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# The Impact of Electronic Resources on Serial Cancellations and Remote Storage Decisions in Academic Research Libraries

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## ABSTRACT

IN THE PAST, SERIAL CANCELLATIONS AND STORAGE DECISIONS focused primarily on print resources. With the addition of electronic resources, librarians in large research institutions must now manage an *integrated* collection consisting of both print and electronic formats. This article explores the impact that electronic resources have on such deaccession decisions. The authors identify criteria for these decisions and, within this framework, discuss the issues that arise because of the complex nature of electronic resources.

## INTRODUCTION

With the relatively recent proliferation of electronic resources and the complexities involved in acquiring access to them, much of the current collections literature focuses on the addition of electronic resources to a collection—in particular, on how these resources affect the traditional collection development and acquisition process. Now that large academic research collections have relied on online databases and an increasing array of electronic full-text products for a number of years, the role of electronic resources in deaccession decisions, such as cancellations and remote storage, is becoming an increasingly important issue.

The University of Minnesota Libraries, like other academic research libraries across the nation, continues to cope with two outstanding pressures

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on its collections: an acquisitions budget that cannot keep pace with collection needs, and insufficient space in its libraries to accommodate continuing growth of the print collection. The former is addressed in part through an ongoing evaluation of the University of Minnesota Libraries' serial commitments and resulting cancellations. The latter will be addressed by the addition of a new on-campus storage facility, the Minnesota Library Access Center (<http://www.minitex.umn.edu/mlac/mlac.asp/>). In the past, serial cancellations and storage decisions focused primarily on print resources, but with the addition of electronic resources, librarians must now manage an integrated collection consisting of both print and electronic formats.

This article explores the issues that emerge when cancellation and storage decisions in large academic research libraries are made in the context of such an integrated collection and asks the following questions: What new issues must be considered when "traditional" cancellation criteria are applied to print resources in an electronic environment? What issues develop when these criteria are applied to the electronic resources themselves? What new criteria emerge because of the complex nature of this format? And what impact do electronic resources have on the storage of print formats?

Throughout this article, it is assumed that deselection criteria are indicators to assist librarians in identifying possible candidates for cancellation or transfer to storage. These criteria are not to be applied exclusively but are to be used by experienced librarians and subject specialists as tools for evaluating a discrete body of materials (e.g., by Library of Congress classification) or for a title-by-title review. The librarian's knowledge of the collection, faculty research and teaching interests, user expectations, and current and future trends in research in related fields are equally important in ensuring that appropriate choices are made.

### CANCELLATION ISSUES TO CONSIDER

Because a large proportion of the electronic resources currently available in academic libraries are serial in nature (journals and databases), and because these electronic serials consume increasingly larger proportions of the acquisitions budget, they are becoming candidates for cancellation when economic forces necessitate such cuts.

In addition, according to G. E. Gorman (1997): "There was a time when collection development meant the creation and organization of collections of knowledge through a complex intellectual process . . . . Today collection development is more about access to information than about the quality of knowledge" (p. xv). He suggests that, driven by a desire to create and expand digital collections, libraries may have acquired electronic access to some resources without a deliberate and systematic approach as to how such resources actually developed the collection. In-

deed, several years ago, fewer options were available, and librarians may have been more accepting of what was offered. With an expanding array of electronic resources now available, accompanied by continuing budgetary pressures, many research libraries may find that a reevaluation of their electronic resources may be in order.

However, Gay Dannelly of Ohio State University and Tom Sanville of OhioLINK recently suggested that it may be premature for librarians to cancel electronic resources. In a discussion thread on the Liblicense-L electronic discussion list (<http://www.library.yale.edu/~llicense/ListArchives/>), beginning August 18, 1999, they expressed the view that electronic journals are actually changing user behavior, and that there is currently insufficient data to inform cancellation decisions of electronic resources.

The present article does not address the merits of either argument. Instead, it seeks only to outline the issues that emerge once a decision has been made to cancel within an integrated environment of both print and electronic resources.

The first section of this article discusses the factors to be considered in such an evaluation. Applying traditional deselection criteria raises a wide range of new and complex issues, many of which are not yet resolved and thus complicate the evaluation process. The second section outlines new criteria unique to electronic resources that have emerged and must be integrated into such an evaluation.

## APPLYING "TRADITIONAL" CRITERIA TO SERIAL CANCELLATIONS

This section discusses those "traditional" criteria most applicable to electronic journals and databases, and the complexities that electronic resources bring to bear on the evaluation process. Traditional criteria are defined as those deselection criteria discussed in the American Library Association's (1991) *Guide to Review of Library Collections* for print periodicals and serials (pp. 18-20).

### *Use Criteria*

Usage and especially cost per use are central criteria in determining whether a print title is a likely candidate for cancellation or withdrawal. Buckland (1990); Flynn (1979); Gyeszly, Bustion, and Treadwell (1990); Rice (1979); and others describe the methodologies behind journal use studies and detail the time and resources needed to conduct such studies of a print journal collection and to analyze the results. For unbound journal collections without online circulation data and for libraries with limited programming support, such studies require a great deal of time and effort.

