computers have made my work-production: __ More accurate; __ Less accurate; __ Same as before.
4. My feelings about working with computers are described by the word: (check any that apply): __ Excitement; __ Irritation; __ Enjoyment; __ Dislike; __ Tolerance; __ Pleasure; __ Inadequacy; __ Competency; __ Frustration.
5. When I have to learn a new technology I: __ Want to learn it, but feel uneasy; __ Look forward to learning it; __ Have no particular reaction.
6. Do you believe that most libraries should move into new areas of technology as quickly as they can afford to do so? __ Yes; __ No; __ No opinion; __ The question is too simplistic to answer as stated.
7. Do you feel that library employees are expected to learn too many new things too fast? __ No; __ Yes; __ No opinion.
8. Do you feel the pace with which new technology is introduced into your work area is: __ Too fast; __ Too slow; __ Just right.
9. Do you feel that automation basically: __ Leaves people more free to be creative; __ Dehumanizes people; __ Does both of the above; __ Does neither of the above; __ No opinion.
10. Has the training you received in new technologies with which you work been: __ Excellent; __ Very good; __ Moderately good; __ Not very good; __ Poor; __ Nonexistent.
11. Do you prefer to learn how to use new technologies: __ In a structured class; __ In a workshop; __ From your supervisor; __ On your own with a manual; __ From a friend; __ Not at all.
12. How would you rate the quality of your library's technology-training program for support staff? __ Excellent; __ Adequate; __ Inadequate; __ Nonexistent; __ No opinion.
13. How would you rate your library's progression toward automation? __ Too fast; __ Too slow; __ Just right.
14. In what department of the library do you think the greatest positive technological strides have been made? __ Cataloging; __ Acquisitions; __ Serials management; __ Reference/Research; __ Circulation; __ Interlibrary loan; __ Other (please list).
15. Do you feel that, overall, technology has improved the accuracy of the records kept in your library? __ Yes; __ No; __ No opinion.
16. Do you feel that people are the masters and technology is a tool we are using wisely? __ Yes; __ No; __ No opinion.
17. Do you believe that technology is becoming master and people are becoming its subjects? __ Yes; __ No; __ No opinion.
Appendix (Cont.)

Library Support Staff Views on Technological Change in the Work Place

A Questionnaire

18. Do you feel that technological advances have: _____ Added more responsibilities to your job; _____ Diminished the responsibilities of your job; _____ Had no effect on the amount of responsibility you carry.

19. If technology has added more responsibility to your job, do you think this added responsibility is reflected in your (check any that apply): _____ Paycheck; _____ Job description; _____ Respect shown to you; _____ None of the above.

20. During the past 5 years your department has (check any that apply): _____ Increased the number of librarians; _____ Reduced the number of librarians; _____ Increased the number of support staff; _____ Reduced the number of support staff; _____ Made no change in number of personnel.

21. Do you feel that technology is responsible for the personnel changes indicated in question 20? _____ Yes; _____ No; _____ Partially; _____ We had no changes in number of personnel.

22. Do you think people have been: _____ Replaced by machines; _____ Displaced by machines; _____ Both replaced and displaced by machines; _____ Neither replaced nor displaced by machines.

23. Which phrases below describe your feelings about the displacement or replacement of people by machines in your library? _____ We have a better organization; _____ We are no better off than we were before; _____ Overall, personnel adjustments have been good; _____ People are not happy with the changes; _____ It makes me angry; _____ I feel good about the changes; _____ People have been treated fairly; _____ People have been treated badly; _____ There has been no displacement or replacement of people by machines.

24. Were you involved at all in the decision-making process concerning the incorporation of new technology into your work area? _____ Yes; _____ No. Please describe the nature and extent of your involvement, if any.

25. Do you think support staff should be more involved than they are at present in decisions about acquiring new technological devices or systems? _____ Yes; _____ No; _____ No opinion.

Please comment on any of the above questions, or share any other thoughts you have on the effects of technology in the library, on your job, etc.

PERSONAL BACKGROUND

Education

Do you have a high school diploma? _____

Do you have:
An associate degree (A.A. etc.) _____
An undergraduate degree (BA, BS, etc.) _____
One masters degree _____
Two masters degrees _____
Ph.D. degree _____
Other degrees, training, or courses _____

Please describe "other degrees, training, or courses:

What was your major subject(s) in college? ________________________________

What was your minor subject? ________________________________

What were your post-graduate study subject areas? ________________________________
Have you at any time had computer or computer-related courses?  
If so, please describe:

Experience

In what library department do you work?  
How long have you had your present position?  
What is your job title?  
What were your previous job titles?  
How long have you worked at this library?  
What is your total number of years of library work experience?  

Comments or additional information:

Individuals who answer this questionnaire will remain anonymous. Results will in no way be presented or tabulated to reflect negatively on a particular library.
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Technology and Organizational Metamorphoses

ANN DE KLERK AND JOANNE R. EUSTER

The rapid introduction of new technologies into libraries has been widely expected to lead to sweeping changes in the ways that libraries are organized and managed. However, few organization charts indicate that such sweeping changes have occurred. The Association of Research Libraries (ARL) Office of Management Studies has published two Systems and Procedures Exchange Center (SPEC) kits on organization charts—no. 1 in 1973 (updated 1977) and no. 129 in 1986. Comparison of the two collections of tables of organization does not reveal a large number of radical changes in the ways that this admittedly limited number of libraries are organized.

Might the significant changes have taken place at a level which is not apparent on a graphic representation of an organization? B. J. Busch (1985) prepared a SPEC kit (no. 112) which inquired into the effects of automation and reorganization of technical and public services and concluded that: "There has been some experimentation with modifications to traditional organizational structures. Yet libraries seem reluctant to make significant changes to organizational structures which technology may be rendering ineffective. Few models for the 1990's and beyond exist...."

Nevertheless, the belief in the likelihood of significant organizational change persists in conversation, in conference programs, and in the literature. Rather than survey the literature detailing changes and experiments, the authors chose to query library directors about their perceptions and expectations for changes in organizational structure as a result of technology. Directors, we reasoned, have the broadest perspective on their entire organizations and also have the greatest control
over the magnitude of organizational metamorphosis. Since we were seeking ideas and perceptions and not a controlled nor statistically valid sample, the inquiry took the form of a letter to colleagues outlining the issue and asking for observations, experiences, and expectations for the future based on the following questions:

1. Are technical and public services being restructured at a micro level which is not readily apparent to the casual observer?
2. Are incremental changes and experiments taking place rather than major reorganizations?
3. If changes are taking place, are they the result of technology, or are they the effects of general democratization of the workplace, quality of work life programs, and the like?
4. What is the extent of changes in the public and technical services organization in your own institution?
5. When did changes, small or sweeping, take place?
6. How has job design or work assignment among librarians, paraprofessionals, and clerical staff changed?
7. What brought about the changes?

Fifty-three directors, representing large and small colleges and universities, wrote or telephoned with thoughtful and analytical comments, histories, and expectations for the future. Remarkably little consensus was found about the extent, scope, or the future of change. On the other hand, the intensity and depth of the replies indicated great interest in the topic. It was apparent that not only is organizational change evolving, but also that directors' thoughts and expectations are doing the same. The discussion which follows draws heavily upon their insightful contributions.

THE IMPETUS FOR CHANGE

"I believe many of us would assume that the technological changes should demand organizational changes but those assumptions need to be tested, and, like any major changes, they will tend to bring an entire group of related problems with them...," wrote one director of a large research library. Others see technology as a cause of change, and one which cannot be avoided. "I am convinced that [changes] are the result of the so-called technological imperative...as changes at the micro level cumulate, we will begin to see some marked changes in organizational structure"; and "I think the driving force has been the technology..."; replied two directors from different parts of the country.

Technology, however, is only one cause of change. Academic libraries are faced with a host of present and anticipated external forces to which they must respond.

1. The mere availability of information technology impacts libraries. Few if any can ignore the capabilities of the electronic revolution. The expectations of faculty and students for information and for speedy and nearly global access have risen dramatically and will continue to do so.
2. Academic libraries are subject to the pressures for qualitative improvement which are affecting all of higher education.

3. Closely related is the general pressure for greater economic and output accountability in a long-term period of stable or declining resources and continued rising costs for labor, materials, and technology, and the simultaneous existence of print and electronic resources.

Of course, changes occur for many reasons. Cautioning against too readily ascribing change to technology, one director writes: "Technology, service demands, and staff efficiency can individually and especially in combination lead to organizational changes." Several directors remarked that changes, from whatever cause, must necessarily follow from the need to improve efficiency and services to users. Another director reflects: "Technology has indeed helped us make some of the above gains through speeding up what we do, but most importantly by causing us to raise questions of why we do what we do."

**Technology Facilitating Solutions**

Beyond the self-examination brought about by technology—alone or in concert with other motivations—are the changes resulting from the use of technology as a solution to library problems. One very large library, reeling from drastic budget cuts at the same time as the online system was being implemented, restructured with several goals in mind:

In order to try and decentralize and to take advantage of the ability of smaller groups to respond to changing information environments...[we created] five groupings, what we call clusters, on subject grounds....A second change was to reconceptualize the composition of printed materials on campus through the creation of resource libraries for each cluster....Again, this was in response to an effort to decentralize, and thereby enhance, the decision making process in relation to the shifting of printed materials among campus libraries...to meet a growing need for space flexibility....Since the library is implementing a high level of automation in several areas simultaneously, it has also been useful to bring into the program new staff with the technical expertise in the application of both mainframe and microcomputer technology.

Technology has permitted staff shifts in some instances. The reduction of professional technical services staff facilitated by the national bibliographic networks is undoubtedly the most sweeping example. The reassignment of positions, with new or retrained staff, to other functions helps to cope with growth in programs and added responsibilities in such areas as public services, collection development, and systems management.

Regroupings such as those described earlier are simplified by availability of access to a single online database. Staff in widely dispersed locations with disparate functions have access to information which previously was difficult to obtain, at best, and begin to develop their own methods of coordinating their activities. One director emphasized
that rather than requiring centralization, the automated system had in fact made true decentralization possible:

What [the system] has done—in a big and noticeable way, is to create a "virtual" library out of the dispersed enterprise. The database is created, managed and used by everyone and because it is so dynamic...everyone knows what is being done everywhere in the system...because all units use one system, staff members may be moved around more easily—upward mobility is increased for those who want to make working in the...library a career.... Job content has changed, although in large measure many people are doing what they did before, but are now using computer terminals, not typewriters and file drawers.

STAGES IN THE USE OF AUTOMATION

As we tried to understand if, and in what way, technology has influenced library organization, it seemed important to explore and review the manner in which automation was and is being adopted in libraries. Typical stages in technological innovation include an initial period during which the individual manual processes, that may or may not be combined, are emulated. During this first experimental stage, the mechanized or automated mode is "layered on" to the manual process, and both are in use. In a later stage, the manual process will be abandoned. Automated processes then substitute for manual ones but typically in the same context as before. The total system will not be completely rethought for some time, and advantage is not taken of new possibilities for fresh sequences and combinations. The new paradigm emerges later.

Have these stages occurred in the automation of libraries? How far have we progressed in technological innovation in technical and public services, and what impact has office automation had in libraries? Has automation occurred simultaneously, at the same pace, and is the character of the automation identical in all areas of the library?

Automation was precipitated in technical services in the early seventies by the emergence of the earliest of the bibliographic utilities, OCLC. Although many processes have now been computerized in cataloging and acquisitions, there is still considerable layering on as card and paper files continue to duplicate machine-readable files. This is the result of two factors: (1) lack of confidence in the new technology, and (2) the needs of other departments in the library that are not automated. While individual tasks in cataloging and acquisitions have been automated, the two functions have not been integrated in most libraries.

Technical services staffs, however, have long been accustomed to detail and specificity of the kind required by the very literal computer. It is not too different from the precision which has always characterized the art or science of cataloging. Exemplified by the bibliographic record in MARC format, now a de facto international standard in library automation, the high level of standardization in technical services activities distinguishes them from public services tasks.
The history and character of automation in public services has differed, although the same general stages are apparent. Automation of circulation occurred early, prompted in large libraries by an increasingly overwhelming volume of transactions. Circulation automation differed from automation of cataloging in that there was little standardization and less attention was paid to the completeness and integrity of the bibliographic record or to the development of a permanent database. As in technical services, the pattern of layering on was evident to some degree with the retention of paper files and manual activities. In the case of circulation though, tasks were now manageable that had not been for some time in the largest libraries, for example sending out overdue notices. Circulation systems, in most cases, remained stand-alone systems existing side-by-side with automated processes in the cataloging department, although sometimes they interfaced. In contrast many libraries presently report systems which integrate circulation with the online public access catalog.

Reference services are at a much earlier stage of automation than either technical or circulation services. (Parenthetically, four of the respondents—all larger libraries—report that, organizationally, circulation is now part of technical services.) While it is true that automation has had a place in reference since the late seventies in the form of fee-based database searching, the activities of reference have lent themselves less easily to precise analysis and definition. Now, in the late eighties, expert system technology derived from artificial intelligence work is beginning to be seen at least on an experimental basis. The 1988 American Society for Information Science (ASIS) Mid-Year Conference, which focused on artificial intelligence and expert systems, included presentations entitled “Progress and Problems in Expert Systems Development for Library Reference Service,” “Construction of a Menu-Driven Automated Reference Program Utilizing dBASE III,” and “Generation of Decision Rules for an Expert System Used in Document Supply.”

In reference we see a good deal of experimentation with new services and the layering on phenomenon is very evident. Traditional reference tools, especially indexes and abstracts, are used alongside librarian-mediated database searching and user-directed or end user searching. What is being searched may be a machine-readable file based on the same material as the printed source or it may be information which exists only in machine-readable form. Information may be accessed by telephone (DIALOG, BRS), through dedicated terminals (OCLC, RLIN), or on-site via CD-ROM technology. Neither access to these services nor the equipment they require are standardized. While the automation of technical services, particularly the development of standards for the bibliographic record, was strongly influenced and developed by librarians, the development of machine-readable databases and CD-ROM technology has been directed by the commercial
sector. The end result is that libraries struggle to run several incompatible systems simultaneously. Little substitution has yet occurred, but issues of availability, both physical and economic, will need to be resolved in the near future as these multiple access modes increasingly strain library budgets.

Reference services are likely to move more swiftly to the integration stage of technological evolution as the online public catalog becomes available and later as it serves as a gateway to other databases. Signs that a new model for reference services will soon emerge include the preoccupation in many public service departments and entire libraries with discussions about, and experimentation with, alternate and more responsive ways of providing information services in light of multiple and sophisticated alternatives. In contrast to technical services departments, reference services need to increase rather than reduce the number of professionals required in response to the availability of technology to provide more and greater expertise in assisting the faculty member or student both within and outside the library with information needs. Many users have increasingly sophisticated needs and the library is no longer necessarily seen as the prime information resource.

Before automation arrived at the reference desk, but after the introduction of bibliographic utility services in the cataloging department, word processing and spreadsheet software were being used in many library offices. The use of both microcomputers and telecommunications provided for some of the very smallest libraries the only opportunity to automate, and software programs were adapted to many uses. For these and many other libraries, office automation demonstrated the possibilities inherent in a common database and in decentralization. Office automation in many libraries is now at the end of both layering-on and experimentation stages and has become routine.

**BLURRING OF PUBLIC AND TECHNICAL SERVICES LINES**

There has been a much-discussed trend toward less clear-cut separation between the traditional divisions of the public services (PS) and technical services (TS) functions. Is this the result of automation alone or of multiple factors including automation and the democratization of the workplace? Directors of small libraries are quick to point out that small size facilitates close cooperation between library divisions, and that this is a historic pattern: “In many college libraries, the so-called PS/TS split hardly existed before automation came into the picture.” Several college libraries reported that all librarians have combined public, technical, and collection responsibilities, as do those in a few larger libraries. The present blurring of lines goes far beyond the long-standing practice in small college libraries of scheduling all librarians for time on the reference desk, which is prompted by the impossibility of one and two person reference departments covering all the needed service hours.
Since the automation of the cataloging function by OCLC in the early seventies, fewer professional catalogers have been employed in cataloging departments. Many libraries were initially able to justify and finance OCLC services and equipment by reducing professional cataloging staff, and, in many cases, thereby also reducing the total staff. While the reduction of the entire technical services staff has not continued at the initial rate, there has been a continuing decline in the number of professional librarians employed in technical services functions, while, simultaneously, demands in the public service areas have increased.

An environment which includes the proliferation of new formats and sources and a concomitant renewed emphasis on user education has led not only to heavier workloads for public services departments but also to expanded and diversified responsibilities for individual staff members. As important as the current environment are the forecasts by directors of research libraries (as stated in a recent Council on Library Resources report) of an increasingly "important participation by the library in the scholarly research activities of faculty and graduate students." This expectation is echoed in a statement from the director of a leading liberal arts college: "If change is, indeed, more of a norm in college libraries perhaps the impact of automation in college libraries can be found by looking at productivity and user patronage." Libraries are moving further away from the warehouse philosophy toward an access and client-centered approach. The availability of remote electronic access to information means fewer people need to come to the library and, in addition, that others are competing with librarians as suppliers of information, with the result that librarians are adopting a proactive role in reaching out to potential users or clients.

What are the models currently in place which merge public and technical services functions? In the "compleat librarian" model in one library, almost all librarians regularly perform all professional activities except cataloging, which is handled by one cataloger and support staff. All librarians participate in collection development and in the assignment of subject headings. At a large research library, newly appointed department librarians spend six months in the catalog department before starting work as departmental librarians. Other academic libraries, both large and small, are advertising for librarians who will work in both public and technical services areas.

A number of library directors who said there was no continuing merging nevertheless describe joint efforts. The demands of preparation for integrated online systems in the eighties have led entire staffs to become involved in major one-time projects in areas which (except for the magnitude of the tasks) would have once been considered the sole province of technical services—e.g., retrospective conversion and bar coding collections.

