The Library: Center of the Restructured University

Patricia Battin

s Franklin Wallin, the president of Earlham College, observed in a recent article in *Change,* "Universities have not moved much beyond amazement at the cost and power of the technological engines that drive this shift [from an industrial society to an information-based society], the computers and telecommunications that can come up with answers in nanoseconds and transmit them to everyone around the world in minutes. We struggle merely to keep up with this technology in our universities. We have scarcely taken time to understand the educational implications of the change or conceive what a university might be like in the context of an information age."

For at least a decade, librarians have been very much aware of the revolutionary impact of developments in information technology. But the expansion of computer capabilities occurred at a time when research libraries were experiencing, for unrelated reasons, serious obstacles in serving scholarly needs. The traditional bonds between scholars and librarians have been substantially eroded, and librarians' efforts to reinvent the library in the electronic environment have often been actively opposed, widely misunderstood, or more generally, completely ignored by scholars and administrators. In addition, there appears to be widespread misunderstanding of the function of the research library in the process of scholarly communication and a pervasive misperception of the "library"

as no more than a storehouse for books. As often happens in academic institutions, symbols become enshrined in mythology and mortgaged to territorial jurisdictions, with the consequence that the basic function is obscured and overlooked.

Traditionally we have defined the library as a storehouse where librarians "mark and park," rather than as a place which has a scholarly information function within the university. The introduction of computer and communications technologies into the society were initially viewed as separate and distinct activities unrelated to the historic functions of the library. The traditional organization of the university into largely autonomous units further inhibited the recognition of the essential relationship between the new technologies and the information function of the library. In keeping with conventional organizational structures, university administrators departmentalized the function, establishing an organizational barrier between libraries and computer centers. For almost a decade, there was little recognition that advances in communication technologies were radically affecting the ways in which scholars communicate.

One of the most powerful deterrents to change in conservative institutions—and I think the educational institution is one of our society's most conservative institutions—is the existence of strong autonomous vested interests and the fear of losing one's empire. Universities are noto-

Patricia Battin is vice-president and university librarian, Columbia University, New York.

riously allergic to systematic, long-range planning efforts and have thrived for centuries on academic star-driven hiring practices and program development. Consequently, the capacity for the kind of substantial, integrated, long-range institutional planning required by the revolution in information and communications technologies is lacking in most institutions of higher education.

The weight of our historic traditions is such that we tend to find it very difficult to look at the future in terms of a vastly changed organizational structure. By asserting the need for continuation of historic entities, like the Library or the Computer Center or the Office of the Provost, the necessary creative vision is stultified. The challenge for us all is to look at the realities of the present and the forecast for the future from the perspective of disinterested, objective university officers and then to re-invent the university in the electronic environment.

I would like to analyze briefly the function of the library as we have known it historically, summarize some of the current activities in the library profession, and suggest the new capacities required by the modern university to continue to provide the essential level of scholarly information support. Such an analysis should provide an understanding of how best to organize the existing talents and strengths within the university to meet the new challenges.

The word "information" is a troublesome one. Academic librarians have always distinguished between "information" and "knowledge," and our basic philosophies and objectives have arisen from a commitment to the organization of knowledge and the support of continuing scholarship. Contemporary information managers and computer specialists tend to treat all information as data and are concerned more with the technical aspects of hardware and systems than with the substantive content of data and its influence on systems of organization, storage, access, and retrieval. I use the term "scholarly information" to define that subset of the information society which is vital to the university and to librarians as professionals historically concerned with providing scholarly support services.

TRADITIONAL ROLES AND SERVICES

Bill Ward, president of the American Council of Learned Societies, recently defined the ideal in library service from the scholarly perspective: "Scholars want what they want when they want it whether or not they know what it is they want." In the past, the university has sought to serve this fundamental need by maintaining bibliographically controlled archival collections of the printed record.

The traditional role of the librarian in the age of printed formats—books, journals, and microforms—has been essentially archival. The mission of the research librarian became the acquisition, recording, storage, and preservation of the intellectual record in printed form.

For over five centuries, the book has served as the uniquely useful method of storing and transporting text and images assembled by the mind of an author. For more than a hundred years in the United States, librarians and scholars settled into a comfortable framework of scholarly communication in which the library represented the essential link in the chain by mailing books available to scholars. The publication explosion, the rapid and inexorable expansion of knowledge and interdisciplinary research, the pressures of the "publish or perish" syndrome on the scholarly process, the demand for speed in information retrieval, and the radical changes in the financing of higher education, all combined two decades ago to begin to reduce the effectiveness of the traditional library in the scholarly process.

Traditional bibliographic services reflect the limitations of scholarly methodology of access to knowledge. In this era, the catalog served largely as the inventory of a specific collection of materials, and its records were linked to a specific location. Its usefulness as a scholarly tool depended upon the scope, size, and comprehensiveness of the collection it described.