With the advent of electronic resources, librarians hoped that automated usage data would be readily available, enabling them to evaluate

their collections easily and to assess the value of expensive journals and databases. They anticipated the potential to gather accurate data on *types* of use (e.g., to distinguish between browsing of tables of contents and actual viewing of articles), as well as cumulative use, and to rely on publishers, rather than understaffed libraries, to provide such statistics in a readily usable form. Unfortunately, librarians discovered that this potential is still largely unrealized. Publishers vary greatly in their definitions of use and in the format and usability of the statistics they provide despite recent standards developed by the library community, particularly the *Guidelines for Statistical Measures of Usage of Web-Based Index, Abstracted, and Full Text Resources* from the International Coalition of Library Consortia (ICOLC, 1998). Such variation severely limits a library's ability to evaluate these resources according to use and to compare the statistics from different providers. However, this type of data is an important aspect of evaluating often costly electronic journals and databases, and libraries should follow the ICOLC guidelines to encourage publishers and vendors to develop viable use statistics.

OhioLINK member libraries, however, expressed satisfaction with the statistics that were made available through OhioLINK's Electronic Journal Center, allowing them to compare electronic usage for titles currently held in print with those not held and to compare usage among all titles available from one publisher with the intention of eventually selecting titles for electronic access from among the "all-or-nothing" packages of several publishers (G. Dannelly & T. Sanville, *Liblicense-L*, August 19, 1999). Their experience, along with the usage data currently being analyzed by the University of Michigan as a result of the PEAK project (Pricing Electronic Access to Knowledge, <http://www.lib.umich.edu/libhome/peak/>), in which Michigan collaborated with Elsevier Science to investigate new pricing models for electronic journals, may provide models for analyzing journal usage in an online environment.

#### *Subscription Price Criteria*

As the *Guide to Review of Library Collections* (ALA, 1991) notes: "When reduction of expenditures is a primary objective, expensive titles become prime candidates for deselection review" (p. 19). The additional costs—and added strain to acquisitions budgets—associated with electronic resources make their integration into the evaluation process of collection management even more critical. Yet pricing is so complex and variable, and so different from the traditional list price for print products, that a comparison of price per title is extremely difficult, and an evaluation of cost per use is even more elusive.

What is certain is that networked electronic databases are far more expensive than their print or CD-ROM counterparts, and their costs may motivate librarians to question the value of a resource compared to its

expense. Such an evaluation may be particularly controversial when a resource, particularly a unique database, has long been held in print and has traditionally been considered a necessary part of the collection. Libraries must now consider whether a single resource is worth \$50,000, \$100,000, or more. Even if funding is available, libraries such as the University of Minnesota are carefully considering whether they should be paying such prices.

Web-based electronic journals have also proven costly, although how those costs are calculated varies widely and may be quite complicated. For example, the prices for print subscriptions and their electronic editions may be bundled or separate. Electronic access may be “free” with a print subscription, although the true price for access may be hidden in a substantial increase in the price for that print subscription or electronic access may be charged as a straight percentage of print subscription prices. Electronic journal prices may be composed of content fees, access fees, and platform fees, each based on its own formula. Negotiated prices may include special discounts, such as those for multi-year contracts, members of consortia, or agreements not to cancel print subscriptions. Such negotiated terms may also provide free access to certain additional titles or charge additional fees on a per-article basis. The list of pricing models and methods is endless, may vary from year to year for a single provider, and makes comparisons—either by title across publishers or by package across aggregators—extremely difficult.

Like print materials, particularly in the sciences, annual price increases for many electronic resources continue to outpace inflation. Even when a publisher/producer includes an inflationary cap on its products, as Elsevier Science (1999) recently announced it will do, the increases are more than most library budgets can bear. And, again, annual increases of 10 percent, or even 7.5 percent, for products that cost \$50,000, \$100,000, or more can increase the strain on an already beleaguered budget. As with all materials, a library must evaluate the electronic resources it can and should support and the ones it can no longer defend that consume increasingly larger portions of the acquisitions budget.

In addition, as noted in the previous section on use, cost data have traditionally been reviewed on a per title basis in order to determine cost per use as part of a collection evaluation. However, with the wide variation in how the costs for electronic journals and databases are calculated and the lack of consistent and comparable use data, such basic information is currently largely unavailable for electronic serials.

Comparisons of cost data may become possible as new pricing models for electronic resources emerge and become standardized. The California State University system’s recent success in moving away from “all-or-nothing” packages—in which publishers insist that libraries subscribe to either all of their titles or none of them—and negotiating for access on a

title-by-title basis may be a model worth emulating (Biemiller, 1999). Not all libraries are willing or able to pay large sums of money to a few publishers for extensive suites of titles, many of which do not meet the selection criteria that librarians would apply to individual print titles. Acceptance of such offers results in a budget that is increasingly consumed by these packages and leaves a library vulnerable to losing access to important journals in the event of a downturn in the budget, either because cancellation of this costly product in its entirety becomes necessary or because other unique titles must be canceled in order to continue this product's support. The prospect of canceling journals published by learned societies and professional associations in order to support lesser-used titles from commercial publishers is one most librarians will want to avoid. As noted in *Preferred Practices for CIC Licensing of Electronic Journals* (CIC, 1998): "Cancellation of electronic journals should be possible on a title-by-title basis" (p. 2).

