Measures for Electronic Use: The ARL E-Metrics Project

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Abstract

Libraries are spending a larger proportion of their materials budget on electronic resources. In 2001, members of the Association of Research Libraries (ARL) spent more than $132 million on electronic resources. In order to determine if their dollars are being well spent, 24 members of ARL self-funded a research project to develop measures for describing the resources, expenditures, and usage of electronic resources. The project resulted in a set of recommended measures and a data collection process that will continue to be refined and tested by ARL members.

Introduction

Since the late 1990s, an increasing percentage of library budgets has been directed to the purchase of electronic resources. Members of the Association of Research Libraries (ARL) began to discuss what new measures would be needed to determine whether the significant investment in these resources was of benefit to their library users at a retreat in 2000. The retreat attendees noted that little data was available. For those libraries that had data, the data were inconsistent and unreliable. The libraries themselves had a variety of internal structures and procedures surrounding the acquisition and deployment of electronic resources and were not well organised to collect common data. Another major problem identified by ARL members was the dearth of information about how the use of electronic information resources contributed to library user success. The ARL E-Metrics project was designed to address these issues. The project began in May 2000 and was completed in December 2001. It has been described previously by project co-chairs Rush Miller (University Librarian and Director, University of Pittsburgh) and Sherrie Schmidt (Dean of University Libraries, Arizona State University) and project investigators Charles McClure, Wonsik "Jeff" Shim, and John Carlo Bertot (Florida State University) in papers given at the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services (Miller and Schmidt, 2002; Wonsik et al, 2002). Project deliverables included a summary of current data collection practices, a set of recommended statistics and measures, a data collection manual of procedures, an instructional module, and papers that address potential linkages between library measures and institutional outcomes. The project documentation has been published and is available on the ARL web site (ARL, 2002).

Background

ARL is an institutional membership organisation consisting of 124 members from the United States and Canada. It has a long history of collecting descriptive statistical data about collections, budgets, services, and personnel and publishes a variety of annual compilations. An interactive web site hosted by the University of Virginia Library's Geospatial & Statistical Data Center provides members and other site visitors with an opportunity to manipulate the descriptive data to respond to internal needs for benchmarking and peer comparisons, as well as to track aggregate trend data. However, ARL parent institutions are requiring more than descriptive data. They are demanding information on the outcomes or impacts institutional units or departments such as libraries provide and they are putting

pressure on those units to maximise the use of resources either through cost savings or reallocation.

A "New Measures Initiative" was established in 1999 to develop tools and measures that would respond to the need to supply new types of statistics more in tune with the institutional demands for outcome data and accountability. The Initiative would provide opportunities for collaboration among member libraries with like interests, develop specific projects using different models for exploration, be self-funded by interested members, and make the resulting tools and methodologies available to the full ARL membership and the wider library community. In the interim, ARL would continue to collect, but limit or freeze any modifications to the existing descriptive measures in order to devote more attention to developing these new measures.

One of the important areas of investigation of new measures was determined to be in the collection of data to determine if the increasing amount of money being paid for electronic resources was in fact well spent. Individual ARL members intuitively felt that the move to electronic resources was warranted, but wanted to know if the trend to direct a larger and larger portion of their acquisitions budget to those resources was supported by data on the use and value of those resources by their user communities.

ARL had begun collecting data on electronic resources in 1992–93. Many libraries were able to supply some cost data, but after several initial attempts were unable to count consistently the resources purchased or the use made of those resources. The data for costs showed that from 1992–93 to 1999–2000, the percentage of acquisitions dollars that ARL member libraries directed to electronic resources rose from 3.6% to 12.9%. The 105 ARL libraries reporting cost figures spent almost $100 million on electronic resources out of their materials

expenditures budget and the figures would be far higher if the expenses for infrastructure and personnel could be factored in to the totals. Clearly this was an area in which large amounts of dollars were being spent and for which the need for consistent and reliable data was apparent. Figures just released for 2001 show the trends continuing. The average percentage of the library budget that is spent on electronic materials was 16.25% in 2000–01, nearly five times as much as in 1992–93. Almost $132 million was reported spent on electronic resources by 106 universities in 2000-01.