We discerned a difference of opinion among library directors about the extent of blurring. Several respondents agreed with B. J. Busch's
statement regarding little probability of integration of both technical and public services because of "significant differences in work attitudes, values, performance and behavioral styles." Nevertheless, in libraries where no ongoing blurring of lines is occurring, comments such as "automation makes you look at the whole picture" and "possibly because of putting aside turf considerations" speak to the influence of technology in bringing about cooperation and greater understanding of the organization. Furthermore, the library director of one liberal arts college writes:

There is evidence of a blurring of the classic bureaucratic structure, directly flowing from the demands of the technology. Step by step as modules are implemented, each department "internalizes" the relevant portion(s) of the online system, in the process becoming more aware of the interrelations of library functions to a degree well beyond their previous experience. There seems to be a growing ability, willingness, even desire, to see the library as an organic whole, while, at the same time, the traditional department structure continues and remains essential to the ongoing work.

"Indeed, we may not be too far from the time when the formal structure may be far less important than temporary coalitions formed to attack a certain task," writes another. The trend implicit in this director's speculation is widely apparent. "People in technical services who are involved in implementing new systems are working closely with public service librarians to get their input and make sure that we are going in the right directions from both the technical and public services points of view," says a director who also reports no major reorganization between public and technical services units. "Team" management is practiced, not only at the top: "The process...was intended to be part of an effort to decentralize decision making and to enable more staff members at various levels and in various capacities to take part," the director of a large library with multiple branches reports. Committees and task forces are common, as this director indicates: "We have established intersystem committees to deal with automation specifications and details; task forces to evaluate specific applications...we have committees that act outside the normal administrative structure in order to effect change quickly."

Can we attribute the changes that have occurred solely or even principally to automation? All who commented on democratization of the workplace felt it was a contributing but not a guiding influence. For example: "Concerns relating to democracy and quality of worklife are shaped in the context of technology." Other factors are seen to be at work as well, in particular the changing demographics of the library profession. As they reach their fifties, members of what has been called a "graying profession" are less desirous of moving and seek new and enhanced job experience in the same institution. This is also true for younger members of the profession, notably partners in a two-career family. One director reports: "We are apt to get a calibre of staff member..."
who is capable and needs to be challenged in their work. Routine tasks are apt to be shared if a smaller library unit is to be run well."

Shifts among the roles of librarians, paraprofessionals, and clerical staff are yet another factor in the equation and are discussed later. The conclusion is clear—blurring of the lines between technical and public services has occurred and has been principally in the direction of technical services librarians performing public services functions such as reference desk service, user education, and database searching rather than reference librarians being initiated into cataloging. Since fewer technical services librarians are needed, the migration to public services or into other roles has been an opportunity as well as an accommodation.

**Shifts of Roles Among Librarians, Paraprofessionals, and Clerical Staff**

Another migration has been observed among the roles of librarians, paraprofessionals, and clerical staff. Many respondents from all sizes of libraries reported a shifting of responsibilities among the traditional categories of staff as well as new positions emerging. There is a fairly strong sense that technology and automation at least accelerated this trend. One librarian writes:

> I think that the level at which most library technologies have operated until recently has had more influence on changing work patterns of clerical staff than of librarians. The early record keeping applications in acquisitions and inventory control were intended to replace hours of filing and typing and to decrease errors in record handling. They did exactly that, enabling clerical staff to give more time to a broader range of duties.

The current shortage of librarians in some areas also contributes to the shifting of roles. Many library school graduates have acquired information skills that can be put to use in other job areas so that fewer graduates are choosing traditional library positions in academic libraries. Positions in special libraries and other organizations often command higher compensation. This shortage has led to the delegation of tasks traditionally performed by librarians to other staff. While librarians are in short supply, in academe at least there is available a number of highly educated people without library degrees. A number of directors wrote about involving paraprofessionals in reference work: "Paraprofessionals successfully assumed some of the daily responsibilities for bibliographic instruction and similar reference services." Another reported that for all paraprofessional and clerical staff "any position which comes open is being rewritten to include the necessity for ability to use microcomputers and training in some form of searching."

The roles of professional librarians have been redefined in response to the new demands placed on libraries and in order to attract and/or keep qualified staff. One library uses "multiple patterns in defining new jobs—unique combinations of tasks and responsibilities." Another is looking at job rotation. Yet another, speaking of reference librarians,
expects "fewer 'routine searches' and more specialized and complicated ones, and more training of patrons to do their own searches." A number of directors commented on the process of filling redefined or new positions from among current staff. "Change for us is managed by adapting needs and personalities and by having personalities who share the responsibilities without worrying about titles"; "[The systems position] began as a part-time assignment, taking advantage of the interests and background of the then music librarian."

The increasing complexity of managing library services has given rise to the need for new and different skills. Increased emphasis on financial accountability in higher education together with the introduction of library automation and higher expectations on the part of students and faculty demand skills in budgeting, strategic planning, educational technology, and time management. Also needed are personal characteristics that include flexibility and ability to deal with ambiguity.

We are witnessing the emergence of career library professionals from among nonlibrarians and what have traditionally been defined as nonprofessional ranks. New positions have emerged. Microcomputer information specialist, systems librarian, and coordinator of database search services are examples of a host of computer-related titles. In addition, bibliographic instruction coordinators, collection development, preservation, personnel, development, and planning and budget officers have been added in the last fifteen years and appear with regularity. The extent to which these positions are influenced by technology varies. While collection development and preservation are not new functions in libraries, their systematic application has been made possible through technology. The training and retraining needs brought about by continuous technological change have altered the role of many personnel offices. Fund-raising, planning, and budgeting have become more critical as the print and electronic libraries compete for scarce resources and as automation choices become million dollar-plus decisions. Library instruction, sometimes now phrased information literacy, has taken on the added responsibility of teaching end user searching as well as the ability to effectively choose among the broadened spectrum of information sources.

New departments have emerged as well, with some matching the new position titles. Combined periodicals/microforms departments are common. Information retrieval services, or computer-assisted research departments, have sprung up to manage both free and fee-for-service online bibliographic searching. Access services departments combine circulation, interlibrary loan, periodicals and microforms, and photocopy services, attempting to coordinate the greatly enhanced ability of libraries to provide a broad spectrum of on-site and remote access to materials to their users. At least one large library provides training and information to both public and staff users of its automated system from the same user services department.
Some of the newly-created positions and other positions are held by professionals who are not librarians. At the same time, the traditional library career professional, the librarian with an M.L.S., frequently needs to develop new skills. New staffing patterns are emerging, less by design than in response to the growing complexity of providing library services in academe. It appears that new terminology for library job categories is needed as well as new strategies for staffing academic libraries to meet the sophisticated demands of users in an online environment.

A Period of Redefinition: Toward a New Paradigm

The magnitude of both technological and structural change is in the eye of the beholder. Libraries with automated systems were described as having yet to experience the full impact of automation, while others, with apparently less automation, described more sweeping organizational changes. It may be that organization charts and job descriptions are less barometers of change and more properly indicators of how the library perceives itself. For example, academic libraries at present tend to rely heavily on coordinative positions and temporary groups, such as task forces and committees, to manage complexity, yet relatively few reflect their collaborative and cross-hierarchical relationships in their formal tables of organization—relationships which are nearly impossible to express on the still widely-used pyramid chart.

Organizational changes tend to be incremental in nature rather than sweeping and dramatic. Even under conditions of large-scale automation, the library must maintain continuous access to collections and the database. Thus it is more likely that structural and job design changes will be in increments which include overlapping and redundant functions so as to reduce the risk of loss of service or staff resistance. Many directors echoed the feelings of the director who wrote: “We have not forced the old structure to change radically—rather, we have created new structures around it to accomplish our automation goals while allowing the old structure to continue to function in its traditional ways. I believe that it will eventually wither as the new structures assume more operational authority and control.”

Most directors, both those who report significant organizational change already and those who see it as yet to come, expect to see significant changes in the future. The nature of information and access technology will continue to change, and the library will continue to adapt to the progression toward a world in which “information will be electronic and no longer bound by physical location. It will be at the desk top.” As one put it: “I wish that I could say that we were at the end of the process of change and that the need to experiment with various groupings had passed, but that is not the case....We believe that this trend towards an increasingly rapid rate of change and the need to adapt old structures and adopt new ones will continue.”
The present spectrum of changes in library organizations strongly points to today as a period of experimentation—one in which a variety of forms are being tried in an effort to increase coordination and flexibility. Many academic libraries are virtually operating two libraries in parallel—i.e., one print and one electronic. The extent to which the new will supplant and complement the old is far from clear. The advent of the paperless society has been much heralded and much delayed. If at some point economics or other forces lead to a slowdown in the rate of technological innovation in libraries, organizational forms may stabilize into standard patterns. Whether the present organizational innovations will endure is far from certain. They themselves may be transitional forms. If the rate of change continues or accelerates (as it undoubtedly will for those libraries which have not yet felt the impact of technology to any degree), even more radical and less cumbersome structures may be required for effective planning and decision-making.

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the one certainty about the times ahead... is that they will be turbulent
times. ... In turbulent times, the first task of management is to make sure of the
institution's capacity for survival,... to adapt to sudden change, and to avail
itself of new opportunities. (Drucker, 1980, p. 1)

If there is going to be one constant in the future it will be change.... The pace
at which it takes place is likely to accelerate, with change being felt nowhere
more strongly than in processes involving information handling. ... Libraries will need to adjust... to different and more sophisticated de-
mands and to develop new roles in order to meet users' needs. (Adams, 1986,
p. 109)

INTRODUCTION

Problems adjusting to technological changes in libraries are but
reflections of similar problems occurring throughout society. The
world is entering a new technological age which will fundamentally
change society; an age dominated by computers and communications
systems. The change is both rapid and revolutionary, and the future will
bring even more rapid and more radical changes to gathering, process-
ing, and dispensing information in libraries (Adams, 1986, p. 109; Huber,
1984, pp. 928-51).

At the same time, cultural values are changing. A new social
awareness has emerged as we become more diverse, more independent,
and more highly educated. More than ever before, we acknowledge the
right of every individual to be free, to participate in our democratic
processes, and to strive to achieve his or her fullest potential. We are
increasingly committed to resolving a host of contemporary issues—
e.g., human rights, equal opportunity, and a clean and safe environ-
ment. Yet our culture continues to be affected by energy shortages,
vilent economic fluctuations, environmental dilemmas, and dramatic
changes in international commerce. These difficult conditions have complicated our perception of the world and limited our faith in technology as an instrument for improving the human condition, particularly as competition for the world’s limited resources intensifies.

The stresses and challenges of coping with change under these conditions have caused organizations to look for new and better methods of organizing and managing themselves. Their search for a more effective, dynamic, flexible, and competitive management system is leading managers, workers, and scholars to a renewed vision of the value of participative management, a theory introduced over two decades ago but not then widely applied in America. The trend toward applying participative management in American organizations is so pervasive that a recent American Management Association (AMA) report concluded of it, “we are witnessing the beginnings of a new tradition in designing the American workplace” (American Management Association [AMA], 1985, p. 39).

**Participative Management Style**

Traditionally, libraries and businesses have been run by authoritarian managers with decisions made at the top and workers expected to follow directions. In the 1950s and 1960s, such social scientists as Douglas McGregor (1960), Rensis Likert (1961), and Robert R. Blake (jointly with Jane S. Mouton) (1964) began to propose new patterns of management as more productive and humanistic. For the purpose of this article, these innovations will be considered to characterize participative management rather than providing a more narrow and precise definition. They include such attitudinal aspects as McGregor’s (1960) theory Y construct that views people as naturally active, self-directing, and enjoying learning and growing when the work conditions support them (pp. 47-49), and Likert’s (1961) emphasis on expressing confidence and trust in subordinates (pp. 4-10). Likert profiled organizational characteristics in seven major processes: leadership, motivation, communication, interaction-influence, decision-making, goal setting, and control. In each he described behavioral patterns characteristic of four different systems.” Systems 1 and 2 are authoritarian while system 3 is labeled consultative and system 4 participative. Likert reports that high productivity derives from such patterns as free communication up, down, and among peers, with extensive friendly interaction; and cooperative teamwork in setting goals, making decisions, and evaluating performance. Despite his differentiation between the consultative and participative management styles, we will consider them both as participative, since moving toward them from the traditional authoritarian styles increases staff participation and productivity. Blake and Mouton (1964) talked of managerial styles structured from the interactions of two variables: concern for production and concern for people. These two variables serve as the axes of a two-dimensional grid with values from 1 to 9. The
number 1 in each instance represents minimum concern and 9 stands for maximum concern (pp. 8-12). Separate chapters describe major styles, which are identified as 9,1; 1,9; 5,5; and 9,9 depending on the magnitude of concern for the two variables. For example, a managerial style identified as 9,1 would have high concern for production and low concern for workers. Most closely identified with participative management is the 9,9 style which is highly concerned for both production and people. Of it, Blake and Mouton (1964) say: “Needs of people to think, to apply mental effort in productive work and to establish sound and mature relationships on an hierarchical plane and with one another are utilized to accomplish organizational requirements” (p. 142). Self-control, self-direction, and teamwork operate in this style, with broad involvement in planning, decision-making, and control. Commitment, motivation, and productivity are the consequences (Blake & Mouton, 1964, pp. 144-48).

Participative management was derived from a post-World War II search for a “theory of organization based on the management principles and practices of the managers who are achieving the best results in American business and government” (Likert, 1961, p. vii). Its antecedents included the famous Hawthorne Works study of Elton Mayo (Roethlisberger & Dickson, 1939), carried out toward the end of the 1920s, which ushered in the Human Relations School as an antithesis to the Scientific Management School, and the Lippitt and White (1952) study of the influence of various leadership styles on worker behavior.

Likert’s theory of participative management was derived from the results of hundreds of studies carried out largely in profit-making organizations. They demonstrated that not only did participative management enhance productivity, but worker satisfaction increased. Likert (1961) also expressed confidence that the results would apply equally to profit-making and nonprofit organizations (p. vii).

While their research and attention were directed largely at profit-making organizations, in the 1970s librarians began to ask whether these concepts were also applicable to such nonprofit organizations as libraries. Marchant (1970; 1976) tested the theory in research universities, using multiple regression and path analysis. He found that the more participative libraries had the most satisfied professional staffs; their faculties, in turn, rated their libraries highly. The libraries he studied distributed across Likert’s systems 2 and 3, none falling into the exploitive extreme of system 1 nor the truly participative aspects of system 4.

Applying participative management to the work environment has taken several different forms. Among them have been the following:

1. Job enrichment, which is a broad label covering increases in the variety in individual jobs, expansion in the range of tasks undertaken, and extension in responsibility for decisions.
2. Job rotation and cross-training, by which people learn related skills,
thus improving flexibility and breadth of knowledge. Related is pay-for-capacity, wherein workers are paid for breadth and range of skills.

3. Gainsharing systems that distribute savings resulting from improved performance.

4. Flextime, which allows workers some control over the hours they work. It includes authorizing the four day work week.

5. Job sharing, whereby two people share one job.

6. Quality circles or problem-solving teams, in which groups of employees work as teams to solve problems. Related to these circles or teams are joint labor management committees and work or communication councils.

7. Formal training in participative management.

8. Self-managed work groups, given substantial responsibility for their work and products.

9. Parallel organization structures that are responsible for managing change, quality of work life, and innovation issues.

10. Project based organization, using groups that are responsible for specific tasks and projects.

11. Multiple reporting structures, wherein workers are simultaneously responsible to two or more separate units of an organization.

12. Employee-owned organizations that allow opportunities to become owners of the organization (AMA, 1985, p. 8).

**Recent Trends**

The research of the 1950s and 1960s exposed the negative social impacts of conventional authoritarian management methods as well as proposing remedies. But during those years, many U.S. organizations listened, but few were willing to change. Some organizations experimented with job enrichment and other participative approaches, but these experiments were rarely sustained and many failed (Lawler, 1986, pp. 1-20).

During the early 1970s, the Secretary of Health, Education, and Welfare assigned a task force to review the nature of work in America and propose changes that would improve the quality of work life. One chapter of the report, emphasizing the high cost resulting from dissatisfaction with work, proposed the redesign of jobs to use such concepts as autonomous work groups, integrated support functions, challenging job assignments, rewards for learning, participative management, and participation in profits. General Foods was reported as building newly designed plants that incorporated radical new approaches to work and management in order to provide a high quality of work life and high productivity. Such companies as Banker's Trust, Corning Glass, and Texas Instruments reportedly had restructured jobs to make them more satisfying to the workers. In the process, they reduced turnover, saved money, and increased the quality of performance (Work in America,
While the book carried a measure of authoritativeness as a consequence of being the consensus of a special task force assigned by Elliot L. Richardson, then Secretary of Health, Education, and Welfare, it served simply as further encouragement for managerial reform and not as a watershed document.

Even so, the transition moved forward rather ponderously but consistently. The 1970s was a period of experimentation and some change. Many studies explored the ramifications and success of these experiments, and they generated a great deal of debate concerning the success and effectiveness of the new participative approaches to management. Most organizations felt there was no reason to change because American businesses were highly profitable and American managers viewed their style of operation as the reason for America's post-World War II economic prosperity. Even though the new participative method had been successful in some instances, and even though studies had revealed that conventional management methods were contributing to low worker motivation, high turnover, high absenteeism, poor product quality, alcoholism and drug abuse, mental and physical illness, organizational conflict, and worker stagnation (Sashkin, 1984, pp. 5-22; Sashkin, 1986, pp. 62-75; for a review of studies related to worker health and management style see Lewis, 1986, pp. 137-48). U.S. managers were hesitant to change because their profits were high (Lawler, 1986, pp. 1-20). They chose to adhere to the philosophy: "If it ain't broke, don't fix it."

When American inability to compete internationally became clear in the latter years of the 1970s and became critical in the 1980s, executives finally realized that the old ways would no longer serve. Several best-selling books popularized the concept of participative management as a means of reversing America's trade imbalance and improving productivity. A particularly good book was Ouchi's (1981) *Theory Z*. His major message was describing how Japanese corporations use participative methods to out-produce American competitors. He also identified American corporations that are highly productive because of their participative management. John Naisbitt's (1982) *Megatrends* reported several trends in American society leading into the twenty-first century. Two major trends were a shift toward participative management and a strong need for "high touch" supportive human relations as a counter balance to the high technology of the information era. Shortly thereafter, Tom Peters's (1982) *In Search of Excellence*, which advocated the use of participative and humanistic concepts, sold more copies than any previous book on management.