#### *Coverage in Indexing and Abstracting Services*

Most journals that charge for access to electronic versions of established print titles are, by extension, covered by the major indexing and abstracting services. As the number of electronic-only journals has increased, the large subject-oriented databases, such as *Medline* and *MathSciNet*, have incorporated these into their review process and now include those that meet their criteria for coverage.

*Journal Citation Reports on the Web* and *Journal Utilization Reports* in electronic format, both from the Institute for Scientific Information and based on data in its citation indexes (i.e., *Arts & Humanities*, *Social Sciences*, and *Science Citation Indexes* now available through the *Web of Science*), provide statistical measures of a journal's importance. Since other automated measures of use are uneven, as discussed previously, the inclusion of electronic-only journals in *Web of Science* is important. However, note that there is a significant delay between the arrival of a new journal, whether print or electronic, and its inclusion in the *Web of Science*, so it will be some time before such data are truly available for journals published only in electronic format.

Of course, recognizing that they cannot afford all that their users need, librarians may make a strategic decision to ensure enhanced access to primary literature through online databases at the expense of owning many of the journals indexed, both print and electronic. Journals are therefore canceled in part to support increasingly costly networked access to databases.

However, the nature of online databases is expanding with the relatively recent inclusion of full text, and so are user expectations. Pressure is increasing to offer online access to articles that users identify through database searching. If full-text access through databases is linked to print subscriptions to those journals (as is the case, for example, for *Web of Science* and a portion of the titles available through *Electronic Collections Online*

from OCLC) but print subscriptions continue to be lost to cancellation, then fewer titles are available electronically. On the other hand, if the availability of electronic access makes such journals more valuable and attractive, then titles that may be canceled are in fact retained. Titles that are unavailable electronically, typically those from smaller or more esoteric presses, may be cut as a result, significantly altering the breadth and depth of a collection.

#### *Availability Criteria*

With respect to print resources, the *Guide to Review of Library Collections* (ALA, 1991) notes that: "Resource sharing within consortia or through other agreements reduces the burden of maintaining current subscriptions . . . to little-used journals" (p. 20). Unfortunately, many publishers prohibit interlibrary loan and document delivery of articles in electronic format, effectively preventing libraries from obtaining these papers through alternative means. The impact of such restrictions has perhaps been delayed because of the current tendency of libraries to duplicate titles in both print and electronic formats. However, as print subscriptions are canceled and a reliance on electronic formats increases, such restrictions could significantly affect the communication of scholarly information. Therefore, the extension of fair use guidelines to electronic media as well as to print resources will become increasingly critical. Publishers that insist on such restrictions would do well to follow the example of many society publishers, as well as Academic Press and Elsevier Science, which have recognized the need to protect interlibrary loan policies by allowing libraries to share *print* copies of online articles. Electronic delivery of such articles would be an even greater improvement.

Of course, librarians must consider the costs and benefits of such access versus "ownership" (where ownership is meant to be a bit more inclusive, referring both to journals that are bought outright and to direct electronic access that may not continue after cancellation). In particular, the inclusion of full text in online databases is changing the nature of such evaluations. For example, David Everett (1993) concluded that full-text sources provide few of the titles requested by users through interlibrary loan. Yet Adele Bane (1995) found considerable savings to interlibrary loan because of the availability of needed articles through *Business Periodicals Ondisc*. A cost-benefit analysis of *Business Periodicals Ondisc* by Gary White and Gregory Crawford (1998) noted that direct costs of full text versus direct savings to interlibrary loan were about equal, but that the nontangible benefits were sufficiently significant to justify continuing access to full text online.

#### *Subject Coverage, Intellectual Level, and Future Programmatic Value*

Collections change over time in response to the research and instructional needs of an institution. With print resources, however, the collection

remains intact and reflects those institutional changes. The costs of storing and reshelving those older and lesser used materials are a part of a library's budget since a central part of its mission is to preserve materials and make them available for future use.

Current pricing and subscription models for electronic serials, however, make responding to changing programmatic needs more difficult. If a resource is leased but not owned and an archive is not made available, then, upon cancellation, not only is the collection lost but so is the historical record that a resource was at one time important to that collection. In addition, if research is ever renewed in that subject, the archive would be difficult and costly to reconstruct. And if an electronic archive *is* made available, then a library is confronted with an entirely different set of issues, including the responsibility for developing an infrastructure to make that archive available in perpetuity.

In addition, in consortial arrangements for electronic journals, several of the large commercial publishers offer access to all their journal titles or to the total number of titles subscribed to by all participating institutions. The result is that libraries are given electronic access to titles that do not necessarily support the research interests or instructional needs of their institutions. In addition, libraries cannot cancel or opt out of these extraneous and highly specialized scholarly journals. And although publishers and some librarians argue that such additional titles *are* used, it is unclear whether users, particularly undergraduates, are finding articles that they *need* or whether they are willing to settle for something, or anything, in electronic format.

