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STATISTICALLY CHALLENGED: THE NEED FOR AN ELECTRONIC RESOURCES MEASUREMENT STANDARD

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ABSTRACT

The authors review changes in the standards for measuring electronic resources through an examination of the 1990-2000 IPEDS Academic Library Survey forms. During that decade, academic libraries have moved from counting electronic resources by the number of bibliographic and physical units to measuring usage. Local attempts to capture electronic resource usage are described.

INTRODUCTION

Accountability has always been important for academic libraries, but over the past 10 years it has become even more critical to assess how libraries meet the needs of their constituencies. Funding has increasingly been tied to performance measures, which are generally expressed as outputs. Output measures are characterized by the question "How many?" In the case of collection growth, the most important question is "How many volumes added per year?" For academic libraries, collection growth has traditionally been a key indicator of success, but in recent years the emphasis has shifted to electronic access rather than print acquisitions. With this change from the print environment to an increasingly electronic one, a key challenge for academic libraries has become how to measure the scope and value of digital collections. Because comparison to benchmarks is an important part of collection evaluation, library administrators need a standard method of measuring their electronic collections. As Ann Peterson Bishop writes, "Measuring and interpreting access and use data within a digital library is complex, however, and the lack of standard metrics across systems makes it especially difficult to develop explanatory frameworks related to digital library use."¹

An overview written by Peter R. Young illustrates the multiple perspectives on how to measure electronic resources.² Initially, electronic resources were counted in bibliographic

and physical units just like books. As technology developed beyond the diskette and CD-ROM, this method became more and more difficult to use, and the search for a meaningful alternative to volume counts began in earnest. Over the past ten years, the concept of counting the number of physical units for electronic resources has become almost obsolete, and counting bibliographic units has become much more complex.

Expenditures on electronic resources continue to be used for quantifying these materials, but the ability to demonstrate what libraries actually get for the growing amount of money spent on them is still very fluid. As noted in the 1989/99 ARL statistics, "Operating expenditures, where many automation and electronic information resource expenditures are reported, are also increasing rapidly."³ Many view usage statistics as a promising way to monitor the value of electronic resources to users; however, others are less convinced that this is practical or useful.⁴ There is also discussion about outcome measures and the impact of electronic resources on student learning. A look at citations would lead one to conclude that European and Australian librarians have been mulling this topic for longer than North American librarians. However, the latter are catching up.⁵ A good compilation of citations is *Library Statistics & Performance Measures*, compiled by Joe Ryan.⁶ An overview of recommendations for measuring e-resources or e-metrics can be found on the Association of Research Libraries (ARL) Web pages.⁷ In the meantime, librarians must continue to respond to institutional information requests.

This article reviews the changes that have occurred in the measurement of electronic collections over the past ten years through an examination of the Integrated Postsecondary Education Data System (IPEDS) Academic Library Surveys. It also covers current efforts to create a usable measurement standard.

Finally, it describes an ongoing project at the University of Louisville Libraries to capture usage statistics for a large collection of commercial databases and online journals.

ELECTRONIC RESOURCE MEASUREMENT IN THE 1990S

Electronic resources began to appear in many academic library collections in the early 1990s. A brief review of the IPEDS Academic Library Survey forms and data definitions from 1990-2000 provide a useful summary of attempts to standardize the measurement of electronic resources.

The Academic Library Survey (ALS) is one component of an overall post-secondary data collection program conducted every two years by the National Center for Education Statistics (NCES).⁸ It is designed to provide comparative data for U.S. colleges and universities in nine institutional categories. Although the primary intent of the IPEDS data is to facilitate research on education, it is also used by governing boards for other purposes, including the determination of institutional funding. For academic libraries, the IPEDS questionnaire and data definitions form the basis for statistical reporting to most other professional organizations, such as the Association for College and Research Libraries (ACRL) and the Association of Academic Health Sciences Libraries. In effect, the data collected in the ALS and the definitions used to describe that data set the standard. At the University of Louisville, the ALS also guides internal data collection, so changes at the national level are closely monitored.