The revolution in information technology has created, quite apart from difficulties caused by financial stringencies and publication explosions, totally new capac-

ities for generating, storing, and providing access to scholarly information—capacities which no longer represent or require links to physical objects in stationary collections. Communication among scholars has been liberated from the limitations of the printed page, and that liberation has brought with it the corollary demand for a new set of lifelines.

Universities are now faced with a dual challenge: we must provide new structures of access to knowledge in an increasing variety of formats and, at the same time, continue to preserve, manage, and make available scholarly information in the traditional printed formats with appropriate links between all formats.

It is essential to emphasize that the whole structure of our research activity in the United States, as we know it, is based upon the knowledge access structures conceived and built over the years by the library profession. Now it is quite possible that many of these activities are costly, outmoded, and do not deserve to survive the transition to the electronic age, but I think we must understand the actual function of libraries in the process of scholarly communication in order to insure a continuation of essential functions in the new environment.

The most striking feature of traditional academic organizations, and the one I believe is most misunderstood and ignored by our academic colleagues, is the virtual isolation of the library in the organization. Despite the rhetoric about it being "the heart of the university," the library and librarians have been for years isolated from the policy councils of most institutions. This isolation was possible because our present system of research support evolved from a tradition of autonomy, symbolized by the autonomy of the printed word. Public policies governing access to information and institutional structures implementing those policies reflect that autonomy. There is a kind of double-speak in this respect. The Library has been organizationally treated as an isolated, autonomous component of the institution. Yet, increasingly, its function is to provide integrated services on the local, regional, and national levels. The re-

sulting tension between the functional expectations and the organizational realities have contributed to the current perceptions of ineffectiveness and impotence.

The new communications technologies require new collective approaches which in turn demand radically different organizational structures to create and support such enterprises. The extreme frustration of the library profession is matched only, I believe, by the frustration and undeserved disdain of administrators and scholars for the library profession's perceived inability to cope with the new demands.

In summary, we have built during the past five centuries a remarkable and successful educational and research establishment centered around the book as the primary medium of scholarly exchange. But, despite the age of our system, we really know very little about how this process actually works or what we need to assist us in the task of re-invention.

NEW COMMUNICATION LINKS

The needs of scholars always have transcended local barriers, and, for the past decade, the library profession has been engaged in developing new communications links between the disparate components of our decentralized "national library." Although the Library of Congress often acts unofficially as a national library, it is precisely what its name implies—the Library of Congress—and all efforts to establish it as a truly effective national library, responsive to the needs of the national scholarly community, have failed.

The American "national library" is a decentralized system composed of the Library of Congress, the National Library of Medicine, the National Library of Agriculture, and approximately one hundred private and public research libraries located across the nation. In the new environment in which the bibliographic machinery no longer represents a mirror of a physical collection, librarians' efforts have been concentrated on ways 1) to provide new structures of access to new formats of knowledge no longer bound by physical and geographic constraints, and 2) to link the multiplicity of scholarly resources,

both print and non-print, into an easily accessible system which will eliminate costly duplication and the unacceptable isolation of individual scholars.

The complexity of a decentralized private and public research library system in the United States is further compounded by the emergence of powerful corporations in the for-profit sector which are seeking control of the "knowledge industry" and introducing the concept of fee-per-use of information. The fact that our copyright laws do not adequately address the issues of copyright protection and the ownership of information in the electronic environment creates additional difficulties. Within this context, there are several major efforts now in progress to provide rational, affordable, computerized information services for scholars.

The Library of Congress provides, via its MARC tape service, the records of its cataloging in machine-readable form. The LC Name Authority File also is available on line as are the bibliographic records from the Government Printing Office and the National Library of Medicine. There are three bibliographic utilities which distribute these machine-readable records to libraries across the country. In turn, the participation libraries, using varying standards, contribute bibliographic records with location symbols prepared for materials not yet recorded in the data base. The phenomenal growth of these data bases has resulted in a vastly increased capacity to share cataloging responsibilities and thus reduce local institutional expenses. The existence of these large data resources has revolutionized interlibrary loan capacities and made possible the potential for developing a coordinated national collection through new means of access to decentralized collections.

The two major bibliographic networks—OCLC and RLIN—provide information on a combined total of 18 million unique records for books, maps, manuscripts, periodicals, audiovisual materials, sound recordings, and music scores. OCLC maintains a large research and development capacity for the exploration of new technologies, primarily involving interaction between information seekers and computers (commonly referred to as "user-friendly" interfaces), electronic document delivery, microcomputer applications in libraries, and on-line catalog requirements. The corporation recently has announced its intent to commit a substantial portion of its research efforts to the development of a national communications service, including electronic mail and facsimile transmission capacities.

