Electronic Resources and Academic Libraries, 1980-2000: A Historical Perspective

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ABSTRACT

OVER THE PAST TWENTY YEARS, ACADEMIC COLLECTION DEVELOPMENT specialists have dealt with dramatic changes, brought about by decreasing purchasing power and the growing importance of electronic resources. Throughout this period, collection managers have rethought their efforts and revised criteria for the selection of materials in new formats while also maintaining traditional collections. Looking back over this period may help provide perspective for dealing with the next stages of change.

INTRODUCTION

Forecasting is notoriously hard, but identifying meaningful trends of the recent past may also be difficult. The World Wide Web is perhaps the most notable example of a far-reaching element that librarians neither predicted nor planned for. Not available before the early 1990s, but impossible to ignore by the late 1990s, the Web offers a kind of watershed in the way libraries and their users "connect." From 1989, when Tim Berners-Lee and others at CERN (European High Energy Physics Laboratory in Geneva) developed a hypertext system, the Web grew from "about one percent of backbone traffic in September 1993 to about 20 percent" by 1995 and has continued to expand dramatically since (Weibel, 1995, p. 7). The Web became the focus of the Internet in 1993 when the graphical browser Mosaic was introduced and followed by Netscape Navigator and Microsoft's Internet Explorer (Cohen, 1998, p. 8). By January 1996, there were "an estimated 90,000 Web sites on the Internet, and . . . the Web is

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doubling in size every fifty days with a home page added every four seconds" (Branin, 1998, p. 10). An OCLC announcement in September 1999 states that there are 3.6 million Web sites of which 2.2 million are accessible to the public.

Twenty years ago, common use of the Internet and such formats as CD-ROM was still in the future; many academic libraries still did not have integrated library systems, though most were using every means they had to acquire them. In the writings of collection developers in the late 1970s and early 1980s, one sees little awareness of the revolutionary changes ahead except for recognition of financial difficulties. This discussion examines how the present mixture of print and electronic collections evolved over the past twenty years and how criteria were revised and expanded to incorporate the latter into established collection development policies. The focus is primarily on academic libraries because that is where most of the writing on these issues originated, though clearly public and other libraries have shared many of the same issues and choices.

Academic libraries have responded to major changes in the nature of their collections and user demands while materials budgets have provided less purchasing power than in the previous decades. Partly due to general economic factors (inflation, weak dollar abroad, increased publishing costs) and partly due to other demands on university budgets (technology, student demographics, staff benefits), library materials budgets have tended to diminish, if not in actual dollars, certainly in what could be purchased and in the percentage of needed materials acquired. This situation was complicated as publishing, fed by university promotion and tenure demands as well as economic pressures toward mergers and increased profits, expanded in disciplines old and new as well as in a variety of formats. Additionally, pricing for scholarly journals, the backbone of any academic collection, increased annually by percentages in double digits, with devastating effects on print collections.

Looking Backward

During the 1980s and 1990s, much was written about the serials crisis, or serials pricing crisis; access versus ownership or access and ownership; "just in time" versus "just in case" purchasing; the library as storehouse versus the library as gateway; and operating libraries within a new paradigm that includes a changing scholarly communication system. These key phrases of the period indicate the nature of the struggle to adapt to very different circumstances from those of the 1960s and 1970s.

In the early 1980s, there were few hints in the professional discussions of resource sharing, use studies, and budgeting about what was to come. The *Library Resources & Technical Services* (*LRTS*) "year's work" in collection development for 1980 concluded that it had been a quiet year (it must have been the last such) with variations on old themes, though

"declining financial resources" was noted as disheartening (Magrill, 1981). By the next year, "austerity" was seen as marking the times, the impact of online bibliographic databases on collection decisions was being considered, and electronic journals were seen as having potential to radically change serials librarianship (Magrill, 1982). By another year, there was discussion of improving access through resource sharing, and the ADONIS project was seen as the beginning of electronic publishing (Welch, 1983). By the mid-1980s, CD-ROMs were considered to offer great possibilities (Wortman, 1987). McCarthy (1996) found "hardly any comparison to the issues and challenges we face today" when compared to 1985 (p. 16). Her list of current issues includes "the access vs. ownership debate, restricted resource budgets, changing management strategies to maximize those budgets, and the impact of information technology," all of which remain several years later (p. 16).

Lynden (1996a) refers to a 1979 *Collection Management* issue forecasting for 2001, noting that the following predictions have happened: print costs have continued to escalate at rates beyond the general economy; demand has been created for access to electronic materials; electronic reference tools exist that offer advantages over their print equivalents; office and home computers are used to search and receive information, build and index files, create reports, and communicate with others; and libraries are increasingly spending for current online access over purchasing print materials (pp. 65-66).

From the early 1980s to the present, libraries have moved into reliance on online systems, electronic databases, and vendor connections, directly impacting collection development decisions. Collins and Howell (1996) note a 1993 *Library Journal* survey, which found "electronic resources in more than 80 percent of public libraries and 99 percent of all academic libraries" (p. 29). They see patrons moving from electronic current awareness services, abstracts and indexes, and tables of contents to document delivery, hard copy in the stacks, or full-text online. The question, then, is how to determine which resources to provide by immediate full-text access, delayed full text, or as citations and, most importantly, how to pay for all of these (pp. 29-30). Branin's (1998) overview of collection development since the 1950s notes that the primary challenges of the last ten years have been "a weak library economy, a new digital information system, and pervasive change" (p. 2). During this period, "economic downsizing and the revolution in digital information technology" have changed libraries such that now we have "two information systems, one print and one electronic, to manage" (pp. 6, 9).

From attempting to "balance" funds between serials and monographs, the need has expanded to "balancing" paper resources with electronic resources while also providing funds for document delivery. From building strong local collections for the long term, emphasis has shifted to

accessing remote materials for current use. And from planning for use of materials within or checked out from the library, the focus now is on maximizing online access from multiple remote locations. There are good reasons to look back to understand what has happened—to recognize patterns and note trends that were less obvious at the time. It is also useful to see how much has been accomplished in a relatively short time.

