More Bang for the Buck: Increasing the Effectiveness of Library Expenditures Through Cooperation

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ABSTRACT
The long-term strategy of the academic library community needs to focus on improved cost effectiveness rather than becoming preoccupied with the short-term effects of budget reductions. Fortunately, the rise of consortia and the maturing of the automation environment provide a conducive environment for substantial gains in the cost-benefit ratio over a wide range of library services. Examples of such gains in four key library service areas are described.

INTRODUCTION

At a time when the restraints on academic library budgets are universally painful and seemingly ongoing, it is easy to believe that the fundamental problem for academic libraries is retrenchment and cost cutting—easy, but wrong and short-sighted. The underlying focus for budgetary attention, whether times are flush or flushed, should be a concern to get the most value out of each dollar spent. In the last decade and a half the convergence of two explosive trends—the rise of digital information and consortial organization—have provided radical new possibilities for improving libraries' abilities to get more value out of each dollar spent. Such a positive approach to the budget can also provide a strong implicit argument for preserving or even increasing the library's share of limited university resources. But whatever the library budget ultimately, the rightful concern for present-day librarians is the potential these two new developments have to increase the value received for library money spent. OhioLINK, a consortium of Ohio academic libraries, as well as other consortial examples, provide illuminating instances, if not a comprehensive survey, of how such an approach to increasing cost effectiveness can work.

Four rather different areas of library service agendas can illustrate how

creative use of these two new developments can improve the cost-benefit ratio of library expenditures: sharing printed books, storing print materials, providing access to the journal literature electronically, and providing access to electronic versions of library special collections, faculty publications, or university projects through a consortial institutional repository. In each of these areas, OhioLINK libraries have dramatically expanded access while at the same time improved the cost-benefit ratio of library services through use of a consortial approach combined with appropriate digital technology. It is important to note that the end game for each of these projects is not to return money to the university administration but to improve and expand services to the user community.

Sharing Books in a Cost-Effective Manner

Books in printed form continue to represent a vast and valuable resource for most academic libraries. Although the idea of using digital technology to share books by putting printed books online goes back more than a decade, and recent announcements by Google and its library partners suggest the first realistic expectation that such an approach might actually come to pass,[1] replacing print books with digital materials on a widespread basis still remains a future possibility. In the meantime, the printed collections held by academic libraries may be in many cases the most monetarily valuable single item owned by a university. Some years ago, for example, when it became necessary to establish a monetary value for the library collection at the University of Cincinnati (UC) for insurance purposes (an intellectually foolish but fiscally required exercise), the resulting value was $117,674,821.[2] Built up over time, academic library print collections universally represent a huge university or college investment.

Ironically, the larger and intellectually richer the collection and its attendant larger acquisition costs, the lower the cost-benefit ratio to the institution, since per title use of large collections is quite small. An informal study at the University of Illinois–Urbana Champaign prior to installing compact shelving in the main stacks, for example, showed that only around 1 percent of the main stack collection was circulated in any given year, while an earlier landmark study of collection use at Pittsburgh suggested that many research books were acquired "just in case" and languished on the shelves, with almost 40 percent of new acquisitions not circulating in seven years (Galvin & Kent, 1977).[3] Even in small, ostensibly high-use collections, the books linger on the shelves. A 1977 study of book circulation at Columbia-Green Community College showed that only 35 percent of the books circulated in a fifteen-month period (Ettelt, 1978). Attempts to leverage the large investment in these collections and expand access to local patrons through interinstitutional borrowing privileges for faculty and graduate students or through interlibrary loan (ILL) were useful steps but represented a negligible increase in use compared to local borrowing. In

the case of ILL, such a strategy of sharing represented an expensive solution, at a combined $31.00 per transaction for the borrowing and lending institution (Jackson, 1998).

The rise of consortia in the early 1990s and the relative maturity of library bibliographic automation, which allowed real-time knowledge of not just library holdings but library circulation records as well, opened up new possibilities for taking advantage of the past huge investment in printed books as well as increasing the efficiency of developing collections. There are three basic principles: (1) it is much cheaper to make low-use and marginal books available to local patrons by borrowing from other institutions rather than by purchasing them; (2) substantial sharing among consortial members requires major reductions in the unit cost of borrowing and major increases in the ease and speed of sharing materials; and (3) it is possible to substantially improve the cost per use of a book title as well as increase the richness of the collection by transferring money spent on unnecessary duplication to purchase of new titles.