Motivations for collecting networked data and statistics

There are several factors that drive the need for the collection of networked data and statistics. In the area of funding, libraries need data to provide information that justifies expenditures and makes the case for continued support for digital collections. The data should show that users want and use the electronic information and services being provided. Also, the data are necessary to provide evidence that additional support for technology and infrastructure is needed. Internally, data are needed to better manage internal processes by measuring and tracking changes in those processes, by serving to justify allocation and prioritisation decisions, and to enable assessment activities. Libraries also want data to use for comparative and benchmarking purposes. The volatile environment of electronic resources and the collaborative methods by which much of the information is purchased encourages libraries to learn about how their peers are managing electronic resources. Also, reliable data can enable a library to compete for campus or institutional resources. And finally, as project participants discovered, the need for data is particularly acute when working with the vendors who supply the electronic resources and services. Libraries need accurate reporting of use, the ability to compare

overlapping coverage, and the ability to pressure vendors to price according to actual need and use.

Establishment of the E-Metrics Project

Thirty-six ARL libraries sent representatives to a retreat in Scottsdale, Arizona, in February 2000 to focus on the challenges involved in developing measures for electronic resources. The two-day event defined a project scope, laid out the commitments of time and resources potential participants would have to make, and subsequently led to the preparation of a project prospectus. All ARL libraries were extended an invitation to participate and a total of 24 libraries agreed to sign on and contribute staff and financial resources to what came to be called the E-Metrics Project. A formal contract was signed with the Information Use Management and Policy Institute at Florida State University and Charles McClure, Francis Eppes Professor and Director of the Institute, Wonsik "Jeff" Shim, and John Carlo Bertot served as contractors for the project. Rush Miller and Sherrie Schmidt served as co-chairs and ARL was represented by Duane Webster, Executive Director, and Martha Kyrillidou, Senior Program Officer for Statistics and Measurement.

The project was designed in 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

Project participants included:

- University of Alberta
- Arizona State University
- Auburn University
- University of Chicago
- University of Connecticut
- Cornell University
- University of Illinois-Chicago
- University of Manitoba
- University of Maryland-College Park
- University of Massachusetts
- University of Nebraska-Lincoln
- University of Notre Dame
- University of Pennsylvania
- Pennsylvania State University
- University of Pittsburgh
- Purdue University
- University of Southern California
- Texas A&M University
- Virginia Polytechnic Institute & State University (Virginia Tech)
- University of Western Ontario
- University of Wisconsin-Madison
- Yale University
- Library of Congress
- The New York Public Library, the Research Libraries

One of the first steps in the project was to come to agreement about definitions. The working definition used for networked resources and services was *those electronic information resources and/or services that users access electronically via a computer network: a) from on-site in the library, b) remote to the library – but from a campus facility, or, c) remote from the library and campus.* The resources included locally licensed databases, regional or statewide consortia licensed databases, aggregated databases, publishers databases, and publicly available (web) resources. Networked information services included access to text and numerical databases, electronic journals, electronic books, e-lists, e-mail; instruction, training, and workshops; reference and

information services; virtual reference; interlibrary loan and document delivery; information technology infrastructure; and institutional and personal portals.

Phase I: What do we know?

Phase I of the project was designed to gather information about current practices within the project participants. The first report from the project investigators was submitted to ARL in November 2000 and documented the state-of-the-art within ARL libraries regarding how they were measuring electronic information resources and services. The data were gathered through survey questionnaires and site visits by project investigators conducted to several libraries that were considered more advanced after analysis of the surveys. As might be expected, there was a wide range of data collection activities among the project participants. Most of the data being collected were in the areas of costs (because these had been part of ARL's supplementary statistics data collection efforts for several years) and patron-accessible resources. There was much less data collected related to use and users since those data were usually available only from vendors and not necessarily available in-house. Most of the use made of collected data was for making management decisions regarding acquisitions or licensing of new electronic collections.