The Serials Crisis

At the heart of the economic difficulties of the past two decades has been the increasing cost of serials, as serials are at the heart of academic libraries. According to Dougherty (1999): "The serials crisis did not really begin in 1984 when librarians began to notice that the subscription costs of selected journals were rising at unprecedented rates" (p. 6). He attributes this phenomenon to publishers' decisions to treat scientific and technical journals as "economic commodities." Those decisions "sounded the death knell for scholarly publishing as it had existed since the end of WW II, and ushered in the beginning of the digital age" (p. 6). For Lynden (1996a) "Publishers have viewed the Library as a perpetual source of income whereas the university has seen it as a bottomless pit" (p. 68). Thus, "U.S. research libraries are mired in a crisis" (p. 70). While materials costs annually increased at percentages in the double digits, libraries received single digit budget percentage increases; the new economics pushed librarians' attention to electronic resources and document delivery.

By the late 1980s, the literature was dominated by discussions of serials pricing; 1988 was the first year of the electronically disseminated "Newsletter on Serials Pricing Issues" edited by Marcia Tuttle. Lonberger (1991) says, "online full-text retrieval is now viewed by a growing segment of library professionals as a viable alternative to ownership of print journals and as the logical extension of the now-familiar online bibliographic database" (p. 323). There are "new economic models for the delivery of journal articles in electronic form," and "economic issues of scholarly publication are now inextricably intertwined with the technological ones" (Sullivan, 1991, pp. 283, 285). There was clear recognition that a new layer had been added without, however, the traditional concerns and activities of collection development having been minimized.

Early Responses

The initial response of many libraries to the serials crisis was a serials cancellation project along with decisions to add few, if any, new print journal titles. Hamaker (1996) reports on one of the more dramatic responses; LSU cancelled $650,000 in journals in 1992-93 (p. 45). They ordered articles for users from 540 journals at a cost of $12,278.14 ($5,740 for copyright fees); 60 of those titles were subscribed to but unavailable for a variety of reasons. Subscriptions to the 480 journals not subscribed to, from

which articles were ordered, would have cost $207,000 for 1994 (p. 44). Chrzastowski and Schmidt (1996) showed that, after cancellations at the University of Illinois Chemistry Library, only 13 percent of the requests for document delivery were for articles from canceled titles. They note a 1992 Columbia study which demonstrated that it is less costly to use interlibrary loan or to get articles from document delivery services than to subscribe (pp. 358-59), and several other studies support the idea that document delivery is "more cost-effective than subscriptions for high-cost, low-use titles" (p. 362). Chrzastowski and Schmidt (1997) state that: "Libraries generally are forced to cancel serials based on economic indicators rather than on the needs of the users and the collection, as is the ideal" (p. 434). Various forms of resource sharing and interlibrary lending have been forced into new roles to support research and instruction because of the increasingly high cost of serials.

Funds spent on interlibrary loan and document delivery, however, may further reduce funds for purchasing monographs. An ARL study (Kyrillidou, Maxwell, & Stubbs, 1996) revealed that, between 1986 and 1996, there was a 23 percent decrease in monograph purchases and 8 percent in serial purchases, while serial prices increased 138 percent (p. 10). Payne and Burke (1997) studied the cost effectiveness of three ways of supplying journal articles—subscription, document delivery services, or interlibrary lending. Their results show that "based on the cost-per-use of all the alternatives," subscription would seldom be the choice (p. 151). ILL increasingly was seen as an integral element of collection development. For Kleiner and Hamaker (1997), a "'good' collection has historical depth and comprehensive coverage and supports institutional programs with a modicum of interlibrary loan (ILL) use. However, this approach is under attack today. Journal prices have created a crisis because few budgets can keep pace with inflated costs and changing needs" (p. 356). Therefore, reallocation of materials budgets has become an issue.

Restructuring

After so many years of the "serials crisis," it is now less a crisis than a fact of life. Farrington (1997) says that faster response time and diverse methods of retrieving documents have encouraged librarians to rethink assumptions about which materials to hold locally, "often in favor of new interlending relationships, consortial partnerships, and document delivery packages from commercial sources" (p. 71). Ten years ago, when format was discussed, it was paper versus microform; a library could subscribe to paper and then purchase microform as the archival format. CD-ROM is the primary newer format "that is tangible and not virtual or solely online" (p. 80). Partly due to its compactness and its allowing users to search with Boolean operators and sort results, it has been a preferred format "for index and abstract titles, and also for census data and maps" (p. 80).

The ability to link CD-ROMs on a Local Area Network to allow multiple users to search simultaneously proved to be an advantage but, by the late 1990s, CD-ROMs appear to have had their heyday and are now being supplanted by the World Wide Web (p. 81). There are many examples of government documents and commercial databases that moved from print to CD-ROM and now have moved to Web access. If the movement from paper titles to Internet access via a gopher was fast, "the transformation from gopher title to Web presence was lightning speed in comparison" (p. 137). New journals are still being started in print, but there are also more and more electronic journals, and more refereed titles, available via the Web. The nature of serials collection development and the traditional serials selection process have definitely changed.