Throughout the 1980s, many highly successful, fast-growing, innovative organizations have developed a common participative, entrepreneurial management style (Senge, 1987, pp. 8-11). Researchers and managers began reporting with greater frequency that organizations using new participative methods were achieving successes. In
1985, the American Management Association surveyed 10,000 of its members and reported that the success some organizations were experiencing was a consequence of using various participative work alternatives. The report said:

When the current findings are considered in the light of other research . . . results show that certain companies are “progressive” in introducing more alternatives (and doing so earlier) than most other firms. Further evidence shows that such progressive companies achieve greater profitability. Over time, there is a strong link between workplace innovation, product innovation, and superior financial performance. (AMA, 1985, p. 10)

The success experienced by some of these companies led them to treat their management practices as proprietary and confidential. In other words, they felt that their use of participative methods gave them a competitive edge, and they did not wish to reveal the methods they were using to their competitors.

Of the several procedures used to democratize the workplace in recent years, the most popular has been quality circles. The number of quality circles has grown in U.S. businesses from about 1,000 in 1964 to 87,500 in 1978. By 1984, more than 36 percent of all U.S. businesses surveyed by the AMA were using quality circles (AMA, 1985, pp. 30-31, 38). Though popular, quality circles are limited in the contributions they make. They generally serve well initially and are characterized by a high early success rate. But early success is often the result of a limited number of easily solved problems. The circles commonly lack authority to make decisions and are limited to recommending action. Their assignments are often restricted to resolving problems of productivity and quality, and they are usually not allowed to consider personnel and management issues. Workers involved in the circles become accustomed to participative interactions that are not allowed on their regular jobs, and the contrast leads to dissatisfaction and distrust of their supervisors. As they become less productive, management resistance can set in and lead to their abandonment (Lawler & Mohrman, 1987, pp. 42-54). Recognizing the success of well-managed worker involvement but wanting to free themselves from these limitations, some organizations have moved beyond quality circles to implement total organizational transformation involving greater employee participation. Richard Boyle reported such a transition occurring at Honeywell. After experimenting with quality circles, one division of Honeywell developed a steering committee to create and monitor task teams established to tackle specific assignments and to measure their progress. The division moved successfully toward a flatter, more participative structure concerned with both productivity and employee needs. He reported such results as an improved work climate, a threefold increase in the minority worker retention rate, improved employee relations and performance evaluations, and a greater employee understanding of long-range corporate goals (Boyle, 1984, pp. 74-83).
Today, participative methods have been developed and tested sufficiently so that their viability has been established. More to the point now is how to manage participative management to achieve desired results. The main point of Boyle's paper was precisely that, and he described how his company did it successfully. Much of Donald Sager's (1982) book, *Participatory Management in Libraries*, deals with the practical aspect of applying the theory to the library environment. Debate continues regarding the effectiveness of participative management, but the number of successful companies reporting its use continues to grow. Critical reports now tend to emphasize specific delimitations rather than the viability of the method (Locke, et al., 1986, pp. 65-79). A major reason for the failure of participative experiments, for example, has been blamed on inept and antagonistic management rather than on shortcomings of the theory (Saporito, 1986, pp. 58-65).

Little doubt remains that the use of participative management methods will continue to grow in the future. The technological, economic, personnel, and cultural changes that are now forcing American management to accept and apply the principles of participative management can be expected to continue. Information technology will change the way organizations are managed, the way they are structured, and the way jobs are designed (Burton, 1988; Shaughnessy, 1982). The automation of manufacturing and the transition of the U.S. economy from heavy industry to the service and information sectors will change the nature of work from manual labor to decision-making. The baby boom generation, socialized in an era of affluence and better educated than their parents, will continue to demand greater participation. Major legislation guaranteeing civil rights, equal opportunity, worker safety, and employee rights have made fundamental changes in the American workplace. Women and minorities in the work force are expecting their newfound rights established under the law to continue and even expand. The greatness of the American political system is tied to the democratic ideal; now the American workplace is benefitting from the application of democratic principles.

**Innovation and Participative Management**

The same changes that are moving American organizations toward greater participation are requiring American businesses to be more innovative in order to survive. Huber (1984) has observed that an organization's survival is enhanced by having structures and technologies well suited to its environment (p. 929). These principles are equally true for libraries. Because libraries are at the heart of the information technology revolution, they are experiencing an environment of rapid and radical technological change. Managing the transition will require of them the capacity not only to tolerate change but to design their own transition. To adapt and to lead in this new age, librarians must be both flexible and innovative.
Participative management contributes to flexibility and innovation in organizations. Brian Reynolds (1986) writes from his review of management research, "the conditions we are now seeing; turbulence, stress, declining resources, and the exploding use of technology, demand an emphasis on organic, flexible, and participatory organizations" (p. 45). By contrast, organizations which are stratified, formalized, and centralized are less dynamic, adaptable, and innovative. Judy Reynolds and Jo Bell Whitlatch (1985) cite numerous papers which support this conclusion, including the work of Michael Aiken and Jerald Hage (1970; 1971). Hage and Aiken's research concludes that decentralized, participative organizations support a higher rate of innovation; and Helen Howard's (1981) study of innovation in four academic libraries supports these conclusions for library settings. Kanter (1984; see also 1983) feels that participative management allows organizations to use their people and their good ideas better:

By building an environment in which more people feel included, involved, and empowered to take initiative, companies as well as individuals can be the masters of change instead of its victims.

The source of new ideas is people. That's why an organization's way of educating and involving people, distributing them among assignments, and rewarding their efforts are so critical in it's ability to innovate. (pp. 44-45)

Researchers at M.I.T., studying innovative, fast-changing organizations, found that highly successful, innovative organizations have in common a participative, entrepreneurial management style. Management gives the employees decision-making power and then works to establish clear links between the employees' efforts and the rewards the employees receive. Employees of these companies share a collective organizational vision of the future. Little if any management hierarchy exists in these organizations. Most of them have flat organizational structures with many people influencing important decisions. They are successful because they create organizational and personal growth through risk, responsibility, and learning. Leaders in these organizations typically are servant leaders. They know that their authority derives ultimately from the respect of those they lead, not from the status of their position (Senge, 1987).

Studies seeking to determine which leadership theory most closely matches subordinates' perceptions of good leadership found that subordinate evaluators consistently gave high marks to managers who were participative in their behavior (Hornstein et al., 1987). In turbulent times, participative managers need to be strong leaders (Nurick, 1985, pp. 188-91). A major attribute of strong leaders is an extraordinary focus of commitment which attracts people to join in bringing the vision to fruition (Bennis & Nanus, 1986). Leaders in today's organization have the responsibility to catalyze creativity and innovation. They can do so by maintaining a high level of motivation within the work force; by providing for workers' continuing education, training, and profes-
sional development; and by promoting worker participation and encouraging the exchange of ideas among workers (Peters & Austin, 1985).

THE IMPACT OF TECHNOLOGY ON MANAGEMENT AND ORGANIZATIONAL STRUCTURE

Most people see technology affecting their lives in one of two ways: (1) technology is bad and suggests a waste of resources, centralized organizations, loss of personal freedom and dignity, inequality, consumerism, deskill jobs, and unemployment; or (2) technology is good and suggests increased personal freedom, participatory democracy, more leisure time, more knowledge, and an improved quality of life. The literature reviews in Burton (1988), and Attewell and Rule (1984) on the effect of new technology on organizations suggest that both of these views of technology are justified. Burton reports that information technology has been shown to centralize and decentralize "authority within the organisation," that it can increase and decrease "opportunities for employee participation and involvement," that it can allow workers "greater access to 'management information' [or] strengthen management control over the flow of information," that it can change or freeze organizational structure, and that it may limit or increase job satisfaction. After reporting these conflicting results, Burton makes the important point that the effects of technology on people, organizations, and management can be controlled and directed. Technology can humanize or dehumanize the workplace, and an important determining factor is managerial philosophy (Burton, 1988, pp. 60, 63-64). Using a participative philosophy in the design and implementation of an automated information system will enhance its acceptance by the staff and provide an environment that encourages innovation and creativity. A creative staff will adapt to change and use these systems to achieve appropriate ends.

The character of computers has also affected who makes decisions. When mainframe computers were dominant, they encouraged centralized decision-making. Now, microcomputers and communications networks are decentralizing decision-making. Today's technology is rendering traditional organizational structures obsolete, and the technologies of the future will encourage the use of participatory models. That today's most successful high tech companies are using participatory models appears to be a reflection of this trend (Peters & Waterman, 1982; Senge, 1987).

As managers recognize that, to be effective, they must manage people and information in ways different than in the past, they are discovering that their organization's two most important assets are human resources and information. Burton (1988) comments: "There is now a greater appreciation of the fact that the technology is only a (sophisticated) means to an end, and attention is being shifted towards
effective exploitation of technologies and the strategic possibilities offered by [information technology]” (p. 62). Zuboff (1985a; 1985b) advocates “informating” organizations rather than automating them. Instead of replacing workers with technology and allowing technology to enslave the organization, she would educate and train workers to use data produced from automation technology to develop more efficient and more effective organizations, process models, production techniques, and automation systems. Machines should be used to facilitate human creativity and data analysis abilities rather than stifle them (Zuboff, 1985a, pp. 103-39; Zuboff, 1985b, pp. 5-18).

Zuboff’s ideas are valid in library settings, and they are not new. Her informating systems are merely participative management information systems. Like participative management, management information systems (which need not be for managers only) were introduced some time ago but are yet to be applied on a wide scale in libraries. We have automated the library, but generally we are not using these systems to informate. Libraries need management information systems. Without them, librarians have little feedback on how well they are achieving their goals. The automated systems existing in libraries today are technology pushed systems and were not designed as informating systems or even as management information and support systems. Peter Brophy (1986) writes:

Librarians pay lip-service to the need for highly developed management information systems but in practice, when offered a choice, nearly always prefer to have developmental effort put into improvements to the operational aspects of their automated systems.... Automated systems seem to be primarily about control at the micro level rather than about exploiting services or encouraging library use. (p. 129)

Imagine harnessing the creative powers of your colleagues and unleashing them to meet their and the library’s goals using the computing power available today. Using microcomputers and communications networks, librarians could create simulations to test, for example, the effects of changes in loan periods on circulation rates and on consequential increased costs of reshelving. Or they could perform sophisticated use studies and use the results to create acquisitions models. Eventually we may even design systems that will help optimize the service we deliver with the limited resources available.

**Future Trends**

Libraries are information systems in the process of entering the high tech information age, but many of them are managed using the same model used by industrial age mass production plants. If we wish libraries to function effectively, they must adapt to a more appropriate post-industrial model. Vincent Giuliano (1984) explains how the two models contrast (pp. 25-27).

The modern industrial age organization is managed for efficiency and is characterized by economy of scale; centralization; standardiza-
tion; routine operations; and a complex, segmented, bureaucratic structure. It typically changes slowly. Information is distributed on paper, filtering slowly from one hierarchical level to the next. The information processing system itself is centralized. Offering only limited access to the information it processes, the system is controlled by management and system technologists. Managers are typically reactive, taking action to change only when trouble emerges. They often have extremely narrow definitions of productivity which concentrate on the quantitative aspects of mechanical outputs instead of the capacity of the organization to satisfy customer needs (Kanter, 1984, p. 40). The worker's intellect is not utilized to capacity, and the worker is often unmotivated and uncommitted to the organization.

By contrast, the postindustrial model is decentralized and is characterized by a focus on quality, "demassification," and short product-life/service-life cycles. The information era organization is information- and knowledge-driven. It serves specialized targeted markets. Its management is participative and responsive. Strategy and planning oriented, management sets the organization's purposes and vision which are held collectively by all employees. The long-term health of the organization is emphasized, as are maximum effectiveness and the maximum utilization of resources. The entrepreneurial spirit of people in the organization is allowed to develop and manifest itself. (See the article by Keith M. Cottam in this issue of Library Trends.) Developing motivated and committed workers is an important goal. Workers are allowed to participate in setting their own goals, and they are encouraged to make voluntary commitments to their coworkers and management. Information is accessible to all workers in the organization rather than just to managers. Information flows instantaneously, and these decentralized information systems are highly linked and often networked.

Organizational structures are flat in the information era organization. Reynolds maintains that the need for greater efficiency and the universal access to information through use of computers will flatten the traditional pyramidal shape of libraries, and the roles of personnel in library organizations will continue "blurring and evolving into mixtures based on expertise and competencies" (Reynolds, 1986, p. 31).

Huber (1984) believes that: "Post-industrial society will be characterized by more and increasing knowledge, more and increasing complexity and more and increasing turbulence" (p. 931). By turbulence, he means rapid and radical change. For an organization to stay at the forefront of its business, it must understand and use a growing body of relevant information. Yet its control by an authoritarian manager will become increasingly difficult and will press the organization to use teams of workers to control information and share in the decision making process. Complexity will increase because specialization and diversity will increase. Growing complexity increases the number of
societal or organizational components and the interdependency of those components. Huber believes that increasing the speed of change in the postindustrial world will require: (1) more frequent and more rapid decision-making; (2) more frequent and more rapid innovation; and (3) more rapid, continuous, and wide-ranging information acquisition. Huber (1984) further claims that: "While on one hand decision-making units will be motivated to increase their heterogeneity and size (so as to include people having various types of expertise and representing various constituencies), on the other hand efficiency considerations will cause this pressure to be resisted..." (p. 936). Allowing people to participate in decisions quickly and from remote locations through the use of expert and decision support systems, along with advanced communication technology, can help reduce that resistance. With the use of computer networks and electronic mail systems, librarians are already coming to work in the morning to find on their personal computer screens lists of items from various people requiring their responses. This sort of participation will increase dramatically as libraries adjust from the industrial to the postindustrial model of management.

As organizational structures change, our workplace vocabularies and methods of compensating workers will also change. According to Zuboff (1985b): "The images associated with physical labor can no longer guide our conception of work" (p. 17). The AMA (1985) survey report concerning alternative work arrangements predicts:

Changes will require us to revise our notions and standards of internal equity in organizations, especially those relating to compensation principles and practices. Increasingly, work alternatives raise fundamental issues about the equity of compensation, and of status, rank, and positional differences within most organizations. The long vertical hierarchies that have been traditional in large organizations will become untenable, perhaps arcane, not simply for reasons of ineffectiveness but also for their incompatibility with new organizational designs and work alternatives. As junior-level employees gain increasing responsibility for more significant tasks, as their activities begin to overlap with those of higher levels of management...compensation and reward systems have to become "flatter" and more equitable in every sense. (p. 39)

CONCLUSION

How do library automation and information technology affect the management of libraries? Two general viewpoints exist: (1) technology is bringing a new age of enlightenment, decentralization, personal freedom, and participatory democracy to our libraries; or (2) technology is bringing about an Orwellian world of decreased personal freedom, with rigid centralized control, little originality or creativity, and class structures with the wealthy dominating the information poor (Burton, 1988, p. 57). Which viewpoint will prevail largely depends on how library managers choose to manage.

If they feel compelled to monopolize the library’s decision-making processes, they probably will succeed in the short term, but at the expense of innovation and staff morale and declining service. But if improving service is more important to them, they will use participative
alternatives to create humane working environments where innovation and high performance can prosper. Over the long haul, the transition to a participative approach that fits the pattern of a modern information system will be required for the library to survive and flourish.

Sashkin (1986) argues that participative management is an imperative even if improved productivity cannot be proven. He feels that managers are ethically responsible for their subordinates’ well-being. He considers participative management as a vehicle for assisting them in reaching their potential and becoming responsible for their actions, their work, their development, and their organization.

Griffen (1982) applies a similar argument in addressing library managers. The library is an open system that exchanges material resources for information. Yet many library managers who recognize the value of user surveys, community-based planning, and user needs hesitate to apply these same open system concepts to their employees. Griffen (1982) claims that automation efforts will succeed when we integrate the concept of the library as an open system into daily management practices (p. 226).

Zuboff (1985b) offers the analogy of looking through a kaleidoscope for the effect that technology has on our world and our organizations. She sees technology as shaping the limits of what is possible and what is barely imaginable, eroding assumptions about the nature of our reality, and creating new choices (p. 5). Technological innovations will change the world we live in and how we view that world. Technology is the force that turns the rim of Zuboff’s kaleidoscope.

The analogy of the kaleidoscope breaks down, however, when human choice determines the direction of technological innovation and the vision and implementation of new organizational designs. Zuboff (1985b) observes that, within the available choices, human beings construct meaning, assess interests, and make choices. Technology cannot determine what choices will be made for what purposes (p. 6).

Advancing information technology is changing our world. We basically have two choices, two paths to follow in managing our libraries: do we automate or informate—do we manage autonomically from a hierarchy or participatively involve our colleagues and colearners; do we waste our human resources, damaging the lives, minds, and spirits of our colleagues, or do we rely on and encourage the human capacity for teaching, learning, insight, and creativity? Our goal as librarians is to maximize our resources to most effectively serve our users. A revolution in information technology is occurring. It is a revolution that will essentially shatter the effectiveness of traditional, scientific, and authoritative methods of management, and it will undoubtedly lead to profound changes in libraries, librarian functions, and user expectations. The future is up to us. Veaner (1985) urges us to seize the initiative, lead these changes, and not allow ourselves to be dragged about by them (p. 222). We must accept the challenge.
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The Physiological and Managerial Impact of Automation on Libraries

JOHN N. OLSGAARD

A recent computer journal carried a mock advertisement for the "most popular computer accessories," and listed a picture of a bottle of Tylenol®, Visine®, and a tube of Ben-Gay® (InfoWorld, p. 22). The implication of the ad was that three of the most common by-products for users of computers are headaches, eye strain, and backaches. There is little doubt that automation has produced a quantum leap in staff productivity in libraries. There is also little doubt that libraries, as organizations, have been much quicker to embrace automation for economic reasons than to deal with employee considerations that are the result of the changes.

The purpose of this article is to examine the impact of automation on employees and on the administration of library operations. The focus of this examination will be on the recent literature concerning the effect of automation on libraries as organizations, and, specifically, on the physiological and sociological influence of computerization on library employees. (This study is an expansion of an earlier work by Olsgaard [1985]).

