

Knowledge Access Management: The Redefinition and Renaming of Technical Services

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The context and environment for library technical services may be best described by the examination of influencing factors, which shape and direct these services. Of these factors, the dominant current forces – economic pressures (i.e.,

budgetary constraints), user expectations, and technology – affect how technical services are changing and converging, thus requiring a new definition and renaming. Knowledge access management is presented for consideration.

The need for redefinition and renaming

A renaming and a new definition for library technical services in the briskly changing world of libraries as information systems are urgently needed. The need for the redefinition and the renaming of technical services stems from these changes in libraries. A new paradigm for technical services both in terms of its organization and the functions performed is necessary due to today's context and environment. This paper reviews the historical framework and the factors influencing these changes and how together they constitute the evidence on which library technical services [1] should be newly defined and renamed. Of the factors that have influenced, shaped, and directed these services, there are three current forces – economic pressures (or, budgetary constraints), user expectations and technology – primarily responsible for how library technical services are changing and converging at present.

A clear shift has been apparent over the last two decades from adding physical materials (information on information) to offering the information *itself* or to providing access to information resources when online search services were of-

fered through DIALOG and other such online databases. A more definitive shift from housing holdings to accessing remote resources is evident more recently. The World Wide Web has begun to facilitate the delivery of Internet resources by bundling all different formats, such as text, graphics, and sound, in cyberspace. The conceptual shift from a supply-oriented to a demand-driven organization has stimulated a re-consideration and redefinition of the role for information professionals. The shift from passive information provision to active *knowledge access management* – an aggressive, new paradigm – must be undertaken if successful adaptation and adjustment of the profession is to occur in these changing environments.

For the next few years, it is evident that we face a time of accelerating change with new formats being introduced and added to the existing multiplicity of formats. Users' increasing ease in accessing recorded knowledge and information via Internet, never mind the avalanche of information and the concerns for authenticity and preservation, has accelerated this shift to the role of knowledge access manager. A knowledge access manager not only provides effective intellectual access to collections, but also places the

desired information into context and delivers it in customized and individualized packaging. Here the term, *collections*, is used in the widest possible sense embracing both internal and external resources. Internal resources include both tangible (books, videocassettes, etc.) and intangible (databases, electronic resources on CD-ROMs, etc.) materials owned and housed in the information system. External resources comprise both tangible and intangible types as well. External tangible materials are not owned by the system, but are available to the users through interlibrary lending and other resource sharing. External intangible materials (electronic resources, databases, etc.) are neither owned nor housed in the system, but can be accessed by the users.

Information technologies present a great potential for knowledge access managers to customize what we access and what we know according to highly individualized needs. Customized access is based on a professional knowledge of the resources as demonstrated in the resources' surrogates (i.e., the bibliographic records.) Knowledge access managers will provide this customization in the most appropriate presentation format for individualized information needs. This value-added service is especially expected of the knowledge access managers in corporate information systems where it is perhaps the fastest growing and first innovation seen in the profession.

A historical framework of technical services definitions

Understanding the term, technical services, presupposes the acceptance of two administrative units and functions [2] of services in traditional libraries: public services and technical services. Gorman (1979) humorously referred to these two species as "the sheep and the goats". Public services, on the one hand, involve direct contact with the users of the library as in such services as reader's advisor, reference, children's services, circulation, etc. On the other hand, technical services, according to Maurice F. Tauber and his successors, traditionally refer to a series of services usually occurring behind the scenes without direct public contact. Because these services revolved around file construction of some sort, they are a) selection, b) acquisition, c) cataloging, d) physical processing, and e) circulation (Tauber

1953). First proposed by Donald Coney (1939) and widely accepted during the debates concerning the relative merits of a separate technical services division in 1940s (Cohen 1949; Randal 1940; Swank 1948), library technical services has been in existence for over fifty years as an identified administrative unit (Tuttle 1976).

All the tasks in the library require knowledge of how the information in a library is organized. Understanding the various components of activities for organizing information and understanding the particular bibliographic control components in a technical services department at a local library will enhance this knowledge. However, as we examine a library as an information system, this definition of technical services changes rapidly during the 1980s and 1990s as seen in writings by Karen L. Horny, Michael Gorman, Sheila S. Intner and Gillian M. McCombs.