In selecting a product like OCLC Electronic Collections Online, Farrington (1997) says, "the library is making a collection decision analogous to deciding to subscribe to a print journal," and the annual fee gives the library a certain level of access (p. 139). Some journal publishers provide access to their titles as a package (e.g., Academic Press, America Institute of Physics), while other vendors (e.g., Silver Platter, Bell & Howell) provide journal indexing and abstracts and sometimes full-text articles from a variety of publishers. It has been less than a decade since pioneering institutions started providing access to electronic journals over the Internet; most academic libraries have followed. But many issues remain, including:

> determining how access can best be provided; developing selection criteria and incorporating e-journals into traditional collection development policies; determining whether to store or archive electronic journals; developing appropriate acquisitions procedures; determining how electronic materials should be indexed and cataloged; and considering staff training and other resource costs. (Hall, 1997, p. 21)

Schwartz's (1998) overview of the literature refers to over 200 publications on the "serials crisis." He recommends cost-per-use analysis as a decision model involving the dual criteria of low use with high cost per use:

> Restructuring serials management along access-versus-ownership lines does not solve the serials crisis, but it does alleviate inflationary pressures and has other significant outcomes. The main *economic* outcome is the cancellation of low-use, high-cost-per-use titles to create a large pool of savings for reinvestment in new resources and services. The main *service* outcome is a fully subsidized, unmediated document delivery system—for a fraction of the cost savings. (p. 115)

Library Journal's thirty-ninth annual serials price survey (Ketcham-Van Orsdel & Born, 1999) shows that the old patterns of writers writing and publishers publishing no longer hold. "The web and the electronic journal are deconstructing the serials landscape. Scholars can now publish without publishers, publishers can distribute without vendors, and end-

users can get access to the scholarly literature without going through the library" (p. 48). Libraries are "forced to maintain dual systems of print and e-journals. There are about 5,000 Web-based electronic journals on the market today," many of them scholarly publications (p. 48). SPARC (Scholarly Publishing and Academic Resources Coalition) and Stanford's HighWire Press are examples of experiments by libraries, universities, and learned societies to lower prices and challenge commercial publishers. "Despite the chaos surrounding electronic journals, print subscriptions still command most of the serials dollars in libraries and, therefore, still require careful cost analysis in planning renewal budgets" (Ketcham-Van Orsdel & Born, 1999, pp. 51-52). But libraries continue to pay publishers' development costs: "[T]he cost of electronic journals will continue to fluctuate until a larger and more stable base of subscribers is established, over which publishers will be able to spread out development costs" (p. 53).

Access and Ownership

By 1991, "all discussions have come together to form one question: access or ownership?" (Monroe, 1992, p. 277). This topic is necessarily connected to discussions of scholarly communication, changing technology, the Internet, serials pricing, and resource sharing. No matter how limiting the phrase may seem, it serves as a shorthand term for the topic. Brin and Cochran (1994) note that there have been articles on this subject since 1975 but focus on the issue dates from 1989, becoming dominant in the early 1990s (p. 207). Pastine's (1997) bibliography of over 360 items on ownership and access to electronic information shows 1995 as the banner year with seventy-five publications. Owens (1994), like many others, says the question is not "access *versus* ownership." The point is "not to *replace* ownership with access but to *incorporate* access into our collecting efforts to maximize our purchasing power and best serve our patrons" (p. 62). Anderson (1991) finds benefits in that: "The access/ownership dynamic encourages us to look at ourselves more creatively: we focus on function rather than organization, on content rather than medium, and on services rather than tradition"(p. 7). And for Kane (1997), although "the concepts of ownership and collecting have been deeply embedded in all that we do in libraries, the trend toward 'access' began essentially as a survival mechanism" against user demands and high costs without increased budgets (p. 60).

Early Responses

Initial responses focused on interlibrary lending but, by 1991, Monroe's survey found two responses: "One is to advocate better service, and the other is to foster better cooperation among libraries" (pp. 277-78). Ferguson and Kehoe (1993) compare ownership and access costs as well as speed of access to information. They say that if cost were the only

consideration, it is less expensive to use interlibrary lending or document delivery services than to buy materials ahead of need. These decisions depend not only on costs, however, but also on how each title is used. Browsing is also an important research activity, though in some cases electronic browsing may be adequate.

Nisonger (1998) notes the increased attention to document delivery, "reflecting the profession's increasing emphasis on access as an alternative to ownership" (p. 30). This included discussion of moving funds from subscriptions to document delivery, collection development for electronic resources, and the Internet. Long-standing issues, though, such as "budgeting, staffing, use studies, approval plans, collection evaluation, serials management, etc., and the application of traditional functions (such as selection, evaluation, and policy making) to electronic resources" still got a lot of attention (p. 34). For most libraries, "collection development now takes place in a dual print-electronic environment. For the immediate future, effective integration of print and electronic resources will be the major challenge confronting collection developers" (p. 34).

Restructuring

Johnston and Witte (1996) point out that: "Historically, research libraries attempted, always unsuccessfully, to acquire and own as part of their collections all materials that might potentially be of interest to library users. Ownership as a guiding principle ruled. Any lacunae in a major research library's collection was viewed to some degree as a failure of those responsible for building the collections" (p. 3). In the information explosion of the 1980s, though, it became clear that "the old paradigm was doomed" (p. 3). Collection developers who were expected to balance inadequate funding in an era of increasing costs saw emphasis on access as the most promising approach. In time it became clearer that "even in the best of times virtually no library is able to acquire and hold all materials needed by users. Resources have always been finite." Now, however, a new layer has been created. "This layer of materials does not reside on our shelves, but neither is it wholly separate from our holdings in the way traditional interlibrary loan items are" (p. 5). To some extent, this shift to electronic resources substitutes online for print sources, but it also requires additional funds for document delivery and remote access, producing complex strata for budgeting and for access.

Harris and Hannah (1996) argue that librarians must "re-vision the library in the digital era" (p. 3). For those who produce the materials acquired by libraries, digital systems are the new "core" or "defining" technology of this era (p. 4). "In a digital environment, however, remote access is in the process of breaking forever the relationship between accessibility and ownership that has served so long and so well as the guiding strategic principle of library planning" (p. 5). Librarians need to "aban-

don nostalgic and misguided defenses of the *book* and move aggressively to discover ways to make libraries relevant to the clients that constitute the only justification for the existence of libraries in any era" (p. 5). People use digital information because it adds value and enhances productivity.

> [When] access to books and periodicals depended on ownership, libraries could offer a valuable service to a select group of information seekers by simply buying as many books as possible. . . . However, it is now apparent that the linkage between access and ownership has been severed, and users now can "access" information in a myriad of information markets. (p. 8)

As local access to a global collection becomes the model: "Local collections will lose their supremacy as digital information systems make physical location of information sources less and less important" (Branin, 1998, p. 11).