Evans (in press) has pointed out that library automation is not an event but a continuing process. That is, automation doesn't occur just once—it is a never ending process of action and reaction within the library as an organizational unit. The character of the continuing cycle of library operations automation is given in Figure 1. The major components of the cycle can be expressed as: Operations and Reporting; Staffing; Planning; and Computing and Human Factors. Although the components of the cycle do not constitute discrete entities—i.e., they tend to merge into one another—they do provide a basis for examining the issues.
Operations and Reporting

One effect of automation on the operations and reporting structure of libraries is the blurring of traditional lines of responsibility and authority. Atkinson (1984) has made a strong case for using automation as a mechanism to decentralize large central libraries and for redefining the nature of the organizational structure in libraries: "The rise of good, inexpensive, rapid, long-distance electronic document transmission may not only change the organizational patterns of individual libraries but may well change the patterns of librarianship as well" (pp. 109-14; see also Myers, 1986). Allen (1984) points out that technology will require libraries to rethink the traditional processes of operation and will necessitate the participation of staff at all levels. An example of this is given by Bednar (1988), who described the merging of various job types in the automating of cataloging at Penn State University.

The reporting function of automated library systems is usually thought of in terms of operations management. Most automated systems in libraries generate a variety of statistical reports that can and
should be, but probably aren't being, used in planning library operations. One of the primary objectives of Management Information Systems (MIS) is to more adequately put resources, such as computers, and staff together in order to achieve better productivity. MIS tells the policymakers how the organization is functioning so that changes can be instituted.

The most typical examples of the type of reports that are possible are those generated as a part of automated circulation systems. The normal circulation report matrix can include documentation as to: the number and type of user (e.g., faculty, adult, child), the subject areas in which circulation is occurring, the time of day or day of the week that the circulation took place, or a combination of all of these. For instance, an academic librarian could determine when most freshman students are using the library and plan staffing accordingly (Olsgaard, 1983; Hawks, 1988; Runyon, 1981).

The bright side of MIS is that it affords the opportunity to better utilize available resources in a rational way. The potentially dark side is that it can allow managers to individually track the productivity of a given staff member. Although Crowe and Anthes have addressed the ethical issues of library technology with regard to external users, little has been written on the ethical use of automation with regard to internal monitoring of library staff (Crowe & Anthes, 1988). The use of automated systems as a tool of employee supervision in libraries, and the concomitant privacy implications, are likely to become a major issue in the future.

Staffing

The second component in the automation cycle is the impact of computerization on the staff of the library. Staffing is literally the alpha and the omega—the beginning and the end—of all automation projects but probably receives the least amount of attention. In many library automation projects, those in charge of the project concern themselves with buying the hardware, doing the data conversion, loading the software, and then, almost as an afterthought, considering what the line personnel might think about the system. The primary reason for this problem is that library automation project teams are usually made up of librarians. Professional librarians are primarily managers. Ergo, librarians tend to concentrate on the management aspects of the automation process rather than on how the process will affect line personnel.

For example, when a large library is in the process of bringing up an automated circulation system, the librarians in charge of the process tend to focus on the cost of the system and the types of reports that the system can generate, because that is where the system will interact with their normal job duties. That is the librarians will tend to be less interested in the level of difficulty of checking materials in or out with the system since librarians in large libraries rarely spend much time
doing that activity. The paraprofessional staff, who do spend a great
deal of time checking out materials, are rarely consulted about the
automated system until after the fact. The contradiction in this mode of
operation is that the paraprofessionals who use the system on a day-to-
day basis will ultimately have a much stronger influence on whether the
system implementation is successful than will the librarians who originally purchased the system.

One of the strongest components of any automation project has to
be a concern with the manner in which the staff that will use the system
will respond to its implementation. At least one study has estimated that
over 85 percent of all failures in systems implementation can be attrib-
uted to “people problems” (Cirillo, 1983, p. 25). The literature would
indicate that the most common effects of these people problems tend to
be the fear of change, and, specifically, the fear of computers.

Fear of change is a natural human reaction. Most of us tend to
develop routines that allow us a degree of control over familiar situa-
tions. Change, by definition, poses a threat to those routines. Auto-
mentation, as an agent of change, has been well documented in the literature
(Olsgaard, 1985). For instance, Jagodzinski (1985) points out that auto-
mation has an impact on many aspects central to the individuality of
employees including their “professional status, job security and self-
esteeem...” (p. 134). Or as Ganus (1985) states: “Not only is there a fear
that the environment will be dehumanized with the introduction of
computers, but a fear that one’s own ‘territorial’ workspace will be
changed to something uncomfortable, even alien. A change of working
relationships is uncomfortable, just as is any change of procedures with
which one has already become familiar” (p. 28).

A relatively recent variation on the theme of computers as an agent
of change is the study of the fear of computers. This field of inquiry has
coined the terms “cyberphobia” and “technostress.” As an exercise in
social psychology, a study was conducted of cyberphobia in office
workers in the Washington, D.C. area. Of those that responded, 14
percent were termed as being “computer anxious” (Gardner, et al.,
1985). However, at least one study indicates that while computerization
does change organizational structure, it has very little impact of any
kind on the stress levels of employees (Leppanen, et al., 1986). Another
study sees the proper application of psychological principles to compu-
terization taking primarily the form of hardware and software design
(Card, et al., 1983).

The consensus of the literature would tend to indicate that automa-
tion can be either a positive or negative force on employees depending
on how the automation activity is implemented.

Positive Effects

The positive effects of automation on staff can be characterized as:
1. Automation can be designed to reduce repetitive work. For example,
the repetitive nature of typing and retyping letters from scratch can be reduced by using word processing equipment.

2. Automation can be used to upgrade the skills of employees. Employees can be freed to use more time on decision-making, planning, and supervision of other employees.

3. Automation can increase the variety of tasks conducted by the employee and provide flexibility in the times when those tasks are carried out.

**Negative Effects**

The negative effects of automation on staffing can be summarized as:

1. Automation can be used to "deskill" jobs. That is, automation can be used to lower position skill requirements by filling them with dull, repetitive duties of another sort. One could argue that an effect of automating library technical services procedures has been to deskill many technical services positions through the use of computers. For example, many librarians who were doing original cataloging now spend the majority of their time making minor screen modifications on one of the online cataloging systems.

2. Automation can eliminate jobs or force the complete retraining of personnel for different duties.

3. Automation can reduce the level and the quality of interpersonal communication (Roscow, 1984; Shiff, 1983; Schement, et al., 1985; Caudle & Newcome, 1986; Waters, 1986; Diebold, 1984).

Whether automation will have a positive or negative impact on the employees of the library will largely be determined by how well the system is planned.

**Planning**

There is no stronger consensus in the literature of automation than the view that adequate planning is essential to the overall success of automation implementation (Mick, 1983). However, much of the planning process in libraries has traditionally occurred only at the middle manager level; by design or choice, relatively few upper-level administrators (e.g., directors) or line personnel (e.g., paraprofessional staff) become associated with planning the system. Unfortunately, these two organizational levels will have a proportionately greater impact on the success of automation than will middle managers. Upper-level administrative participation is important because they control project funding and support. Paraprofessional participation is important because they will be doing a large share of the staff interaction with the system.

The management literature is particularly expressive in its support of upper-level administrative involvement in the planning process. The quantity of the literature on this topic can itself be rather intimidating. In reviewing the advice this literature has to offer, the administrator is
urged to: keep up with new developments in computerization (McAulay, 1987; Grant & Robinson, 1984); strive for "computer fluency" in order to communicate with systems designers (Keen, 1985); and "manage change" through involvement in the automation process (Rockart & Crescenzi, 1984; "Manage the impact," 1985). Perhaps the best rationale for administrative involvement is that if the administrator has a more personal stake in the success of the project, he/she will be much more forthcoming with financial support for the project (Allen, 1982; Quible & Hammer, 1984).

On the other end of the administrative spectrum, it is equally important for line personnel (e.g., paraprofessionals) to become involved in the automation planning process. A number of studies in both the management literature (Staples, 1985; Kanter, 1984; James, 1986; Franz & Robey, 1986), and in the literature of library and information science have demonstrated the favorable effects of staff involvement in the automation process (Bichteler, 1986; Horsnell, 1983; Drescher, et al., 1986; Henshaw, 1986; Allen, 1983). For instance, a 1984 survey of four Indiana companies concluded that:

Managers frequently tend to assume that if subordinates are simply told why change is necessary, they will adapt compliantly. As this study indicates, this is clearly not the case. The extent to which operants accept technological change, and, indeed, welcome it, is largely determined by their involvement in the planning and implementation of the change. (Matherly & Matherly, 1985, p. 23)

Similar findings were reported in a survey of U.S. academic librarians by Olsgaard (1984) and in a survey of Canadian libraries by Dakshinamurti in 1984. Dakshinamurti (1985) states: "This clearly underscores the importance of allowing all staff members to have a say in proposed changes, particularly those workers affected by these changes" (p. 350).

Given the evidence of the research that has been conducted concerning the success of involvement of all levels of employees in the automation process, it is not surprising that the earlier mentioned studies exist. What is surprising is the number of guides to automation in libraries that do not include recommendations on employee participation.

**Computing and Human Factors**

One of the more popular topics in the literature of library and information science, in computing, and in management science is "human factors engineering." "Human factors engineering," or its more popular synonym "ergonomics," is the generic term which describes the study of any aspect of human-machine interaction. The purpose of ergonomic research is to explore the effect of physiological factors on employees who utilize computerized systems or other forms of equipment. As library employees are increasingly exposed to automation, physiological considerations will have a direct effect on continuing gains in staff productivity.
Although there is a considerable volume of material on the physiological aspects of ergonomics, much of it is rather repetitive. The basic recurring problem described in many types of organizations—and one could certainly include libraries in this listing—is that the primary emphasis has been on the purchase of technological machinery rather than adapting the machinery to fit the employee and the operational circumstances. Generally, these physiological conditions simply mean that since employees come in a wide variety of shapes and sizes, the machinery and furniture utilized by those employees should be adjustable to fit them. The following include some of the more basic hardware ergonomic considerations:

1. **Seating.** The chair should be adjustable in terms of height, back support, and armrests.

2. **Noise.** Employees should be protected from recurring sources of loud noise associated with automation (e.g., impact printers). The ambient noise level should not exceed 55 decibels.

3. **Tables.** The table that supports the microcomputer should be adjustable in terms of height and should be large enough to hold both the computer equipment and other work material.

4. **Computers.** Various accessories should be added to the basic microcomputer configuration that would allow adjustment of the video display terminal (VDT) in terms of height and angle. The purchase of an inexpensive glare screen for the VDT can significantly reduce eye strain. The keyboard should also be height adjustable.

5. **Lighting.** The VDT should be placed at a 90 degree angle to room windows to reduce glare. The general room lighting should provide 500-600 lux of indirect illumination.

6. **Other.** Many employees who spent a significant amount of time working with computers find other devices of great value. These items include footrests and the ability to change the color on VDT screens (Ergonomics, 1986; Owens, 1987; Thiel, 1983; Self, 1984; Vickery, 1984; Gordetsky, 1984; Mason, 1984; Schmidtke, 1984; Dainoff, 1984; Koffler, 1983; Roose, 1986; Bube, 1985).

An area of ergonomic consideration that has just begun to receive attention in the literature is "software ergonomics." Software ergonomics is the study of design factors that would increase the productivity of computer systems. This area of ergonomics can be as basic as the software having the ability to be either menu driven for novice users or command driven for the more experienced employee. Increasingly, software designers are writing programs that can adjust speed, help levels, and escape mechanisms to facilitate communication (Martin, 1986; Vigil, 1983; Ramsey & Grimes, 1983; Waite, 1982; Cockton, 1987).

According to Otten (1984):

> the ergonomically conscientious software designer has the following general design objectives:

1. Minimum mental effort and strain for the user;
2. Minimum requirements for learning new procedures, definitions, codes and for unlearning long-practiced thinking patterns;
3. Ease of operation, simplicity of expressing commands to instruct the tool to perform specific tasks;
4. Prevention of frustration, provision of specific, relevant help whenever needed; and
5. Communication effectiveness, no need to consult reference material to interpret displays of responses and results of work. (pp. 19-25)

One additional ergonomic consideration that must be addressed is the health aspects of working with VDTs. Occasionally employees will become quite concerned over the effect of radiation in general, on pregnant women in particular, and on vision. Almost anyone who has spent a couple of days staring at a VDT can testify that this activity might cause eye strain or muscle fatigue, but there is no evidence that VDTs are a radiation hazard or cause eye damage (Miller, 1983). Henriques and LeGates (1984) state: “The facts are reassuring. All sorts of scientific and academic groups around the world have come to the conclusion that there is no health hazard connected with visual displays” (pp. 64-68).

The primary reason that library managers should be concerned with ergonomics is not just that employees will be less cranky—although that is probably a pretty good reason—but because ergonomically designed systems allow employees to be more productive. Experiments in various organizational and laboratory settings have demonstrated that when ergonomic techniques are utilized, employees work longer, faster, with fewer entry errors, and with fewer sick days. Depending on the study and the type of work analyzed, the increase in productivity can range from 4.5 percent to 23 percent. Springer (1984) points out that ergonomic modifications in the typical organization will pay for themselves in less than five years if a 3 percent increase in productivity is realized.

CONCLUSIONS

The purpose of this study was to examine some of the recent developments concerning the physiological and managerial aspects of library automation. Although the cycle of library operations automation was depicted as having four components, it should be emphasized that the components are interlocking and mutually supporting. That is, the organizational functions of operations and reporting affect, either positively or negatively, the staffing functions of the process. The staffing functions will affect the planning functions and so on.

In an earlier work, I have suggested that as automation processes in libraries matured, concern would move from technological considerations, to organizational considerations, to human considerations (Olsgaard, 1985). The literature of library and information science has a rich legacy of information on technological development and associated problems; it is currently building a corpus of material on the organizational impact of automation, but it has made little progress in coming
to grips with the reality of the personnel aspects of the process. The literature of the profession is still more concerned with making people fit machines than with having machines modified to fit people. The point of automation is not just to do what we have always done, faster. The object of library automation should be to do what we do, better and more productively. The profession generally has yet to discover that designing automated systems that will make the library employee's job easier and more rewarding is not only good humane policy, but will make good policy from a dollars and cents point of view.

REFERENCES


The Retreat as a Response to Change

JANICE KIRKLAND and LINDA S. DOBB

Library automation can cause dramatic changes in the workplace; new machines and new systems offer unique opportunities that challenge staff and accelerate the pace of everyday interactions. Such change, however fruitful, may also prove stressful as personnel are pulled in several directions, implementing new technology while maintaining normal work loads.

The need to examine organizational goals and prescribe new objectives for the continued good health of the work environment has therefore never been more important than it is at the present time—i.e., in the midst of a technological revolution. Possibly there is no better forum than a carefully planned retreat for reexamining present procedures and outlining new ones. In a setting outside the work environment, participation in library assessment and goal definition can prove beneficial for both the personnel involved and for the library, because those "who have invested time and energy in helping to mold a 'new organization' will naturally be more committed to the product of change if they have been involved in the process of change" (Azzaretto & Smith, 1986, pp. 18-20).

The two narrations which follow describe a retreat as a response to automation and a post-retreat goals assessment by the libraries of two campuses of the California State University (CSU) system. The first retreat, at CSU Bakersfield, was departmental and involved both professional and paraprofessional staff; the second at California Polytechnic State University, San Luis Obispo, was librarywide, but involved primarily supervisors from various library departments. Both retreats received essential administrative support and input.

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A Retreat on Quality of Work Life

The employees who are involved in a retreat may function loosely as a quality circle, analyzing problems, contributing ideas, and recommending possible solutions. At CSU Bakersfield, the entire retreat process was to be composed of five steps: planning and research, a preparatory film, the retreat itself, a written evaluation, and a post-retreat discussion with the Library Director, Rodney M. Hersberger.

Planning began with discussions during regular catalog and serials department meetings. We selected the umbrella topic of quality of work life and decided to combine general group participation with individual reports; everyone read for discussion at the retreat the same three basic articles (Martell, 1983a; Martell, 1983b; Martell & Tyson, 1983) from a series edited by Charles Martell on quality of work life and each person selected one aspect of quality of work life for a separate report. To avoid duplication, we compared report topics and sources, but there were no other restrictions on the material for the reports; each person could choose any appropriate readings to discuss or to use for handouts at the retreat.

The videocassette “In Search of Excellence” was shown two days before the retreat. Based upon the book of the same title (Peters & Waterman, 1982), the video covers in eighty-eight minutes the importance of people-centered management. The showing had been announced at a librarywide staff meeting and was attended by personnel from other departments as well as those planning the retreat. Although the film and book are intended for profit-making organizations, there is much carryover for the nonprofit sector in both philosophy and method. Such factors in the film as work climate, rewards for achievement, balancing productivity with creativity, sharing information, cooperating in problem-solving, and other aspects of a people-centered participative environment prepared us for the concentrated effort of the retreat itself.

The location of the one-day retreat was in the mountains eighty miles from campus, far enough from the normal San Joaquin Valley work setting to enable participants to view the scene of their usual forty hours of activity from an entirely different physical perspective and ideally from a different psychological perspective as well. Urban or rural settings may be equally effective for retreats as long as they provide a complete relaxed change from the usual workday surroundings. If enough time is allocated, recreational facilities for non-meeting times can be beneficial, and food should be served no matter what the length of the retreat.

Changing with Change

At the CSU Bakersfield retreat, after breakfast and a view of mountain scenery, the presentations covered an overview of the process of change, and the importance of good supervision and communication in
meeting the challenges of change in the workplace and maintaining good quality of work life.

The first participant to give an individual report provided an introduction which began with an analysis of the cultural framework for change and the way in which change occurs at the cultural level, drawn primarily from Thomas Kuhn's discussion of paradigm shifts and Alvin Toffler's assessment of the third wave information revolution (Kuhn, 1970; Toffler, 1981). The focus was then narrowed to examine the ways in which people are affected by (and can affect) the process of change, and discussion followed on the adjustments required of individuals caught in the midst of rapid cultural transition, linking change in the workplace to several job satisfaction issues.

