Proceedings of the IATUL Conferences   2003 IATUL Proceedings

Jun 2nd, 12:00 AM - 12:00 AM

Assessing Library Performance: New Measures, Methods, and Models

Julia Blixrud
Association of Research Libraries, Washington, DC

ASSESSING LIBRARY PERFORMANCE:
NEW MEASURES, METHODS, AND MODELS

Julia C. Blixrud [1]
Association of Research Libraries, Washington, DC

ABSTRACT

Size has been a traditional measure of a library for many years. How many books were held, how many people were served, and how much money was spent were all ways to determine if a library was successful. That has changed recently. University administrations and public officials are looking more closely at how well libraries serve their users and how well libraries manage their resources. This paper will describe some current projects that seek to highlight new methods for assessing library performance and show how these new measures will help libraries demonstrate their efficiency and effectiveness.

INTRODUCTION

For much of their history, libraries have been able to demonstrate their importance to their parent organization by reciting statistics focused on inputs (resource investments) and outputs (services produced). These data were useful to track trends and, in some situations, provide benchmarks for services. Ratios from these two data points could provide a better picture of how well libraries were functioning, and institutional accreditation (certification) standards provided guidance as to acceptable levels. However, in recent years, libraries have been called upon to respond to two specific needs:

1. Increasing demand for libraries to demonstrate outcomes/impacts in areas important to the institution.

2. Increasing pressure to maximize use of resources – benchmark best practices to save or reallocate resources.

This became more and more evident in the 1990s to members of the Association of Research Libraries (ARL), an institutional membership organization consisting of 124 members from the United States and Canada. ARL has a long history[2] of collecting descriptive statistical data about collections, budgets, services, and personnel and publishes a variety of annual compilations.[3] 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, many of ARL's members were feeling increasing pressure to find other methods to demonstrate how well they were doing – supplying inputs and outputs was not enough. Rapid changes in the development of new services and increased user expectations also led to a need by libraries to find ways to demonstrate their efficient and effective response to user demands.

A "New Measures Initiative" was established by ARL 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 addition, ARL staff would monitor projects from other types of libraries and from other parts of the world to identify activities and new tools that could be used by the ARL community as they struggled to find new ways to respond to institutional demands.

LIBRARY SERVICE QUALITY

Several areas of new measures interest were identified by the ARL Initiative. Not the least of which was how to answer the question, how well does a library serve its users? One common mechanism existed in many libraries – the user survey. Another recent measurement tool, LibQUAL+™, is being developed by ARL for use in a variety of library settings worldwide.

User Surveys

Libraries often conduct surveys of their users to determine their satisfaction with library services, either overall system or with specific types of interactions (interlibrary loan, reference, etc.). The Association of Research Libraries has published several summaries of user survey activities in its member libraries from 1981 through 1994 and a substantial body of literature on user surveys exists. User surveys have many benefits, including:

- Obtain direct responses to a series of questions from the community surveyed
- Identify user issues, concerns and needs
- Measure library performance from the user perspective, including satisfaction
- Acquire quantifiable data that can be statistically analyzed and generalizeable for the larger population
- Improve or change services
- Increase library visibility and marketing
- Contribute to broader institutional assessment/accreditation[4]

LibQUAL+Ô

Although evidence exists that many ARL libraries regularly surveyed their users, ARL sought to develop an even more rigorous survey instrument to take a more comprehensive look at how users defined service quality. LibQUAL+™ is a research and development project undertaken by the Association of Research Libraries (ARL) in collaboration with Texas A&M University and with financial support from the U.S. Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE)

through September 2003.[5] LibQUAL+™ is defining and measuring library service quality across institutions and creating quality-assessment tools for libraries. It is adapted from an instrument called SERVQUAL (for SERVice QUALity), which is grounded in the "Gap Theory of Service Quality" developed by the marketing research team of A. Parasuraman, V.A. Zeithaml, and L.L. Berry.[6] This tool uses a web-based method of administration and analysis to ease the burden of administration locally and creates a scaleable and replicable protocol. It also makes readily available large normative data on user perceptions and expectations of library service quality. Results from the LibQUAL+™ instrument are helping to identify benchmark indicators to better assess library service quality, provide empirical documentation of the findings to campus administrators, and develop a reliable tool by which to measure library service.