Early on in the information-gathering portion of the first phase, it became clear that much of the data regarding usage information would need to be gathered from vendors. Project participants set up a Vendor Statistics Working Group to try to address vendor-supplied statistics. The perceived lack of consistency among data variables and definitions was one of the major issues. The Working Group was particularly interested in gaining vendor cooperation in developing and field-testing data elements. Participants supplied usage statistics reports from 12 vendors to be reviewed by project

investigators. The reports were from those vendors with which many libraries had subscriptions or for which they spent significant funds.

The vendors included Academic Press/IDEAL, Bell & Howell/ProQuest, EBSCO, Elsevier/Science Direct®, GaleNet, HighWire Press®, ISI/Web of Science, JSTOR, LexisNexis®, OCLC/FirstSearch, Ovid, and Silver Platter.

The project investigators reviewed the reports in terms of the types of statistics, the report formats, the frequency of the reports, and other information. The investigators also tried to match the reported statistics to the guidelines promulgated by ICOLC (International Coalition of Library Consortia) to see how close the vendors came to meeting the guidelines (ICOLC, 2001). Another step in the process was to review the definitions, descriptions, or explanations of the usage statistics provided by the vendors to the actual reported statistics. This provided the investigators with an opportunity to conduct a systematic, standardised review of vendor usage statistics. The comparisons proved to be a challenge and revealed a wide range of practices among the vendors. Details of the differences are included in the Phase I report, (Wonsik et al, 2001) but some of the major findings included such things as the variety of delivery options by some vendors leading to different types of reports and how the vendors interpreted the ICOLC guidelines.

Eleven of the vendors whose reports had been analysed and a new vendor, netLibrary, agreed to take part in the Phase II field-test aspect of the E-Metrics project. Nine of the vendors met with project team members in April 2000 to discuss issues that had arisen as part of the analysis of the vendor reports and from information gleaned from project participants. The meeting was a valuable opportunity for both the E-Metrics project to

share its progress and for vendors to share general information among themselves about what statistics they provided customers, how they interpreted data definitions, and how their systems were set up to generate reports.

During the life of the project, ARL was not the only organisation interested in collecting data about electronic information, nor was it the only project in contact with vendors. Several other projects had begun or were beginning to develop recommendations regarding the collection of consistent and comparable data for electronic resources. While these projects were certainly related to the ARL E-Metrics project, they did not exactly match its goals or timeline. The ARL project leaders established communications with the other organisations to share information and progress. Those projects were:

- International Coalition of Library Consortia (ICOLC) Guidelines for Statistical Measures of Usage of Web-based Indexed, Abstracted, and Full-Text Resources

- European Commission EQUINOX Project (EQUINOX, 2002)

- International Standards Organization revision of ISO 2789 (Sumsion, 2002)

- US National Information Standards Organization (NISO) update of the library statistics standard (NISO, 2002a and NISO, 2002b)

- US National Commission on Libraries and Information Science (NCLIS) project to standardise online database usages statistics and reporting mechanisms (public libraries) (Davis, 2000)

- US Institute of Museum and Library Services (IMLS) project to develop national network online statistics and performance measures for public libraries (IMLS, 2002; Information Use Management and Policy Institute, 2002)

- Council on Library and Information Resources (CLIR) report on network statistics (Luther, 2002)

- Digital Library Federation projects to measure digital library use (Digital Library Federation, 2002)

- Publishing and Library Solutions Committee (PALS) Working Group on Online Vendor Usage Statistics (UK) (JISC, 2002)

- CENDI Web Metrics (Hodge, 2000)

The extent of interest in measures for electronic resources was evident by the number of organisations working in this arena.

Phase II: What can we collect?