Two sections of the ALS cover electronic resources and both can be considered indicators of collection strength. Part C addresses expenditures and Part D addresses collections. In 1990, the IPEDS survey requested information about electronic resources for the first time. Part C asked for "Expenditures, Machine Readable Materials" and Part D asked for "Machine Readable Materials, Number of Titles." The instructions were fairly specific about what to include and exclude. For example, punched cards and magnetic tapes that "are designed to be processed by a computer" were to be included, but "bibliographic records used to manage the collection" and microcomputer software were not. The University of Louisville held 135 titles in 1990, but did not keep separate expenditures for electronic materials at that time. It is likely that the University of Louisville was typical of most large, academic libraries.

Part C of the 1992 IPEDS survey was the same as the 1990 form; however Part D asked for "Machine-readable materials, Units and Titles." Librarians were instructed to identify "an individual physical item" in this section, such as "a disk, tape or cartridge." A copy of the University of Louisville survey indicated the number of titles held, but did not include a count for units, so the difficulties with counting an electronic product the same as a book were already evident. Expenditures for electronic materials were not available that year either.

The 1994 ALS form reflected the growing complexity of the electronic environment. For example, expenditures were requested for "Computer files and search services." The instructions stated that it covered materials "purchased or leased" that were considered part of the collection. Other inclusions were expenditures for online searches of remote databases, even though the remote database was not counted as part of the collection, and expenditures for equipment when the cost was "inseparably bundled into the price of the information service product."

Part D still requested "Computer files, Units and Titles," but the instructions anticipated certain problems with treating electronic products like print volumes. They specified that "If a CD-ROM subscription for a title is contained on one disc that is updated (i.e. replaced) once a month, count as one unit, not twelve." The 1996 version of the ALS survey did not contain many notable changes from the 1994 version. The instructions for the expenditures were also basically the same. Part D still asked for "Computer files, Units and Titles," although the examples used in the instructions were expanded to include the growing variety of electronic products. These included "U.S. Census data tapes, locally-mounted databases, electronic journals, and reference tools on CD-ROM, tape or floppy disk." The librarian was also instructed to include government documents. The form repeated the instructions from the 1994 version about how to count CD-ROMs that were updated, but did not provide information about how to count the number of units for a locally-mounted database or for an electronic journal. The University of Louisville was still not reporting units but was finally able to supply a dollar figure for computer files.

The 1998 ALS form presented a big change from the previous versions, both in format and in the underlying philosophy. In both Part C

and Part D materials were described as information resources, and "electronic" resources were a subcategory under books and under serials, rather than a separate category. In Part C, the biggest change was the instruction in the books section to include "expenditures for materials purchased jointly if such expenditures can be separated for other changes for joint services." For current serial subscriptions, the instructions included "leases to collections of electronic serials" and the "cost of search services such as FirstSearch." Part D dropped the attempt in earlier versions to equate an electronic title/unit with a print title/volume. Instead "Electronic - Titles" were sought for books and for current serial subscriptions. The instructions for electronic books included many more types of materials that could be counted, including "materials available remotely" and "materials purchased jointly."

The good news for anyone filling out the form was that physical ownership was becoming less important as a criterion for measurement of library collections. The bad news was that the instructions were not easily applied to the variety of products acquired or licensed. Counting electronic titles was relatively easy to apply with individual subscriptions to an electronic journal. It was not so easy to apply to citation databases that included access to full-text for a portion of the titles indexed.

The Web page for the American Library Association Office for Research and Statistics (ORS) provided access to an article entitled "Electronic Subscriptions and Electronic Titles: Why Counts Are Not Requested on the IPEDS Academic Library Survey Form for 2000."⁹ It briefly describes some of the problems encountered using the 1998 definitions, even taking into account the clarification "distinguishing between periodicals indexed or abstracted by reference databases and periodicals offered through journal aggregators."¹⁰ The ORS advisory committee to the NCES advised that the 2000 ALS survey focus on expenditures and not on title or subscription counts, because title counts are highly likely to be unreliable given the current environment. The 2000 ALS did, in fact, drop any attempt to capture information related to electronic holdings and instead focused exclusively on electronic resources even through the expenditures information was retained.