In response to the question “Why is quality of the work environment a concern?” there were at least three key answers. First, the new technology liberates us in many ways to pursue meaningful personal agendas, yet the more automated our surroundings, the more we need and value human contact. John Naisbitt (1982) has characterized the two sides of this issue as “high tech/high touch” (p. 39). Second, in an information society, human resources provide the competitive edge; innovation is a uniquely human product best cultivated in a human environment. Third, as hierarchies give way to more informal organizational networks, an ensemble approach to problem-solving emerges, and the value of cooperation is enhanced as a central aspect of effective management.

Shifting from the theoretical to the practical, the next presentation investigated developing tools for improving the quality of work life. This involved examining intradepartmental and interdepartmental relations, particularly the role of the supervisor. Handouts aided in the identification of different managerial styles, and provided an awareness of the way in which styles differ from person to person. Such an awareness is vital in lessening conflict which is due to differing approaches to common goals.

Communication

A third presentation covered the essentials of communication as a factor in establishing and maintaining harmony in the work situation. Successful communication results when the receiver/listener interprets the sender/speaker's information as the sender intended: this requires good listening and speaking skills. We learned that when listening one must block out distractions, concentrate on the sender's verbal and nonverbal messages, and, most importantly, give feedback. If there is no feedback, there is no communication.

We discussed good speaking skills, agreeing that words are symbols and are always open to interpretation; that each person has her/his own expectations of a situation, and that each person selectively perceives those communicated items which he/she feels are most important.
Therefore when speaking it is best to keep it short and simple, and to orient the information to the receiver; if this is done, misunderstandings will be less likely to occur (Dellinger, 1980).

The sessions after lunch began with a presentation which dealt with quality of work life for student assistants. Since all of the paraprofessionals who were present supervised student workers, all of them recognized the improvement of student working conditions as a test arena for ideas which might later be applied to their own full time situations. The discussion was based on three articles on management of student employees in academic libraries (Cottam, 1970; Frank, 1984; Kathman & Kathman, 1978), and concentrated on three suggestions for improving student work life: management training for paraprofessionals responsible for supervising student assistants, better training and more extensive library orientations for new student assistants, and the development of a method of supportive supervision.

We concluded that more emphasis should be placed on conveying to each student an understanding of the individual’s particular role within the scheme of library operations. To this end, we discussed expanding new student orientations from technical services to encompass the entire library, and compiling a glossary of frequently used library terms, including automation terminology, to help new students understand library procedures and equipment which regular staff often take for granted. We also decided to use a checklist of all student duties in each department to record the breadth of training and level of expertise each student attains. As a long-range goal, we considered developing an orientation/training presentation on videotape to supplement or replace the existing personalized methods.

As a logical extension of supervision, we then looked at formal and informal authority, its limitations and utilization, and questioned ourselves about our own effectiveness as supervisors in a positive and noncritical manner.

Each retreat presentation was enthusiastically given and received; each ran over the time allotted, and was interrupted and followed by questions and discussion.

Finally, using material from D. L. Foster (1987), we discussed the decision-making process and identified the steps in that process—define the problem, analyze the problem, examine alternatives, reach a decision—in preparation for dealing with a specific problem presented at the conclusion of the retreat. This problem was to plan a cross-training program which would allow staff members to gain practical familiarity with the work procedures of library departments other than the departments to which they were regularly assigned.

Such training should promote better understanding of the library as a whole and provide trained backup personnel to help out in times of unusually heavy work load or personnel shortages. More importantly, it should also increase communication between otherwise separated segments of the staff, should expose staff members to the ideas and managerial styles of others, and should improve quality of work life by
promoting more personal contact in an increasingly automated workplace—i.e., high tech/high touch.

Retreat participants completed the day by putting together a flexible outline for such a cross-training program, tailored to the existing structure of the library and involving all departments. The outline was submitted to the director after the retreat.

**Evaluation**

During the week which followed, retreat participants filled out evaluation sheets covering their opinions of the preliminary film, the amount of time allocated for the retreat, the relevance of the topic of quality of work life, and the content of the individual presentations (see Appendix A).

In answer to the question, "What do you feel was most valuable to you from the retreat?" one person wrote, "I came away from the retreat with the feeling that my thoughts and suggestions are important and are considered as such." Another saw the retreat as an "opportunity to articulate ideals/goals/approaches and to discover the extent to which they are shared." A third said it provided a chance for "actively seeking solutions to problems, not just silently acknowledging them." They all viewed permission to hold a departmental retreat as important evidence of administrative interest in, and support for, an attempt to improve job satisfaction and the work environment.

The library director read the evaluations, submitted without names, before spending an hour with the participants in a post-retreat discussion during which he answered quality-of-work-life-related questions about space use, equipment budget, training funds, and the library policy on staff development.

He recommended that a follow-up meeting be held later in the year to measure progress on the plans made at the retreat. Because of staff turnover and a general library reorganization, no later retreat assessment was held at CSU Bakersfield, but participants felt that it was an experience worth repeating. Some of the ideas which had been explored were implemented: e.g., student assistant checklists and a glossary were compiled and used, and two persons attended supervisory workshops and shared what they learned there. Interdepartmental cross-training was begun on a trial basis using some of the suggestions in the outline compiled at the retreat and currently continues on a modified basis under the new organization. Much had been communicated at the retreat, and the retreat process itself was regarded by those who had taken part as a valuable type of participation in work environment examination which we had not previously tried.

The next section of this article, written by Linda Dobb, presents the goal analysis of a different retreat which was later reevaluated by its participants, how they did this reevaluating, and what resulted from the process.
In the summer of 1987, the Library Advisory Council of California Polytechnic State University, San Luis Obispo, decided to hold the library’s first retreat. The Dean of Library Services, David Walch, stated as its objectives, to become familiar with each department’s goals and to determine if any of these goals were at cross-purposes with each other or required special infusions of money and energy for their accomplishment (Walch, 1987). Each department head and representatives of the Staff Council and Librarians’ Council submitted goals for discussion. The two-day retreat was held at Cambria, a coastal resort forty miles north of the campus. During sessions on both days and even at breakfast, lunch, and dinner, the participants stated and analyzed for each other what they foresaw as their agendas to fulfill the mission of the library and the goals of their areas. Ten months later, a questionnaire (see Appendix B) was sent out asking each individual to evaluate how successful he or she had been in setting priorities and achieving or progressing toward those goals.

Not everyone responded to the questionnaire and some who did gave rather curt and cryptic replies. Generally, however, the replies made several things clear—as a group, department heads set realistic goals for themselves and most heads were satisfied that they had accomplished, or were on their way to accomplishing, their goals. On the other hand, where objectives crossed departmental lines, there had been less accomplished, and all retreat participants felt that follow-up could have been stronger, with goal reinforcement being a librarywide ongoing part of the process.

What Were the Goals?

The head of Government Documents stated as some of his goals at the retreat: “to improve the quality of the collection,” “to stimulate public interest and use of the collection,” and “to exploit available information handling technology for increased access to government information and increased efficiency of processing documents” (Kim, 1987, p. 1). He laid out a point-by-point plan for accomplishing the goals, including such processes as weeding, upgrading, advertising, exhibiting, and lecturing on the collection. Also planned was an investigation of possible online systems for processing government information.

Ten months later, this department head wrote that his goals had been deliberately realistic, practical, and capable of realization. He had not committed himself or the department to goals with which he did not feel comfortable, but in general he did not feel that goal-setting had been important to his department. His plans for action were not far-reaching visions of change but individual steps with a cumulative impact on his continuing objective—i.e., the satisfactory operation of the Govern-
ment Documents and Maps Department. Perhaps this department head was correct in perceiving that no radical change in direction or enlargements of scope were necessary for his area; this methodical goal-setting and tendencies seems to have been a prescription for success since seven months after the retreat the department received a citation for its excellence.

The head of the Learning Resources and Curriculum department similarly expressed realistic goals that were for the most part capable of fulfillment within the bounds of the department’s budget, staffing allocation, and other resources. Among these goals were: to finish conversion of resource material records to machine-readable form, to redirect the activities of a microcomputer center in the department toward a model for experimentation and testing rather than simply a station for use and instruction, and to appoint a librarian from the department as a consultant to the community’s teachers on instructional materials.

Ten months later the department head still saw these goals, now in the final stages of accomplishment, as practical and appropriate. Two other goals based upon library automation, however, were less certain of fulfillment; the first, which depended upon cooperation by other departments and realignment of the overall library budget, involved adding space to accommodate automation. The second was a matter of personal attainment, the redirection of professional time toward automation. Both goals were continually reassessed during the year but had not been achieved. Stating them as goals, however, seemed to remain important to the department head: “I think you can account more for your work when you have definite goals to strive toward. It helps one focus on what needs to be done now as opposed to later” (Brady, 1988).

The dean also set forth goals at the time of the retreat; among these were “to refine the library’s administrative organization,” “to provide increased office space for librarians,” “to integrate into the library automated procedures that would improve service,” and to improve external and internal library communications (Walch, 1988). He felt that these goals should be achievable through reviewing and modifying the organizational structure, husbanding funds for construction purposes, reviewing departmental goals for automation, and publishing external and internal updates on library events.

Looking back on his plans and activities of the previous ten months, the dean believed the goals to be realistic although not yet fully accomplished. The wheels are in motion; however, the wheels are moving at various rates of speed.” The dean’s goals were broad: restructuring part of the organization, creating space within a completed structure, and building a broader communications network for the library; they would also be far-reaching, affecting personnel, budget, and the library’s overall standing in the academic community. Perhaps it was the broad nature of the goals and the fact that they crossed so many
boundaries both inside and outside of the library that made implementation difficult. Additionally, achievement of a dean's goals might involve not merely taking concrete steps to an end, but might also entail reinforcement of a vision to those within the organization, an agenda much more difficult to accomplish.

The dean, in responding to the questionnaire, felt that there was a need for more formal review of departmental goals and their status. Indeed, almost everyone who answered the questionnaire felt that the discussion of goals during the retreat had been valuable, but that follow-through via subsequent discussion and coordinated action had been less strong. Most thought that goal-setting (even if one did not constantly refer to one's stated objectives during the course of the year) was of some use, but that organizational review was necessary so that we were not merely individuals identifying problems, but also a collective moving to solve them. With strong institutional reiteration of goals, interdepartmental problems, such as those involving space or automation planning, might be seen as priorities for all, resulting in a more united movement toward resolution.

**The Human Side of Goal-setting**

Unlike many of my colleagues, as head of the Cataloging Department, I did not achieve the majority of my retreat goals, but nonfulfillment was not a result of crossing too many departmental boundaries or of lack of institutional-level push. Analysis, ten months after the retreat, revealed that failure was perhaps the result of having unrealistic expectations, or of circumstances beyond my control, or, more importantly, of not considering goal-setting as a serious shaping of management style either at the time of the retreat or later.

As new head of a department which had always been production-oriented, I wanted to instill in the library assistants, who do the bulk of the cataloging, a sense that they could make an intellectual contribution to the public catalog. Automation, so heavily used in technical services departments, should free workers to spend mental as well as physical energy. I wanted us to explore the concepts of adding headings to accepted copy and questioning the appropriateness of preassigned call numbers in relation to the needs of the library's users. To this end, I held discussions with the cataloging department staff and routed articles (e.g., Dwyer, 1987) on improving catalog access points. Unfortunately, the discussions and source material served more to confuse the staff than to convince them of the need to read Library of Congress copy critically and bolster its effectiveness as a key to our collection. Staff members wanted to know if we weren't defeating the purpose of using national data, if we wouldn't be corrupting accepted standards, and if we could possibly maintain a demanding production schedule if we had to evaluate and change records commonly accepted as the best available copy. Despite my assurances that production would no longer be as critical as
thoroughness and that "corruption" can be acceptable, it has not been easy to convince the staff to manage the data which machines make accessible.

Another goal that seemingly eluded accomplishment was successful teamwork on materials. I had a strong desire to expand the range of cataloging capabilities available in the department to include classification skills for all library assistants, learned by working with experienced catalogers on projects of reclassifying individual sections of the collection. Regimented compartmentalization of functions, however, closely tied to the machines we used, seemed to defeat original work; as the year wore on, reclassifying remained strictly the duty of those who knew how to do it.

Finally, an accident altered the direction of the department work flow entirely and convinced me that setting goals in a heavily automated environment requires more than functional thinking: the datafile on our circulation system was mangled through circumstances almost entirely beyond local control. The inventory portion of the records was recoverable but unhappily the bibliographic portion, the portion built record by record over eight years of cataloging staff activity, was not. What was lost was not merely data but also confidence in the system of work that had produced the records, belief in the efficacy of automated systems in general, and pride in past accomplishments. The relationship between the departments which shared responsibility for the database also collapsed.

It should not have taken a crisis of these proportions, however, to make me realize that a most important goal for a manager in any environment, but particularly in an automated one, is to keep morale high and personal motivation for performing quality work paramount. My first priority should not have been the intellectual improvement of cataloging, but a willingness to try group discussion as a way of changing how the staff viewed their jobs. Expanding library assistant skills might expand production, but did they have in mind other changes which might improve overall work life? The accomplishment of day-to-day tasks is important but so is the spirit with which the tasks are accomplished. With a good spirit intact, an organization can more easily weather a crisis and cope with change.

What are Appropriate Goals in an Automated Environment

Most of the retreat participants stated as a goal the rather open-ended desire to integrate automated systems into all aspects of the library, but the objectives given as milestones on the way to this goal concerned machines and systems, not the education and motivation of the people behind them. This is a problem for many administrators and librarians who "become so engrossed in technology that the human side is often overlooked" (Rooks, 1988, p. 14). The library might have profited if the retreat had involved working on a long-range plan of
implementing coordinated automation for all departments, a plan which laid out specific objectives on both sides of the fence, human and technological. Among other people-oriented goals we might have established were a conscientious review of library organizational structure to accommodate the possible blurring of distinctive functions (Myers, 1986); a comprehensive plan for involving all areas of the library, and, perhaps, faculty outside the library in automation procurement and implementation; a librarywide policy of ensuring educational growth to expand staff awareness of change and to encourage creative input into the change process; and provision of a forum to discuss staff concerns on automation and the modifications it might bring in job design, work conditions, and organizational responsibilities.

Even without stating some of these human considerations as goals, the retreat recognized and instituted some measures that allowed group involvement. However, the ideals of a retreat, "to create a new organizational climate, help clarify organizational goals, improve overall communication, and involve all employees in the change process" (Cargill, 1988, p. 101), were only partially realized. We had the benefit of sharing departmental plans and the dean's vision for future efforts; had we but coordinated our designs, recognized a common theme, and foreseen the necessity of accommodating personal as well as functional goals, we would have derived more benefit from the retreat.

The library staff was unanimous in requesting a second retreat which was in the planning stage as this article was being written. It is planned for a similar resort-like setting and two-day period. This time, however, facilitators for the retreat are attempting to coordinate goals for the library and promote team building through reciprocal goal establishment. Each department has been asked to submit two goals on automation, one specific to the department or group represented, and another for the entire library. In this way, we are hoping to generate ideas that involve the entire staff in a common purpose and ideas which may take into consideration the human component common to all departments and groups. Additionally, each representative will be asked to suggest anonymously one goal for a department or group chosen at random. We are hopeful that this approach and the discussion of its results at the retreat will lead to a "team feeling" in the work of the coming year.

The facilitators are also attempting to provide after the second retreat a continuing followup, perhaps by including goal-tracking discussions in library council meetings. Part of the retreat agenda will be a discussion of milestones by which we can track progress, and use of departmental reports given at the biweekly council meetings as a forum for such tracking. Some departments, such as the Cataloging Department, are also scheduling their own retreats for group goal-setting prior to the library's management retreat and will schedule follow-up sessions to discuss progress in various areas or the need to establish new goals as changing circumstances dictate.
As the questionnaire revealed, feedback and a consistent reanalysis of goals as the year progressed might have helped the California Polytechnic library to profit more from its first attempt to step back from current operations and then move forward with a new awareness of our motivations. We are hopeful that through the exercise of reexamining our past experience and carefully shaping the next retreat, we can all share successful adaptation to an increasingly automated library environment.

**Summarizing the Retreat Concept**

As the two preceding narratives have brought out, the retreat is one effective method which the administration and staff of an automating library may choose for responding to technological change. As the number of machines surrounding us in the library workplace grows, and the variety of machines which we must master to remain in control of the information environment proliferates, the need for human contact and occasional refreshment by immersion in nonautomated surroundings likewise increases whether or not we are aware of it. Stress is caused by lack of control, actual or presumed; stress erodes library efficiency. To increase control of the automated workplace by improving planning and coordination, and to satisfy the need for human refreshment simultaneously, a retreat can be a very useful tool. Libraries of all types may borrow a page from business literature in which retreats have been featured frequently in recent years. “The four most important considerations when using a retreat as a means of facilitating change... [are] purpose, process, product, and people” (Azzaretto & Smith, 1986, p. 18).

A retreat must have a purpose, which must be understood by all of the participants: the purpose may be to analyze quality of work life, to set operational goals for a future period, to improve communication and relations between attending departments, or any of a large number of other worthwhile undertakings.

A retreat must be run by a defined process, or method of organization, so everyone knows what to expect. The process may include guest speakers, an externally procured facilitator, group discussions, brainstorming, question-and-answer sessions, structured and unstructured intervals, quality control circles, written exercises, prepared participant reports, or any process combination which seems desirable to the retreat organizers. The process may include evaluations during and/or after the retreat, both as a basis for assessing its short- and long-term effectiveness, and as a guide to planning future retreats.

A retreat must have a product. The product or plan which issues from the retreat must be realistic in terms of the environment in which it must be applied, and must be detailed enough to serve as a blueprint for action, yet remain flexible enough to be adapted to shifting situations and unexpected developments during the period in which it remains in force.
And finally, purpose, process, and product may be brilliantly conceived but, for a retreat to succeed, the most important resource is people. If participants regard the concept of the retreat favorably, and if it provides an atmosphere of openness and trust in which each person’s point of view is respected, they will be able to use the retreat as a forum for the solution of the problems which they bring there for examination.