The second phase of the project included an iterative process to define a set of proposed measures and then to test the data elements. A needs assessment conducted in the first phase of the project resulted in a list of preliminary statistics sent to project participants by the investigators for comment and review in November 2000. This list also appeared in an ARL bimonthly report, along with a report on the progress of the progress (Wonsik et al, 2000). Comments from project participants led to some modifications and the revised list was sent back to the participants in December 2000 as a survey. The major changes in the revision were that clearer categorisations were made and the cost categories being collected as part of the ARL supplementary statistics were added, in order to avoid duplicated efforts. Project participants were then asked to rate the usefulness of the proposed statistics and measures on a five-point scale. This activity was intended to give the project investigators a rapid, quantitative assessment of any potential problems with the proposed measures. The ratings indicated that participants were more comfortable with the cost categories (possibly because those data already were

being collected) and less comfortable with the proposed performance measures. Individual scores for each measure identified possible least useful items, but it was not always clear whether they were less useful because of the difficulty in collecting them, or whether participants thought they would not provide information about electronic resources that would be useful to them.

The initial list of measures was 15, which grew to 21 in the revised list. Performance measures that could be derived from combinations of individual statistics were also recommended. Four were suggested in the initial list and seven were on the test list. Field-testing of the measures was desirable for several reasons: a) to know whether or not the data could be collected, b) to determine if the recommended procedures would work, c) to determine the time and effort it would take to collect the proposed data, and d) whether particular data or measures were worth the time and effort to collect them.

E-metrics participants were given three options to participate in the field-testing:

1. **All or nothing** – A small set of libraries field-tests all of the proposed statistics
   *Advantage*s: easy to administer and gather results
   Problems: burden on libraries

2. **Area coverage** – A small set of libraries collect the same category of statistics (e.g. cost measures only)
   Advantages: lesser burden on libraries
   Problems: small set of results; hard to adopt by libraries not in the field-test

3. **Pick and choose** – All libraries choose from the full set of statistics what they would like to field-test
   Advantages: large set of results, easy for libraries to adopt
   Problems: difficult to administer and analyse results

At the January 2001 meeting of the participants, the three options were discussed. Participants noted the importance of broad testing in order to obtain meaningful results. It was agreed that if a library decided to take part in the field test, the library would test all of the statistics and measures so that the results could be more reliable and consistent. The one exception was in the area of digital collection statistics since not all libraries were significantly involved in building digital collections.

After that meeting, a final set of field-testing statistics and measures, along with definitions, were sent to all project participants asking who would like to take part in the field-test. A total of 16 libraries agreed to take part. Twelve would test all proposed measures and the other four would test all but the digitisation statistics. The project investigators prepared a field-testing instruction manual with detailed definitions, examples, and data collection procedures. Participants also received a self-evaluation form for each statistic and measure to understand more about how local testing was being conducted and what issues would arise if this measure was to be collected on a regular basis by all libraries. The types of questions asked included:

1. What was the easiest aspect of collecting data for this statistic/measure?

2. What was the most difficult aspect of collecting data for this statistic/measure?

3. Do you have any suggestions or recommendations that would improve the data collection process?

4. Approximately how many staff hours were needed to produce this statistic/measure?

5. To what degree is this statistic/measure worth collecting given the amount of time and effort required to collect it?

In addition to answering questions from field-test library liaisons, the project

investigators also made site visits to three libraries to meet with staff who were engaged in the field-test activities. One-on-one interviews and reviews of internal processes helped provide additional information on what was needed for libraries to collect the proposed measures.

Fourteen of the 16 libraries were able to compile and report data, but the ability and time to collect specific statistics varied widely. Patterns of abilities were hard to determine and many libraries indicated that, if the recommended statistics and measures were to become the established ones, procedures would need to be put into place in order to collect those statistics regularly. It was clear from the field-testing, however, that the level of effort required to collect the data depended on the library's current capability (i.e. its staff and resources) and interest in data collection. An investment in the development of an internal information system would result in the establishment of local practices that would decrease significantly the effort in collecting data.

There were several challenges affecting a library's ability to collected networked statistics identified as a result of the field-testing. First, many acquisitions, fund accounting, and cataloguing systems are not set up or designed to support this kind of data collection activity. New systems have to be put in place to gather the necessary data, and often the data are located in several different places. Second, the definitions and procedures prescribed for the project (i.e. with the intent to collect common data) are not compatible with local practices. Libraries have built ad hoc systems in order to address the management of electronic resources. Third, since the environment in which electronic databases and systems are produced is so changeable, it is difficult to devise specific, stable definitions and procedures. Project investigators indicated that the measures for electronic information may never be set in stone, but rather be

"good enough" for collection because the systems delivering the information will be in such constant change. Fourth, the dispersed nature of networked resources makes it difficult to consolidate and manage data gathering. For many libraries, data will need to be gathered locally and obtained from a variety of vendor sources. Although internal systems can be set up to capture as much data as they can automatically, there will be a need for significant staff resources to manage this process.