THE SEARCH FOR NEW MEASURES

Given the changes over the past decade in the volume and format of materials available electronically, what is the best method for recording

and reporting on them? How can the library community address accountability and internal management needs for collection evaluation? As Young stated in 1998, "rapid technology adoption challenges conventional library statistics and measurement concepts."¹¹ He also stated that "agreement about timely, reliable, and relevant statistical information regarding electronic media resources and services in libraries has yet to emerge."¹² This is very evident in the pattern of changes seen every two years during the 1990s in the ALS form.

At the University of Louisville, keeping statistics on electronic resources has been a challenge. Each time the ALS forms and definitions were altered, cataloging and acquisitions personnel were given different instructions on what to count and how to count. For example, CD-ROMs were originally counted as either monographic or serials titles. Then, as the libraries began to acquire Web-based products housed on vendor servers, CD-ROMs and locally-mounted databases were counted as "local" holdings regardless of whether they were monographs or serials, while the Web products were recorded as "remote" holdings. Later still, CD-ROMs were eclipsed by a dizzying array of vendor packages mostly accessed through a Web interface. At that point, the emphasis shifted back to the more traditional monographs and serials counts, creating a new set of "rules" and questions.

When all titles within a vendor package, such as JSTOR, were cataloged and added to the OPAC, each individual title was counted. However, citation databases with limited full-text access were only counted once. As more of the citation databases added full-text, the previous clear distinctions became much less clear. With all of these varieties and more in development, it is a challenge to determine what to count and then to revise statistics sheets and their accompanying instructions. As Marjorie Wilhite notes, "Because of the need to report more finely tuned statistics, not just on the number and costs, but also on the method of electronic access, it is worthwhile to devise a method to record each mode of access, the 'vehicles,' in a manner that can be read, sorted and compiled by a library management system."¹³

It is clear that a new method of statistical management is warranted. Electronic resources are increasingly important to library patrons, allowing them the luxury of access to an incredible wealth of information not previously available to them through their local

libraries. But these resources are expensive and their expense must be justified to administrators and other funding agencies. In a discussion of evaluation measures for the emerging virtual library, Thomas A. Peters notes, "User-centered outcome measures will become a crucial way to assess the value of digital libraries."¹⁴ Counting electronic resources is not only a perplexing task, but may also not be the best way to determine the value of the collection to the university or any of the other bodies to which the libraries are accountable. The E-Metrics project "provides one approach, a beginning approach, for describing and measuring some of the resources, uses, and expenditures for supporting networked services in a research library setting."¹⁵

THE UNIVERSITY OF LOUISVILLE EXPERIENCE

At the University of Louisville, the Office of Libraries Technology has been working with a librarian from Content Access (a.k.a. technical services) on a system to gather use statistics for individual serial and monographic titles using links from the OPAC to the online resource. The information collected provides a method for local personnel to assess the usage of individual titles.

To create these links, staff create a "script" in the MARC holdings record. Each script in the holdings record contains the URL for the usage counter the Office of Libraries Technology maintains, the URL for the electronic version of the title, the unique local system holdings record number, and a note that displays in the OPAC indicating to "Click here for full-text." It is the local system

holdings record number, which allows the counter to capture statistics showing the use of each individual title. A "location" of "electronically available" is assigned to all electronic resources, and a note is created advising patrons to click for full-text. This note provides instructions to users, rather than displaying the URL in the OPAC. The script is also used to create a list of individual electronic titles that is posted on the libraries' Web pages. Each time a user clicks on the link from either the OPAC or from the Web page list to the individual title, a counter automatically records the transaction.

In Figure 1, *A Magazine* shows 38 in the Subtotal column. This indicates that from January to June 2001, thirty-eight clicks were recorded for that title. The number of users clicking on the link or information on how the title was used is not known. However, the statistic collected is comparable to the browsing statistic gathered on print periodicals picked up and reshelved in the stacks.