A retreat may also serve both as an effective response to change in the library environment and as a source of change in the participants themselves. When members of a staff become jointly involved in analyzing problems and suggesting solutions, they develop a sense of commitment toward successful outcomes, and those who questioned the need for a first retreat may become the most enthusiastic proponents of a second one. Retreats can be rich and rewarding responses to technology.
Appendix A

Questions for an Immediate Post-Retreat Evaluation

1. How much time did you spend preparing for your part in the retreat? Was this enough?
2. Was the preparatory film useful?
3. Was one work day enough time for an effective retreat? Too much time?
4. How relevant was the topic “quality of worklife”? The three articles on QWL?
5. What is your opinion of the size and composition of the retreat group(s)?
6. What is your opinion of the presentations and related discussions?
7. What do you feel was most/least valuable to you from the retreat?
8. Would you support regularly scheduled retreats? If so, how frequently? If not, why not?
9. If you answered yes to question 8, what topics would you like future retreats to cover?
Appendix B

Questions for a Later Assessment of Retreat Goals

1. Looking back, do you think the goals you set for yourself and for your department were realistic?
2. Would you set different goals and priorities if you were establishing them today?
3. Have you been successful in realizing any of your short-term or long-term goals? If so, how has this been accomplished?
4. Have you put the wheels in motion for future accomplishment of some of your other goals?
5. Did you commit yourself to any goals which you wish you had not?
6. Do you find goal-setting a good tool for establishing priorities in your work?
7. Have you referred to any of the materials prepared for the retreat in the period since then? If so, which materials?
8. Have our follow-up discussions of issues helped the Library accomplish the goals set during the retreat?
9. Do you think the Library needs to reinforce the unaccomplished goals we set as a unit at the retreat?
10. Would you like to see the Library hold another retreat this year?
11. Additional comments:
REFERENCES


The Information Professional and the New Technology: An Investigation of Possible Differential Responses by Gender

Paul F. DuMont and Rosemary Ruhig DuMont

The study of professional careers in librarianship has gained considerable momentum in the past few years. Historically, theoretical and empirical work in the field has been somewhat limited in the variables chosen for study. A major portion of this effort has centered on the demographic characteristics associated with library positions (Heim, 1983; DuMont, 1985). For example, the male/female ratio in management positions in libraries has long been of interest to researchers in the field (Phenix, 1985). But recently, new conceptual frameworks developed to aid in the study of professional careers have expanded the set of variables useful to the explanation of career development.

This expansion includes exploring the linkages between libraries as organizations in unique environments and the careers of library professionals. Hiatt (1983), for example, describes the professional career primarily in terms of management skills that can be learned by librarians. His view emphasizes two equally important components. First, he prescribes an ordered sequence of management skills that can be learned by individuals in professional positions. Second, and perhaps more significant, Hiatt describes an assessment process that provides a mechanism for individuals to identify personal strengths and weaknesses including managerial skills. From this it follows that the development of career or job mobility is not only a function of learning skills but also of personally realizing that these skills can be parlayed into career advancement. Thus, mobility is contingent upon the self-assessment of individuals that they can indeed apply those skills in a work setting. Self-assessment, in turn, is partly determined by the organization’s structural and exogenous variables such as size or technology.
or the environment in which the library operates. For example, an individual may perceive an expanding or contracting financial base as encouraging or inhibiting opportunity to apply skills. Such an expanded definition of the professional career emphasizes the subjective aspect of job mobility—i.e., people's attitudes toward, perceptions of, and expectations about their careers.

As an exogenous variable, technology is exerting an increasing influence over libraries and professional careers. Recent advances in the use of computers and information technology have accentuated the importance of technology to libraries. Thus the present study explores the role of attitudes toward technology as a determinant of careers.

Conceptual and operational definitions of technology are many and varied. A simple definition states that technology is the set of "man-machine activities which together produce a desired good or service" (Thompson & Bates, 1957, p. 325). The complexity of technology is reflected in the distinctions made of technology types including:

1. Operations technology: the sort of equipment the organization uses in the performance of daily activities and the way the equipment is linked together;
2. Materials technology: the types of materials used in the workflow (note that human beings may be considered as "materials" in specific settings, e.g., patients in hospitals, students in schools, etc.);

An assumption included with many of these definitions is that technology is at worst neutral and at best essential to progress. This leads to a belief in what Wright calls "technological determinism"—i.e., that technological discoveries and applications occur according to their own inner necessity, from laws that govern the physical and biological world, and that they, in turn, unilaterally affect social reality. From this perspective, human beings have few alternatives in their response to technology besides enthusiastic or resigned acceptance (Wright et al., 1987). Wright et al. identify critics of technology who oppose this deterministic view. They view technological development as part of a pattern responsive to the cultural and ideological values of society and are particularly concerned with the ways in which new technologies serve to reinforce dominance based not only on class or race but on sex, age, and sexual preference (Wright et al., 1987).

In particular, the computer gender gap has claimed much of the attention of those who study the social impact of new technology (Sanders & Stone, 1987). Many research reports provide evidence of the gender gap. For example, Anderson reports that the gap between males and females taking programming courses actually widened between 1978 and 1982 and the Project of Equal Education Rights tells of surveys on computer course enrollments in California, Maryland, and Michigan which discovered a 2:1 ratio in favor of males (Sanders, 1986). Other
studies show that women are more afraid of computers than are men and that women also believe that other women feel the same way (Dambrot et al., 1985). Such sex differences in attitudes toward computers are shown to be strongly established by grade 8. At that stage, males are consistently more positive about using computers than are females and more likely to express interest and pleasure in using a computer (Collis, 1985, p. 209). Advancing to secondary school, male dominance in computer use exists in a substantial proportion of schools (Becker, 1986). In addition, males are much more likely to seek out extracurricular training in computer programming than females; the disparity between females and males increases with age, is greater in advanced than in beginning classes, and is larger for expensive programs (Hess & Miura, 1985). Only one recent study appears to contradict these findings. A 1987 study at the University of Michigan shows that, although male students were purchasing more computers, more females were planning to take computer classes (Michigan Study, 1987, p. 15).

CAREERS IN LIBRARIANSHIP AND TECHNOLOGY—
AN EXPLORATORY STUDY OF GENDER DIFFERENCES

In the present study, it is suggested that certain boundaries may be set on librarians' career movement by the actual need (or even by a perceived need) for specific technological skills to enter into selected positions. Perceptions and attitudes toward technology can thus affect individual perceptions of career choices. Specifically, aspirations to advance into management positions may be affected by the view that technological expertise is necessary for such advancement. Attitudes about technology thus may impact career aspirations in general. The hypothesized view holds that women librarians are less interested in technology than men and thus this difference in attitude may be the one reason inhibiting female mobility into managerial positions. If this difference in attitude exists, a self-selecting process may be at work leading to a higher proportion of men interested in technology who are in management settings because of a more positive male disposition toward technology. This study is exploratory in nature since there are limited theoretical bases for these hypothesized relationships (Bailyn, 1987).

Because there is a paucity of information available on the impact of technology on career perceptions or the psychological impact of technology on the workplace in general, it was decided to conduct a small-scale pilot survey study to examine the relationship between motivation to manage (MTM) by professional librarians and their attitudes about technology. The concept of motivation to manage has been discussed previously in the library science literature (Swisher et al., 1985). One conclusion of that research is the suggestion that female librarians, although motivated to manage, may not be opting for top administrative positions in the same proportion as males because they do not see
themselves capable of such positions. The basis for the present research is to test that perception in relation to technology.

**HYPOTHESES: TECHNOLOGY AND GENDER**

From the discussion presented earlier, three hypotheses were derived. They concern the relationships among interest in technology and motivation to manage and gender. First, it was hypothesized that MTM and interest in technology would be consistent—i.e., high levels of motivation to manage would mean that high interest in technology would also be present. Hypothesis 1: Motivation to manage is positively correlated with attitudes toward technology (AT). Second, it was hypothesized that those individuals already holding management positions would have a high interest in technology. Hypothesis 2: Persons in managerial positions have stronger positive attitudes about technology than persons not in managerial positions. Third, since it was expected that there would be more men in the sample than women who held management positions, high interest in technology and high MTM scores were projected to be predominantly male characteristics. Hypothesis 3: Males have higher MTM and AT scores than females.

**METHOD**

*Sample*

The sample used in this study consisted of 105 members of the Ohio Library Association (OLA). These 105 members were selected on the basis of their probable association with an academic library since they listed an academic library affiliation for the 1987 address list.

A two-wave mailing of a composite questionnaire generated seventy-one usable responses for a 67.8 percent return. Since our interest in this study was in academic librarians, the seventy-one respondents were categorized as being employed full-time in an academic library ("academic librarian") or as "other." This generated a second smaller pool of responses of fifty-seven or 40.4 percent.

*Data Collection and Analysis*

A 135 item composite questionnaire was sent in two mailings to selected OLA members. The composite questionnaire was accompanied by an explanatory letter on Kent State School of Library Science stationery and a stamped return envelope.

The composite contained two separate questionnaires, both of which were previously developed and separately reported in the literature. Motivation to manage was measured using the forty-item multiple choice version of Miner’s Sentence Completion Scale (Miner, 1977). The form adopted had been previously modified to remove gender bias (Swisher et al., 1985). Attitudes toward technology were assessed by using the seventy-six item Resistance to Technological Innovation in
Libraries Instrument (Fine, 1979). This latter instrument was modified only to the extent that items (questions) with similar response scales were grouped together. This resulted in five "checklist" scales being removed from context and placed at the end of the composite instrument.

Before the tests of the hypotheses are reported, it should be noted that the attitudes toward technology scale used in this research is not separately identified or reported by Fine (1979); this scale is a subsection of the Resistance to Technological Innovation in Libraries Instrument. Fine's research focused upon identifying personality factors associated with resistance to technological change. Thus, Fine's instrument contains many items assessing personality dimensions such as "locus of control" and higher order needs (achievement, affiliation, dominance). For Fine's instrument to be useful to this project, the items associated only with attitudes toward technology had to be separated and evaluated.

To accomplish this, both authors and a graduate research assistant identified the items that clearly assessed technological attitudes. Consensus resulted in thirty-five items being identified in Fine's instrument as relating to technology. Four of these were checklist items not capable of being added to the scales used in the remaining items. Thirty of the items used a five-point anchored Likert-type scale from "strongly agree" (+5) to "strongly disagree" (+1) and also included a "no opinion" option (0). One question, concerning future budget allocations for technological improvements, used a different five-point scale which was compatible with, but not identical to, the Likert type scale illustrated earlier. Because of the small size of the sample and the large number of items on the four checklist questions, these four questions could not be subjected to rigorous statistical procedures such as factor analysis. For these reasons (scale incompatibility and small sample size) these four items were not included in the instrument used here to measure attitudes about technology.

Another problem faced in this research concerned the scoring of the various items. Fine does not report whether items are positively or negatively related to technological attitudes. In fact, Fine does not report scoring protocols for any items or any statistical analysis of the instrument (validity or reliability). The original questionnaire was not tested for validity, reliability, or generalizability (Fine, 1979). The Fine questionnaire was used anyway because it is the only one of its type to measure attitudes about technology held by librarians. Thus, the two authors and research assistant again used "face validity" to judge whether positive or negative scoring was appropriate.

Participants recorded responses directly on the questionnaire. Responses were transcribed to the Kent State University IBM mainframe computer for analysis. Standard statistical routines (as available under SPSSX) were utilized for data analysis.
The seventy-one returns were used in two ways in this research. First, the entire pool of seventy-one returns was used to test hypotheses and to establish the AT scale reliability and internal consistency. The pool was then reduced to the fifty-seven responses from full-time academic librarians and the same tests repeated. Both procedures were used because the size of the study's data pool was so small.

Demographics

The full pool of seventy-one responses was split 36.6 percent male (26) and 60.6 percent female (41) with two "nonresponses." Fifty-seven academic librarians constituted the largest group (80.8 percent) with fourteen others responding. (Demographics of academic librarians are reported in detail later.) Thirty-three (46.5 percent) reported having managerial responsibilities while twenty-nine (40.8 percent) did not, and nine did not respond to the determining question.

The fifty-seven academic librarians represented a cross section of academic libraries. The respondents were mainly from educational institutions which offered degrees through the doctorate (59.6 percent) while 12.3 percent worked at institutions with a terminal master's degree, and 22.8 percent worked at wholly undergraduate institutions. Three returns (5.3 percent) were blank. The size of the academic libraries represented in this sample was measured by holdings and staff as shown in Table 1.

The predominant library represented had between 1 and 2 million volumes in the collection (38.5 percent) and had a staff in excess of twenty-five full-time professionals (35.1 percent). The academic librarian respondents were split 40.4 percent males and 59.6 percent females. Individuals working primarily as professionals with supervisory responsibilities (45.6 percent) considered themselves to be administrative staff (43.8 percent) rather than functional staff and had budget-making authority (50.9 percent) (see Table 2 for more details).

Experience in the profession and in the current job was reasonably distributed (see Table 3). The typical respondent earned $35,000 or more per year and was forty years of age or older (see Table 4).

Results

Hypotheses

Face validity for the individual items in the AT scale was established as discussed earlier. Thus, when read, the individual questions do appear to measure a person's attitude toward technology. Internal reliability (the consistency with which individuals respond to related questions in the same scale) of the AT scale was very good with a Cronbach's Alpha of .817 and a Spearman-Brown coefficient of .739 for the full respondent pool \((n = 65)\). Similar measures for the academic librarians \((n = 53)\) were marginally higher at .832 and .777 respectively.
TABLE 1
SIZE OF ACADEMIC LIBRARIES REPRESENTED

<table>
<thead>
<tr>
<th>Collection Size</th>
<th>Percentage of Respondents (n = 57)</th>
<th>Number of Full-Time Professionals on Staff</th>
<th>Number of Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage of Respondents by Size of Library</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 100,000</td>
<td>24.6</td>
<td>28.1</td>
<td>Under 5</td>
</tr>
<tr>
<td>Between 100,000 and 1 Million</td>
<td>24.6</td>
<td>21.1</td>
<td>5 to 15</td>
</tr>
<tr>
<td>1 Million to 2 Million</td>
<td>38.5</td>
<td>12.3</td>
<td>16 to 25</td>
</tr>
<tr>
<td>Over 2 Million</td>
<td>8.8</td>
<td>85.0</td>
<td>Over 25</td>
</tr>
<tr>
<td>Not Reported</td>
<td>3.5</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2
RESPONDENT JOB CHARACTERISTICS

<table>
<thead>
<tr>
<th>Position</th>
<th>Percentage</th>
<th>Functional Area</th>
<th>Percentage</th>
<th>Budget Authority</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Para-professional Administrative</td>
<td>1.8</td>
<td>Technical Services</td>
<td>8.8</td>
<td>Yes</td>
<td>50.9</td>
</tr>
<tr>
<td>Non-supervisory Professional</td>
<td>29.8</td>
<td>Reference</td>
<td>15.8</td>
<td>No</td>
<td>45.6</td>
</tr>
<tr>
<td>Supervisory Professional</td>
<td>19.3</td>
<td>Cataloging</td>
<td>14.0</td>
<td>No Response</td>
<td>3.5</td>
</tr>
<tr>
<td>No Response</td>
<td>45.6</td>
<td>Administration</td>
<td>43.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.5</td>
<td>Special Collections</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Response</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Hypothesis 1 states that motivation to manage and attitudes about technology will be positively correlated. A correlation (Pearson's $r$) of .414 between MTM and AT scores ($n = 55$ complete cases for the full response pool) was highly significant ($p = .001$). When singled out, academic librarians also reported a highly significant correlation between these scores ($r = .442, n = 47, p = .001$). Thus, Hypothesis 1 is supported.

Hypothesis 2 predicts that librarians in management positions will have stronger positive attitudes toward technology than nonmanaging librarians. Comparisons of the distributions of AT scores between managers versus nonmanagers yielded marginally significant differences in the distribution of the two groups (chi square) for the full pool of seventy-one responses. Nine managers reported either very low or below average AT scores compared to twelve nonmanagers. In a similar manner, seventeen managers rated as above average or very high compared to only seven nonmanagers. However, a comparison (t-test) of the
TABLE 3
RESPONDENT EXPERIENCE

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percentage of Total Libraries</th>
<th>Percentage of Present Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under One Year</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>1 to 5 Years</td>
<td>5.3</td>
<td>21.1</td>
</tr>
<tr>
<td>6 to 10 Years</td>
<td>28.1</td>
<td>33.2</td>
</tr>
<tr>
<td>11 to 20 Years</td>
<td>29.8</td>
<td>28.1</td>
</tr>
<tr>
<td>Over 20 Years</td>
<td>31.5</td>
<td>12.3</td>
</tr>
<tr>
<td>No Response</td>
<td>5.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TABLE 4
RESPONDENT CHARACTERISTICS

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
<th>Salary ($)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Under 5,000</td>
<td>1.8</td>
</tr>
<tr>
<td>20-29</td>
<td>5.4</td>
<td>15,000 to under 20,000</td>
<td>14.3</td>
</tr>
<tr>
<td>30-39</td>
<td>21.4</td>
<td>20,000 to under 25,000</td>
<td>17.9</td>
</tr>
<tr>
<td>40-49</td>
<td>33.9</td>
<td>25,000 to under 30,000</td>
<td>12.5</td>
</tr>
<tr>
<td>50-59</td>
<td>28.6</td>
<td>30,000 to under 35,000</td>
<td>12.5</td>
</tr>
<tr>
<td>60+</td>
<td>10.7</td>
<td>Over 35,000</td>
<td>41.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

AT mean scores contrasting managers against nonmanagers was not significant ($t = -0.99, p = .324, df = 55.5$). Data for the academic librarians alone yielded the predicted (but not significant) results. Twelve nonmanagers compared to seven managers scored low, while only five nonmanagers compared to twelve managers achieved high AT scores. This grouping (chi square $= 4.099, df = 2$) approached significance ($p = .1290$). More important, a comparison of AT scores of managing versus nonmanaging academic librarians also approached significance ($t = -1.37, p = .176, df = 53$). These data provide marginal support for hypothesis 2.