In defining technical services for the pre-automated environment of the 1950s, in the classic work on librarianship, *Technical Services in Libraries*, Maurice F. Tauber (1953) includes those "services involving the operations and techniques for acquiring, recording, and preserving materials." He further states that as "... the oldest aspects of librarianship," this service includes all work connected with some activity, such as acquisitions, cataloging, binding, photography, or circulation. Using the term *technical* denotes certain operations usually carried out away from the public service desks and more susceptible to specialized codification than those of the readers' departments. Tauber further defines operations as steps involved in performing the service whereas he defines techniques as methods used in executing the operations involved in a service. Tauber's concept of technical services, i.e., as a series of operations, susceptible to codification and performed away from the public desks, has been an accepted notion in the field for decades.

In the past decade or so, Tauber's definition of technical services with these two underpinning assumptions – operations susceptible to specialization or codification and operations performed away from the public desks – has been evolving due to some changed notions. These far-reaching changes have brought many different definitions of the term *technical services*.

For instance, Horny (1980) emphasized the notion of *access* in her definition of technical services

as “those services that provide access to information existing in some published form.” She further states that there are two major components of access for technical services. These are: (1) physical access, created through the process of acquiring, organizing, and labeling information packages; and (2) bibliographic access, which requires the creation of descriptive and subject tags to allow the eventual end users to select the information package they need. Although her definition still continues the Tauber traditions, Horny may be the first writer to clearly distinguish access in these two major components. Squarely emphasizing the role of access provided by technical services, she states that “all other aspects of library service depend upon the efficiency and accuracy with which this work is accomplished.”

Almost single-handedly for over two decades, Michael Gorman has been the most insistent and the strongest advocate of the holistic librarian to bridge the two divisions of library work – technical and public services. For instance, as in many of his speeches and other writings, Gorman (1979) states:

One finds catalogers who have a tremendous knowledge of the subject field in which they work, yet that knowledge is seldom or never used in reference work. Again, one finds reference librarians who disavow cataloging as a process and seem almost proud of their inability to grasp the basic concepts underlying cataloging and the most important and expensive tool in the library – the catalog.

Gorman recognizes “many and different definitions of the term *technical services* ..., complicated by the many and far-reaching changes in the nature of librarianship in the past decade or so” in his landmark work of 1990 and its revision in 1998, *Technical Services Today and Tomorrow*. Curiously, though, Gorman accepted a rather conventional definition of technical services for his book of 1990 and for his revised edition of 1998. His broad definition of technical services includes “all the tasks carried on in a library that are concerned with the processing of library materials in order to make them accessible to the users of the library” (Gorman 1998). Such processes include:

- ordering, claiming, and receipt of library materials
- cataloging and classification

- serials control
- database and catalogue maintenance
- marketing of processed materials
- shelving, [housing,] and retrieval
- circulation (charging, [retrieving,] and discharging)
- binding and preservation
- collection management
- budgeting and planning for these activities
- creating and implementation of automated systems*
- personnel work *
- accounting (other than acquisition accounting)*
- support services (mailroom, photocopying, etc.)*
- library administration*

(terms in [] indicate their addition in the 1998 ed.)

* denotes the inclusion in 1990 ed. but the exclusion in 1998 ed.)

Not included in this definition are:

- selection of library materials
- collection development
- reference and other user services
- instruction in the use of the library and its services.

Gorman’s definition appears to embrace the basic premise of Tauber’s definition, operations performed away from the public service desk and easily but especially codifiable operations. His list also includes new and emerging notions such as database and catalog maintenance as well as creating and implementing automated systems.