There are several examples of how this can work in practice. In the case of OhioLINK, we have managed to increase the effective collection size of each participating institution to 43,500,000 items, including 9,259,000 unique titles. We have dramatically reduced the traditional ILL costs between member libraries by using patron-initiated requests and a staffing context that requires little more than low-cost student labor. Based on an in-house study at the University of Cincinnati, the round-trip delivery costs using student labor came to less than $1.00 per requested and returned item. We have forty-eight-hour turnaround for 75 percent of interinstitutional borrowing requests and seventy-two-hour turnaround for 95 percent of our interinstitutional borrowing requests. A variety of cooperative tools and approaches have been developed, and libraries are experimenting with coordinated collection development in order to reduce unnecessary duplication and expand overall collection depth and breadth.

How does a highly automated consortial environment bring this about? Consortial collections can be large and grow at a prodigious rate since a book added by any consortial member is in effect added to everyone's collection. The key to a practical virtual collection, however, is not the size of the collection per se but the ease, speed, and expense of actually using each other's materials. OhioLINK, working with Innovative Interfaces, Inc., developed a real-time consortial circulation module that allows a patron in any OhioLINK library to search, view circulation status in real time, and request materials held in any member library. Such searches and requests are called "patron-initiated circulation" rather than ILL since they do not require the staff or procedures of a traditional ILL loan. All requests for materials between libraries are initiated directly by the patron and mediated by automation technology since all such requests are for known items in known locations. Since the patron can see the circulation status of the

desired item, lost, circulating, or restricted items can be ignored and only those items that are truly available are requested. A notice is generated at the holding library, which prompts retrieval by a student assistant, who does a preliminary checkout to the requesting patron and deposits the book in a courier bag for delivery to the patron's home library. At the patron's home library the checkout is confirmed when the item is picked up by the patron.

In terms of faculty and student response, patron-initiated circulation is probably the most successful program undertaken by OhioLINK libraries. Acceptance has been enthusiastic and use vigorous. Beginning in 1994 with 6 library members, patron-initiated borrowing now includes 85 institutions and has risen from 77,000 items per year to 756,000 items per year. By transforming interinstitutional borrowing from a marginal to a core activity, it can be truly said that every academic library in the state of Ohio has increased its effective collection size to 43,500,000 items. It is particularly worth noting that highly automated sharing of consortial print resources is not only much more cost effective than traditional ILL but is much more cost effective than each library purchasing even a fraction of that size of collection individually.

It is even possible to increase the cost effectiveness equation by fine-tuning the collection development process. While establishing in-depth collection specialty responsibilities among OhioLINK member libraries is an evolving process, a working outline of the mechanism is emerging. Developing consortium purchasing mechanisms within Yankee Book Peddler's GOBI2 administrative system allows library collection development specialists to see what books other consortial members have already purchased. This provides a voluntary mechanism likely to reduce unnecessary duplication in the consortial collection. The resulting savings can then be used to extend the depth and breadth of collection coverage. Already reports from OhioLINK selectors indicate this is happening, and new acquisition rules that account for copies already held by others are creeping into the system. Data from the patron-initiated circulation program is revealing in terms of suggesting the scope for such redeployment of funds. Thirty-nine percent of such requests have five or more available copies at the time of request. There is clearly unnecessary redundancy in the system; funds could be put to better use buying a wider range of materials.

OhioLINK is not alone in discovering the increased cost effectiveness of sharing printed books rather than purchasing them. One prominent consortium that has published a report on a similar project is the group of Borrow Direct partners. Unlike OhioLINK, these consortial members do not share a common automation system and must operate across state lines. Still, they have been able to drive the sharing costs quite low (down to $10.00 per transaction). They report many of the same advantages in extending the range of resources available to their patrons in a timely and convenient way while significantly improving the cost-benefit ratio of

their book collections through sharing rather than purchasing (Nitecki & Renfro, 2004).

In short, in a predigital world it was necessary for academic libraries to function as largely self-contained repositories with all the attendant inefficiencies and cost-benefit problems noted above. Increasingly mature automation technology has made interinstitutional searching a "known item" in a "known location" experience. It has made it possible to realize considerable savings and to increase the speed and reliability of the former ILL experience so that interinstitutional sharing can be a major, rather than negligible, element in library circulation. Solving such problems in a consortial environment allows librarians to deliver in practice what was formerly only a theoretical hope—a reliably working virtual collection offering a huge range of resources in an improved cost-benefit environment.

Storing Books in a Cost-Effective Manner

Building libraries is an expensive proposition, in part because they require such a variety of spaces—book stack space, reference space, carrel and study space, a variety of technical services spaces, office space, and so on. While the need for these spaces is declining or static in many academic libraries as building traffic, cataloging units, and numbers of library staff generally decline, the need for stack space reliably continues to increase year after year. Although many librarians may be under the impression that monographic purchases have been declining due to shifts in library budgetary resources to support scientific, technical, and medical (STM) journals, in fact the average number of books purchased by Association of Research Libraries (ARL) members has steadily increased, though with occasional pauses to regroup, over the years. From 1989 to 2003 the average number of books purchased by an ARL library has risen from 34,500 per year to 41,836 per year—a 21.3 percent increase in the last fifteen years (Association of Research Libraries, 2003). Given this trend, it has become clear to library administrators and funding agencies alike that the most practical solution to this lopsided pattern of space needs is the construction of specialized storage facilities devoted exclusively to the efficient storage of physical library materials—primarily books but also bound journals, government documents, and even archival records.