In addition to the information collected on individual titles, the Office of Libraries Technology also maintains a separate usage report by database name and vendor. Electronic resources are frequently purchased as "packages" from vendors or publishers. Staff at the University of Louisville have not cataloged the individual titles within these packages due to regular changes in their content. Instead, the libraries maintain a list of available databases on their Web pages. The links from this list also contain a script that allows the Office of Libraries Technology to generate the vendor/database report.

FIGURE 1: E-JOURNAL USAGE REPORT – BY TITLE (BC, ELEC)

Name	Sub-Total	Jan. 2001	Feb. 2001	Mar. 2001	Apr. 2001	May 2001	June 2001
19th century music	3		1	1		1	
A magazine	38			4	23	8	3
A.L.L. points bulletin	23		6		11	3	3
AAPS PharmSci	58	6	4	6	30	5	7
AAPS PharmSciTech	30	2	2	1	20	3	2
Abacus	9		3	2		3	1
About-time magazine	12			1	4	5	2
Abstracts of the papers communicated to theRoyal Society of London	2	2					
Abya Yala news	7				3	4	
Academic emergency medicine	69	4	20	13	19	5	8
Academic psychiatry	63	2	11	16	20	7	6

FIGURE 2: DATABASE USAGE REPORT-BY VENDOR

Name	Sub-Total	Jan. 2001	Feb. 2001	Mar. 2001	Apr. 2001	May 2001	June 2001
ABC-Clio	1,412	274	385	350	256	71	76
Accessible Archives	211			23	70	63	55
American Statistical Association & Institute of Mathematical Statistics	51	5	10	9	15	9	3
American Mathematical Society	84	14	13	11	21	15	10
Bell & Howell (ProQuest)	13,274	1,980	3,350	3,398	2,573	783	1152
Britannica.com, Inc.	518	94	128	132	108	30	26
Brown University	36	4	5	8	10	2	7
Cambridge Scientific Abs	1,122	122	285	250	176	106	180
Career Guidance Foundation	104	18	22	18	20	13	13
Chadwyck-Healey	1,154	205	331	319	189	66	40
Columbia University Press	89	15	27	24	17	3	3

Using scripted links, reports can also be generated showing if the user selecting the links is in the libraries, elsewhere on campus, or off campus. These statistics provide an in-house method for tracking use of electronic resources. However, the statistics acquired through this method are not the same as usage measures. As Peters notes, "Measuring the outcomes of virtual browsing and surfing sessions on a computerized, networked information environment is much thornier than measuring the outcomes of more structured (both spatially and intellectually) searching in print-based libraries."¹⁶

CONCLUSION

Librarians have been challenged in recent years by the need to compile statistics about electronic resources. The IPEDS surveys are one example of the reporting that academic libraries conduct, and they provide artifacts of the thinking prevalent over the past decade. With the most recent change in the IPEDS, librarians have been somewhat left to their own devices to respond to reporting agencies and their parent institutions. Many libraries, including the University of Louisville, have developed local solutions that meet their accountability and decision-making needs.

The lack of a national standard for data collection about electronic resources precludes benchmarking with peers, often a useful indicator of achievement.

The need for a standard is being addressed by organizations such as the Association for Research Libraries (ARL), and considerable progress has been made in creating definitions for measuring the usage of electronic resources. With the cooperation of vendors, libraries are beginning to receive data on local usage, although problems do exist with the data. How much the vendor-supplied data is currently being used by librarians to understand and describe their collections is unknown, as is the number and types of local systems developed to capture information about collection use. Librarians must familiarize themselves with the current trends in usage statistics and work collaboratively to develop and adopt standard definitions and collection techniques. This will provide librarians the information needed to manage their collections and to address institutional demands for accountability. As anyone who has tried to gather and compile statistics knows, the task is much more difficult than it seems. This is an opportunity to make it easier.

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