More recently a new perspective on technical services is emerging. For instance, the notion of confining technical services to activities *performed away from the public* is increasingly questioned and rejected. The new notion of technical services *in full display* for the public not only to watch but also with which *to interact* must be considered. According to Intner, the concept of “technical services” continues to change and evolve, and the appropriate education for technical services activities must evolve as well. As Intner correctly points out in her writings, technical services can no longer be confined to those activities done behind closed doors where contact with the public is minimal. Rather, technical services today embodies all those activities that involve or are dependent on a library’s bibliographic files and

services, and may indeed include contact with the public (Intner 1992, 1993). This statement of technical services, which embodies all those activities which are dependent on files and services in contact with the public, is an important idea to consider, and will have far reaching impact on the preparation of librarians and information managers who are effective in the new environment. In addition to her definition of technical services "as that set of activities performed without direct contact with the public" (Intner 1994), a definitive exposition of this new idea by such a richly contributing writer to library literature as Intner would be a welcome development. She appeases the idea of technical services embodying all those activities that are dependent on files and services in contact with the public by stating that:

Today's compleat [sic] librarian is expected to accomplish more than two librarians – one a technical specialist and one a reference specialist – might have done in an earlier time, albeit with the assistance of well-trained paraprofessional and clerical personnel and automated systems (Intner 1994).

The same definition of technical services appears in her 1997 writing as well (Intner 1997), since she made no attempt to redefine technical services when she addressed topics of technical services concern.

Gillian M. McCombs expresses a consistent theme in her 1991 publication, *Access Services: The Convergence of Reference and Technical Services*, as its editor (McCombs 1991), and in her other writings (McCombs 1986, 1992, 1994). This theme is that the automation of library processes has very definitely moved the 'backroom' of technical services to the 'front desk' of reference services, as well as provided a convergence of functions (collection development, user services and technical services). McCombs urges that "public and technical services redefine both their own roles and their relationship in order to provide the services needed by patrons through the year 2000" (McCombs 1991).

In this author's view, the broad definition of technical services, initially proposed by Intner, and thematically expressed by McCombs, must be broadened further as we move into the twenty-first century, using the full range of information technologies and telecommunications. In examining how librarians and information managers

cope with changes in preparation for the twenty-first century, many noticeable transformations of technical services are taking place today. For instance, the licensing of databases as opposed to the purchasing of library materials represents a definite ideological transformation from traditional forms of collection development. Ownership and archival holdings of purchased items get transformed ideologically to notions of current *access* and *knowledge delivery* on demand because the licensing of databases does not firmly assure uninterrupted, stable access. Instead, the fundamental notions of access and delivery of information content itself (i.e., knowledge) are accepted and emphasized. Online search services offered through DIALOG represent a clear shift from adding physical materials to offering information content itself. A clear ideological transformation is occurring from collections *held* in a library to *access plus*; thus collections in the widest possible sense, including access to remote resources and delivering information content itself, is already eagerly embraced and practiced.

A definite transition from centralized services stemming from one central file such as the card catalog to remote access services supplied through workstations scattered at distant locations is already widely practiced. Individual professionals are empowered as knowledge access managers at decentralized workstations that incorporate computing, telecommunications, and storage technologies. New delivery mechanisms, e.g. World Wide Web pages, metadata schema facilitation, e-mail reference services, electronic pathfinders, and remote access to library resources are all indicative of the transforming new role that technical services librarians will assume. The conceptual shift from "supply-oriented to a demand-driven organization" is stimulating the redefinition and renaming of technical services. In this environment, the librarian's professional grounding in a core competence, i.e., expertise in providing access to information content and creation of tools to help make sense, will remain important, but in a new sense and at a higher level. Not only will the work of technical services be used to locate pieces of information, but also to put those pieces into context and to weigh and compare different items. In short, to identify, to authenticate, and to validate information requires a professional core competence. As put by Paul Saffo (1994):

The future belongs to neither the conduit or content players, but those who control the filtering, searching, and sense-making tools we will rely on to navigate through the expanses of cyberspace. In a world of hyper abundant content, point of view will become the scarcest of resources.

The opportunity of blending digitally formatted information of various types by collecting, storing, and distributing information in a common digital format provides the current impetus for knowledge management. The “process of capturing a company’s collective expertise wherever it resides – in databases, on paper, or in people’s heads – and distributing it to wherever it can help produce the biggest payoff” (Hibbard 1997). A technical services librarian is a knowledge access manager, who is a holistic librarian or a Renaissance information manager, who performs a whole range of services combining functions formerly seen as technical services with public service aspects of libraries. As an organizer of information resources, acquired or accessed, a technical services librarian has a tremendous personal knowledge of a wide spectrum. This includes a subject knowledge of the field, a tested knowledge of the “what, how, and where” of information resources, and an intimate knowledge of files and file structures. She or he is a builder of the tools for making sense of information, and displays an in-depth and analytical knowledge of how best to retrieve the information imbedded in resources and files. Given the reference service environment, matching information resources with a particular user inquiry and providing access to information resources are done best by tapping into the personal knowledge bank, and thus, uses knowledge access management by knowledge access managers.