Although such specialized buildings are not always associated with consortia (some of the largest libraries such as Harvard and Yale have their own exclusive, high-density storage facilities), the history and general trend of libraries is to approach the construction of such facilities as a group (consortial) project. The first storage facility independent of a particular library in the United States was the New England Depository founded in 1942, followed shortly thereafter in 1951 by the better-known Center for Research Libraries (originally named the Midwest Inter-Library Center until 1965).

While these pioneering efforts provided useful experience and lessons, the trend for highly specialized and physically separate high-density storage units began in earnest in the 1980s. Characterized by a highly specialized off-site building; major, rather than token, transfers of library material; digital (Web) access to repository holding records; and facility ownership/funding generally based in a consortium, a variety of building models emerged. The University of Michigan retrofitted a preexisting building to create the Buhr Shelving Facility in 1981, and the University of California system organized their buildings around the use of standard compact shelving in 1980, but the dominant model was pioneered by Harvard in 1986—a large cube with ten-story stack ranges, shelving by size, and a small associated processing area. As well as being the dominant model, the Harvard approach is the most radical in its single-minded focus on storing the largest amount of material in the most compact space.

The difference between earlier repositories and the post-1980s models can be most clearly seen by comparing the Center for Research Libraries (CRL) with both a Harvard and non-Harvard model of high-density storage. CRL, for example, has a present collection of 3.5 million volumes. This may seem like a lot, but consider that this collection was built over a fifty-one-year period from an approximate average of sixty members nationwide. This is the equivalent of an average of 68,627 volumes being transferred annually from roughly sixty members, or just over a thousand volumes a year per member. Since the CRL has also functioned as a common buying club for some materials, this means even fewer materials being transferred.

In contrast, the southwest Ohio repository (based on the Harvard model and one of five OhioLINK high-density storage facilities), serving just four academic libraries, has developed a collection of 1.5 million volumes in under eight years. This is the result of a transfer rate of 187,500 volumes per year for four libraries or 46,875 volumes transferred annually per library. This represents an increase in transfer rate of over 40 times (40.97) that at CRL. Such large transfer rates are common. The first module of the California Northern Regional Library Facility (a non-Harvard model) was filled with 3.1 million volumes in six years (University of California, Berkeley, 2005). With four large member libraries transferring materials, that comes to 129,167 volumes annually per library. Although the transfer rate declined while filling the second module—2.37 million volumes over ten years for a 59,250 volume annual transfer rate per library—even this lower figure is still well above a 40 times greater transfer rate than that experienced by CRL. Incidentally, both the northern California and the southwest Ohio repositories are well along in planning their third repository module. In short, these repositories are not a one shot, one time solution but an ongoing way of life for the foreseeable future.

In addition to the very real advantages of storing printed materials under optimal storage conditions (controlled light, temperature, humidity), there are a number of other important advantages as well. The first is the efficiency of the shelving. Shelving by size in oversize stacks dramatically increases the number of materials that can be stored. Minnesota studies indicate a 40 percent gain in shelf storage capacity (University of Minnesota, 2005). A second important point is cost. An informal review of comparative costs by Orbis, a coalition of academic libraries in Oregon and Washington, indicated that the construction cost per volume was $3.75 for a high-density facility compared to $13.39 for traditional campus library construction (Murray-Rust, n.d.). Yale reports an even higher rate of savings, calculating that off-site storage is one tenth as expensive as traditional library open stacks housing (Block, 2000). The lower costs of off-site land alone can be a significant factor. For what they do, the modern repositories are relatively cheap to build and very cheap to maintain.

 A third important point is that these repositories are basically local, serving a relatively small number of nearby libraries. This is a very important feature when the library tries to convince local faculty to agree to let "their" materials be moved to another location. Any library director will agree that "down the street" is a much easier sell than "across the country," although neither is a walk in the park. And, of course, retrieval speed, typically one to two days based on anecdotal reports, is also enhanced with a local, rather than national, facility.

Although the data is still anecdotal, there appear to be other cost savings as well. Chief among these can be a substantial reduction in binding costs for journals. Material available via the online journal collection JSTOR or material that is traditionally low use after a year or so can simply be shrink wrapped and stored in the repository. When patrons request such an item, it is either already available online or it can be faxed or emailed to them by depository staff.