### *Duplication*

Although the *Guide to Evaluating Library Collections* (ALA, 1989) applies a duplication criterion only to monographs (p. 17), it is particularly applicable to electronic serials and is therefore included here. Duplication in an integrated collection takes several forms. First, there is duplication due to multiple formats, particularly electronic editions of print serials, both journals and databases. For the past ten years, spiraling journal costs that far outpaced increases to acquisitions budgets necessitated huge cancellation projects. Duplicate copies of print journals on one campus were often at the top of cancellation lists and the first to go, significantly reducing duplication of print resources on that campus. However, with the widespread adoption of electronic editions of print journals, and an initial reluctance to cancel the print, many research library collections are again full of duplicated content in different formats. Particularly where indexing and abstracting resources are concerned, some libraries and their users embrace the new electronic formats but still find it difficult to part with previous print and CD-ROM versions (as users note, they enjoy the convenience of Web-based databases but rely on print indexes as excel-

lent backups when server problems, Internet traffic, and workstation hardware interfere with research). It is this sort of duplication, however, that is becoming increasingly difficult to justify and must be examined.

One example of a smaller library that has instituted a policy to reduce such duplication is Drexel University. The library will subscribe only to the online versions of journals unless there are strong reasons to maintain both print and electronic access. Drexel has also decided to discard some non-core print journals that are duplicated online (communication from C. H. Montgomery to the STS-L electronic discussion list, August 25, 1999).

In addition, libraries must consider whether unique journal titles should be canceled in order to pay for core titles in multiple formats. Some faculty endorse this approach, but of course such decisions have significant implications. Libraries must consider their mission and purpose in developing a collection. Would such decisions affect a broader community, state, or region, particularly if those outside the university would not enjoy remote access to electronic resources? Are librarians obligated to maintain the breadth, depth, and uniqueness of a research collection? Budget constraints have already eroded what were once rich and diverse collections. What is the impact on scholarship if such erosion is hastened and research libraries become increasingly alike in their holdings? Users' demands for electronic resources place new and increasing pressures on collection managers.

Of course, licensing agreements that prohibit cancellation of print editions of electronic serials effectively tie the hands of librarians faced with unexpected budget constraints, particularly if hundreds of titles are involved through access to an entire package of journals from one of the larger commercial publishers. For libraries with uncertain acquisitions budgets, entering into such agreements may be risky, and the model endorsed by the California State Library system may be preferable.

In addition to duplicated content through multiple formats, duplicated content has recently arisen through an increase in the number of vendors and aggregators providing access to similar content. Often the duplication is more a matter of overlap than exact replication, but such overlap should also be evaluated. For example, one research library may subscribe to *Expanded Academic Index* (Information Access Company), a wide variety of subject databases through FirstSearch (OCLC), and *Academic Universe* (Lexis/Nexis), and discover that it is paying repeatedly (and again, for large research universities, each product may cost \$50,000 to \$100,000 or more) for resources that offer a great deal of duplicated content. In such cases, additional criteria must be part of an evaluation to determine whether the unique aspects of such products justify such duplication.

An interesting motivator for selectors to cancel the print version of a serial that is also available in electronic format is that the two formats may

be paid for by different sources of funding. If a print title is funded by a selector's serials budget, but the electronic edition is paid for centrally, perhaps because it is included in a large package of titles, the selector may realize savings while still maintaining some form of access for his or her users.

### APPLYING NEW CRITERIA IN THE CANCELLATION OF ELECTRONIC SERIALS

Drawing from a list developed by Cheryl LaGuardia and Stella Bentley in 1992 for online databases, Peggy Johnson (1997) offers a list of considerations to guide librarians in the selection of electronic resources or to help them choose between print and their electronic counterparts (p. 97). These same considerations may be applied when reevaluating a resource, particularly when new products become available and new comparisons are needed or when similar content is offered by several different publishers or vendors. Among the criteria given are the following:

- availability of network hardware and software resources, electrical and telecommunication lines, systems support, and maintenance;
- additional costs for all of the above, which further complicates cost comparisons;
- quality of the interface, treatment of images and equations, and functionality of the search engine; and
- licensing considerations, including any barriers to access or constraints on use.

In addition to these criteria, several additional factors and attendant issues may also be taken into consideration.

#### *Competition among Vendors*

Unlike print journals and indexes, an increasing number of electronic resources are now available from a wide variety of vendors, each of which may offer different features at different prices. For example, a Web-based version of the Inspec database is available through several different vendors, including SilverPlatter, Ovid, OCLC FirstSearch, and the American Institute of Physics. Each vendor offers a different interface, different search capabilities, and varying levels of full-text content, at very different prices, offering libraries more selection and a more competitive market. As the number of vendors and aggregators increases, and as the number of titles or resources that each vendor offers increases, libraries will find that they need to reevaluate decisions made several years ago and consider selecting a new vendor that offers comparable, if not exactly the same, content. For example, Yale University reports that they have changed vendors for their "undergraduate" suite of electronic journals three times, moving from IAC's Academic Index to UMI Proquest Direct to Ebsco Aca-

demic (A. Okerson, personal communication, August 30, 1999). Although in these examples content may not be eliminated completely through cancellation, a growing number of choices in obtaining access to similar content necessitates a continuing review of electronic resource decisions and the ongoing coordination of migrating to new platforms and interfaces.