But access to what and what kind of access? asks Miller (1997). "A focus on ill-defined access coupled with a failure to recognize the value of cataloging may lead libraries to provide neither very good access nor ownership, and in so doing forfeit their role as the keepers and purveyors of society's collective knowledge" (p. 101). When the term "virtual library" became current, many leaped to the conclusion that all information would soon be available free electronically. Some hoped this would mean less expenditures for libraries, "often seen as a great sink hole in budgets absorbing increasingly alarming amounts of money while returning no revenue" (p. 105). The task of allocating scarce resources is nothing new to libraries but has been made more daunting with the advent of new media accompanied by demands for new services without additional financial resources. There is less talk now about the "free" virtual library, though many still fail to understand that costs must be paid by someone. Print materials are not likely to become obsolete soon; many print documents will not be digitized, and many will retain value, but libraries must be repositories for physical materials as well as gateways to digital information (p. 105).

In examining the cost effectiveness of an electronic database, White and Crawford (1998) confirm that expenses are not always reduced when new services are offered; they may just be shifted elsewhere in the budget. New services may increase customer expectations, and nontangible benefits should be considered, such as the immediacy of full text versus the time lapse for ILL (p. 509). A study comparing the costs of providing access to full-text business databases with costs of owning those journals found that "providing access to both indexes increased access from the 242 periodicals to which their library subscribed to 513 periodicals at a cost increase of approximately 15 percent" (p. 505). These trade-offs—increased costs versus increased access—must be addressed by each library, time and again.

Martin (1996) observes that for at least the last two decades "even the largest libraries could no longer claim to collect everything, and admitted reliance on sources outside their walls—real or virtual" (p. 291). Internet sources should be selected and cataloged because there is a need "to reflect the intellectual effort that we expend in assessing electronic resources and then providing access to them" (p. 292). There is a need to define "access" carefully and then keep statistics to reflect how it works. In short, libraries should regard "these accessed resources as part of the information universe that we provide our users" (p. 292).

Virtual Collections and Electronic Books

After much talk, electronic books finally seem to have arrived. The idea in some form has been around for several decades but only now is it developing into something useful. In 1999, NetLibrary can provide reference titles with methods for tracking use and copyright. The search and retrieval features could provide the difference that is needed to support educational use (Kiernan, 1999). NetLibrary's product does not feature a portable piece of equipment, and the focus is on academic and reference titles developed with the assistance of academic librarians, at least partly for distance education. The key difference is that the market is libraries, not individuals. For individuals, though, the SoftBook and the Rocket eBook, despite limited selection and relatively high costs, are seen favorably (Tanaka, 1999). In late August 1999, the Microsoft Reader was announced, a software application enabling one to use Windows to read electronic titles. Some form, or several forms, of electronic book seems to be moving to the foreground; for libraries, this promises to be one of the next stages of format revolution.

Current efforts are indebted to such earlier initiatives as Project Gutenberg, started in 1971 and now offering some 2,000 works, and such other pioneers as "Wiretap, the On-line Book Initiative, the Electronic Text System at the University of Virginia, the English Server at Carnegie Mellon University, and the Oxford Text Archive" (p. 126). Additionally, in 1995, the Commission on Preservation and Access declared its intention to establish a National Digital Library Federation to consist of collections from the documents of fifteen large research libraries (Skinner, 1996, p. 121). Clearly, major forces are working to increase the number and quality of documents available electronically. Lynden (1996a), quoting Merrily Taylor, says that the research library of the next century will be "*a virtual library* which gives to the user the illusion of access to materials which are not actually present. It is a *gateway* or springboard for users who require information not held on site" (p. 66). It will be some time before the majority of documents are in machine-readable form, but the focus now is not on whether, but when and how. The shift to an electronic library has left formidable unanswered questions regarding "copyright, equal access

for scholars, the nature of scholarship, costs for electronic information and equipment, indexing of electronic files, the conversion to electronic full text of publications, equity of access to information for non-scholars here and abroad, security, employment, and instructional issues" (p. 68). These ongoing concerns need to be resolved in the next stages of this transition.

Preferring "virtual collection" to "virtual library," Kopp (1997) sees this as consisting of two elements: technological and intellectual—"a technologically based structure of a shared online system" and "an intellectually based decision to bring collections together in such a system" (p. 85). Some say that the virtual library is far in the future, if it ever arrives, while others see it as present already. Among other concerns, Pastine (1997b) points out the increasing distance between the "haves" and "have nots" in terms of user access. The information available in many cases on the Internet "is irrelevant and even largely inaccurate—a virtual mine of disconnected bits of information rather than an existing organized knowledge base" (p. 215). Technology must be second to people, with the library's emphasis on "empowering the user, not just delivery of information and services" (p. 216). In order to accomplish this, staff may have to change their focus, new funding sources must be found, and new marketing services developed.

Changing Selection Criteria

Since the late 1970s, there have been several overlapping stages before the present dominance of the Web. Criteria for selection changed largely by the expansion of old criteria as libraries moved through print to information on floppy disks, tapes loaded onto an integrated library system, the beginnings of standalone CD-ROMs followed by networked CD-ROMs, then to the Web, and now poised for a proliferation of digital projects including sound, video, and animation. Early issues included which formats to add from among the many forms of changing technology, what equipment was needed to support these, hardware and software compatibility, permanency of the materials, ongoing costs, training and support, and how to work with limited access. Selection criteria had to be adapted to deal with these considerations.

Expanding Existing Policies

Among the early efforts to offer criteria for the new electronic resources is Ferguson's 1988 article with eight criteria for selecting CD-ROMs: relevance, scope, need, quality, currency, accessibility, language, and cost, followed by observations on cultural and political factors. LaGuardia and Bentley's (1992) criteria for selection of electronic materials include consideration of vendor support; administration of costs, maintenance, and security; and searching and system capabilities. They note the importance

of license agreements and staff support as well as the audience selected for, hardware, software, and content (under which are listed scope, accuracy, cost/benefit, currency, and stability). These criteria, of course, keep changing. Present criteria must respond to issues of how to serve remote users, copyright issues of multiple copies or uses, on-demand access versus local holdings, the role of aggregators in determining which titles the library has at least temporarily leased versus owned, and how or whether to archive and preserve digital materials. Increasingly, connecting to a remote electronic resource is seen as one form of collecting, and methods used for in-house collections are considered to apply to selecting for access.