As in the case of patron-initiated circulation, the key to successfully taking advantage of the substantially reduced storage costs of off-site, high-density storage is reliable online bibliographic control, a convenient request process, and speedy delivery of materials. While consortial involvement is not absolutely necessary, as noted above it does share the building and automation costs over a larger pool, and few libraries need to move more than 100,000 volumes a year off site. While more detailed studies would further and more definitely identify the exact size of the improvement in the cost-benefit ratio, the present evidence is already compelling.

Expanding Access to Articles

Possibly the most well-known intersection of automation and consortia has been the "Big Deal," or variations on group electronic journal licensing, with the resultant tremendous increase in journal literature access

for patrons and the leveraging of the library collection's dollar that this model of journal purchase has made possible. Like all breakthroughs, it has at times been misunderstood, and it has required fine-tuning to meet changing external conditions and inherent structural problems.

The simplest explanation of the traditional Big Deal, and its variations, is that a consortium contracts with a publisher, traditionally over a multi-year term, to receive all or a substantial portion of a publisher's titles for all members of the consortium in electronic format. Additionally, each individual library continues to receive its particular subset of print copies. The price for this arrangement is calculated as the cost of the combined members' print subscriptions plus an affordable surcharge as an incentive for the publisher. Such an arrangement not only substantially increases the journal literature available to consortial members but also allows the possibility for making a strong statement to administrators about improved cost effectiveness—a reality that a number of libraries and consortia have turned to their advantage (Kohl, 2003).

The most common misunderstanding involving the Big Deal and its variants is that it is a mechanism to save money and reduce library expenditures. Although such a misapprehension is perhaps understandable, it is, of course, completely wrong. The Big Deal is (1) primarily a means of substantially improving the purchasing power of the consortium and its library members by delivering proportionately more titles per dollar spent (similar to shopping in bulk at Costco); (2) a method to maximize use via electronic delivery over traditional and limited (basically rationed) access in print; and (3) a means of making a more compelling argument for increasing library and/or consortial funding. The underlying rationale of the Big Deal for libraries was that, by paying a little more, they could get a lot more; it has become the overwhelmingly preferred mode of journal purchase for consortia worldwide.[4]

Of course, individual consortial circumstances, as well as the changing landscape of journals in a digital world, have resulted in endless variations on the Big Deal theme. Probably the biggest and most difficult external adjustment to the Big Deal model was the advent of flip pricing, namely, shifting the ongoing group base cost from the collective print spend with an electronic add-on to an agreed significant group cost for licensing of the electronic titles with print copies both priced marginally and maintained discretionarily. As both libraries and publishers increasingly move into a digital journal environment, basing Big Deal pricing on fixed print spending has become increasingly problematic and divorced from any recognizable reality. As the publishing and library worlds change, an evolutionary and pragmatic restructuring of Big Deal pricing continues to evolve.

A more fundamental and long-term problem, however, was inherent in the bulk purchase approach of the Big Deal itself. If all of a publisher's titles are purchased, the Darwinian quality of the marketplace as reflected

by academic selection is defeated. An endless number of new journals could theoretically emerge without regard to academic quality or merit. Given the steady increase in academic journal titles and journal content, even under the gentle Darwinism of title-by-title selection, any further acceleration in new titles is alarming. This is especially so when considering the concomitant increase in expenditures likely to be expected by publishers. Lowering of academic quality is a concern if new venues for publication open up too rapidly. A mechanism for restoring some balance and discrimination is desirable and, indeed, has already been tried and described elsewhere (Gatten & Sanville, 2004).

Of primary interest, however, are the specifics of how the Big Deal actually worked to leverage the expenditure of library funds while increasing access to the journal literature. Critical to understanding the significance of the Big Deal is the context prior to the deals, namely, that relatively modest access to the full range of journal literature was being provided by libraries. The accumulated print subscription histories of journals published by academic publishers of the thirteen original core OhioLINK libraries was revealing (see Figure 1).

On average, only about 25 percent of the potentially academic titles were being made available to Ohio's university patrons. Even the largest institutions with the most complete collections provided only limited access. Ohio State University, whose ARL ranking for "total journal titles" has consistently placed its journal collection in the top thirty in North America, had only a bare majority of the titles, while the University of Cincinnati, with the second-largest journal collection in the state, had a bare 40 percent. Figures revealing such lacunae began to suggest not highly selective collections but surprisingly limited ones.