The third hypothesis suggests gender differences with males scoring higher on MTM and AT measures than females. Again $t$-tests of means were used. However, this hypothesis was not supported. Both the full pool and the reduced pool of academic librarians yielded insignificant comparisons (see Table 5 for $t$-test values).

DISCUSSION

Previous research has established several relationships between a variety of variables and the professional academic librarian's career. Most notably, family background and personal characteristics such as age, marital status, and educational attainment have been examined in relation to library position held. Other characteristics were examined by
Irvine (1985) including mobility patterns, career history, the availability of role models and mentors, professional activities, and publication record. The striking nature of Irvine's findings is that women who make it as administrators are not unique or special. They display many of the same characteristics as their male administrative colleagues. Female administrators are mobile and obtain varied experiences as middle managers. Other studies show female administrators to have similar levels of interest in managing libraries as their male colleagues (Swisher et al., 1985). In fact, when these studies are compared using such instruments as Miner's Motivation to Manage Questionnaire, there seems to be little interest in management among professional librarians. This characteristic applies whether the professional librarians are administrators or not and whether they are male or female.

Why then do women fail to occupy upper-level managerial positions in libraries in proportion to their numbers in the profession? The current study examines the potential explanatory power of attitudes toward technology as a determinant in the lack of women in top managerial ranks. Hypothesis 1 which establishes a correlation between motivation to manage and attitudes toward technology is strongly supported. Hypothesis 2, which projects a strengthening of attitudes toward technology by the holding of managerial positions, is not supported by statistically significant results. The statistical tests do, however, approach significance (see Table 5).

Thus, attitudes toward technology can be posited as a variable which might intervene in the career paths of women if a strong gender bias can be demonstrated. However, hypothesis 3, which predicts a gender bias in attitudes toward technology, is definitely not supported. This finding suggests that attitudes toward technology cannot be used to explain gender imbalance in management positions in libraries.

The authors would be remiss, however, if they did not advise caution in the interpretation of these results. This study was limited to members of the Ohio Library Association who appeared to be working in academic libraries. The full pool of seventy-one responses and the qualified pool of fifty-seven academic librarians is not a sufficient base upon which to draw sweeping generalizations for the profession at
large. This study, because of the limited sample, should thus be considered as only a pilot study.

Another caution concerns the instrument used to assess attitudes toward technology. While the instrument items have obvious face validity, this is not sufficient in and of itself. Further study needs to be done to establish construct validity through concurrent validation with similar instruments such as computer anxiety questionnaires, etc. In addition, the stability of the instrument has not been established although internal consistency measures are very good.

Clearly, more research on the personal and organizational determinants of job mobility of males and females in the library profession is necessary before researchers will have sufficient knowledge upon which to construct models of career mobility. The present study suggests that technology is not a significant variable in the career paths of library managers. Other unknown factors must be impacting on job movement. Once factors impacting career development are more commonly recognized, there may be some impetus for the control of those organizational and personal factors important in the development of career paths for both male and female librarians.

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The Impact of the Library "Intrapreneur" on Technology

KEITH M. COTTAM

Innovation, creativity, and entrepreneurship are words which describe one of the most important organizational development and management trends of our time. The concepts they represent permeate "pop-management" literature and attract the interest of scholars, business philosophers, and management commentators (see Marcae, 1976; Naisbitt, 1982, pp. 145-49; Drucker, 1985; Kiam, 1986; Miller, 1986; Warner, 1987). Practitioners examine the ideas for their potential to encourage change and distinction in organizations. For example, the theme of the ACRL for 1987-88, promoted by Vice-President/President Elect Joanne R. Euster (1987), was "Fostering Creativity and Innovation." She launched the year by inaugurating an "Innovations" column in *College & Research Libraries News* and capped the year with her president's program at the ALA 1988 Annual Conference in New Orleans on "Creativity in the Workplace: From Conception to Application."

There are even specialized centers for the study of creativity, innovation, and entrepreneurship. The Center for the Study in Creativity, State University College, 1300 Elmwood Ave., Buffalo, NY 14222-1905, fosters ideas and information for understanding and using personal creativity, for facilitating creativity in others, and for structuring situations for innovation. The Center for Entrepreneurship, Wichita State University, 008 Clinton Hall, Campus Box 147, Wichita, KS 62708, is committed to promoting an environment that encourages private enterprise and seeks not only to preserve, but also to enhance entrepreneurial activities and risk-taking.

But in organizational settings the concepts are often difficult to apply. Even though people may have a desire for looking at new ways to
put resources to work more productively, they are often frustrated by situational constraints, as well as the obstacles inherent in a would-be innovator's personality or ability to engage in a problem-solving process. A creative thinker in an organization who does come up with an innovative idea is often blocked from acting on it—i.e., kept from being an entrepreneur and kept from purposefully working to see that a creative idea becomes reality. An independent entrepreneur, on the other hand, would simply sidestep roadblocks in personally planning, financing, building, and managing a new enterprise designed to meet a particular need. Entrepreneurship in the traditional sense does not fit well in the thinking of bureaucratic organizations.

But most of the characteristics identified with entrepreneurial behavior will work in organizational life with a little accommodation and adaptation of the concept. Knowing how to innovate in an organization is a key to embracing entrepreneurship, and having a model to work from will lay out a pattern for action. First, in order to bridge the gap between the denotation constraints of the term entrepreneur and its application, a new concept was developed by Gifford Pinchot in 1978 and coined as "intrapreneurship." His ideas are popularized in Intrapreneuring: Why You Don't Have to Leave the Corporation to Become an Entrepreneur (Pinchot, 1985), and they were given international exposure in a 1982 Economist article (Macrac, 1982). Pinchot develops the thesis that organizations can encourage a climate wherein the entrepreneurial spirit will survive and an intrapreneurial environment will thrive. Intrapreneurs, however, must be "empowered" to act on problems and implement ideas with organizational support and funding. In Pinchot's philosophy he explains how organizations and intrapreneurs can interact to mutual benefit.

Pinchot's ideas are geared for application to research and development in industrial and corporate life, and librarians may find them at first a little alien. But they are wrong to dismiss them without some serious reflection on how they might be adapted. For example, Pinchot (1985) defines an intrapreneur as:

Any of the "dreamers who do." Those who take hands-on responsibility for creating innovation of any kind within an organization. The intrapreneur may be the creator or inventor but is always the dreamer who figures out how to turn an idea into a profitable reality. (p. ix)

He adds to this definition the ideas of "sponsors" (those who assist in removing or tempering organizational barriers) and "protectors" (those in higher levels of authority who approve and protect) (pp. 143-62). And without funding, intrapreneurial ventures are nearly impossible, so his concept of "intracapital" (a timeless discretionary fund for which the intrapreneur is responsible and from which money is available to turn dreams into reality) is designed to meet the need (pp. 276-98). In the corporate world, intracapital would be earned and built as a timeless fund through successful intrapreneurial ventures; in the
nonprofit sector, intracapital must generally come from set-aside budgets, grants, or other external funding.

There is room in these concepts and definitions for librarians and nonprofit library organizations. Librarianship needs intrapreneurial managers and staff who are dreamers. Libraries need people who can break with tradition and act to develop new roles and responsibilities, secure risk capital, co-opt emerging information technologies and develop new ones, and figure out new ways to make libraries essential in an information-based society. But how can a library step beyond the age of printed formats, traditional archival management, and bibliographic service to new ways of controlling, managing, and providing access to information? How can dreamers be given a chance to innovate in developing and implementing worthwhile ideas? How can a library introduce flexibility to fixed budgets, bureaucratic decision-making, delimiting policies and procedures, and rigid management processes? How can librarians learn intrapreneurial behavior? How can library organizations be encouraged to support the behavior?

In 1986 this author explored some of these issues and described certain librarian intrapreneurial behaviors (Cottam, 1987). The characteristics identified define librarian intrapreneurs as people who are both capable of seeing possibilities and acting on their ideas. They describe energetic, driven people who want to get things done, as well as people who are self-confident and secure in their knowledge, skills, and abilities as library practitioners.

A second survey by the author in 1987-88 sought to identify specific libraries and librarians who have used intrapreneurial activity to affect technological development. Inquiries were sent to the directors of eighty-six selected libraries, most of them members of the Association of Research Libraries. The selection was arbitrary but was based on the author's familiarity with the institutions or the directors. The letter described the intent of the survey and requested that a self-addressed, stamped postcard be returned with the name, title, and phone number of a staff member who might fit an intrapreneurial profile. Twenty-three directors responded, with fourteen sending possible contacts for the study. The response is considered favorable in view of the following description and the assumption that intrapreneurism in libraries—as defined or practiced—is just beginning. Documenting case studies of existing examples will help the profession understand its potential.
Several directors took exception to the idea of intrapreneurism and questioned the assumptions in the above definition. One respondent wrote, "the library administration supports this type of behavior in its normal procedures. It was even suggested (in considering the inquiry) that crazy ideas might receive better hearing than more traditionally sound ideas." Another wrote: "One of the real problems, of course, with intrapreneurship is that we administrators tend to welcome them when they are successful and castigate them when they are not, or when they create problems or conflicts with general library goals." Rather than embracing intrapreneurial activities, a few directors described their preference for innovative organizational approaches which use management groups, project teams, and independent, problem-solving committees to improve dialogue and communication, enhance motivation, prompt insight, and overcome bureaucratic obstacles.

Irene Hoadley, director of the Sterling C. Evans Library at Texas A & M University, described her perspective more fully.

There can be a definite hierarchy and still be creativity and innovation....Fostering creativity and innovation must be a part of the environment for it to occur. It must be a part of the fabric of the organization, and it must be encouraged in all staff, not just a few select people. Having pockets of creativity will create spot improvements while what is needed are ideas and concepts that contribute to the organization as a whole. Ideas must not only come from the bottom, they must also come from the top because that is a part of creating the environment. When the staff know that the director and assistant directors have ideas, many of which never get very far, that provides more encouragement for them. Another way of encouraging such an environment is by encouraging teamwork. Most major activities in the Evans Library are done by committees. It takes time, but people learn to work together and they feed on each other's ideas. This also includes letting individuals take on special assignments either for short or even longer periods of time....I do not want staff to bypass line authority or be completely independent. I want the organization to help nurture their innovations, not be separate from them. I want a strong organization, not a few bright spots in an overall dull organization. (I. B. Hoadley, personal communication, April 18, 1988)

Intrapreneurship, however, is not contrary to this point of view. It is an orderly way of looking at opportunity for innovation. Solving problems, developing new ideas, and managing projects that transcend tradition and organizational constraints is intrapreneurial activity, and the following cases reflect its potential in the area of technological development.

AN INTERLIBRARY LOAN RECORD-KEEPING SYSTEM

In 1982, William Van Arsdale, then the head of the William Robertson Coe Library Reference Department in the University of Wyoming Libraries and responsible for interlibrary loan (ILL), believed a new microcomputer-based ILL record-keeping system could be developed to...
replace the old card records and files. The manual files were cumbersome and required excessive amounts of staff time to maintain and use, even though they included essential ILL information. Copyright requirements had overburdened the staff and the record-keeping system, and at the end of each year the need to glean the file for activity data required several days of work from every staff member in the ILL unit.

For over a year the idea of developing a new automated system was frustrated at every turn: there was no sponsorship from superiors, there were no discretionary funds available, administrative sentiment was not convinced that an automated record-keeping system was necessary, and those in authority felt the idea probably would not work.

Van Arsdale persisted, and in 1983 there was an administrative change, and, after some discussion, he was encouraged to try to develop his idea. Funds were set aside for a microcomputer and peripherals, as well as for a contract with a local computer programmer to work with a team of people in the libraries to develop the program. There were no committees, no consensus building, and no reluctance to take a little risk. There was minor opposition from some staff members, but the idea had promise and others believed the idea would work.

The project proceeded to develop outside of the libraries' traditional hierarchy and organizational constraints, and today there is not one system but two: ILLRKS (borrowing record-keeping system) and LILLRKS (loaning record-keeping system). The ILLRKS program keeps track of copyright information, tracks costs, automatically handles OCLC requests through downloading, manages files (file number, patron data, main entry, OCLC transaction numbers), generates mail-ready ALA requests, prompts "forgotten requests" or requests which are not being filled, and generates statistics quickly in any time frame. The LILLRKS program keeps track of all loans by type of material (photocopies and books, as well as unfilled requests and charges), automatically maintains and loads into the program pending requests from the OCLC ILL system and prints a working log, shows borrowing library by code, prepares overdue notices ready for a window envelope, maintains active and inactive files, interfaces with a remote branch campus library ILL office, and produces statistics and management information on demand. (The systems are now marketed by Arnold Library Systems, Box 3912 University Station, Laramie, WY 82071.)

Reflecting on the ILL systems during a personal interview with the author, Janet Carlton, now the head of the ILL Department, noted: "There are plenty of good ideas from staff and administrators, but getting the ideas past the bureaucratic review, analysis, approval and just plain politics to the working level is the challenge." Those who worked on the project believe there are five main reasons why it succeeded: (1) the administration was open to the idea and willing to sponsor and protect the project; (2) people on the project were encouraged to think, dream, and act outside of normal organizational and
administrative processes; (3) the project was supported with funding, equipment, and staff; (4) the people on the project believed they had a better idea and were determined in their ability to develop it; and (5) the team felt “lucky” to have had a bright and perceptive consultant to work with the project.

**An Automated Library Instruction Program**

Susan L. Perry, the Olga Meyer and Alice Meyer Buck Librarian at Stanford University, shared the details of an intrapreneurial program developed by Deborah Murphy (S. L. Perry, personal communication, November 23, 1987). The project "BiblioMania" was developed in collaboration with the Faculty Author Development Program set up by Stanford’s Academic Computing office. The product is a software game for use with a Macintosh (512K, single disc drive, mouse) microcomputer to teach students how to select periodical indexes appropriate to their needs and then locate periodicals in the Stanford University Library. The project was supported in part by a grant from the Payson J. Treat Fund for Library Program Development, a Stanford University Library fund used to encourage innovation and change through the testing of new ideas or approaches. The financial support is a good example of intracapital funding.

Designed to be more than just a rote computer assisted instruction package on how to use periodical indexes, BiblioMania simulates the Stanford campus environment as much as possible using text, graphics, and sound. Although a player needs to follow a set series of steps to complete a game, the program allows flexibility and freedom to explore the complex steps involved in a library research process. The game is played by deciding on a topic to research, choosing a periodical index, selecting terms to search in the index, making a list of likely articles from the index, using Socrates (the online catalog) to determine library serial holdings, and using a campus map to identify the libraries in which to find the periodicals.

The continuously available, self-contained program cycles an "attract mode" across the screen of a public Macintosh near the reference desk to entice students to play. The game format itself is a cross between a standard Mac program and a video arcade game, and a score is kept during play. An automatic "time-out" feature returns the program to the attract mode if someone leaves in mid game. To reward completion of a game, a voice simulation utters congratulatory words and a high score graphic appears on the screen giving high scorers the chance to create a personal logo.

According to Deborah Murphy (personal communication, June 30, 1988), now the data archives reference librarian at the University of California, Santa Cruz, the project succeeded for several reasons: (1) the administration turned her loose with "great and abiding trust" to apply her energy and drive to the project; (2) there was freedom to think and
function creatively—few constraints were placed on the project; (3) essential funding was received to pay for equipment and the programmer on the project; (4) Murphy was not concerned about rewards or failure; rather, she was goal oriented, self-motivated, enthusiastic, and determined to develop a creative idea into a product with great potential; (5) the project was “lucky” to retain the right programmer; (6) Murphy received invaluable support and help from other library staff members who acted as a sounding board for new ideas in the project; (7) the interest of the library in technology promoted ties with automation experts across the campus; and (8) a catchy name for the project, BiblioMania, probably did a lot to market the concept. (“BiblioMania” is now a copyrighted product available through Kinko’s Academic Courseware Exchange. The latest catalog is available from Kinko’s Service Corporation, 255 West Stanley Ave., Ventura, CA 93001.)

**TECHNICAL INFORMATION SERVICES**

The Purdue University Libraries, formerly directed by the late Joseph Dagnese, cite a number of intrapreneurial projects (J. M. Dagnese, personal communication, November 11, 1987). Among them is an electronic bibliographic database on lodging and travel. “The Lodging and Restaurant Index” database, designed and authored originally by Judith Nixon, Consumer and Family Science Librarian at Purdue, has gone beyond being a local resource and is now a cooperative venture between the libraries of Cornell University, the University of Wisconsin-Stout, and the American Hotel & Motel Association’s (AH&MA) Consortium of Hospitality Research Information Services (CHRIS), a program of the AH&MA Hospitality, Lodging and Travel Research Foundation. (Further information is available from Omar Akchurin, database editor, AH&MA, 1201 New York Ave., N.W., Washington, DC 20005; Katie Lawrence, director, School of Hotel Administration Library, Statler Hall, Cornell University, Ithaca, NY 14853; or Phillip Sawin, collection development officer, Library Learning Center, University of Wisconsin-Stout, Menomonie, WI 54751.)

A second and unrelated venture has developed into the very successful Purdue Technical Information Service (TIS) coordinated by Gordon Law, head of the Management and Economics Library. Developed as a collaborative program between the Purdue Schools of Engineering and the libraries, with funding from the Indiana Economic Development Council, the TIS provides:

—dial-up access to the Engineering Information System (EIS), a computerized catalog and index to the Siegesmund Engineering Library which includes the tables of contents of thousands of engineering books in the collection;

—document delivery of sources found in the EIS;
—dial-up access to the Purdue Libraries Unified System (PLUS), the Purdue online public access catalog; and
—full client-centered professional information service.

Law explains the project as an outgrowth of the need to generally broaden the service role of the university libraries (G. Law, personal communication, July 1, 1988). His personal interest in the needs of technical information users “external” to the university fueled the initiative in an action-oriented way. He talked with people in Indiana and made connections with the corporate and engineering world around the state. He learned what corporations require to meet their information needs and how the Purdue University Libraries could respond using technology and a professional information service.