Decisions about changing criteria took place in the context of discussion about the usefulness (or otherwise) of collection development policies and how these might be updated and expanded (if not deleted entirely) to incorporate new decisions. Hazen (1995) takes the position that such policies have outlived their usefulness, and the library would be better served by "devising flexible guides to all the information associated with particular fields of study. Local collections will comprise a part of these 'information maps,' but only within the context of a richer and less bounded universe of scholarly resources" (p. 29).

Johnson (1997), however, recommends a policy as a framework for decisions. If kept current, such a policy can identify issues and assist in responses. She considers categories of information, types of resources, and delivery mechanisms. Elsewhere, Johnson (1998) notes that collection development policies can inform staff and users about the criteria that guide collection decisions and protect the library from claims against these decisions. Her guidelines for traditional materials are applied to electronic resources: "The need to balance traditional print resources with electronic resources should be stated along with information about the high inflation rates affecting all serial formats, print and electronic" (p. 10). Her criteria include "relevance, quality, language, currency, frequency of revision or updating (if appropriate), scope, depth, geographic coverage" (p. 11). She recommends stating how selection decisions are made and how priorities are set. Retention, preservation, and deselection processes should also be included with user policies, such as limitations to access, authorized users, and freedom of access (p. 12). Individual choices remain difficult even with clearly defined policies but, without guidelines, it is hard to keep decisions consistent with the library's overall goals.

Demas, McDonald, and Lawrence (1995) point out that users expect electronic resources to have the kind of selectivity and organization that libraries offer in other resources. In addition to the quality and usefulness of the resource, other considerations in selecting these include the means of storage, their delivery, and preservation. They have no expectation of a paperless society but think that selection methods will be needed in the

electronic world even more than previously. They offer a system of categories for organizing these resources (pp. 276-77).

Demas (1998) sees current methods of selection as inadequate and finds that the need has never been greater for "qualitative, balanced, systematic, and efficient selection methodologies" (p. 152). The task at hand is nothing less than "*reselecting* major portions of the collections we have built over centuries, for preservation and for enhanced access" (p. 152). He sees a need to reinvent selection by looking more broadly than individually at local library collections, "thinking in terms of analyzing and mapping the literature of whole disciplines" (pp. 152-53). He sees four issues as important in this reinvention process: an "interplay" between technology and selection; the relation of selection of format to selection of content; the librarian's role in selection for conversion; and "the need for a more holistic approach to selection" (p. 154). As he correctly observes: "Selection is about choices—choice of content and choice of format" (p. 153). Content is primary, and content with value should be selected, considering an item's "importance, authority, uniqueness, timeliness, and demand" (p. 155). He calls for an "organizing principle," such as "selection by discipline, geography (that is, by country or region), genre, chronological periods, agency of publication, language, and various combinations of these" (p. 157).

For Billings (1996), collection development policies should reflect cooperative resource-sharing agreements as well as recognize new relationships among physical and digital information sources, and acknowledge the new forms of multimedia including text, graphics, sound, video, and animation, available globally (p. 16). Others, in giving guidelines for the selection of Internet resources, focus on quality and content, including credibility; importance of the source; comprehensiveness and completeness; relevancy; ease of use; reliability and stability; cost and copyright; and hardware and software (Pratt, Flannery, & Perkins, 1996, pp. 134-35). There is no shortage of work to be done in this area.

Adding Another Layer

Davis (1997) notes that criteria have evolved from those established for print; electronic resources require "a more extensive set of criteria" in order to cover the "changing array of products and access methods" (p. 391). Selection now includes more tasks, such as considering not only content and format but also "equipment needs, access methods, purchase or lease options, and varying cost structures" (p. 392). There are problems of archiving, network applications, product support and updates, interfaces, and license agreements (p. 395). For White and Crawford (1997), the selection of electronic information resources is "inherently more complex than traditional print resources since they involve analyzing many other issues such as equipment, space, trade-offs with other

resources, technical support, and vendor support" (p. 54). General guidelines include considering the

> relevance and potential use of the information, redundancy of the information contained in the product, demand for the information, ease of use of the product, availability of the information to multiple users, stability of the coverage of the resources, longevity of the information, cost of the product, predictability of pricing, equipment needed to provide access to the information, technical support, and availability of the physical space needed to house and store the information or equipment. (p. 53)

Nisonger (1997) considers how the Internet has impacted collection management by being used to perform selection of traditional materials, by traditional collection development functions being applied to the evaluation and selection of Internet resources, and by changing traditional functions and materials (p. 29). "Established, authoritative methods for evaluating the Internet's effectiveness in libraries have not yet been developed. Present evaluation appears to be in an early, exploratory stage and frequently draws on general evaluation methods" (p. 43). He correctly observes that evaluation criteria are needed to determine "how well and how cost-effectively patron information needs are met" as well as "to assess how well the library—as a system that integrates both print and electronic resources—is responding to patron need" (p. 45). In a later article, Nisonger (1999) notes the assertion from some that principles learned in library school are still appropriate to the selection of Internet and Web resources whereas others insist that traditional selection criteria must be augmented for application to electronic resources. Criteria are offered for evaluating Web sites; a major challenge remains—"development of evaluation techniques for a mixed print-electronic milieu" (p. 75). Collection management is clearly becoming more complex. The Internet also accelerates the rate at which trends reach smaller collections. Nisonger (1998) says that one way in which collection development is being redefined is that it must be knowledgeable about such things as server space, operating systems, and contracts. There are special problems due to the multiplicity of formats, such as newspapers in paper, microform, and electronic forms. He observes further that library cooperation is difficult because of a tradition of autonomy and because library quality has been measured by the size of local collections and budgets (pp. 116-19).