There is an urgent need to recognize and accept this new breed of professionals whom this author calls knowledge access managers in any briskly changing information systems, including libraries. The need to respond to the many, far-reaching changes in the nature of libraries and librarianship in the last two decades, makes the acceptance of the new professionals called knowledge access managers emerging from the changes in information systems, including libraries, urgent. Knowledge access managers are positioned to provide value-added services with intellectual access plus quality standards. In addition to val-

ues added in terms of context, sense-making tools, and access provision, mentioned in the previous paragraphs, further value-added services are discussed in the paragraphs below concerning the *macro* view of information.

The context and environment for knowledge access managers in information systems may be best described by examining the factors that shape and direct the *services* of these information systems. Of the factors, three current forces – economics of information, user expectations, and information technologies (library automation, in particular) – affect most dominantly how information system services are changing and causing the functions performed presently by professionals to converge.

Influencing factors

By examining and understanding the factors influencing the direction of information services, we will develop a proper redefinition of knowledge access management. Because the history is so recent, it is hard to distinguish which societal trends are the most important. However, the following must be considered to have played a role and will continue to shape the landscape:

1. volume and diversity of information resource packages;
2. efficiency and productivity;
3. automation and macro view on information;
4. economics;
5. professional human resources;
6. standardization and cooperation;
7. information technologies; and,
8. user needs and expectations.

1. Information resource packages

Physical packages of information resources, those in which human knowledge and experience are recorded, are not only increasing in quantity but also in type. The exponentially increasing *volume* of printed library materials, after World War II, was addressed by Fremont Rider (1944). The *volume* of information, and the types of materials in which information is packaged are also changing rapidly. Information content is no longer em-

bodied in print and audio-visual forms of various types, but also in various electronic forms. In addition to print materials such as books, government documents, and periodicals, audio and visual tapes and cassettes are the norm for any library today. New forms of packaging textual and graphic information as well as sound in CD-ROMs, optical discs, full text, and electronic interactive multi-media are finding their way into the main stream of library services. Consider the point-and-click, easy access, ubiquitous since Mosaic (Netscape's predecessor) took the Internet by storm late in 1993, and the FTP function for Internet resources and their implication for knowledge access management. These present a daunting task in terms of any information systems functions for acquisitions, indexing/cataloging/classification, preservation, and dissemination. The rapidly expanding variety of digital information resources, World Wide Web resources in particular, has forced libraries to examine how best to balance new and traditional collections and services. New components of the Internet and their concomitant new media pose opportunities and challenges for libraries. As libraries and their users move into cyberspace, technical services librarians must renegotiate their roles as knowledge access managers, since they are the ones presently leading the profession to reassess what constitutes library and information principles. In their recent article, "Metadata, Cataloging by Other Name ..." (Milstead and Feldman 1999), Jessica Milstead and Susan Feldman state that "[w]hether you call it cataloging, indexing, or metadata, the concept is a familiar one for information professionals" and that "the biggest stumbling block in the way of orderly development of metadata is the sheer number of different metadata projects" developed by various communities (Milstead and Feldman 1999). Of particular importance is the ability of knowledge access managers to integrate library MARC data – library metadata – with other metadata from other communities like the archival, geospatial and museum communities.

2. Efficiency and productivity

The notion of efficiency and productivity came to libraries in the 1970s as administrators began to document activities and outcomes based on

measurable units that could be compared from year to year. This need to be efficient caused many librarians and information managers to review their programs in an attempt to rationalize them. Streamlining procedures and eliminating duplicate steps resulted in combining acquisitions and copy cataloging units. The blurring of the lines between traditional organization units, even the line between technical services and public services, is occurring. The ability of computers to generate *quantitative* information about who is cataloging how many books or who is doing what kind of ordering provided librarians with the data to justify a decision to outsource or to automate to tailor their resources – human and financial – to the uses to which the collection was being put.