To date, nearly 250,000 individuals have answered the LibQUAL+™ survey yielding a wealth of information about user perception of library service quality. The spring 2003 survey was conducted at 308 institutions in North America, England, and the Netherlands. Consortia of libraries have participated in order to test service perception in geographic or types of libraries. Throughout the first years of grounding and testing the instrument, results and analysis have led to the thesis that the dimensions of service that make up a users perception of service quality include:

- Service affect; i.e., responsiveness, assurance, empathy, and reliability – the human dimensions of library service
- Library as place; i.e., campus center of intellectual life, a place for reflection and solitude
- Personal control; i.e., ability to navigate both the information universe in general and the web in particular
- Information access; i.e., ubiquity of access meaning information delivered in the format, location, and time of choice and comprehensive collections.

These dimensions have held and a substantial body of literature is being developed from the LibQUAL+™ project and a bibliography is regularly updated.[7] This literature discusses such things as the quantitative and qualitative analyses for the project, administering a web-based survey, representativeness vs. responsiveness, score reliability, and response rates. Many more documents are expected as the spring 2003 data are analyzed. Reports from institutions that have been participating in the project since its inception will be of particular value as they will provide examples for the use of longitudinal data.

In addition to the funding from FIPSE, ARL and TAMU have also received funding from the National Science Foundation to adapt the LibQUAL+™ instrument for use in the Science, Math, Engineering and Technology Education Digital Library community. Goals for this 3-year grant include: a) defining the dimensions of digital library service quality from the users' perspectives; b) developing a tool for measuring user perceptions and expectations of digital library service quality across NSDL digital library contexts; and c) identifying digital library best practices that permit generalizations across operations and development platforms. This project began in late 2002 with its own qualitative development effort.

EFFECTIVENESS OF PROVIDING ELECTRONIC RESOURCES

Since the late 1990s, an increasing percentage of library budgets has been directed to the purchase of electronic resources. ARL had begun collecting data on electronic resources in 1992/93. Many libraries were able to supply some cost data at that time, 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 2000-01, the percentage of acquisitions dollars that ARL member libraries directed to electronic resources rose from 3.6% to 16.25%, nearly five times as much. The 106 ARL libraries reporting cost figures in 2001 spent almost $132 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. Since is an area in which large amounts of dollars were being spent, the need for consistent and reliable data was clear.

There are several factors that drive the need for the collection of statistics for electronic resources. 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. Reliable data can enable a library to compete for campus or institutional resources. 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 prioritization 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. And finally, 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.

E-Metrics

Members of ARL began to discuss what new measures would be needed to determine whether the significant investment in electronic resources was of benefit to their library users at a retreat in 2000. The retreat attendees noted that little data were available at that time and any libraries that had data, found their data to be 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 organized 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 (May 2000 through December 2001) was advanced to address these issues. It has been described comprehensively 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.[8] 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 also appears on the ARL web site.[9]

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.

A major part of the project was the definition of measures that could be tested for annual collection by ARL members:

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 catalog

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 Digitization 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 performance 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 statistics or performance measure is needed and/or how it can be used useful 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, categorized 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.

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.

Project COUNTER

During the ARL E-Metric project, participants articulated the need to need to obtain consistent and systematic data from library vendors. ARL became a sponsor of Project COUNTER (Counting Online Usage of Networked Electronic Resources), which was launched in March 2002 as an international initiative to serve librarians, publishers and intermediaries by facilitating the recording and exchange of online usage statistics. Building on a number of existing initiatives such as ARL's E-Metrics work and the ICOLC Guidelines for Statistical Measures of Web-Based Information Resources[10] COUNTER is setting out to develop Codes of Practice for the industry. In December 2002, Release 1 of the COUNTER Code of Practice was issued to provide, inter alia, guidance on data elements to be measured, definitions of these data elements, usage report content and formats, as well as on data processing. COUNTER will initially focus on journals and databases, as these types of content are not only the major items in most library material budgets, but have also been available online for some time and have a core of well-accepted definitions and content structures. Other electronic resources, such as e-books, will be covered in subsequent releases of the Code of Practice. COUNTER is also establishing an organizational framework and technical/business model for ongoing implementation and development of the Code of Practice. The Code of Practice should help libraries as they manage their electronic resources, both as individual institutions as well as those who are in organizations such as ARL and are reporting data as a community.