The need for evaluation of Internet resources is also pointed out by Piontek and Garlock (1996). They focus on the collection, evaluation, and coherent presentation of Internet resources, identifying Web directories and search engines, and discussing the need for evaluation. Considerations include the intended audience for the resource, frequency of updating and review, whether there is an affiliated institution, what the resource developer's expertise is, what the relationship is between the

resource and other similar resources, what others with the same interests think of the site, and whether there are special requirements for using the resource (pp. 20-25). Wolfe's (1996) selection criteria include collection value, content and coverage, resources format (does the library have the necessary technical capability?), available formats of resources (consider the various ones available), producer, source of information, contact person, currency, availability, stability, user knowledge requirements and ease of use, and cost. In some areas the Internet has allowed expanded collection coverage.

Aggregators

> It is not just the format that is changing as authors and publishers adopt new digital technology. Control of publishing is changing; distribution means are being altered; and ownership rights to information are being questioned and revised. The very basic structures and tenets of the scholarly record—authorship, the framing devices of the book and journal—are giving way to new concepts of bibliographic control and organization. (Branin, 1998, p. 13)

Aggregators of electronic collections and services may include document delivery services as well as integration of full-text electronic documents into a common interface. One advantage of aggregated collections of full-text serials is that smaller libraries may have an opportunity to access serial titles they never could before, especially if they are able to participate in consortial purchasing plans. But aggregated collections can also mean that local libraries have less selection control than when selection was made title by title. Titles are duplicated in separate collections or desirable titles bundled with ones of little value. Nor can these be secured for future use, as they are leased rather than owned; as newer issues are added, older ones are dropped. This can become a particularly complex form of "outsourcing" selection, a hotly debated subject. Each library pays substantial sums to vendors for short-term access. Ongoing concerns include the implications of leasing rather than buying, archival formats, the impact on interlibrary lending costs and staffing, and the importance of aggregators in shaping selection choices.

Other Elements in the New Paradigm

Organizational Change

Collection development has always straddled the usual definitions of public and technical services; the merging of those functions is greater today than previously, as decisions that once might have been made within a single unit now must be discussed in a larger context. Electronic resources have implications for acquisitions and cataloging as well as for reference and serials and interlibrary lending. As Owens (1996a) says:

> Collections work is the point at which many aspects of librarianship intersect. Collections librarians must be skilled in working with library

> users, and we must also have a command of internal library processes. . . . The advent of electronic information has served to intensify collection managers' allegiances with both of these traditional divisions because electronic resources create opportunities and challenges for library users and professionals alike. (p. 1)

Organizational changes and staffing; training of staff and teaching of users; public relations and budgeting; facilities and equipment are all impacted by the increasing reliance on electronic resources. For Branin (1994), "rapid advances in information technology, difficult economic conditions, and the restructuring of the workplace are the three forces that appear to be causing the most change in collection development and management and in all of librarianship" (pp. xii-xiii). The traditional concepts of library organization are definitely being rethought. Library workers

> are accustomed to a hierarchical, functional, or specialty-segmented organization that is involved mainly, almost exclusively, in managing on-site collections and information services. We may not think we are "media-bound" or "culture-bound," but we do find the prospect of a flattened, fluid organization in which teamwork is the rule and information is distributed across international networks in multimedia and hypermedia formats somewhat daunting to contemplate. (pp. xiii-xiv)

This interconnectedness of library activities, which appears to have significantly increased with the use of electronic resources, reinforces the need to reorganize library functions. More collaborative teaching and learning styles are also changing the way academic library users work and what they expect from library services.

Distance Education

In order to support Internet courses and other forms of distance education as well as faculty research needs and the process of scholarly communication, libraries have responded in a variety of ways. Silveria and Leonard (1996) say that supporting remote users is "a balancing act." Off-campus and on-campus needs must be weighed along with such other considerations as range and level of resources, ownership and access, and the print and electronic mix (p. 150). Kirk and Bartelstein (1999) note that: "By 1998, the American Council on Education estimated that 85 percent of 'traditional' colleges and universities either offered, or would soon offer, distance-accessible courses" (p. 40). But few institutions "have strategic plans for information technology" (p. 41). Without such planning, the library may have to work without support.

On one end of the spectrum, Jones International University, the first all virtual university, was accredited in 1999 by the North Central Association of Colleges and Schools (http://www.jonesinternational.edu/press/index.html). The university developed an exclusively virtual library as opposed to a "site-based library." Its databases were acquired through a

statewide consortium, and an electronic library of about 500 resources was selected and annotated by a librarian. With changes this dramatic, libraries need to be involved in the planning and delivery of distance education programs, participate whenever possible in instructional design, and work at ensuring support for the academic library in this effort.

Resource Sharing—Starting with ILL

For most libraries, the beginning of resource sharing is interlibrary lending; for many, there is little beyond that. Lynden (1996a) finds mixed benefits from interlibrary loan and document delivery versus owning lower cost titles. He sees electronic information as "supplemental," though for most of us it has passed that stage. Certainly it may duplicate some items already held in print form, and the costs of special equipment cannot be ignored. "There are great advantages to the user from electronic information, but these do not necessarily translate into savings for the library" (p. 76). These issues affect users of electronic materials and present complications for the library. For McCarthy (1996), libraries must make access easy to materials owned by the institution as well as those that are available globally. Fundamental changes, such as the reallocation of acquisitions funds away from those "associated with building a self-sufficient collection" and toward "those associated with cooperative collection development and sharing," are needed in order to have "a fully linked digitized network of research library collections" (p. 21). Libraries are moving to more distributed collections, a process which can include canceling print sources, provision of titles on CD-ROM via a network, using the library's catalog as a gateway to online sources on the Web, or subsidizing document delivery (p. 24).