Some of the reasons for the acceptance of technology and of library automation were the need for accountability, the needs for efficiency and productivity, financial considerations, rising expectations of users and increased interdependency. One example of the technology that developed to increase efficiency and productivity is the bibliographic utilities, an infrastructure creation of the late 1960s characterized by a focus on the cooperative development of machine-readable bibliographic data bases. Working with the bibliographic utilities, such as OCLC, knowledge access managers are becoming planners, coordinators and evaluators of efficiency and productivity. The success of efficiency and productivity depends on system information that is complete and accurate. Aiming at successfully matching users with information resources, knowledge access managers plan, coordinate and evaluate access to the systems and retrieval of information that is complete and accurate.

Reasonable guidelines for improving the cost-effectiveness in technical services are provided in the "drift-down" principles proposed by Gorman (1987):

1. Nothing should be done by a professional that can be done by a technician.
2. Nothing should be done by a technician that can be done by a clerk.
3. Nothing should be done by a human being that can be done by a machine.

The momentum to automate library files and processes intersected with societal needs, espe-

cially in the late 1970s and 1980s, when technical advances in computer science put small computers in the grasp of many modest, local libraries. Local libraries in turn achieve efficiency and productivity by computer applications. The rapid and widespread use of bibliographic telecommunications networks, such as OCLC, has had a great impact on libraries. These networks, now so vital to libraries, could not have developed without the impetus and support from other segments of society.

3. Automation and a macro view on information

Thinking macro, not micro, about information is important in today's automation environment. Macro thinking considers information *quality*, instead of the *quantity* issues, which are the domains of micro thinking. Meaningful experiences in library automation were eagerly embraced by most libraries when MARC records were created in bibliographic utilities and commercial databases such as DIALOG, Orbit, BRS, etc. were used in the 1970s and 1980s. Copy cataloging using data from bibliographic utilities was the first breakthrough in improving efficiency and productivity in information systems. Smooth productivity upgrades brought about by automation occur when libraries focus on noticeably improved services giving users unprecedented access.

Fostering an atmosphere conducive to quality, the added value provided by human intellect, at the same time as utilizing quantitative measures for counting the "right" things endorses a macro view on information, instead of thinking micro way. Qualitative effectiveness for MARC has often been at the mercy of those who view information contents from the micro perspective, viewing information contents only in terms of measurable quantities, not the macro view of contents for *long term, durable, quality* services. Straightforward copy cataloging, without any local customization, was done in libraries when expediency and quantity were greatly promoted, the micro-view on cataloging where the quantity of cataloging counts. This viewpoint emphasizes the speed of processing. Cataloging is viewed just like production in a factory. Thus, counting the number of items processed means the most to the micro view. However, copy cataloging in most libraries has been adaptive cataloging, using the biblio-

graphic utilities as the data source and then customizing the data for the local community. Local customization makes a local catalog, one of the *tools* for making sense of information to users within the context given to the content and access, to borrow Paul Saffo's (1994) words. What, how much, who customized depends on the knowledge access managers' macro view, the sense of cataloging contents completely and accurately within the appropriate context, if effective use in terms of their *long range goals* is central to serving the unseen (remote) users of the present library and for the future.

Cataloging contents within the context given for effective use relies most of all on the *access points* that are value-added services provided by libraries. The aim is increasingly better services. Better services and increased user satisfaction are met by the value added access points, i.e. controlled vocabulary known as classification and headings, along with cross-references. The convergence of the micro and macro views of information can be at the access points provided to users. In short, quantifying, i.e. counting, all the access points created per title should replace counting the number of items processed. If value is added for users accessing the appropriate information, counting the number of headings and cross-references in the OPAC should be done. Headings in the OPAC may include main and added entries and subject headings, along with their related cross-references, and the classification that furthers user browsing.

Libraries experienced an increase in productivity and successful sharing of materials when they joined OCLC. They cumulated their experience of applying computer technologies in technical services especially in the 1970s. To underscore what is often neglected in the success story of the dramatic increase in productivity through collaborative sharing is the sharing of information concerning access points through authority control, the most expensive operation of all bibliographic control. The fact is that most emerging metadata schema today extend the use of controlled vocabulary as developed by the library profession, such as subject headings and the Dewey Decimal classification. In addition to definition, authority control ensures that everything that might be useful is found, or that it is weighed and authenticated. Controlled vocabulary and its

logical structure developed by the information profession address the tension that is inherent in most information seeking – the abundance of content and the crude methods available to access it.