Measuring the Impact of Networked Electronic Services

Not only are libraries interested in gathering consistent and reliable information on the costs and uses of their electronic resources, but they are also interested in finding ways to

determine how these resources are being used. A methodology for impact measurement has been developed by Brinley Franklin (University of Connecticut (US)) and Terry Plum (Simmons Graduate School of Library and Information Science (US)). The investigators sought to identify demographic differences between in-house and remote library users, the purposes for accessing electronic resources, the differences in usage based upon the location of the users, and the information technology services libraries should implement to make studies of users of electronic resources routine, robust, and integrated into the decision-making process.[11] Further investigation of this methodology is now being taken up as part of ARL's New Measures Initiative.[12]

COST EFFECTIVENESS

A variety of activities are taking place across the world as libraries try to find ways to benchmark and improve their operations. Time and cost studies can provide valuable information about the efficiency of operations.

Interlibrary Loan/Document Delivery (ILL/DD)

One of the more cost-intensive operations in libraries is interlibrary lending. A 1995-97 ARL ILL/DD Performance Measures Study provided 1996 baseline data to enable librarians to identify and understand local performance of mediated ILL/DD operations and compare the performance of their operations to other participants' operations. Funded by a generous grant from The Andrew W. Mellon Foundation, the study tracked borrowing and lending unit costs, borrowing and lending fill rates, borrowing turnaround times, and borrowing user satisfaction for 97 research and 22 college libraries. The findings were distributed through a publication, in 12 ARL-sponsored workshops, and more than a dozen other workshops and speeches. The methodology was adapted for use in studies in Australia and the Nordic countries. Libraries of all types and sizes have incorporated many of the characteristics of high-performing borrowing and lending operations identified in the study. A new study of 77 libraries (both ARL and non-ARL), undertaken in 2002-03 is tracking the effect of those changes for the libraries that participated in the earlier study, collect new data on user-initiated ILL/DD services, and analyze the performance of these two models for providing ILL/DD services. Results will enable study participants to once again benchmark their performance against high-performing operations.

Technical Services Cost Study

A methodology developed for use in technical services[13] by Dilys Morris (formerly of Iowa State University), now marketed as TCA DecisionBase, uses a longitudinal approach and time sampling. All staff time is tracked for a seven-day sample week from Monday through Sunday. Four to six weeks are sampled annually, providing ongoing data for understanding and planning for change. It enables library administrators to identify expensive activities for evaluation and support more informed management decisions. The software provides default standard cost centers and tasks, but supports local customization. Staff time is tracked according to the tasks performed during the week. Tasks are organized

into eight cost centers: five Product Centers, which create products and services; and, three Overhead Centers, which do not create products. <http://www.arl.org/stats/newmeas/tcs_overview.html>.

Activity-Based Costing

Limited use of activity-based costing (ABC) has occurred in the United States. ABC measures and allocates all the costs that are incurred in the production, sale, and after-market needs (warranty, for example) of a product or service. Once costs have been determined, the processes that produce these goods and services can be redesigned for greater efficiency.[14] The methodology was used in the United Kingdom in the 1990s and in several projects in Australia.[15]

Balanced Scorecard

A few institutions are beginning to examine Balanced Scorecard as a tool for combining data arising from costing methodologies and user survey or quality service measures. The Scorecard, developed in the early 1990's by Drs. Robert Kaplan and David Norton of the Harvard Business School.[16] The Balanced Scorecard is more than a measurement system; it serves as a management system to enable organizations to clarify their vision and strategy and translate them into action. The Scorecard provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results. The methodology builds on some key concepts of previous management ideas such as Total Quality Management (TQM), including customer-defined quality, continuous improvement, employee empowerment, and measurement-based management and feedback.[17] Some libraries have begun to experiment with the Balanced Scorecard methodology.[18]

