Assessing networked services: an update

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IMPORTANCE OF DEVELOPING NETWORK STATISTICS FOR ACADEMIC LIBRARIES

In an increasingly networked environment, academic libraries are thriving, contrary to some predictions, as an information portal to become a 24-hour a day access point through which users obtain information services and resources on their terms and when they want such services. At all levels of institutions of higher education, remote use of the library has become tightly integrated into the academic environment and although the user may not often enter the library physically nor interact directly with the library staff yet he or she enjoys an unprecedented access to a myriad of scholarly and educational materials. Libraries now depend on the publishers of electronic journals (e.g., Elsevier's ScienceDirect and Cambridge Journals Online), electronic content aggregators (e.g., Ebsco and Gale), and other commercial and non-commercial information providers to meet the user demands for resources and services. However, the cost of providing networked services and resources, which users often do not know or understand, has increased significantly, as demonstrated in the recent ARL (Association of Research Libraries) statistics. According to its 2000-2001 data, research libraries in North America spent more than 16% of their materials budget on electronic resources compared to 3.6% in 1992-93 when the data was first collected (ARL, 2002). We expect that the trend will continue.

The rapid transition in libraries from the traditional paper-based information environment to a networked, electronic environment has significantly altered the ways in which libraries gather and use data to make a range of decisions to provide efficient and quality services to their users. As library materials and services increasingly reside outside the physical library buildings, so do the data that describe the collection and its use. Consequently, libraries find themselves dealing with inconsistent, incomparable data from external vendors who set their own rules to report usage statistics.

Library managers need reliable and useful statistics that will allow them to make good resource allocation decisions (e.g., cost/benefit analysis, contract negotiation, and justification of expenditure), meet user needs (e.g., identifying barriers of access, understanding user behaviours), and develop strategic plans (e.g., user education, peer comparison) for the development and operation of electronic services and resources. At the very least, they want to know what is going on in the library and how library patrons are using the resources and services it provides.

Usage statistics in the context of electronic subscription based databases mainly refer to the indicators of the volume of user access to the electronic resources and services available from the database vendors. Examples of those indicators are a count of sessions in a specific database, the time per session in a specific database, the

count of searches in a specific database, and the count of full-text downloads per time period per database. In addition, usage statistics can show a variety of information including success or failure of user access (e.g., turn-aways per time period per specific database), user access methods (e.g., telnet vs. browsers), access levels of one institution compared against peer institutions, cost of access (e.g., cost per downloaded item), and other items pertaining to user behaviours.

This paper describes two major efforts—one from the USA and the other from UK—to develop usage indicators for electronic resources and services in hopes to inform the readers of major developments and issues in the area of capturing and utilising network statistics in academic libraries. We also include a section on the role of standards for network statistics and their importance in the overall process for measuring networked use, users, and services.

RELATED INITIATIVES AND PROJECTS

One should view the two projects that we will describe in the context of a number of related initiatives—both national and international—that are either completed or under way to assist libraries in assessing their networked resources and services. These initiatives take different approaches, focus on different types of libraries, and work within various operating environments, but all focus on developing library electronic statistics and performance measures. These efforts include:

- Equinox. This is a two-year project undertaken under the auspices the European Commission. Equinox expanded performance measures to include those for the networked environment. One important aim of the project was to develop automated data collection and management tools for library managers (project website is http://equinox.dcu.ie).
- LibQual+ is a collaborative effort between ARL and Texas A&M University to define and measure library service quality metric—including some aspects of network services—through a series of carefully tested web surveys of users. It has attracted more than 400 libraries of various types and has expanded internationally (project website is http://www.libqual.org).
- International Coalition of Library Consortia (ICOLC). Since the mid-1990s, this international coalition of libraries—predominantly academic—has been working toward a standard set of definitions for subscription

online contents. It published a revised version of the guideline in December 2001 (see http://www.library.yale.edu/consortia/2001webstats.htm).
- National Information Standards Organisation. NISO is updating its Z39.7—Library Statistics Standard to include network services and resources statistics and performance measures. The draft standard was completed in 2002 and is now under trial (see http://www.niso.org/emetrics/).
- Project COUNTER (Counting Online Usage of NeTworked Electronic Resources). COUNTER is supported by a group of publishers, library associations, and other library related national bodies whose primary aim is to formulate an international code of practice (COD) governing the recording and reporting of usage statistics. The first COD was released in January 2003 with the revision planned in early 2004 (see http://www.projectcounter.org).
- National Clearinghouse for Library and Information Centre Networked Statistics. Proposed by Charles R. McClure and his associates at the Information Use Management and Policy Institute, Florida State University, the establishment of the clearinghouse will facilitate the sharing and dissemination of primary data, tools, education and research regarding statistics of networked resources and services (see http://www.ii.fsu.edu). The Institute also sponsors Network Statistics Working Group meetings that attract many vendors to discuss issues related to the provision of usage statistics.