The vendor statistics field-testing also provided some challenges. In order to minimize the burden on libraries to evaluate too many vendor reports, the project investigators assigned three or four vendors to each library. The following deliverables were asked from each vendor:

- A monthly report (April 2001) in a standardised text format (specific guidelines were given for data elements and their arrangement)

- A detailed step-by-step description of the process employed to collect the statistics including the rules and assumptions applied in the process

- A monthly (April 2001) raw data log file, and

- Issues and suggestions for providing usage statistics

Eight of the vendors were actually able to participate in the field-testing and the project investigators noted that since their Phase I analysis, progress had been made by vendors in providing documentation. Cross-comparison was still significantly difficult and for this Phase, no effort was made to validate compliance with ICOLC guidelines except to identify the categories in which data were available.

The library evaluation of the vendor data resulted in several observations. Because not all vendors participated, there was not

enough data to do all of the analysis that was desired. For the data files that were received, libraries reported that it was relatively easy to read and process the data, but they found it difficult to carry out any data comparisons because the necessary descriptions of data definitions and data collection processes were not always available. Although the project investigators had provided vendors with guidelines for essential data elements, data arrangement, and file format, the vendors had simply repackaged their monthly usage reports. This meant there was little difference between the field-testing report and the report that the libraries normally accessed from the vendor site. However, one benefit was the ability to get data in a text format and to get the necessary explanations for the data elements. While working with the small set of vendor data for this analysis, it became quite clear that, for ARL libraries that purchase dozens of databases, there would be a significant burden in handling even the raw text data that came from the vendors.

After reviewing the vendor data and the library analyses, the project investigators made a few recommendations about vendor statistics. First, they suggested that the libraries focus their data analysis on high impact databases. Due to the difficulties in normalising usage statistics from all vendors, it would be best for a library to invest its time in those databases that are considered of major importance to their local environment. The investigators recommended that libraries try to find ways to capture internal data for the external databases as a means of verification. Libraries are also encouraged to keep track of aggregate statistics as a measure of general trends on use. They can be gathered consistently by choosing a common pool of databases and tracking figures over specific periods of time.

Recommended statistics and measures

As a result of the field-testing, the project investigators came up with a recommended set of 17 measures that were grouped into 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

In addition, the investigators proposed performance measures that the libraries could begin to consider using:

- Percentage of electronic reference transactions of total reference
- Percentage of virtual visits of all library visits
- Percentage of electronic books to all monographs

And project participants subsequently added one additional measure:

• Percentage of electronic journals to serial subscriptions

For each of the proposed statistics and performance measures, the investigators supplied the following criteria:

Definition: A description of each proposed statistic or performance measure

Rationale: A discussion of why the statistic or performance measure is needed and/or how it can be used to describe electronic resources

Unit of measure: The specific data variable being collected

Data source: The location of the data

Implementation: Instructions for the implementation of the proposed statistic or performance measure, categorised by who collects it, the frequency or collection, procedures by which it is collected, and any other special considerations

Collected by: Indicates who is responsible for collecting the data and makes a distinction between locally collected (i.e. by the library) and vendor supplied (content providers with whom the library has a contract to provide electronic resources or services)

Frequency: Identifies how often the statistic or measure should be collected

Procedures: Describes how the data may be collected and, in some cases, includes forms for data collection

Special considerations: Identifies any factors that need to be understood when collecting or interpreting the measure

Related issues: Discusses other issues such as the availability of complementary data, ways in which the statistics could be combined with other statistics, or other approaches to data collection

In addition to the recommended measures, the project investigators also provided some tools such as report forms to show how the data might be collected.

Phase III: What difference does this make?