#### *Consortial Arrangements*

Access to many electronic resources available in research libraries is purchased through consortial arrangements with other institutions. Through such agreements, libraries may increase their buying power and realize significant savings, but they may also find that their subscriptions are less flexible. For instance, cancellation by one institution affects the pricing that the remaining institutions must pay, particularly if pricing depends on the total number of FTE and a large institution decides to back out of the agreement, leaving much smaller institutions to pick up the tab. Such arrangements, and the impact on other institutions, could influence a library's decision on whether to cancel or retain a resource.

#### *Archiving Options*

Uncertainties about the permanence of electronic resources have made librarians understandably nervous about abandoning a print format in favor of an electronic option (Buckley, Burright, Prendergast, Sapon-White, & Taylor, 1999). Instead, libraries have tried to maintain both (and even, on occasion, additional versions on CD-ROM and microfiche). Cancellations could result in the complete loss of data paid for in previous years—particularly true for bibliographic databases and many electronic journals. Certainly, the potential to lose access completely to many years of data purchased over time could influence a cancellation decision.

Increasingly, electronic journal publishers are realizing that they must address archiving concerns in order for these resources to be fully accepted by the library community. However, a guaranteed archive also has costs: Some publishers require that libraries purchase the data on CD-ROM; others are considering charging a fee for continued access to an archive that the publisher hosts electronically; still others will hand over the data free of charge, but then the library is responsible for making that data accessible to users in perpetuity, which presents the library with an entirely new range of costs and factors to be considered. Certainly, the presence or absence of an archive is a consideration in retention decisions, although budgetary pressures are forcing libraries to reduce duplicated formats or forego the electronic alternative altogether.

As discussed throughout the first half of this article, electronic resources can have a significant impact on serial cancellations. In terms of both budgetary realities and issues of access, libraries have yet to strike an acceptable balance in integrating print and electronic collections. This will be a critical goal in the coming decade. The second half of this article

will discuss how these electronic resources may influence the selection of materials for remote storage.

### ISSUES TO CONSIDER IN THE SELECTION OF PRINT MATERIALS FOR STORAGE

The *Guide to Review of Library Collections* (ALA, 1991) identifies three guiding principles in selecting materials for storage: "In general, decisions to transfer material to a storage facility rest on a careful balance between prompt user access to materials, the need for space for growing collections, and protection of specific materials" (p. 10). While the availability of electronic alternatives could be applied to these principles, most large academic research libraries have not yet integrated this criterion into their storage programs, primarily because of the high cost of digitization. Indeed, in most libraries, digital initiatives do not address storage concerns with only a few exceptions. In 1997, the University of Minnesota Libraries announced the construction of a new state-of-the-art storage facility and its plans to "press the boundaries of the application of digitizing technology both as an access medium and as a means of reducing paper storage demands" (Merrill-Oldham & Reed-Scott, 1999, p. 31). Now, as the new facility nears completion, this initiative is uncertain due to inadequate funding. More recently, Columbia University, Princeton University, and the New York Public Library announced similar plans to digitize a significant portion of the journals housed in their shared storage facility (Davis, 1999). Despite the promise of these high-profile initiatives, most libraries are developing digital collections not as an alternative to print collections but rather as an additional, or an enhanced, means of access to library collections. While there is considerable political pressure to move toward the digital library, there are still serious economic, cultural, and organizational issues that must be resolved before most large research libraries will rely on electronic collections as the primary or only means of access to library resources.

#### *Economic Issues*

The costs involved in building digital library collections are high and, given the limited staffing and fiscal resources available in most institutions, libraries must often strike a balance between acquiring commercially produced electronic products, digitizing local collections, and maintaining ongoing acquisitions of print materials. When digitizing local collections, libraries must also weigh needs and institutional priorities in giving priority to low-use research materials or to high-use teaching materials. Choices are often further restricted by available funding sources.

Few libraries have used a storage location as a primary criterion in identifying collections or individual titles for digitization, in part because of the relatively high cost of digitizing when considered against the rela-

tively low cost of storage of print materials. In a recent ARL survey, Merrill-Oldham and Reed-Scott (1999) reported a mean per volume storage cost of \$0.90 for reporting institutions (p. 8). More accurate representations of cost include construction costs and retrieval/circulation costs. Lesk (1998) suggests that these total costs may be as low as \$2.00 per book in off-campus warehouse storage (p. 209). While Lesk (1997) and others argue that costs for scanning are now approaching costs for storage (p. 75) and that it may soon be cheaper to digitize collections than to store them, others agree with Bruce Bruemmer, coordinator for Digital Projects at the University of Minnesota, that scanning costs represent only 25 percent of total costs for digitizing projects. More important, and more costly, are the administrative, descriptive, and structural metadata aspects of these projects (B. Bruemmer, personal communication, August 30, 1999). Despite these higher costs, many libraries may choose to digitize stored materials or even to digitize instead of store print materials, but these decisions are made in response to other factors—among them, an interest in creating a digital library and enhancing access to library collections.