According to Law, response to the service has been exceptional and demand is beginning to outstrip the ability to meet the need. “A lot of luck was involved” in securing funding from external sources, he said, but “the recognition of the need to expand and adjust to new user groups—a vision of the administration to broaden the role and scope of the libraries—made the difference in how the project was supported and protected.” His own vision, coupled with his abiding belief in the project and the following significant factors, led to the continuing development of the TIS: (1) there was support for the concept and the project in the university at the vice-presidential level as well as from the library administration; (2) Law was given freedom to act in developing the initiative as long as he kept the administration informed; (3) the creative energy, along with responsibility and accountability for the project, rests with Law; (4) essential funding was secured to acquire the technology; (5) Law’s motivation was primarily goal inspired, achievement motivated, and oriented to personal satisfaction with his success in the project; (6) the project won the respect and acceptance of other staff members as a university libraries program rather than a personal project; and (7) the need for the TIS and its services and products pointed to the probability for success, and risk was minimized. (Further information is available from Gordon T. Law, Jr., Management & Economics Library, Krannert Building, Purdue University, West Lafayette, IN 47907).

AN AUTOMATED U.S. DEPOSITORY ITEM NUMBERS DATABASE

Margaret T. Mooney is the remarkable head of the Government Publications Department at the University of California, Riverside, and a notable intrapreneur. In 1984 she launched the “Depository Item Numbers Database” project and more recently began an experimental project with the electronic transfer of the automated database (M. T. Mooney, personal communication, June 8, 1988). Of the latter, Mooney (1988) writes:

This project, representing a pioneering attempt on electronic transfer of in-house databases between libraries, involves the participation of twenty
The Depository Item Numbers Database project is a creative idea implemented to enhance the control and management of depository collections (M. T. Mooney, personal communication, June 8, 1988). By converting the bibliographic information pertaining to depository items to machine-readable form, the database can be used to exercise powerful controls over the collection, resolve cataloging problems, automate the processing of depository shipments, and eliminate time-consuming manual files. With its multiple access points and Boolean search capabilities, the database serves as an effective tool for both collection development and technical processing activities, and Margaret Mooney reports that "potential applications of an automated item numbers database are literally limitless." The database contains bibliographic information for all active depository item numbers distributed (not just those selected by U. C. Riverside), which gives it universal applicability for all depository libraries. The impact of Mooney's intrapreneurism on this technological development is significant, and her outlook illustrates the intrapreneurial spirit and model. Here are excerpts from her own self-assessment of her intrapreneurial behavior (M. T. Mooney, personal communication, June 8, 1988).

She assesses herself as a "dreamer who dreams with pragmatic realism" and a curiosity to "seek out and entertain new ideas for improvement." She works "hard to explore the ways to transform them into reality." Through experience she has "learned to be tolerant of ambiguities and uncertainties" with an "eternal optimism" and "courage to forge ahead despite known obstacles." She is not particularly affected by external rewards; her motivation stems from personal satisfaction and achievement. She describes herself as having a "genuine interest and technical knowledge in the area of microcomputer technology," but she denies being a "technocrat." Her technical knowledge, however, has undoubtedly enabled her to take advantage of technology to enhance her professional role and functions. She notes specifically the following insights:

1. she is able to conceptualize projects that are technically sound and feasible;
2. she is able to communicate her ideas intelligibly to computer specialists and consult and work with them effectively to achieve project goals;
3. she is willing to dare to take calculated risk in embarking on pioneering projects;
4. she is able to articulate the value and the potential of an idea and to elicit institutional support; and
5. she is willing to share her ideas and expertise with others in order to develop their interest and knowledge in technological applications.
and to invigorate their enthusiasm and support for innovative projects.

Finally, Mooney states that "the symbiotic relationship that exists between my personal goals (or my commitment) as a librarian and those of the organization is a critical element which contributes to my ability to undertake innovative projects within the organization." She seeks to initiate projects which will be satisfying to her, beneficial to her institution, and significant in meeting identified needs. She enjoys the support and sponsorship of the university librarian, which gives her the freedom to think about and explore new areas, a freedom she believes "fosters creativity which leads to innovative projects." (Further information about the Depository Item Numbers Database program is available from Margaret T. Mooney, head, Government Publications Department, University Library, Box 5900, Riverside, CA 92517.)

These four cases illustrate the potential of intrapreneurship, a concept only recently defined and labeled and as yet generally unfamiliar to most librarians. But for people in organizations, intrapreneuring unfolds a way of thinking, understanding, and acting on creative ideas. It serves as a vehicle for developing innovative products, services, or procedures. As the author's work on the concept continues, other intrapreneurs and cases are being identified. (Additional cases are available from the author: e.g., Tony R. Kwak, head of the Learning Resources Division, Biomedical Library, University of California, Los Angeles, is a veritable center of intrapreneurism, including work with instructional technology ["SHOW Program" and "Problem-Oriented Instructional Media"] and management systems ["TIPS Program" and "ILL Invoicing System"]; Malcolm Getz, director of the Jean and Alexander Heard Library at Vanderbilt University, recognizes the intrapreneurial spirit in himself and others and works to foster it [Vanderbilt's "Enhanced Information Access Project" is a pacesetting online public access system]; and Donna Whitson, assistant director of libraries for outreach Services and coordinator for the Wyoming Intermountain Community Learning and Information Services [ICLIS] project, University of Wyoming, is challenging the traditions of academic library service for land grant universities with work on making technological and programmatic connections between informational resources and services and educational opportunities for rural residents. Other case studies are being developed and readers are encouraged to send the names, addresses, and telephone numbers of librarian intrapreneurs to the author.) From the study, guidelines and models are emerging which are useful for planning, designing, and acting on strategies to foster innovation through intrapreneuring. Even now a pattern is apparent; there are some essential characteristics common to library intrapreneurial activities.

—Librarian intrapreneurs share a personal profile described earlier by the author (Cottam, 1987).
Sound ideas, properly developed and presented, attract administrative support, trust, and encouragement.

Freedom to believe, dream, reflect and act is a hallmark.

There is an abiding belief in an idea which, if developed, will meet a need.

Reasonable funding is made available.

Other essential organizational resources are available—personnel, facilities, equipment, expertise, and personal networking.

Staff support is viewed as essential and it is cultivated.

Failure is not at risk (Cottam, 1988).

Traditional external rewards—salary and promotion—are not issues.

The right combination of resource support is often described as "luck."

The organization is receptive to innovation and productive change.

The cultivation of an intrapreneurial self-concept and spirit will increase opportunities for more successful professional performance. The development of organizational accommodation of the concept will encourage creativity and innovation. The impact of intrapreneurship on technological development can be significant.

REFERENCES


The Public and the Computer:
Reactions to a Second Generation Online Catalog

LYNN L. MAGRATH

The Pikes Peak Library District (PPLD) located in Colorado Springs, Colorado, is the home of Maggie III, a public access catalog (PAC). The original Maggie was a real person, the head of cataloging at PPLD. Not long after she retired, the library began automation of library records and named its new computer Maggie II. Maggie II was replaced in 1986 by Maggie III, a Tandem Computer with four four-megabyte nonstop TXP processors. This system is currently running approximately 300 terminals.

When Maggie II was replaced, so was the original online catalog created by in-house staff in 1981. The new public access catalog was developed by the Colorado Alliance of Research Libraries (CARL) and is now in use by libraries all over the state of Colorado. The transition to CARL software also resulted in a change in the software for the Community Information Files originally developed in 1978. The current eight databases employ the same software as the PAC to create a more powerful retrieval capability and the same search strategy as the PAC for the user.

In addition to the library staff, the “user” consists of both visitors to one of the two full-service library facilities or its eight branches and “home users.” Home users dial directly into the library’s computer from their home or office microcomputers. The presence of many high-tech firms and one of the highest education levels in the United States may contribute to the high number (between 3,000 and 4,000) of people who like to access library information (both bibliographic and community facts) in this fashion.

The Pikes Peak Library District has been a leader in the develop-
ment of online community information databases. To date PPLD has been unable to monitor usage of those files without burdening the user with a cumbersome protocol. Library staff are reluctant to impose such time-wasting steps on patrons, particularly home users. The survey on which this article is based provided a subjective picture of how often people access these information files and what types of information files they are interested in.

The information available to the home and in-library user online from Maggie III is the same. All of the databases can be searched by name or word (or string of words) or may be browsed through. Any specific search may be "saved" and tried in several different databases. The following databases are available online:

- **Public Access Catalog**: Contains information about the library's book, record, and video collections including checkout status and location of the item.
- **Calendar**: Lists events of interest to Colorado Springs residents that are usually cultural in nature. Information includes sponsor, type of event, date, and cost.
- **Agency**: Lists social service and community action agencies in the Pikes Peak region, including the contact person, phone number, eligibility requirements, and application procedure.
- **Club**: Lists clubs in Colorado Springs and El Paso County and includes information on contacts, memberships, and meeting times.
- **Courses**: Lists information about adult education and recreation opportunities in El Paso County. It shows courses by subject and includes name, address, phone number, and contact person.
- **Local Documents**: Annotated lists of documents from local government agencies. Most of the documents are housed in the Local History division of the library and include such things as City Council minutes, maps, blueprints, studies, and reports related to the Pikes Peak region.
- **Local Authors**: Lists all identified published authors in the Pikes Peak region.
- **Facts**: Contains miscellaneous facts from magazines, public hearings, Congressional hearings, and public opinion polls.
- **Senior Housing**: Lists facilities that provide various levels of care and alternative living situations for senior citizens in the Pikes Peak Region. Level of care, physical layout, cost, services, amenities, location, and eligibility requirements are provided for each of over 100 facilities listed.
- **CARL**: Provides access to the collections of the Colorado Alliance of Research Libraries including Auraria campus, Denver Public Library, Colorado School of Mines, University of Northern Colorado, the University of Colorado at Boulder, and Denver University.
- **Marmot**: Provides access to the collections of seventeen western slope libraries including Adams State College, Aspen Schools, Colorado
Northwestern Community College, Durango Public, Eagle County, Fort Lewis College, Mesa College, Mesa County Public, Mesa County Schools, Montrose, Pathfinder System, Pitkin County, Southwest System, Three Rivers System, Vail Public, Western State College.

In order to assess the level of use of these databases and assess the satisfaction of the library's two types of online users as well as providing specialized data needed by the Systems Division, it was necessary to use two different survey instruments. It is anticipated that Systems will eventually add the software which will allow the library to conduct this type of survey online.

**METHODOLOGY**

The two surveys were both conducted in May/June 1988. The Home Users Survey was mailed to 400 of the approximately 4,000 dial-up users. The response from this group was 32 percent (128 surveys returned).

The Public Access Catalog Survey was somewhat longer than the survey mailed out to home users and was conducted by the surveyors by approaching every person using the terminals at the two full-service libraries—Penrose and the East Library and Information Center. These surveys were conducted at random times and days, morning through evening.

While the response rate was much higher than can normally be expected from a mail survey without a second mailing, the in-house PAC survey return rate was much lower than expected. One possible reason for this is that people entering the building were asked to fill the survey out and return it before they left the building. We were making specific demands on their already allocated time. The home users, on the other hand, could fill the survey out at their leisure and return it without personal expense.

The primary questions to be answered by the survey were:

1. Does the PAC user (whether accessing the database from home or library) find what she/he is looking for?
2. Does the PAC provide the user a method of access which she/he perceives to be easy and quick to use?
3. Which Community Information Databases are most frequently used?
4. Are Community Information Databases more likely to be used by the home or library user?
5. Which of the databases currently under development have the most potential value for the general library user?
6. What other types of hardware or software would public library patrons like the library to develop or provide?
7. Does the users' frequency of use impact the results of their search?

**THE USER**

The profile of the in-library PAC user: he is predominately male
(50.4 percent of the respondents were male, 41 percent were female, 9 percent did not respond to the question). Only 20 percent of the respondents had a high school or lesser education. Some had masters degrees or had completed post masters work (19 percent). The rest of the respondents had some level of college education.

The home user survey provided less insight into the respondent as the demographic questions were deleted to keep the survey to one page. We can assume, however, that these users are relatively affluent as they all own their own microcomputers. The majority of them use the library’s databases between 4 p.m. and midnight. Of the dial-up users, 91 percent have a current library card, and 51 percent have had their library card more than three years.

**CURRENT AND POTENTIAL USE**

Frequent users for this survey are defined as: those home users who dial into the library’s computer at least once a week; and in-library users who use the PAC everytime they use the library. Infrequent users are those users who do not fall into the above categories.

All of the frequent users (home and library) reported that they use the public access catalog. Only 70 percent of infrequent users reported regular use of the library’s catalog. Frequent users are much more likely to use the Community Information Databases than infrequent users. The frequent users were two to five times more likely to use a community information database than someone who used the computer only occasionally. The ability to find the information sought was markedly higher for those people who use the databases frequently. Frequent home users were 30 percent more likely to find what they were looking for than infrequent home users.

**Items Found**

Of the in-house PAC users, 47 percent answered that they found everything they were looking for or more in their search on the PAC. Their actual count of items found in PAC totaled 62 percent of those searched. Another 40 percent of the respondents found some of what they were looking for. One might expect the in-house users to be more proficient in their search since library staff are available to help them. This was not the case, however, as 66 percent of the home users usually find what they are searching for in the PAC.

**Community File Usage**

The home user was most likely to access the CARL database (62.5 percent), the calendar of community events (58.6 percent), the FACTS database (55.5 percent), and the Club file (48 percent) on a regular basis than any other files. The in-library user was much less likely to use the information databases (all of them used PAC). After the “Help” information, the highest usage was 27 percent for the FACTS database, 20
percent Calendar, 19 percent Local Documents, and 19 percent use Courses at least occasionally. The interest shown in the databases then under development was not great for either the home user or the in-library user. The databases evaluated were:

—Socioeconomic: A database of current social and economic statistical indicators such as growth, etc.
—Electronic City Hall: A database which will provide information from city hall such as city council minutes and frequently asked questions regarding city operations, etc.
—Senior Housing: A database which will provide information on the variety of housing options available to senior citizens in our region.

Of the PAC users, 42 percent felt the Socioeconomic Indicators database would be somewhat useful. Of those responding, 35 percent felt the Senior Housing database would not be useful to them. As 71 percent of the respondents were over the age of 25 and might eventually be caring for their elderly parents, this was a somewhat surprising response. Only 1 percent of the respondents was over the age of 62. An even greater number of home users (63 percent) projected the Senior Housing database to be "Not Useful" to them. They, however, like the idea of the Electronic City Hall database.

CONVENIENCE

All users involved in this study were asked their opinion of the ease and speed of using the computer to access library materials. Home users were the most enthusiastic about the system, perhaps because of their greater sophistication in using it. There were 88 percent who reported it saves them time, 84 percent said it saves them trips to the library, and 92 percent said access from the home should continue to be offered (the other 8 percent did not answer the question). No one said this service should be discontinued.

There were reports that 74 percent of home users made a connection to the library's computer on their first try, another 14 percent were connected on their second try. This indicates a sufficient number of dial-up lines for the current number of users.

Only 14 percent of the home users reported that the computer's response time was not fast enough. As 14.6 percent of those responding were using 300 Baud modems, it is conceivable that their modems are part of the problem. Those using the PAC in the library (86 percent) feel that the computer is fast enough and 64 percent felt the steps to use the computer were easy to follow. Only 10 of the 139 respondents (7 percent) reported that they had to wait for a terminal. Of those ten, four waited less than two minutes; six waited three to five minutes. In previous visits, none of the respondents reported they consistently had to wait for a terminal. The in-library users' most frequently requested improvement was the ability to print the results of their computer search.
CONCLUSION

In spite of the fact that neither the home nor “in-library” user always finds what he/she is looking for in the PAC, both are happy with the convenience and speed of the Pikes Peak Library District’s online catalog. Usage of the community files by both in-library and home users was higher than anticipated, but the databases currently under development are of less interest to current users than anticipated. Overall, satisfaction with the public access catalog and community information files was high, but there is room for improvement in both speed and accuracy of records.

REFERENCES


Afterword

F.W. Lancaster

When the editor of this issue, Janice Kirkland, asked me to write a kind of postscript to the papers, I had only a vague idea of their scope. The title "human response to library automation" can be interpreted in several different ways. For example, it could refer to the perspective of the librarian or to that of the user of libraries. It could refer to response to projected automation, or to response to automation already in place. Finally, it could refer to attitudes toward library automation or to the effect of automation on organizational and individual behavior.

In fact, all of these aspects are touched upon at some point in this volume, and it is encouraging to see that the views of the library user are finally being taken into account. For many years it seemed that automation was looked upon solely as a convenience for the librarian and that too little attention was paid to its effects on the services provided.

If these papers fully reflect the present situation, and I am inclined to believe that they do, they suggest that rather little work has been done to study human response to automation in the library setting, and much of what has been done is more anecdotal than scientific or is based on surveys with very small numbers of respondents.

It is, of course, very difficult to study human response to library automation per se, controlling all the other variables. When studying use of, or reactions to, an online public access catalog, is one really looking at the automated catalog or merely at the catalog? Ideally one would like to study use of the card catalog in a particular institution and, at a later time, that of its online replacement, using comparable methodologies and populations of users. Unfortunately, such "before and after" studies have rarely been attempted.
Many of our conclusions on the effects of automation in libraries, then, while they may be entirely plausible, can hardly be considered scientifically proven. To take but one example, it is claimed that automation blurs the distinction between technical services and public services and brings into contact with library users more staff members who were previously behind the scenes. It is by no means clear that this trend is a result of automation or is merely due to a realization, long overdue, that behind-the-scenes staff may be more highly motivated and do a better job if they actually get to meet the people they eventually serve.

Another danger that exists is to assume that findings in other settings, such as large profit-making corporations, on the effects of automation can be transferred to the library arena. For example, has automation in itself brought about more participative management in libraries? I doubt it. One can readily see that computer conferencing and electronic mail, by allowing more rapid inputs to the decision-making process to be made by more people, may well promote participative management in a large corporation, particularly one having many branches that are geographically dispersed. It is much more difficult to see how automation promotes participative management in libraries, especially the smaller ones. This is not to deny that some level of democratization in management has occurred in libraries but merely to caution that this trend, while it has accompanied automation activities, is not ipso facto the result of automation.

This issue of *Library Trends* is stimulating and provides much food for thought. However, it does suggest that "human response" has not been uppermost in the minds of many of those engaged in library automation and that this aspect of automation deserves more of our attention in the future.
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