As the philosophy of the Big Deal began to take form in Ohio, two key threads were intertwined. The first was a concern to substantially increase access to the potentially useful journal literature given the deficit we had discovered; the second was to replace the idea of the librarian as resource gatekeeper with the concept of the librarian as "gateway." In other words, rather than trying to prejudge what academic library patrons needed and wanted and then ration out a selection of titles, the idea was to provide as much of the journal universe as possible and let the patron decide what was useful. Such a philosophy seems particularly appropriate for the new world of electronic information, where patrons can quickly traverse a very broad spectrum of content.

Considering the 25 percent average print subscription levels in universities, a Big Deal provides on average a fourfold increase in accessibility. For four-year liberal arts colleges with much lower subscription levels, the expansion can easily be twentyfold. For community colleges who traditionally have miniscule journal collections, the increase in intellectual resources is off the charts.
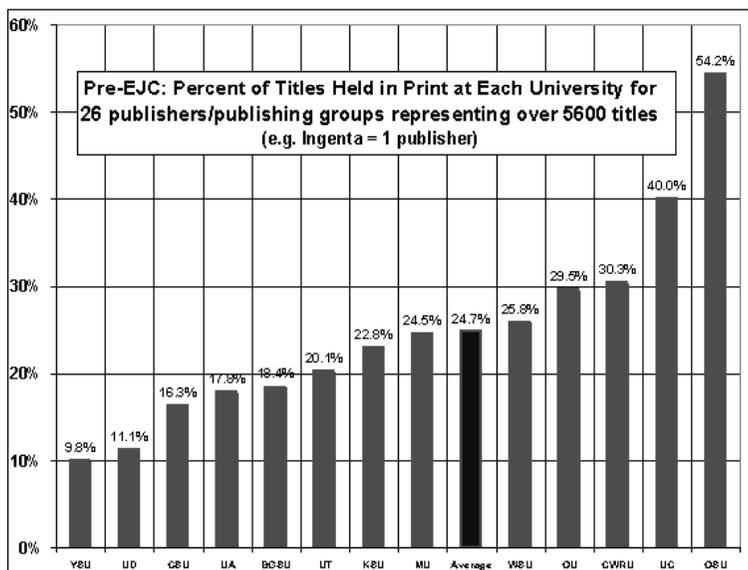
Figure 1.   Before the Electronic Journal Center: Percent of Titles Held in Print at Each University

Note: The titles in the EJC are for twenty-six publishers/publishing groups representing over 5,600 titles (for example, Ingenta = one publisher). The institutions represented are Youngstown State University (YSU); University of Dayton (UD); Central State University (CSU); University of Akron (UA); Bowling Green State University (BGSU); University of Toledo (UT); Kent State University (KSU); Miami University (MU); Wright State University (WSU); Ohio University (OU); Case Western Reserve University (CWRU); University of Cincinnati (UC); and Ohio State University (OSU).

Of course, this increased access (keep in mind that the increase is only to digitally accessible titles) has a price, but it is a relatively small one. Since we were already supplying only what we could afford of the likely core journals of interest to our patrons, the increased access had to be heavily discounted by the publisher to be attractive to the library community. In these cases the increase in base cost is typically around 5 percent to 15 percent. There is a dramatic expansion in access with only a marginal price increase. This leads to a dramatic improvement in the effective average per title cost across the whole package. If the base print costs and original print titles are excluded, and the cost of the new titles alone is calculated, based only on the increase it is clear that the new titles have been purchased for almost pennies apiece. However calculated, such deals clearly give a substantial boost to the collection cost-benefit ratio.

It is important to note that initially there was concern both within and outside of OhioLINK that while the Big Deal is a great bargain for libraries, a bargain on something that is not needed or used is no bargain at all. In other words, there was concern that such dramatically expanded
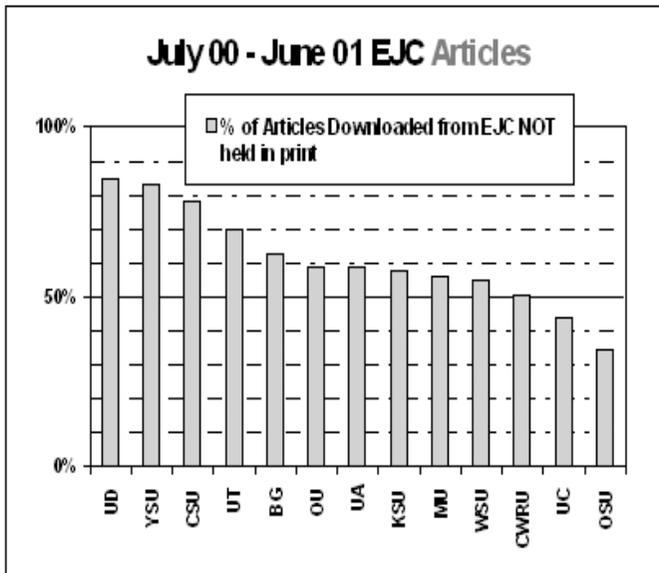
Figure 2. Percentage of Articles Downloaded from EJC Not Held in Print, July 2000–June 2001