ARL E-METRICS PROJECT

The ARL (Association of Research Libraries) E-Metrics project is an attempt by the academic research library community in North America to investigate various problems related to collecting and using data regarding electronic materials and services. The project, which began in April 2000, and completed in December of 2001, was funded by a group of twenty-four libraries in ARL.

The E-Metrics project aimed to:

- Develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries
- Engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services

- Develop a model to describe possible relationships between library activities and library/institutional outcomes.

The project included three phases:

- Initial phase (May-October 2000): inventory of current practices at ARL libraries as to statistics, measures, processes, and activities that pertain to networked resources and services
- Second phase (November 2000-June 2001): identification and field-testing of statistics and measures, recommendations of measures, and documentation for data collection
- Final phase (July 2001-December 2001): identification of linkages to educational outcomes and impacts, to research, and to technical infrastructure.

WHAT DO LIBRARIES COLLECT?

The findings from the first phase revealed a range of data collection and use activities among project participants. To a large degree, respondents have just begun investigating the issue of data collection of electronic resources and services seriously, and formal assessment activities in this area differ among respondents. Clearly, there are libraries working in this area and gaining experience with some specific data collection procedures such as cost analysis and collection development. But as a group, it is difficult to point to specific best practices among participating libraries and offer a coherent picture of issues, strategies, and specific techniques related to producing statistics and performance measures for networked resources and services at respondents.

Regarding the most important issues related to measurement of networked resources and services, the majority of respondents cite the lack of consistent and comparable statistics from database vendors as the most serious problem. Relatively few respondents recognised or identified problems associated with the library's inability to process and utilise collected data. While the database statistics supplied by vendors are essential, libraries seem to ignore the fact that there are other types of data that they could collect and analyse. We all agree that progress should be made to standardise usage statistics from database vendors. At the same time, libraries will also look at networked services and resources for which data can be gathered internally.

RECOMMENDED STATISTICS

Based on inputs from participating libraries, project investigators developed and field tested a set of recommended statistics and measures that provide indicators of library networked services and resources under five categories.

Patron accessible electronic resources
- Number of electronic full-text journals
- Number of electronic reference sources
- Number of electronic books

Use of networked resources & related infrastructure
- Number of electronic reference transactions
- Number of logins (sessions) to electronic databases
- Number of queries (searches) in electronic databases
- Items requested in electronic databases
- Virtual visits to library's website and catalogue

Expenditures for networked resources & related infrastructure
- Cost of electronic full-text journals
- Cost of electronic reference sources
- Cost of electronic books
- Library expenditures for bibliographic utilities, networks & consortia
- External expenditures for bibliographic utilities, networks & consortia

Library digitisation activities
- Size of library digital collection
- Use of library digital collection
- Cost of digital collection construction & management

Ratio measures
- Percentage of electronic reference transactions of total reference
- Percentage of virtual visits of all library visits
- Percentage of electronic books to all monographs
- Percentage of electronic journals to serial subscriptions

The report and the manual to collect and use the recommended statistics and measures provide a beginning approach for research libraries to better describe the use and users of their networked services. The recommended statistics are being tested and will be integrated into ARL statistics in the near future.

Vendor statistics

Another key activity of the E-Metrics project was to investigate the provision of usage statistics from major content providers. The primary goal of this exercise was to assess usage statistics in terms of comparability of reported statistics and their definitions, breakdown of data, and report formats. In the first phase of the project, the study team obtained usage reports of twelve major vendors. In the second phase, we solicited data directly from the same vendors and asked participating libraries to evaluate the data based on several criteria, such as the level of effort required to process the reports, comparability of data across vendors, and the usefulness of reported statistics. Eight vendors and thirteen libraries participated in the field-testing.