Malcolm Baldrige National Quality Award

Another tool increasingly used by educational institutions to develop measureable performance indicators for organizational assessment and improvement is to use the Baldrige National Quality Program process developed by the U.S. Commerce Department's National Institute of Standards and Technology (NIST). Each year the Baldrige Award is given by the President of the United States to businesses—manufacturing and service, small and large— and to education and health care organizations that apply and are judged to be outstanding in seven areas: leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management, and business results. Congress established the award program in 1987 to recognize U.S. organizations for their achievements in quality and performance and to raise awareness about the importance of quality and performance excellence as a competitive edge. The award is not given for specific products or services. This competitive award process is being embraced by some institutions of higher education as a way to demonstrate their organizational effectiveness and soon libraries will be engaged in this institution-wide process as well.[19]

INSTITUTIONAL OUTCOMES

The most important measures for academic and research libraries – and the most difficult – have to do with how they identify the contribution they make to institutional outcomes. How does a library contribute to its parent organization success?[20] Outcomes assessment tools have been more prevalent in public library settings in recent years[21] and special libraries have always had to link their contribution to parent organization success, the academic library community has no set of tools available to use to demonstrate its contribution to learning, research, or institutional outcomes. While Accreditation agencies are beginning to provide some guidance as they stress to institutions the need for the parent to be explicit about their own outcomes and how they will measure them. That process will make it somewhat easier for libraries to determine the appropriate measures to demonstrate their contribution.

Learning Outcomes

The ARL Learning Outcomes Working Group has spent considerable time in the past two years identifying how best to measure a library's contribution to student learning outcomes. An early identifiable problem was that there is no common definition for learning outcomes and institutions are characterizing their own. Definitional problems exist among institutions, which makes the process for libraries to identify common outcomes difficult.

In a consultant report to ARL, it was suggested that one useful method to assess whether or not a library is making a contribution to student learning outcomes is to understand what library professionals consider key learning outcomes.[22] A potential answer to the question is provided by the Information Literacy Competency Standards for Higher Education approved by the Association of College and Research Libraries on January 18, 2000.[23]

- Become self reliant (comfortable and confident) in information literacy skills including:

- Identifying information needs

- Finding/locating information

- Selecting relevant information

- Assessing and evaluating information

- Synthesizing

- Using information effectively

- Presenting information

- Students understand and use the information search process (eg. Kuhlthan model)

- Understand different formats of information and deal with them effectively

- Be aware (have an accurate mental model) of the structured nature of information

- Understand how to evaluate bias and the credibility of information

- Appreciate the way the quality of information varies along an historical continuum

- Understand the social/ethical/political/economic implications of information and intellectual property

- Understand the research process through which new knowledge is created

- Understand the scholarly communications cycle and its application to scholarly research

- Become self confident and comfortable in information rich environments

- Develop attitudes of openness, flexibility, curiosity, creativity, and an appreciation of the value of a broad perspective.

Developing a set of learning outcomes will allow libraries to determine the extent to which their interests are aligned with the expectations of other academic communities in the University. Faculty responsible for the general education program as well as those responsible for many of the academic degree programs also are interested in critical thinking, the effective use of information and technology, the search process and collaborative reasoning. This suggests that departments may be very receptive to including in their courses, course segments developed and delivered by the library to increase the emphasis on a number of shared outcomes, especially where the expertise of the library complements the expertise of those in the academic programs. These segments are units of learning materials designed to develop competency in specific learning outcomes that are considered important by the library and by other academic programs. They give the library a curriculum (its own set of course segments) and an opportunity to connect this curriculum to other academic programs. To be effective, these segments must be incorporated into required courses. Therefore, there is a need for the library to engage in a dialogue with departmental faculty in order to identify ways in which they can contribute to the learning outcomes of the academic program. The library must take the initiative in determining what the library has to offer that will help the department achieve greater success in achieving their learning outcomes. It is unlikely that the department on its own will identify the library as a place to turn for help.

One specific tool addressing an aspect of learning outcomes is SAILS, Standardized Assessment of Information Literacy Skills, a project developed at Kent State University (US) as one of ARL's New Measures Initiatives to create a tool to measure information literacy and assess its impact on student learning. The project team is developing a web-administered tool that is standardized and easily administered by all types of libraries for both internal and external benchmarking. The instrument is based on outcomes defined by the ACRL Information Competency Standards for Higher Education. <http://sails.lms.kent.edu/index.php>.