#### *Cultural and Organizational Issues*

As with most technological change, libraries and their users are slower to adapt to the new environment, and there is an inevitable period of adjustment as they work out new modes of operation. Most libraries and their users, while embracing the potential advantages of electronic collections, are not yet confident that the disadvantages of this technology will be overcome. Nor are they entirely comfortable with working in an electronic environment.

#### *User Expectations*

Many librarians report that there is a broad spectrum of user acceptance of electronic access, in part because of individual levels of interest, but perhaps more importantly, because of varying levels of sophistication of the campus infrastructure from department to department and office to office. Libraries must work with the broader campus community to identify an acceptable minimum level of access and to support campuswide training in the application of these resources to the research and teaching of the university community. User confidence in the reliability and continuity of these resources is a broader issue.

#### *Copyright*

Intellectual property rights in the electronic age are among the most important issues to be resolved as we move into the twenty-first century. Without resolution, the digital library will have little resemblance to the library as we now know it. The impact of copyright is felt in several ways. As libraries negotiate contracts for commercially produced electronic resources, they are obligated to accept more restrictions on use and access

than is allowed under the Copyright Act of 1976. It may be difficult for users to rely on electronic resources as their primary or sole means of access when there are fewer restrictions on print resources under fair use guidelines. As libraries digitize their collections, they are currently limited to titles in the public domain and collections for which they hold the rights. This restriction eliminates any flexibility libraries may have in creating new and innovative applications designed to adapt library services to the new academic environment of distributed services and distance learning.

As libraries expand services to users, electronic delivery is becoming a viable alternative to fax or photocopies, although for most libraries it is still too costly in comparison with other delivery mechanisms. A recent ARL survey found that eight libraries (14 percent of responding libraries) currently provide electronic delivery (Merrill-Oldham & Reed-Scott, 1999, p. 10). Since that survey was conducted, other ARL libraries have begun, or are considering, pilot projects. Should libraries consider archiving these scanned documents for future use, they would also face copyright restrictions.

#### *Need for Archiving*

As discussed earlier, we need assurances from publishers that they accept responsibility to archive their electronic resources and to make them available into the future. How these archives and archives of locally produced resources will be maintained across hardware and software platforms is perhaps a more serious matter. The Council on Library and Information Resources publication *Why Digitize?* (Smith, 1999) identifies three reasons for concern: (1) uncertainty about the technology and standards needed for migrating and accessing digital documents, (2) the high costs of maintaining these archives, and (3) the issues involved in establishing the authenticity of electronic documents (pp. 3-7). However, as libraries become increasingly reliant on networked access to electronic publications, particularly electronic journals, concern about archiving these resources may become harder to defend in light of increased user demand for, and satisfaction with, enhanced and, in many cases, expanded access to the journal literature.

#### APPLYING "TRADITIONAL" CRITERIA FOR STORAGE WHEN ELECTRONIC RESOURCES ARE AVAILABLE

The *Guide to Review of Library Collections* (ALA, 1991) discusses six criteria relevant to storage and deselection decisions when electronic alternatives are available: (1) actual use, (2) projected use, (3) protective storage, (4) redundancy, (5) availability, and (6) physical condition (pp. 10-18). For most libraries, the first criterion for storage is still use, but librarians must consider how the existence of electronic counterparts to print mate-

rials alters the situation. In the current environment, the application of these criteria will vary considerably by format and by discipline both because of significant differences in the availability and sophistication of electronic counterparts to the various formats of research materials and because of historical and disciplinary traditions in the use of these materials. Electronic journals, particularly in the sciences, are clearly the most advanced and widely accepted electronic format. They meet the needs of most researchers and, in many cases, are the preferred means of access. In contrast, monographic materials and other related primary sources are still at a developmental stage in terms of production, access, and user acceptance.

#### *Actual Use*

Several studies report that past use is the best indicator of future use and is therefore an appropriate criterion to apply in identifying materials for storage. Slote (1989) has developed procedures based on "estimates or measures [of] the length of time a book remains on the shelf between successive uses" (p. 30). The Silverstein and Shieber (1996) study at Harvard University revealed that past use is the "best single criterion for predicting book use" when a significant percentage of materials are selected for off-site storage (p. 276). *The ALA Guide to the Evaluation of Library Collections* (1989) provides an overview of methods for gathering use statistics. Recognizing that the retrieval of materials from storage has a direct impact on the operating costs of a storage facility, most libraries include this criterion, along with publication date and format, in their decision-making process. The guidelines prepared at Brown University (n.d.), Dartmouth University (1992), and Yale University (1999) are typical of most large research libraries. The University of Minnesota has also identified use as the primary criterion for storage. When considering the use of print materials and their electronic equivalents or alternatives, it is more difficult to evaluate relative use of the two formats. Libraries are finding that the availability of electronic formats is generating use that would not have occurred if only print were available. The University of Michigan Making of America Project (1998) has generated considerable use of the widely available electronic texts while the stored print editions have seen little or no use. Similarly, projects such as the Brown University Women Writers Project, *Women Writers Online* (<http://www.wwp.brown.edu>), and the University of Minnesota Women's Travel Writing Project (<http://etrc.lib.umn.edu/womtrav.htm>) apply the technology of text-encoding software to digitized printed editions. They create new enhanced texts to support research in text analysis that would have been impossible with printed editions. In the case of JSTOR, even though there is an electronic equivalent, some libraries consider these primary titles ineligible for storage because of high use. Other libraries move partial

runs of JSTOR titles into storage to adhere to general date criteria. For example, Ohio State University considers all pre-1960 science and technology serials potential candidates for transfer (Merrill-Oldham & Reed-Scott, 1999, p. 115).