The majority of libraries reported that the data provided by the vendors are 'necessary and valuable.' They liked the fact that the data are 'straightforward and easy to use' and, more importantly, that the data provide some indication of the extent to which subscription-based services are being used by their patrons. Still, there is some doubt among libraries about the aggregate value of the combined data. Given that a typical research library deals with several dozen content providers, getting the data and processing them would require a considerable effort on the part of libraries. Consistent data arrangements in standard file formats would significantly reduce the effort to capture and process statistics. Libraries reported that it was difficult to compare data from different vendors due to the lack of sufficient description of data definitions and how the data were collected and summarised. For the usage statistics to be truly valuable, vendors need to provide information about how each data element in usage reports was defined and how the counts are filtered.

With changes in technology, database structures, and other factors, the provision of usage statistics has been anything but constant. Also several developments such as COUNTER occurred after we completed the analysis for the E-Metrics project. For this reason, we are in the process of updating vendor reporting practices and capabilities, and identifying critical issues that need to be resolved to bring this important initiative forward. We expect to complete the analysis and make it available at the Information Use Management and Policy Institute website (www.ii.fsu.edu) later this autumn 2003.

Outcomes perspective

The third phase of the project was intended to address the larger issue facing libraries that were making a significant investment in electronic resources – what difference do these resources and services make to the user? A number of documents were produced to begin to lay the groundwork for further investigation in this area. Bonnie Gratch-Lindauer wrote one project report in which she conducted a content analysis of the standards and supplemental documentation of the six US regional accrediting commissions of higher education. It identified the overall trends in accreditation and how they affected libraries by comparing how user and institutional outcomes are represented in the standards. The report described how electronic and networked services are referenced in the standards and emphasised the need for libraries to show the connection between those services and fulfillment of the higher education institution's mission. Finally, Ms Gratch-Lindauer provided some observations and recommendations for libraries based on her analysis.

More recent work by Bertot and McClure (2003) provides a framework for how to approach the issue of linking institutional and other types of outcomes with library measures and suggested some next steps to take to investigate how this might be done. Currently, the notion of outcomes assessment in an academic library setting has a number of strengths and weaknesses which are only now being investigated. The degree to which a formalised outcomes assessment approach can be made practical and feasible in an academic library setting is, as yet, unclear.

Detailed ARL E-metric project information and final reports can be found at http://www.arl.org/stats/newmeas/emetrics/index.html.

E-Valued project

In response to demand from the library and information services community in higher education institutions (HEIs) in the UK for support with the evaluation of EIS (electronic information services) the Centre for Information Research (CIRT) at the University of Central England is undertaking a number of initiatives funded by HEFCE (Higher Education Funding Council for England).

A survey conducted by CIRT in spring 2002 to provide a baseline of current evaluation activity confirmed that the evaluation of EIS is not widespread across institutions, is sporadic in terms of services evaluated and approaches to evaluation

and is conducted using inadequate data, particularly from vendors of e-resources. In addition, it was clear that many practitioners welcomed guidance in methods to evaluate this rapidly evolving area of their service provision (Thebridge et al, 2002). In the UK CIRT is currently conducting the following projects to assist the academic community in the evaluation of EIS:

EVALUED (2002-2004)

The eVALUEd project is developing a toolkit of resources to assist information professionals in HEIs in the UK with the evaluation of their EIS. Based on a considerable body of research and consultation within the higher education sector and beyond, the developing toolkit will be broad in scope providing information on evaluating many aspects of EIS including: usage; user support; impact on users; resource provision; collaboration and integration; and security. The toolkit resources will include: a step-by-step evaluation process; sample tools including statistics, surveys and interview questions; case studies of evaluation conducted by HEIs; and links to current research and relevant organisations and literature. Aspects of the toolkit are currently being piloted with a selection of HEIs and it is anticipated that the toolkit will be made live in March 2004. In addition, from May 2004 the eVALUEd project will be running dissemination and awareness workshops in all nine English regions to raise awareness of the toolkit and approaches to the evaluation of EIS.

E-LIBRARIES: OUTCOMES AND MEASURES (2003-2005)

This project comprises two core elements, which aim to provide more in-depth work to supplement the eVALUEd project in two respects: e-measures and outcomes.