Note: The institutions represented are University of Dayton (UD); Youngstown State University (YSU); Central State University (CSU); University of Toledo (UT); Bowling Green State University (BGSU); Ohio University (OU); University of Akron (UA); Kent State University (KSU); Miami University (MU); Wright State University (WSU); Case Western Reserve University (CWRU); University of Cincinnati (UC); and Ohio State University (OSU).

access, even at a very low rate, was unnecessary and unneeded by library patrons. A series of studies was conducted to determine usage of the new materials, particularly as compared to usage of the titles originally received by individual libraries prior to the Big Deal. As Figure 2 indicates from one such study, there was substantial use of the new materials among the universities.

In fact, as a group the use of the new titles was greater than the use of the previously subscribed titles. A quick check showed that the reason for this seemingly surprising figure, was not that the titles formerly held in print received less per title use. In fact, on an average basis they received significantly more use. However, the number of new titles was so great that even with a lesser per title use, the aggregate overwhelmed the combined use of the print titles. In other words, each of the newly electronically accessed titles individually contributed less use than the print held titles, but there were so many new titles that it still added up to more overall usage. It may help to keep in mind that we went from 25 percent of the title universe to 100 percent of the title universe, thus making new titles the vast majority of titles available to library patrons. Table 1 shows current evidence that the

Table 1.   Use of the Titles in the EJC by Library Type in 2004

Library Type	Minimum	Average	Median	Max
University	3,877 (66.8%)	4,797 (82.6%)	4,968 (85.6%)	5,590 (96.3%)
Community College	582 (10.0%)	1,401 (24.1%)	1,320 (22.7%)	3,094 (53.5%)
Private College	112 (1.9%)	1,816 (31.3%)	1,883 (32.4%)	3,013 (51.9%)

Note: n = 5,806 titles accessible.

wider range of digital journals continues to be extensively used, providing ongoing validation of the decision to expand journal access.

It was also useful to note, in light of fine tuning the Big Deal, that the use patterns of individual journals followed a modified 80-20 rule, with 30 percent of the journals providing 80 percent of the use and, more significantly, 23 percent of the journals providing 1 percent of the total use. Perhaps most importantly of all, in a digital world we know exactly which titles these are (see Figure 3).

OhioLINK and other consortia continue to develop still evolving models of journal purchasing that allow libraries to substantially leverage their collection expenditures while dramatically increasing access to the universe of journal literature. The primary intent is not to solve immediate library
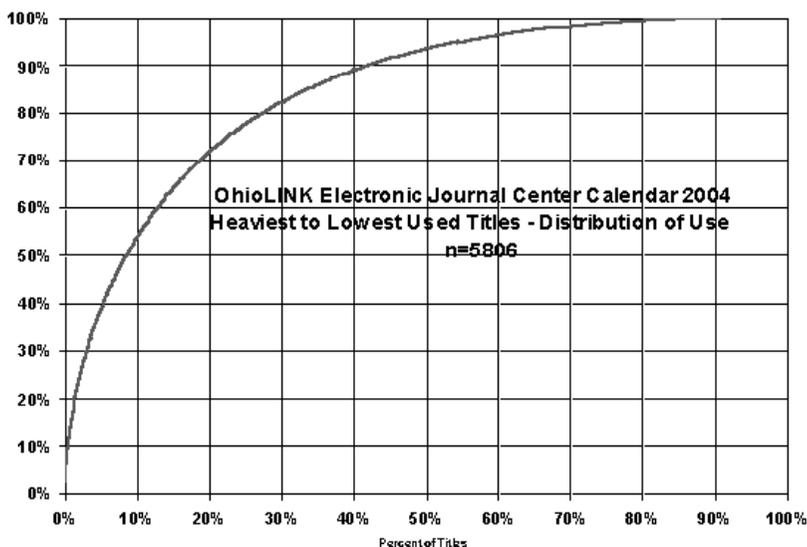

Figure 3.   Distribution of Use of EJC Titles, 2001: Heaviest to Lowest Used Titles

Note: n = 5,808.

budget problems by saving money but to allow each library to substantially increase the journal access received for money spent, thereby advancing the library's core mission of improving access to academic resources.

INSTITUTIONAL REPOSITORIES AND DIGITAL LIBRARIES

Equally important as the previous three areas (but more difficult to quantify the full impact of) is the emerging concept of establishing digital institutional repositories to house and make available scholarly resources. Part of the problem of providing solid quantifiable data is the newness and evolving nature of the concept. Still, even if the cost data are not yet entirely locked down, there are strong logical indicators why, with today's automation, consortia can expect to enhance both the cost and the benefit sides of establishing and maintaining institutional repositories. Here we use "digital institutional repository" to refer to a vehicle housing all varieties of campus-produced intellectual content, such as individual faculty or academic department collections, library special collections, teaching aids, faculty or institutional special projects, and the like, not just scholarly working papers and articles.