The issues related to how these materials are used are also critical. In fields dependent on current journal literature, such as high energy physics, computer science, and engineering, older runs of journals have been reasonable candidates for storage, allowing libraries to identify large amounts of material with little effort. In fields dependent on historical scholarship, older runs of journals and older books are likely to be more heavily used and thus inappropriate for storage. In all disciplines, storing or weeding print materials in favor of electronic formats as the primary or sole means of access is dependent on user satisfaction and confidence: Does the electronic format meet the research and teaching needs as well as print? Has the print journal been digitized from cover to cover, including all editorial material, such as correspondence and advertising? Does the electronic format enhance access, either in terms of desktop delivery or greater access to the content through full-text searching capabilities?

#### *Projected Use*

While libraries have past use data from a sufficiently long period to make reliable predictions of future use of print materials, they do not have comparable data for use of electronic resources. While it seems clear that use of electronic resources will only increase, libraries are still cautious about making decisions based on available data. In particular, they are uncertain about how the availability of electronic resources will impact the use of the print counterparts. Some institutions report increased use of print materials while others report decreased use of print, but few librarians are willing to predict future use based on these trends. As noted in the previous section on cancellations, Ohio State University has only now accumulated sufficient data to begin an evaluation of level of use and user satisfaction after investing heavily in building their electronic journal collections over the last three years. They will concentrate on those titles provided through OhioLINK since the consortium mounts the content locally and thereby serves as a consortial archive location (G. Dannelly, personal communication, August 30, 1999).

#### *Protective Storage and Physical Condition*

As discussed earlier, digitization is not yet recognized as an appropriate medium for preservation. It is, however, an appropriate medium for providing access to brittle or fragile materials, at least for those volumes that have little or no artifactual value. Instead of creating photocopied editions to replace the originals, libraries are now moving toward digitizing the original as the primary point of access and creating a print reproduction of the original from the digital copy or reserving that option if a

print edition is required. The disposition of the original edition is still a sensitive issue. Because they serve as collections of record, academic research libraries are reluctant to take the final step of withdrawing the print and relying solely on the digital copy. This may change as the standards for creating, maintaining, and migrating digitized collections are developed and as librarians and users gain confidence in the reliability of digital resources.

### *Redundancy or Duplication*

Generally, librarians are not convinced of the interchangeability of print and electronic resources, and so the issue here is not so much duplication as it is equivalence, both in terms of content and use. Librarians do not consider the availability of an electronic counterpart as justification to store or weed a print title without consideration of these factors. Print journals, indexes, and abstracts are among the first likely candidates for storage. Usage of many print indexes and abstracts has declined dramatically to the point where younger faculty and undergraduate students may not even be aware of their existence. In the case of electronic journals, the increasing number of projects digitizing full or extended runs of journals, among them, JSTOR, the Physical Review Online Archive (<http://prola.aps.org/>), and the American Theological Library Association Serials Project (<http://rosetta.atla-certr.org/CERTR/CERTR.html>), will generate a larger body of data and enable librarians to better understand the relationship between print and electronic.

In the case of monographic materials, the situation is more complex. In considering the wide array of electronic texts, electronic editions, and electronic books that are now available, librarians need a clear understanding of how these formats differ from their print counterparts.<sup>1</sup> Electronic texts are only loosely connected with print counterparts. Project Gutenberg, begun in 1971, creates electronic public domain texts that are "99.9 percent accurate in the eyes of the general reader" with little or no commitment to creating authoritative editions (Hart, 1992, p. 3). Compilations such as Chadwyck Healey's *Literature Online* (<http://www.chadwyck.com>) and the ARTFL Project (<http://humanities.uchicago.edu/ARTFL/ARTFL.html>) are compiled from a large number of identified printed editions, but their use extends beyond the limitations of the source editions. Electronic editions are closely related to a specific print edition but are expanded to provide additional information or to allow more specialized access than is possible with the print counterpart. This category includes the ever-increasing number of texts enhanced with text-encoding initiative (TEI) software and reference books such as the *Grove Dictionary of Art Online* which expands the text of the printed edition to include links to related Web sites. Electronic books have a one-to-one correspondence with a print edition or exist only in electronic for-

mat. It is only this category that provides true equivalence between print and electronic formats. It includes older, mostly public domain, books digitized by libraries and new or recent imprints distributed by publishers and vendors such as netLibrary.