E-measures

Measuring usage, provision and cost of EIS is clearly important in managing electronic resources. It is widely acknowledged that doing this is not without problems, such as the lack of comparability of vendor statistics and the difficulty of devising accurate systems to monitoring web page hits. The project aims to:

- Develop a set of current performance measures for EIS in HEIs in the UK
- Pilot, refine and roll them out to the sector as standard performance measures for EIS.

In order to achieve these aims CIRT is working in association with SCONUL's Advisory Committee for Performance Improvement and is also taking

account of work done in this field internationally, for example, by the National Information Standards Organisation (NISO) and Association of Research Libraries (ARL).

The project will involve working closely with up to 25 pilot institutions representing a diverse range of information services in UK higher education. Pilot institutions will test the measures developed and reflect on the issues concerning the collection of the data. Ongoing support will be provided by the CIRT team and pilots will have the opportunity to share their experiences with other institutions through a variety of means including a discussion forum and seminars. The piloting will take place in two distinct stages.

Phase 1 (October 2003 - June 2004)
A set of measures designed to complement the traditional library measures collected in the SCONUL annual statistical return will be piloted. The aim at this stage is to ensure that these basic measures are robust and to identify any difficulties involved in the collection of such data.

Phase 2 (June 2004 - March 2005)
In phase 2 additional measures over and above those developed for phase 1 will be developed and piloted. The nature of these measures will be driven by the needs and concerns of library practitioners and horizon scanning to anticipate future issues around the provision of EIS.

One of the key outcomes of the project will be to encourage the active take-up and use of the measures developed and to provide information to support the collection of the data.

OUTCOMES

The issue of outcomes assessment in relation to EIS in higher education institutions is currently of great concern internationally. Consultation with the UK higher education sector through the eVALUEd project suggests that this is an area where information services require additional support. Factors such as the changing roles of information services, the rapid developments brought about by EIS and the anticipated potential for repositioning of university outcomes in the light of developments such as the strategic review of higher education in the UK, *The future of higher education*, make this an important area for research.

Building on the theoretical framework devised by Bertot and McClure (Bertot and McClure, 2003),

the project will develop work in this area further through undertaking a series of case studies at a selection of different types of UK HEI. The case studies will examine organisational structures and institutional, departmental and information services outcomes. The project will provide recommendations for evidence procedures to enable information services to assess whether, and to what extent, they are contributing to wider institutional outcomes and suggestions for ways in which service outcomes may be adapted to align EIS more closely with institutional outcomes.

Further information about these and related projects can be obtained from the CIRT web site at http://www.cie.uce.ac.uk/cirt/current.htm

THE ROLE OF STANDARDS

Traditionally, standards serve key functions in terms of library statistics, including:

- Identification of critical library holding, content, budget, expenses, personnel, and other items considered important to track longitudinally
- Definition of data elements to guide data collection and reporting efforts by libraries
- Suggestion of general methods and approaches to collecting data regarding the identified and defined data elements.

As such, standards serve both informational and definitional purposes that enable the aggregation of library data across a number of libraries. Most academic, public, school, and other library types agree upon a set of statistics that they will collect and report at pre-determined intervals (usually on an annual basis).

A number of groups can and do maintain standards – ARL, for example, has its own data collection process and reporting system. So too does the U.S. public library community, through the Federal-State Cooperative System (FSCS) maintained through an agreement by state library agencies and the National Centre for Education Statistics. At a higher level, the National Information Standards Organisation (NISO) develops and maintains library statistics standards (Z39.7) that inform US library statistics standards across all library groups. At the international level, the International Statistics Organisation (ISO) develops and maintains both library statistics (ISO 2787) and library performance indicator (ISO 11620) standards. In general, all these groups rely on libraries in the field to conduct research into and test different data elements and indicators for

inclusion into the respective standards. Finally, library standards (such as those by NISO and ISO) are typically on a five-year review and revision cycle.