4. Economics

A fourth point of interest to knowledge access managers is the renewed need for economic re-distribution of resources and the goal of "doing more with less". This development forced librarians to review their allocations for materials and services. Automation, with its tentative promise of savings in personnel, began to look extremely attractive. Considering that 80%–85% of the cost for traditional technical services is personnel, outsourcing, or "contracting out", work usually accomplished by in-house library staff to vendors, has been discussed and tried. Assuming that major environmental changes would force the need for *radical* change in organizational processes, that "technical services operations are not core services" (Hirshon 1994), and that the business of technical services is to help library users obtain the information they need quickly and easily, Arnold Hirshon at the Wright State University Library began to outsource technical services in 1994 and thereby reduced his cataloging cost by about 70%.

Obviously he supplements total quality management (TQM) with re-engineering, one of the organizational change theories, as in the case of "reinventing government," a concept that was recently used by U. S. Vice President Gore. High visibility of technical services is demonstrated in a high level of customization and adding value to their work. What was attempted by Hirshon was to re-engineer, or to radically change, the organizational structure of his library by outsourcing the entire technical services department. This degree of radical change in the organizational structure of the library is not at issue here. However, it is important to note that functions of technical services remain crucial to the library. In addition, it is important to note that what has been saved or reduced by outsourcing is generally redistributed either in supporting other services or in creating new operations. New operations of carefully specifying and planning the acceptable outsourced work and of checking and evaluating the work itself require re-distribution of resources. Out-

sourcing is often the re-distribution of costs and human resources saved from one service to other services.

5. Professional human resources

A fifth factor propelled by automation and economic realities is the concomitant *flattening* of the organizational structure – the issue of human resources. The flattening effect is the placement of librarians, or information managers, at decentralized workstations to provide individualized services, further facilitated by advancements in information technologies. As the librarians at decentralized workstations offer a whole range of services, from making decisions on selection/acquisition to inputting user vocabulary into the authority control database to answering user inquiries, the need for education and training becomes critical. Indeed, this new breed of librarians will be the Renaissance librarians who are cross-educated to perform both public and technical services.

Education and training empower individual librarians to be knowledge access managers. Redefining and restructuring the role of librarians is inevitable. Expert knowledge access managers will be the problem solvers, trainers, and team leaders in improving access to knowledge and information. As planners and trainers, knowledge access managers will require a professional knowledge base for an especially sophisticated and in-depth understanding of the total operation of an information system.

6. Standardization and cooperation

Standardization and cooperation are the constant historical hallmarks for the information management world, and librarianship in particular. Encouraging better communication within a library, among libraries and between library systems, libraries have used cataloging and classification tools to construct consistent and uniform catalogs. Examples of standardization and cooperation are abundant. U.S. librarians' tools such as AACR2 Revised, Library of Congress Subject Headings, Dewey Decimal Classification, Library of Congress Classification are good examples.

The U.S. MARC Project and Format are the foundations of American library automation prog-

ress, because of their standardized representation of cataloging contents for any automated system. A cooperative system, such as OCLC, would not have had such a great impact on library automation unless its core was built on MARC. MARC facilitates the transfer of information in the machine-readable form from one system to another in a cost-effective manner. As automated systems and databases converge in a networking environment, librarians are instrumental in developing and ensuring such standards as Z39.50 and such Internet resources management architectures as OCLC's CORC (Cooperative Online Resource Cataloging) Project flourish and take a root in our profession [3] in order to foster speedy and cost effective services for users.

7. Information Technologies

Advancements in information technologies on all three fronts – computing, storage and telecommunications – have been the vanguards and catalysts for recent changes in knowledge access management. Advancement in microcomputer technology has facilitated the downsizing of automated systems, making automation of local information systems of any size possible. Technological advancements in telecommunications have been most influential in recent years, presenting information systems with the opportunities of the networked environment. New developments in networks and other cooperative activities brought with them the requirements for the generation of accurate shared information. Because computers permitted ease in compiling union catalogs and other databases, they now could ensure that knowledge access managers geographically distant would have access to the same information as those nearby. This had the further attraction of cost sharing among those who chose to participate. Computers are readily accepted as viable tools in information systems.