Resource Sharing—Beyond ILL

Libraries are adapting to the electronic information age with improved access, but as Lynden (1996b) notes, costs of electronic technology include "expensive special equipment such as high-end computers, scanners such as ARIEL, and high speed printers" which must be maintained and upgraded, as well as costs for more highly skilled staff (p. 52). The costs of electronic materials limit the library's ability to purchase other materials. Libraries are asked to develop new electronic services with the expectation that these will reduce service costs and local purchases. Electronic resources can offer prompt access to wide-ranging information, but redistributing funds previously used for collections into electronic resources and equipment risks impoverishing local collections. Depending on shared resources works only so long as someone has those resources to share but, with the homogenization and reduction of all collections, this gets harder (p. 66). Recommendations for increasing support include regional and national cooperative efforts, using remote storage facilities, developing common site licenses and delivery services,

cooperative cataloging of the Internet, user initiated ILL, and consortial purchasing (pp. 66-69). It is "the personal and political issues, as always, which determine whether or not resource sharing will succeed. Real resource sharing demands shared values, vision, and commitment, as well as a good political situation, special funding, and full participation by all staff" (p. 70). And decades of experience have taught that this is difficult to achieve.

According to Ferguson (1996), "the cost of . . . information is increasing faster than our library materials dollars are increasing [and] . . . the amount of information is growing faster than our library materials budgets are expanding" (p. 86). Resource sharing and commercial document delivery are the obvious choices. Progress has been made in knowing what other libraries own and in speeding delivery but less in "expanding the breadth of materials available through collaborative collection development" (p. 88). Collection development librarians need to determine how much should be spent on owned items and how much on commercial document delivery; then the decision moves to which titles to own and which to access. Ferguson predicts that, in the future, libraries will "spend proportionately more on access and, as a consequence, less on ownership" (p. 91). There remains the need to monitor "usage, ownership and access costs" (p. 91) as part of the larger effort to balance funds among print periodicals and monographs, access expenditures, and electronic texts (p. 92).

Billings (1996) sees a growth in "distance information" in which he includes interlibrary loan, document delivery, and remotely accessed databases (p. 4). He sees the library continuing "as a cost-center middleman, using economies of scale in its payment for information access, and in chasing the dream of making information as freely available as possible" (p. 8). He predicts that libraries will charge for information more than previously:

> We are moving towards managed information just as surely as we have moved towards managed health care. Those who fund libraries have recognized that there is no way to keep up with the levels of service demands and the rise in costs without the application of management principles to control costs by urging libraries into arrangements that take more advantage of leveraged resources. These include consortial information purchases and more centralized coordination of what has been a very decentralized system of information acquisitions. (p. 12)

According to Branin (1998), the shift away from local collections selected to meet local needs is clear. Journal cancellations, interlibrary lending and document delivery—i.e., per use access rather than ownership through CARL, BLDSC, CISTI, ISI, and others—can provide economies of scale. There are, thus, two information systems to manage, but "the trend in both systems will be towards centralized provision and distributed access" (p. 15).

The balancing act of obtaining the optimum resources for library users with limited funding pivots on resource sharing, from interlibrary lending to coordinated collection development, and the critical nature of serials within the changing aspects of scholarly communication and electronic publishing.

Preservation

The preservation of materials printed on acidic paper has proved to be a costly process at best and prohibitively expensive or impossible in too many cases. At least a great deal more is known about the problems and potential solutions than was clear twenty years ago. The preservation of electronic resources may prove to be equally daunting. As Tennant (1999) notes: "The more serious threat is technological obsolescence" (p. 30). He reminds us of extinct 8-track tapes as well as more "complex materials that were born digital, such as multimedia presentations" (p. 30). Brand (1999) also reminds readers of a recent format now rarely seen—5¼ inch floppies—as an example of the rapidity of change. "Due to the relentless obsolescence of digital formats and platforms, along with the ten-year life spans of digital storage media such as magnetic tape and CD-ROMs, there has never been a time of such drastic and irretrievable information loss as right now" (p. 46). Putting this into terms comparable to preservation efforts of the recent past, he says: "The rate of digital obsolescence keeps accelerating, and the serious search for a long-term strategy for storage has yet to begin. There is still nothing in the digital world like acid-free paper. . . . We need a digital equivalent to microfilm, a 500-year solution" (p. 46). Casey (1998) points out yet another area of concern: "The disembodied nature of Web sites makes it difficult to remember that they deserve the same attention to collecting and preservation as their physical counterparts" (p. 309). Clearly, this new electronic world will require its own campaign against the "slow fires" of self destruction, as it requires much from libraries in other regards.

Looking Forward

Predictions on the extinction of libraries abound but, despite much glib talk about the end of the book and the end of libraries, real evidence for this is hard to find. What exists instead is an increasingly complex mix of formats and means of access. As Dougherty (1999) says, the "implications of providing information support in an environment in which physical remoteness becomes the rule rather than the exception" remain to be dealt with (p. 7). Creative rethinking of roles and responsibilities is required, productive of new visions and values, and fitting libraries into their own and their universities' current missions (p. 7). "It falls to our generation of librarians to both preserve the record as it has been printed on paper and to build the electronic library" (Fedunok, 1996, p. 86).

Librarians need to become "knowledge managers" instead of collection managers in order to "manage the intersection of the print and the electronic information systems by applying the skills of collection planning, selection, analysis, and cooperation" (Branin, 1994, p. xiv). Substituting "knowledge" for "collections" moves the focus away from the development of local print collections. The mission has not changed; librarians are still "responsible for surveying the universe of information resources, now in both print and electronic form, and selecting, organizing, and preserving those resources that constitute the record of knowledge" (Branin, 1994, p. xiv). In order to make the print and electronic systems work together and to build electronic collections cooperatively, a new perspective is needed (pp. xv-xvi). For the next ten to twenty years, Branin (1998) sees, "radical changes in the very structure of information services and scholarly communications"; the loss of supremacy for local print collections; "the creation of provision centers to serve specialized, regional, or national collection needs"; and the "challenge of managing local access to global collections" (p. 12).