The networked environment requires a rethinking of the traditional standards process. Increasingly, standards are about compliance, but there are a number of forms that compliance can assume when considering network-based services and resources that go beyond the traditional definitional and reporting approaches. These include (Bertot, 2003):

- Methodological. Most library data collection and reporting efforts rely on accepted research methodologies such as surveys used with appropriate approaches such as sampling. Libraries are, however, left to create those survey protocols to best fit the library environment in which the libraries reside – albeit with the accepted definition of elements as described above. In order to be able to count virtual visits, for example, and have these data be comparable across libraries, there is a need to consider similar methodological approaches to the collection of such data.
- Technical. In order for libraries to offer and/or participate in the provision of various services/resources, they need to adopt a variety of technical standards such as the Z39.50 search and retrieval standard. Other standards exist or are under development –particularly in the area of metadata– that libraries will need to monitor so as to enable other services/resource provision based on those standards in the future.
- Data. As mentioned earlier, a new compliance effort—Project COUNTER (http://www.projectcounter.org/)—concentrates solely on the issue of vendor/publisher online data compliance. Through project COUNTER efforts, vendors and publishers have begun to adhere to a Code of Practice that will require participants to provide their usage data to a third party for data normalisation efforts. The intent is to allow libraries to receive online resource usage data in a standardised format that allows comparability of data across vendors and publishers. In theory, Counter-compliant vendors should enable libraries to compare database/publisher data for their own subscriptions.
- Configuration. Libraries that want to engage in benchmarking and peer comparison activities will likely have to consider systems and

application compliance. For example, libraries that want to count and compare database sessions and database items examined across libraries will need to consider a whole host of systems configuration and architecture issues in order to engage in benchmarking activities, as differences in implementation can alter significantly the numbers that libraries report.

Thus, there is a need to move standards bodies from their roles of reviewing data elements and crafting definitions, to include methodological, data, and configuration issues so as to be able to compare data within and across libraries.

Another issue regarding standards is the timeline and process. Network statistics evolve at a rapid pace that technology influences greatly. The traditional standards process is deliberative, relies on the field to recommend data elements, and assumes an underlying degree of stability regarding data elements and definitions. This process is outmoded for the networked environment. It is the case that the standards process will be in a continual cycle of definition, refinement, and recommendation when it comes to library network statistics and performance indicators. The standards bodies (group, national, international) will need to function within this reality and consider adopting flexible standard maintenance strategies. Indeed, in some cases, it is the standards organisations that may develop and refine network statistics prior to the field – which is a completely new approach. As an example, readers should compare ARL E-Metrics database statistics included in this paper and the current NISO database network statistics (http://www.niso.org/emetrics/current/subcategory7.9.1.html). A number of technical developments required numerous changes to the definitions, thus creating a situation in which the standards group moved ahead of the most recent research projects and initiatives. COUNTER is another example of this. Readers can visit the Information Institute website for information on the comparison of statistics from various initiatives. In particular, the Institute developed a comparative data element and definition table across several initiatives (http://www.ii.fsu.edu/getProjectDetail.cfm?pageID=8&ProjectID=7&type=initiative).

Next steps

Given the general lack of systematic network statistics and performance measurement activities in participating libraries, there is a clear need for staff development and training in both assessment and network statistics activities. This training should incorporate an overview of the benefits and impacts of evaluation activities; the value of evaluation in decision-making and resource allocation processes; network statistics and performance measure definitions, collection activities, methodologies, and reporting systems; and the incorporation of findings regarding network statistics and measures into decision-making and resource allocation activities.

The Information Use Management and Policy Institute (Information Institute) at Florida State University was awarded a grant from the Institute of Museum and Library Services (IMLS) to develop training programs to help public libraries in the USA collect and make use of network statistics. We expect that academic libraries will also benefit from the outcomes of the project.

As we previously discussed, a number of initiatives and organisations are working on the problem of network statistics. For a host of reasons, including vendor cooperation, library reporting requirements, and library management needs, coordination and cooperation is necessary throughout these projects. The establishment of the National Clearinghouse for Library and Information Center Networked Statistics (http://www.ii.fsu.edu) at the Information Institute will play a coordinating role, to the extent possible, in the collection, use, and analysis of network data sources including, but not limited to, vendor statistics. The Clearinghouse will facilitate the cross-fertilisation of the various efforts thus far to build upon each other and integrate activities for meaningful library assessment in support of decision-making and analysis.

Finally, it must be stressed that the role of database vendors, aggregators, and other commercial firms that provide libraries with descriptive statistics related to electronic resource use and services must continue to be actively involved in the various efforts described earlier in this paper. There continues significant variance among the vendors as to how they report and present data related to electronic resources use. It is essential that the library community, the vendor community, and the standards community – within an international perspective – continues ongoing discussions about how best to identify, define, collect, and report data related to electronic resources use.

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