### *Availability*

Closely related to redundancy, this criterion addresses the need for access: whether an item is available within the library or from external sources (ALA, 1991, pp.17-18). That is, is there some provision for alternate access? Few libraries have included the availability of electronic alternatives in the selection process, either because their selection criteria were developed before electronic access was available or, as is the case at Yale University (1996), they determined that "digital publications will have only marginal impact over the next decade or more in moderating the space requirements of collection growth." Some libraries, however, are moving forward. Brown University (n.d.) has included the availability of an electronic version in their general criteria for selecting material for storage. Princeton and Columbia Universities will also consider the availability of electronic formats in selecting materials for their shared facility (Princeton, 1999).

For some categories of materials, digitization does present significant advantages over storage by enhancing access to materials. Technical reports and other locally-produced documents or research reports are often under poor bibliographic control and may be difficult to locate. Because they tend to be in poor physical condition and have limited artifactual value, they are likely candidates for digitization (and storage of the paper originals). Digital access to theses may also have a significant impact on storage decisions. The University of Minnesota recently revised its policy on retention of doctoral dissertations. Rather than maintaining print archival and circulating copies of all dissertations, they have chosen to rely on Bell & Howell Information and Learning (formerly UMI) as the archive of record for all doctoral dissertations that have been deposited with Bell & Howell since 1953 and will retain only one circulating local copy. This difficult decision was made in response to severe space constraints and may not have been made were it not for the space crisis, but it highlights the alternatives that are available in the digital environment.

It is not yet clear how these resources will be managed in integrated library collections or what impact they will have on the use of those collections. Decisions about storing print monographs that have electronic counterparts must be made on a case by case basis, relying heavily on local needs and research interests. Access to the electronic text must fulfill the demands of most, or even all, users to ensure the cost and space savings associated with storage facilities. For those titles having approximate electronic counterparts, it is likely that other criteria such as usage and condi-

tion would be weighed more heavily than the availability of electronic access to the content of these titles. For those titles having exact or parallel electronic counterparts, the decisions are simpler but, again, there must be a high level of confidence in user satisfaction with electronic access.

## CONCLUSION

In the environment of integrated library collections, the array of opportunities and challenges presented to collection managers must be solidly grounded in the mission and goals of the academic institution. The library must consider:

- its mission to its primary users,
- its obligations to the larger community,
- its role as a research library in providing breadth and depth of coverage,
- its position on access to information versus ownership of that information,
- its comfort level with the current state of archiving of electronic resources,
- its desire to increase access to special collections and "low-use" materials through digitization, and
- its need to balance the costs of maintaining its print collections with the need to expand its digital resources.

In the increasingly expensive arena of print and electronic journals, the fiscal realities of inadequate acquisitions budgets, increasing demand for electronic access, and the commitment to maintaining research level collections require that librarians work within the broader community to address the outstanding issues preventing a reasonable integration of electronic resources into existing library collections. The difficulty of balancing storage costs (from open stack collections to remote high-density facilities) with user needs for access may be eased in the future as administrative and operational costs for digitizing decrease, but the remaining issues of user expectations, copyright, and the need for archiving have yet to be resolved.

The ALA's *Guide to Review of Library Collections* (1991) and the *Guide to the Evaluation of Library Collections* (1989) provide a solid foundation from which to consider the implications of electronic resources on the management of print collections. This article is an initial attempt to expand the existing guidelines and to outline the issues that must be addressed as libraries work toward integrated collection management. At this point there are more questions than answers. Further research is needed in use studies to examine how electronic collections are used and the impact of this use on print collections; in surveys of user satisfaction with, and

expectations of, electronic access to library collections; in examining the costs of building digital collections; and in options for distributing these costs in consortial or collaborative partnerships among libraries. In addition, libraries must expand and encourage international cooperation in the development of standards for creating, maintaining, and preserving electronic texts.

## APPENDIX

### INFORMAL SURVEY OF MEMBERS OF THE ASSOCIATION OF RESEARCH LIBRARIES

Research for this article included an informal survey of large ARL libraries. Respondents to the survey were asked the following questions.

1. Have print subscriptions been canceled in favor of electronic formats (journals, databases, etc.)?
2. If you haven't yet begun to cancel print subscriptions, what criteria must be met for future cancellations?
3. Have subscriptions been reevaluated and subsequently canceled? If so, why?
4. In the operation of (or planning for) your storage facility are selection/deselection decisions influenced by the availability of electronic alternatives? For example, are print journals available through JSTOR sent to storage? Do you have other examples?
5. Do you digitize stored materials to meet patron requests for electronic delivery (as an alternative to providing original or fax copies)?
6. Do you have (or plan to have) a formal program to digitize print resources as an alternative to storage (beyond on demand digitizing in the previous question)? Are you discarding print materials that are duplicated in electronic format?
7. Do you believe digitizing (commercial, consortial, or local) is an acceptable alternative to storing low-use print materials? Do you believe such digitization is primarily a mechanism for improving access or delivery rather than a collection management/preservation decision?
8. Do you have a formal document outlining the selection criteria applied to identify materials placed in storage? Does it address the impact of electronic resources?

## NOTE

- <sup>1</sup> Use of these terms is not consistent in the literature. Distinctions made between these terms are not intended as definitions, but to categorize the wide variety of electronic texts now available, particularly as they relate to comparable print texts.

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