From lessons learned in the operation of established consortium services such as OhioLINK's Electronic Journal Center and database hosting, parallel strong economies of scale exist for consortial institutional repositories in terms of staffing, equipment, software, maintenance, and development. Being able to spread the operating and development costs among multiple libraries minimizes duplication of effort, builds a facility that all members can use, and creates a collective body of content. While some libraries may have the individual ability to mount an institutional repository, they seldom can do so in as effective, efficient, or intellectually rich a manner as a consortium. And, of course, for many smaller or less affluent institutions, creating and supporting their own repository is simply out of the question.

Additionally, there is a further factor important now and likely to remain so for some time in the future. Search engines still have a limited ability to completely and reliably identify significant scholarly resources, which are widely dispersed institutionally and often reside in a complex multitude of data formats. While the advent of Google Scholar and IBM's recent announcement about developing a search engine that is independent of data formats is encouraging, Web searches for reliable and widely dispersed academic resources remain problematic. Going to a reliable site is still a useful strategy, but only if the site is content rich, simple, and reliable to use. In this sense, a consortial approach to an institutional repository can have important advantages over single institutions by providing rich content, standard data formats, and a common look and feel.

The importance of groups of libraries to the creation of rich data content cannot be underestimated. OhioLINK has in operation a first-generation

institutional repository known as the Digital Media Center (DMC). While it does not have fully developed administrative functionality that makes content entry and control easy at the institutional level, these shortcomings will be addressed in a second-generation platform that more closely fits current institutional repository definitions and expectations. Nonetheless, OhioLINK has a number of examples in the DMC that begin to illustrate the extraordinarily wide range of research and pedagogical resources that an institutional repository can provide.

At the request of graduate school deans across the state, OhioLINK developed an Electronic Theses and Dissertations Center (ETD). It provides a well-supported site for Ohio academic institutions to voluntarily deposit the theses and dissertations (and even senior honors papers) of Ohio students. Available since July 2001, its adoption on campuses is primarily a matter of local interest and culture. Growth has accelerated in the past two years as several large universities have begun to require electronic submittal of theses and dissertations. Even so, at this point there are only six universities and a handful of smaller schools inputting papers. Still, we have over 4,400 full-text documents, far more than the 1,400 records our largest contributor holds. As a consortium we offer a richer collective resource at a fraction of the cost of individual sites.

Of particular interest in terms of the importance of constructing a data-rich site for institutional repositories is the OhioLINK experience with ETD. As Figure 4 shows, the size of the database has grown in a regular and steady manner, but the use pattern has been somewhat different. For the first fifteen months for which we have use data (beginning January 2003), monthly use has fluctuated but demonstrated an overall gradual growth, with monthly downloads during that period ranging from 1,651 to 6,290 and averaging 3,696. Then in April 2004 harvesting to other Internet ETD sites began. For the following eight months, the most recent for which we have data, the monthly downloads have ranged from 7,086 to 20,036 and averaged 12,925 per month. Not surprisingly, worldwide access brought dramatic increases in use.

Foreign Language Digital Videos is a collection of brief foreign language video clips of native speakers sharing everyday experiences. These videos are produced by the ViewPoints Project of the Five Colleges of Ohio consortium. There are over 270 such clips—providing spoken examples of such varied languages as classical Arabic, Swahili, and Mandarin Chinese—now available in this growing collection. Cooperatively produced and collated into the DMC, it becomes a useful resource, accessible to the world, on an efficient basis.

We have a growing collection of historical and archival material supplied by faculty or libraries. These definitely represent just the tip of the iceberg of the intellectual assets that could be placed in a statewide repository: historic maps of Akron and Summit County, Ohio, contributed by the University of