The Research Libraries Group (RLG) represents a focused effort by a number of research universities and their libraries to reshape information services for scholars. In contrast to OCLC, which is a mass-market driven enterprise, RLG derives its direction from the program needs of its owner-member research institutions. Perhaps its most dramatic achievement to date is the development of a computerized capacity to achieve bibliographic control of East Asian vernacular material. The development effort will permit computer supported creation, copy, amendment, search, display, and output of bibliographic records composed of East Asian characters. In addition to standard bibliographic services, RLG also maintains on RLIN several special data bases, including the Avery Architecture Index, SCIPIO (an index of art sales catalogs) and the Eighteenth Century Short Title Catalog. Plans are underway to create a special data base of bibliographic records for machine-readable data files in the humanities and social sciences.

At the present time, the utilities are not linked, thus creating serious access problems for scholars since institutional participation is usually limited to one utility. The Council on Library Resources, a privately funded foundation, launched some years ago a Bibliographic Services Development Program to help bring into existence a comprehensive, logically consistent, non-redundant data base of bibliographic records. To insure comprehensiveness, the data base must be built by a set of cooperating, contributing institutions adhering to a common set of standards. The element of non-redundancy requires the use of an authority file to record the entities that have been created according to the set of accepted rules. The

objective of this program is to create a widely available, cost-effective bibliographic record service that will incorporate the resources of the major shared cataloging services and provide access to a variety of bibliographic data bases in a manner transparent to library users.

For the past three years, the Library of Congress, the Washington Library Network, and the RLG have worked on a cooperative project funded by the Council on Library Resources to develop a standard network inter-connection which consists of a seven-layer communications protocol which will permit computer-to-computer communication. This project will be completed by the end of 1983 and represents an extraordinary example of library leadership in the application of communications technology for academic purposes. Plans are underway to develop the capacity to conduct bibliographic searches through the links with the ultimate objective of full-text transmission.

The relatively sudden availability of affordable personal computers promises another major revolution in research information services within the next five years. The new powerful microcomputers will have storage and retrieval capacities equal to the large mainframes of the past decade. Many American universities are planning the ''wiring'' of their campuses to support the demand by students and faculty for computerized information services. Both RLG and OCLC are planning technical architectures which will permit the orderly and effective decentralization of many currently centralized information services, and we are beginning to see the first efforts of the for-profit sector to market bibliographic information directly to the end-user, a phenomenon which transfers costs normally borne by the institution to the individual scholar on a per use cost basis.

But the technical systems represent only a capacity to communicate. The effectiveness of new systems of access to scholarly resources will depend upon the cooperative efforts of the university community to identify and develop the substance of new structures of access to knowledge, a process which will demand new organizational capacities in the university.

POLICY IMPLICATIONS

There are six major policy areas which will demand specialized and unprecedented attention from university officers during the next five years. In each of these areas, an organizational mechanism to draw together currently disparate components of the university is required for effective action.

1. *Centralized financial and technological planning.* The successful and cost-effective integration of the various information support services will require a centralized long-range planning capacity and a re-cast budgeting process to accommodate the following characteristics of the new services:

a. the archival obligations of scholarly information support services, regardless of format;

b. the introduction of high technology with its corollary built-in obsolescence;

c. the magnitude of the capital costs required;

d. the integration of services offered through book and journal collections, mainframes, microcomputers, and local area networks;

e. the provision of access for local scholars to external knowledge data bases, networks, etc.

2. *Integration of information services with academic programs and priorities.* In contrast to other ''information professionals,'' academic librarians have traditionally made substantial contributions to the organization of knowledge within the old structure of printed formats. The new formats will require similar efforts to build new access structures to knowledge and to work with scholars in identifying and defining the basic access structures in each discipline which must be mastered to enable informed judgments. More so than ever before, a university or college degree should certify a certain level of bibliographic literacy and competency in information sources in a particular discipline. There should be within the university a central capacity to assist the departments of instruction and research in the development of these skills.

3. *Access to scholarly resources.* As mentioned earlier, one of the major contributions of the library profession to scholar-

ship is bibliographic control over the printed record. A problem for computer data archivists today is the lack of attention paid to these issues during the early days of data collection by computer specialists and scholars.

The Roper Center estimates a five- to ten-year effort will be necessary to achieve the cataloging necessary to enable effective retrieval below a very broad descriptor level. We need to know a lot more than we do about the specific ways in which scholars will use on-line information sources, but we do know it will be essential to provide orderly and standardized retrieval mechanisms in considerable depth for archival collections in all formats. National agreement within the scholarly community on a variety of standards affecting cataloging activities, communications networks, and hardware capabilities will be essential to prevent both the unacceptable isolation of individual scholars and a generalized Tower of Babel.