Research Outcomes

As much as it is difficult to identify how a library contributes to institutional and student learning outcomes, it is just as difficult to determine what contribution a library makes to the research enterprise. While some libraries have tried to determine the portion of

11

their budget that is in support of research in order to make a case for receiving some of the indirect research funds that the University receives, others are looking at what the results of library support yield in terms of research productivity. Direct measures are hard to identify so identifying legitimate surrogates and making a link between library use and research output may be the best approach at this time.

Surrogate measures may include:

- R&D expenditures
- PhDs awarded/year
- Post-doctoral appointments
- Research awards per year
- Academy memberships
- Faculty quality rankings

One recent investigation has been conducted by the Research Support Libraries Group, established jointly by four UK higher education funding bodies, the British Library and the national libraries of Scotland and Wales to make recommendations for a UK wide strategic framework to promote collaboration in the development and provision of library collections, their long-term management, and services to support research. One of the annexes to the project is a commissioned study that examines the information sources researchers both use and require, how they work with the resources, and identification of major trends. The researchers identified significant differences in research requirements and behavior among subject disciplines and noted the increasing importance of remote access to information resources.[24] These studies confirm researchers need for and use of information, but did not enlighten the library community as to what measures would provide evidence of the value of library services to the research community. While no definitive work has yet come from these studies, it is encouraging to note the increased interest in working on this issue.

DEVELOPING A CULTURE OF ASSESSMENT

In all new measures activities, training has been identified as a major need by many libraries. In addition to providing specific information about how to use a particular tool, conduct a specific data-gathering exercise, or gather the recommended statistics, 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.[25] 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.[26]

SUMMARY

The Northumbria International Conference on Performance Measurement in Libraries held every other year has become a gathering place for librarians interested in sharing information about assessment activities.[27] And organizations such the International

Federation of Library Associations (IFLA), the International Standards Organization (ISO), the (US) National Information Standards Organization (NISO), and many national library associations have been working for decades to establish standards for library statistics and performance. For example, at the international level, the LibEcon project is using internet communications to develop a continuously updated database of library activities and associated costs in the context of national economies. This project is funded by DG13 of the European Commission within the Telematics Applications Programme. Gathering consistent information about the part played by libraries in developing the information resources within Europe is a difficult process. The project is examining the feasibility of assembling such information via electronic means. An internet site has been established to test and then generate an automatic means of collecting data. Data collected in past surveys has been added to the database, and visitors to this site can review past trends as well as compare national statistics. Suzanne Ward and others from the Library and Information Statistics Unit (LISU) of Loughborough University (U.K.) provide an overview of the development of performance measures in Europe.[28]

There are many more projects being conducted in libraries of all types and geographic locations. Many of them were precipitated by both internal needs and external pressures for libraries to define new measures to demonstrate how they add value to the organization in which they are located as well as to characterize how well they are utilizing the resources with which they are entrusted. As results of these projects are shared, the collaboration of learning what to measure – and how to measure it – will ensure library success.

---

[1] Julia C. Blixrud, Assistant Executive Director, Association of Research Libraries, Washington, DC USA

[2] Blixrud, Julia. "The Association of Research Libraries Statistics and Measurement Program: From Descriptive Data to Performance Measures," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services*. (Washington, DC: Association of Research Libraries, 2002.): 87-91.

[3] ARL Statistics and Measurement Program, <http://www.arl.org/stats/>.

[4] Hiller, Steve and Jim Self. "A Decade of User Surveys: Utilizing and Assessing a Standard Assessment Tool to Measure Library Performance at the University of Virginia and University of Washington," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services*. (Washington, DC: Association of Research Libraries, 2002.): 253-254.

[5] <http://www.libqual.org>.

[6] A. Parasuraman, V.A. Zeithaml, and L.L. Berry, "A conceptual model of service quality and its implications for future research," *Journal of Marketing*, 49 (1985):41-50.

[7] <http://www.coe.tamu.edu/%7Ebthompson/servqbib.htm>.