Local Area Networks (LAN) and Wide Area Networks (WAN) have had an impact on the way information services are provided. Integrated services such as distributing voice messages and data through computers and dial access to external databases are now provided to help information professionals seek needed information. In the Internet environment, resources for many libraries are networked. Providing access to these

resources is the information systems' responsibility.

Compliance with Z39.50 in automated systems enables ease of access for users. The knowledge access manager in any information system may serve in the role of an innovative hub for technological implementation to provide services through computers. The capability of storing and manipulating ever increasing amounts of data, using CD-ROM products, dedicated and dial access terminals with links to national bibliographic utilities, and satellite transmission of data and video images through broadband channels are just a few examples of services. In short, managing data communications and establishing the networks through which users identify and retrieve information are important functions. However, the integration of large amounts of information into the catalog from a wide array of diverse sources will continue to be the challenge to the knowledge access manager.

8. User needs and expectations

The final driver to innovate knowledge access management results from user needs and demands for better services. User expectations become more sophisticated as better services are provided. Services that are noticeably improved over card catalogs are appreciated by users; OPACs (Online Public Access Catalogs) employ the full range of online capabilities, including Boolean operators, limiting, truncating, nesting, etc. OPACs based on integrated local automated systems have been enhanced by these online features. These integrated systems require single inputting of data for multiple purposes. The same file in the system is accessed by many users, including librarians, not only on the library site but also in remote sites. The mounting of various local information files, tables of contents, full text, Web sites, and externally licensed A&I services from commercial publishers or vendors through OPACs in the late 1990s has changed the character of OPACs. They have become the 3E- "meta-catalogs", Enhanced, Enriched, and Expanded super OPACs.

Transformed into computerized, networked, multi-media search service platforms, these 3E- "meta catalogs" are at the core of the workstations used by scholars and knowledge access

managers. In turn, these 3E-“meta-catalogs” transform communication by scholars. Rapid growth and expansion in diverse forms of Internet resources, coupled with user expectations that OPACs function as effortlessly as Internet searching engines but more effectively, present challenges for the knowledge access manager to provide an information gateway customized and tailored to individual users. Contemporary libraries design information gateways providing access to a wide range of catalogs, databases and online resources but also providing a tool to help individual users start their research with customized lists of information resources based on criteria defined individually by each user (University of Washington Library 2000).

Characteristic converging trends

In conclusion, change is the only constant for knowledge access managers. Don Riggs (1996) noted that “change is occurring faster today than ever before in the history of academic libraries,” and “change is discontinuous and not part of a pattern.” The categories discussed above represent the factors that influence, shape and direct not only technical services into knowledge access management but also library information services in general. These factors today transform librarians into knowledge access managers. Regardless of whether technical services continue as an administrative unit in libraries, renaming it and redefining its nature are long overdue. Renaming technical services to knowledge access management is simply a reflection of the activities and services being performed. The new paradigm, knowledge access management, is a function that every information manager, including librarians, performs and manages in order to provide effective and efficient services. These services provide for *ACCESS plus context* to information resources and knowledge itself, whether locally held or remotely available.

Notes

1. Note that the word *services* is underlined for two reasons: first, to highlight the qualitative notion of “services,” since the ultimate purpose is the same as that of reference services, i.e., to provide information access to users. The second reason is to dis-

tinguish it from *processes*, the word often used synonymously with services when technical processes are described, implying things, objects and activities.

2. The term “technical services” denotes the administrative units of organization in libraries, whereas it also denotes the functions performed in any library. In this paper, both the administrative units and the functions performed in libraries are included.
3. The OCLC Cooperative Online Resource Catalog (CORC) is now available as a regular service as of July 1, 2000. CORC enables libraries to bridge between traditional and new forms of metadata by facilitating access to the Web and by maximizing the usefulness of their online catalogs. By using CORC (i.e., a Web-based system for building bibliographic records and pathfinders (subject bibliographies), librarians apply their knowledge access management expertise to the Net to deliver valuable, authoritative Web resources to their users.

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