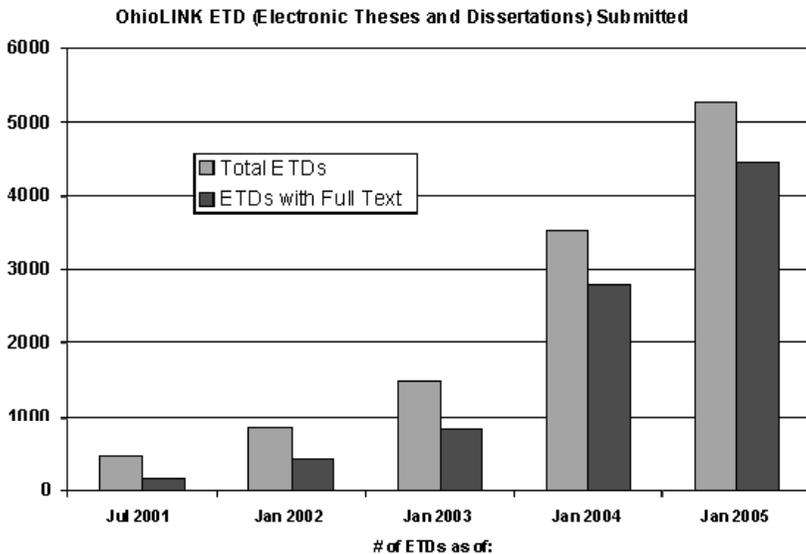**OhioLINK ETD (Electronic Theses and Dissertations) Submitted**

Figure 4. OhioLINK Electronic Theses and Dissertations Submitted

Akron; Lake Erie's Yesterdays, photos of the Erie Islands and Lake Erie's western basin; papers from the Rutherford B. Hayes Presidential Center; National Underground Railroad Freedom Center documents related to slavery, abolition, and emancipation; E. W. Scripps Papers 1868–1926, containing letters and photos from the Scripps archive at Ohio University; Wright Brothers photos documenting the invention of the airplane and the lives of the Wright family from Wright State University; and more.

Similar collections have been submitted to our Social Sciences Digital Media. This collection contains images and other media related to the social sciences. Currently, the database contains two collections: Greek and Latin inscriptions (digitized squeezes, that is, accurate paper impressions) from Ohio State University, and Mayan archaeology digital photos from Oberlin College. Likewise, our Science Digital Media contains digital videos and images related to the sciences. Currently, the database contains such institutionally based collections as dolphin embryo digitized slides from the Northeastern Ohio Universities College of Medicine; forestry photos from Ohio State University; geology photos from Oberlin College; reproductive physiology animations from the University of Cincinnati; digital animal sounds (for example, thousands of identifying bird songs) from the Borror Laboratory of Bioacoustics at Ohio State University; and others.

Finally, our Art and Architecture Digital Media includes art and architecture images from the following institutional sources: images from the Akron Art Museum; art and architecture from the University of Cincinnati; and Works Progress Administration prints by Cleveland artists from the Special Collections at Case Western Reserve University.

This is just the tip of the iceberg. The variety and richness of useful academic resources that are locally generated or locally relevant and can find an appropriate home in a consortial institutional repository is far greater than many of us have imagined. This material gathered together at a single consortial site can contribute to the development of a critical mass, necessary so that an individual institution's contributions are not lost through dissipation in multiple, local sites.

To be sure, other groups and institutions are active in these repository developments. All the libraries experimenting with D-Space are a prime example. The e-Repository of the California Digital Library is a fully functioning site to house the papers of the University of California faculty. A number of libraries are using the Online Computer Library Center's (OCLC) Content DM to house local digital collections. In the end, as this experimentation continues, can the evolutionary process of adoption be quickened, made to include more institutions, be accomplished more cost effectively, and result in richer sites if consortia act to create and operate these repositories? Will this result in more exchange across repositories because there is more likelihood of standards compliance, easier harvesting, federated searching, and linking? As in the other areas discussed above, it seems likely that institutional repositories represent an arena ripe for cost-effective consortial development and exploitation.

In conclusion, the fortuitous rise of consortia and the maturing of library automation offer libraries a wonderful set of opportunities to not only continue and expand their mission of providing access to the world's scholarly resources but to do so in an increasingly cost-effective manner. Becoming more efficient is not the same as saving money and, as we have seen above, at times it requires more money to achieve a heightened cost-benefit ratio. But improving the value received for the cost paid can never be a wrong strategy and represents a solid basis for advancing into the future.

NOTES

1. Project Gutenburg, for example, began in 1991 as a volunteer community project to bring printed books into the online environment and was followed by repeated and generally unsuccessful attempts to develop e-books on a widespread basis. Recent announcements by Google and a cohort of five major libraries suggest that both the interest in and process for digitizing books may finally start to enter the mainstream in a serious way, although many questions still remain.
2. Given that UC falls roughly in the middle of the ARL rankings for total volumes held suggests that this considerable figure is reasonably indicative of the general level of investment in research print collections.

3. For further and more complete information on this study, see Kent et al. (1979).
4. An Ingenta Institute report suggests that 50–60 percent of library e-journal purchases are a result of consortial deals. This is likely low since straw polls at the Thessaloniki (2002) and Copenhagen (2003) ICOLC meetings indicated almost universal participation in and support for the Big Deal approach to e-journal purchase by consortial delegates (Ingenta Institute, 2002).

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