Harloe and Budd (1994) look for a "'more dynamic' relationship between collection development and the system of scholarly communication" (p. 83). They see this as more complex than economic uncertainty, technological changes, and increased user expectations. "Economic forces and technological advances have combined together to create a new environment, one where access to collective scholarly resources that no one library could ever afford supersedes the historic quest for the great comprehensive collection" (p. 83). Librarians need to focus more on content, less on format. Their 1997 article carries this further in a discussion of the movement from collection management to "content management":

> The current crisis of scholarly communication is being driven by the rapidly escalating cost of traditional printed journals, especially in the sciences. As a direct result of this crisis, many academic libraries have found that the classical model of collection development, one that assumed the existence of large, self-sufficient research collections as the foundation of the system of scholarship, simply no longer works. [Thus] academic libraries will need to redefine their role, their mission, and the very language used to describe what it is they do. (pp. 3-4)

They make the assumptions that academic libraries will develop "core collections of highly used materials that reside physically on-site" as well as resources that can be called "core access"; that resource sharing and cooperative collection development will become more important; that document delivery in a variety of forms will be basic; and libraries will develop stronger contacts with users, with faculty, and campus computer center staff to ensure that the proper resources are provided (p. 4).

Stanley (1995) says that libraries are collecting electronic journals as an extension of their usual efforts to acquire appropriate information whatever the format:

> Electronic-based information, however, is not simply another new form, but perhaps the most important source of information developed this century. The historical significance of electronic publishing is akin to that of the printed book and will have profound effects on every facet of the future for librarians, vendors of information, and information gatherers everywhere. Just as television never replaced radio, electronic serials will not entirely supplant print versions. However, this revolution will markedly impact the format in which information will be made available in the future, and who will provide user access. (pp. 29-30)

There can be savings from storage costs, and electronic resources may arrive more quickly than print. Librarians and libraries have to respond to these changes quickly, though, and become proactive, not waiting for the next wave.

Academic libraries must change, say Stoffle, Renaud, and Veldos (1996), "giving up the focus on acquiring, processing, and storing physical objects" (p. 213). They doubt that, in the future, costs will permit libraries to "manage large print collections side by side with digital ones" but see more information moving to digital formats (p. 217). Others are competing for the roles that academic libraries have traditionally claimed, such as bookstores, campus printing and publishing units, media production units, extension programs, computing centers, and off-campus publishers and vendors (p. 218). Libraries have to stop thinking about cataloging versus reference versus circulation or even about "managing physical facilities and print collections" (p. 220). It is time to organize around customers and focus on processes. "One of the biggest changes that libraries have to make immediately is a redirection of the budget, including the collection or information budget." Funds must go to "access, just-in-time collection building, document-delivery services, and online publishing ventures" (pp. 221-22). Hamaker (1996) focuses on another level:

> the primary motivator for changes in academic libraries as we enter the next century will not be technology, will not be funding. It will be change in the Academy and its response to the outside world. Change in missions, and in goals and in basic understandings of the nature and utility of information, will be the fundamental forces behind change in libraries. (p. 35)

Conclusion

Librarians, especially academic collection development librarians, have long recognized a responsibility for conservation—conserving collections for the present and the future, acquiring, maintaining, and preserving

items physically and making them available. But there is also a responsibility to adapt and change to meet user needs and the possibilities offered by new technologies. It is important to identify the elements of continuity within collection development that allow for change without discarding past gains that retain values while moving rapidly forward into new territory.

In the late 1980s, librarians were cautiously tracking costs of online searching; by the early 1990s, many libraries were already used to non-renewal of serials, increased ILL and document delivery services, and expanding electronic access. Where next? Electronic books? Almost certainly in some format(s). Wireless technology? Probably, though the implications of this for libraries, as for so many technologies on the horizon, seem as yet unclear. As Owens (1996b) says, "libraries will survive not in spite of but because of technology. Even in a fully digital environment, scholars will require assistance which machines simply can't offer. They will need librarians' interpretive . . . skills" (p. 20). But, in turn, librarians must focus on users' needs (p. 20). Many library users have difficulty understanding the different database interfaces, for example moving from FirstSearch to CINAHL or ProQuest Direct; the differences between commercial and free databases on the Web; why some databases can and some cannot be accessed from home versus on campus versus only in the library; indeed the connecting of the online catalog to databases and Web sites; not to mention passwords, vendors, and license restrictions and so on. Despite the common idea that the Web is a big free library, it is not easy for library users to find what is available and to understand that many quality items are accessible only if paid for by someone, usually the library.

The essence of the profession is not books or printed documents but the provision of information. As scholarly communication changes and as users' needs change, librarians and libraries must also change to meet those needs. They will have to be flexible enough to continue changing, adapting to change as they have done over the past decades but more rapidly and more creatively. Libraries' parent institutions are changing as well as the larger society. User demands and expectations affect library activities and choices. Librarians now work in a very different milieu from that of twenty years ago, as it is now possible to discuss a university without a physical library or a university without a campus. Technology has dramatically changed the nature of the librarian's work, making us far more dependent on hardware and software, on campus network choices, and on technical staff expertise, as well as on aggregated collections remotely accessed.

The next two decades will see equally dramatic, if not greater, changes than have the last two. Libraries have lost a kind of monopoly as "the place" for information seeking. Though some sophisticated users may doubt their need for libraries, libraries continue to play an important role.

Popular discussion on the demise of libraries suggests that they will be (or already have been) replaced by the Internet. In an environment where the value or usefulness of libraries can be seriously debated, materials funding and staff positions will become even harder to justify. Librarians must continue to reassess what they do and why they do it, avoiding the trap of continuing to do what has been done before and instead creatively moving forward, setting the standard, and not merely reacting. Examining the literature of the last twenty years, one sees an impressively resilient profession, willing to question its past in terms of its future, willing to reorganize for more effectiveness, able to build upon the continuity of its past (service, quality, information) while adapting to the changes necessary to remain viable. Librarians have worked with substantially decreased buying power, and limited staff and resources; at the same time they have trained and re-trained to adapt to new challenges, while hearing others question their usefulness. If to those strengths can now be added boldness in facing issues and creativity in resolving them, it will indeed be an encouraging record with which to face the future.

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