4. *Electronic publishing.* The advent of electronic capabilities provides the university with the potential for becoming the primary publisher in the scholarly communication process. At the present time, we are in the untenable position of generating knowledge, giving it away to the commercial publisher, and then buying it back for our scholars at increasingly prohibitive prices. Universities have long served as publishers' distributors and warehousers and have served that role because of the perceived advantages in having a form of ownership control over purchased information.

The electronic revolution provides the potential for developing university controlled publishing enterprises through scholarly networks supported either by individual institutions or consortia. Increasingly, scholars are producing their work in machine-readable form. The lacking ingredient is the organizational capacity for on-line refereeing, editing, and distribution, as well as the necessary modifications in the process of assessing publications for promotion and tenure.

5. *Copyright and ownership.* Our present copyright laws essentially address the issues surrounding the ownership of printed formats. There will be substantial revisions during the next decade, with significant implications for educational institutions. Commercial publishers have been moving steadily during the past ten years to substitute a fee-for-use principle for our historic tradition of multiple uses of documents after their initial purchase. Computerized indexes and abstracts are now available both on a fee-for-use basis and in hard copy. When the publisher decides to discontinue the hard copy, the only access will be through the computerized service with monopolistic control over the fee structure held by the publishers.

The implications of information ownership issues arising from the basic conflict of information as a commodity and information as a public good are serious. It will be essential for the university community to develop a capacity for thoughtful, critical analysis of the issues accompanied by significant influence on public policy.

6. *Research and development in information technology.* Universities are faced with the unprecedented requirement of basic research in the very substance of their existence—information technology. In the past, the existence or absence of the capacity for cutting-edge research in a particular field threatened only the survival of a particular department or discipline in the institution, rather than the institution itself. Now that information is valued as a commodity in the society, competition with the private sector is unquestionably beyond the financial capacity of individual institutions of higher education. To maintain control over their own scholarship and to avoid becoming a hostage to the for-profit sector, universities must find a way to create and support the capacity for continuing research and development in the application of information technologies. Otherwise, the university will continue to lag behind the for-profit sector in the very area of its raison d'etre and be forced to adapt its research and instructional needs to the marketplace rather than control the application of appropriate technologies to support scholarship.

The Institute for Scientific Information is marketing a software package to provide individual searching of a wide range of bibliographic data bases. The software and companion data base management

package costs approximately $1000 per individual scholar and represents one such need. A university supported capacity to develop and maintain a variety of software tools for its students and scholars would be both cost-effective and enable the scholarly community to retain control over its information costs. In some ways, such a capacity is different only in kind from the long-standing traditional university production of textbooks and the card catalog; both are software aids for communicating and retrieving information. There are similar examples in the hardware field, where mass market appeal will drive the affordable availability of new technology.

The most important issue, to my mind, is the need for a cooperative, unified voice for scholarship—not just for science or humanities, or a voice for biomedical pursuits—but all scholarly endeavors. The new communications technologies will acquire an extraordinary and unprecedented cooperative effort to insure compatible, affordable, widely available access structures to knowledge, transparent to the users. The financial pressures on the higher education community will be intense as the for-profit sector seeks to gain control over ownership and dissemination of information as a commodity. If the scholarly community is to be effective in this unprecedented struggle for control over its life-blood, it must transcend its cherished autonomy and create organizational mechanisms which will support effective cooperative activities in its own best interests.

ANOTHER PERSPECTIVE

It may be useful now to review this analysis from a less objective perspective.

It seems that modern information and communications technology have destroyed the viability of the traditional organizational structure of the university as a collection of largely autonomous units based on historic disciplinary definitions. Although it is true that the library has not been central to the academic institution in organizational terms, its function has always been central to research and instructional activities. The definition of the library and librarian may be obsolete, but the function is critical to the survival of the university.

The library is the organizational unit within the institution which contains the nucleus of talent, expertise, and conceptual understanding of the process of scholarly communication. The profession of librarianship, which must expand to encompass its new responsibilities, is the obvious choice for leadership. Substantial elements of the new capacities needed by the modern university exist within the traditional library organization. They need to be strengthened, expanded, and enriched by bringing together under a principal university officer for scholarly information the various talents and functions scattered throughout the institution.

I am not defending a vested interest; rather, I am seeking to vest a new interest. It is unfortunately true that the library profession has not reformed itself rapidly enough to meet the new challenges—but neither have the scholarly disciplines. Because the profession is viewed as one of low prestige and lower salaries, we have failed to attract the necessary talent in sufficient numbers. We must not become unduly dazzled by the wonders of hardware, software, and the wizards of high technology to the extent that we jettison a rich and productive tradition of scholarly support because that particular profession does not, at this point in time, command the necessary depth and breadth of talent and respect.

The new organizational structure would mean that we can draw into an existing strength the talents and expertise of individuals newly committed to the management and provision of scholarly information services and create an institutional capacity to re-invent the university in the electronic age.