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? The project investigators provided two documents to begin to lay the groundwork for further investigation in this area. The first was a subcontracted report by Bonnie Gratch-Lindauer (2001) 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 fulfilment of the higher education institution's mission. And finally, Ms Gratch-Lindauer provided some observations and recommendations for libraries based on her analysis (Gratch-Lindauer, 2002).

The second report, written by Bruce Fraser and Charles McClure (2002), provided a framework for how to approach the issue of linking institutional outcomes with library measures and suggested some next steps to take to investigate how this might be done.

Phase III also included the production of an instructional manual and a set of PowerPoint® slides that provide libraries with a context of why collecting data is important, how to prepare for the collection of measures for electronic resource statistics, and an overview of the recommended statistics and measures.

E-Metrics assessment recommendations

Several recommendations have come out of the E-Metrics project in addition to the suggested measures. It became especially clear during the field-testing that libraries need to have administrative clarity regarding their assessment programme. Data gathering efforts cannot happen in a vacuum and the library's assessment plan should reflect the institutional structure and staff functions. Libraries will need to balance stakeholder needs with the availability of data and not seek perfection but look towards "good enough" data that will support administrative decision-making in a timely manner. In preparation for data gathering of any type, but especially for electronic information, the library should provide for the input, structure, housing and archiving of data and should propose a structure to disseminate those data, reports, and information. For some libraries, it may mean building dynamic web intranets to which staff are given the necessary training and access.

The implementation process for E-Metrics was defined as a set of steps beginning with the preparation, both immediate and long-term, and thinking about what is needed for the library. Next are the identification of the tasks to be performed, the data to be collected, and the needs to be addressed. The actual data collection is the third step and information management – the handling of the data – is the fourth step. Finally, the process includes reporting, dissemination, and feedback to ensure that all who are involved in the process are kept informed. Each library will need to go through these same steps as they implement procedures for gathering data on networked data and statistics.

Next steps for the ARL E-Metrics Project

Acceptance of the project investigators' report is not the end of the ARL E-Metrics Project. A call for participation was sent in the summer of 2002 to all ARL member libraries to continue the work of the project and test the proposed measures during 2002/03. This will include examining the deliverables from the first phases of the project; collecting data totals for FY02 with an eye to compilation needs, data analysis, and distribution of the data for discussion of the process; an analysis of the local approaches for gathering data; and identification of best practices for the work processes needed to gather the data using either the recommendations as presented in the E-Metrics reports or locally developed by participating libraries.

ARL will be continuing its work with the vendor community, primarily by supporting the COUNTER (Counting Online Usage of NeTworked Electronic Resources) project, which is a multi-agency project with the objective of developing a single, internationally accepted Code of Practice that will allow the usage of online information products to be measured more effectively (COUNTER, 2002).

The E-Metrics project will also be monitoring developments within the national and international standards communities as draft standards both within NISO and ISO are finalised.

Training was identified as a major need by many libraries. In addition to providing specific information about how to gather the recommended statistics, the training also needs to include conceptual understanding of the importance of using data for

decision-making and developing a culture of assessment that encourages staff to make use of gathered data. ARL has been delivering workshops about the culture of assessment and other data collection activities and is planning to develop more offerings of this type (ARL Professional Development Workshops, 2002).

In keeping with the goals of the ARL New Measures Initiative, documents from the E-Metrics project are available to the wider library community. A printed compilation of the investigator reports and the instruction manuals are available for purchase (ARL Announces … Results Published from E-Metrics Study, 2002) and all the documents are on the E-Metrics web site (ARL Measures for Electronic Resources, 2002).

The ARL E-Metrics project has been only a beginning, but it is a significant undertaking to identify the measures needed to provide information on the electronic resources libraries provide to their communities. The project demonstrated that the collection of data to provide that information is a complex set of activities, and requires the cooperation of many units within a library and of the vendors who produce the products and services that the libraries make available. The project resulted in a set of recommendations for new statistics and further actions and, using the knowledge gained through the project, ARL will continue to search for the best measures to determine how the provision of electronic resources contributes to the success of library users.

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