[8] Rush Miller and Sherrie Schmidt, "E-Metrics: Measures for Electronic Resources," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services.* (Washington, DC: Association of Research Libraries, 2002): 37-42; Wonsik "Jeff" Shim, Charles R. McClure, and John Carlo Bertot, "Preliminary Statistics and Measures for ARL Libraries to Describe Electronic Resources and Services," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services.* (Washington, DC: Association of Research Libraries, 2002): 337-344.

[9] *Measures for Electronic Resources (E-Metrics).* Washington, DC: Association of Research Libraries, 2002. <http://www.arl.org/stats/newmeas/emetrics/>.

[10] <http://www.library.yale.edu/consortia/2001webstats.htm>.

[11] Franklin, Brinley and Terry Plum. "Networked Electronic Services Usage Patterns at Four Academic Health Sciences Libraries," *Performance Measurement and Metrics* (2002) 3, no. 3: 123-133.

[12] <http://www.arl.org/stats/program/2003/a5C_Impact.pdf>.

[13] Morris, Dilys, et. al., "Cataloging Staff Costs Revisited," *Library Resources & Technical Services* (Apr. 2000): 44, no 2: pp. 70-83.

[14] Peebles, Christopher S. and Laurie Antolovic, "Cost (and Quality and Value) of Information Technology Support in Large Research Universities," *Educom Review* (Sept./Oct. 1999) 34, no. 5: 20-49.

[15] Gerdsen, Trevor, "Activity-Based Costing as a Performance Tool for Library and Information Technology Services," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services.* (Washington, DC: Association of Research Libraries, 2002.): 119-126.

[16] Kaplan, Robert S. and David P. Norton. *The Balanced Scorecard: Translating Strategy Into Action.* Boston, MA: Harvard Business School Press, 1996. Kaplan, Robert S. and David P. Norton. "Strategic Learning & the Balanced Scorecard." *Strategy and Leadership* 24, no. 5 (September/October 1996): 18-26.

[17] The Balanced Scorecard Institute. <http://www.balancedscorecard.org/default.html>.

[18] Balanced Scorecard at the University of Virginia Library. <http://www.lib.virginia.edu/bsc/>. Poll, Roswitha, "Managing Service Quality with the Balanced Scorecard." 67th IFLA Council and General Conference (August 16-25, 2001) <http://www.ifla.org/IV/ifla67/papers/042-135e.pdf>. Poll, Roswitha. "Performance,

Processes, and Costs: Managing Service Quality with the Balanced Scorecard." *Library Trends* 49, no. 4 (Spring 2001): 709-17.

[19] Baldrige National Quality Program. Education Criteria for Performance Excellence. <http://www.quality.nist.gov/PDF_files/2003_Education_Criteria.pdf>.

[20] Lindauer, Bonnie Gratch. "Defining and Measuring the Library's Impact on CampuswideOutcomes." *College & Research Libraries* (Nov. 1998) 59, no. 6: 546-70.

[21] See for example, *Putting Outcome Evaluation in Context: A Toolkit*. <http://www.si.umich.edu/libhelp/toolkit/index.html>.

[22] Smith, Kenneth, "New Roles and Responsibilities for the University Library: Advancing Student Learning through Outcomes Assessment," ARL:A Bimonthly Report on Research Library Issues and Actions from ARL, CNI, and SPARC (Dec. 2000) no. 213: 2-5. <http://www.arl.org/newsltr/213/assess.html#smith>.

[23] <http://www.ala.org/Content/NavigationMenu/ACRL/Standards_and_Guidelines/ Information_Literacy_Competency_Standards_for_Higher_Education.htm>.

[24] Researchers' Use of Libraries and Other Information Sources: Current Patterns and Future Trends. Final report. Education for Change Ltd., SIRU, University of Brighton, The Research Partnership. Higher Eudcation Funding Council for England, 2002.

[25] Lakos, Amos, "The Missing Ingredient – Culture of Assessment in Libraries: Opinion Piece." *Performance Measurement and Metrics* (August 1999): 3-7.

[26] <http://www.arl.org/arl/workshops.html>

[27] <http://online.northumbria.ac.uk/faculties/art/information_studies/imri/PM5/PM5.htm>

[28] Suzanne Ward, John Sumsion, David Fuegi and Ian Bloor. *Library Performance Indicators and Library Management Tools.* EUR 16483 EN. Loughborough: European Commission, 1995.