Library Assessment Conference

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Conference Papers

Edited by Mersini Moreleli-Cacouris
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Preface

In June 2005 the Library of Alexander Technological Educational Institution of Thessaloniki in cooperation with the Association of Research Libraries (USA) organized a conference under the “Library Assessment” theme. The conference was supported within the framework of the European Community Social Fund. The papers in this volume were presented as part of that conference.

Library Assessment is gaining new impetus over the last ten years as competition for scarce resources is fiercer and the electronic environment introduces other major competitive forces in the delivery of information. Libraries need to create a stronger culture of assessment to survive in this new environment. In 1993, ARL adopted a new objective to describe and measure the performance of research libraries and their contributions to teaching, research, scholarship and community service. This action led the ARL Statistics and Measurement Program to expand beyond measures of "input" (such as collection size, number of staff, expenditures, etc.) and to search for new kinds of measures of library performance and impact. The focus of this conference was to examine the need for library assessment and discuss the international developments as they have evolved primarily in the Anglo-American tradition. It also examined more closely two methodologies that have widespread appeal and applicability: LibQUAL+™ and MINES (Measuring the Impact of Networked Electronic Services).

LibQUAL+™ is a suite of services that libraries use to solicit, track, understand, and act upon users’ opinions of service quality. These services are offered to the library community by ARL. The program’s centerpiece is a rigorously tested Web-based survey bundled with training that helps libraries assess and improve library services, change organizational culture, and market the library. As of spring 2004, LibQUAL+™ has more than 500 participating institutions,

MINES is an online transaction-based survey that collects data on the purpose of use and demographics of electronic resource users. As libraries implement access to electronic resources through various portal developments, collaborative and consortial arrangements, the MINES protocol offers a convenient way of collecting information about users in an environment where they no longer need to physically enter the library to access resources. In 2005 sixteen libraries in Canada participated in the MINES project through an arrangement with the Ontario Council of University Libraries (OCUL). Numerous other libraries have applied MINES as part of a larger indirect cost study that universities are conducting to understand the value of delivery of information services to faculty and students.

Conference participants were informed about the development and use of LibQUAL+™ and MINES, as well as about the current effort to adapt LibQUAL+™ into the digital library environment (DigiQUAL™). They also engaged to identify ways to use evaluation data for managing change and improving services in a Greek library environment.

June 2005
Library Assessment
Why Today and Not Tomorrow?

Martha Kyrillidou
Director, ARL Statistics
and Measurement Program
Washington, DC

Libraries have a long tradition and history, and their existence has been justified on the basis of organizing, providing access and preserving important historical and cultural information. This is a very complex role and is often difficult to justify in an empirical fashion, since the many factors that shape these cultural institutions influence each other. Historically libraries have evolved with different aspects of their operation being critical at different points in time. In recent years and with the development of networking technologies, the familiar and traditional roles of libraries have been called into question and greater calls for accountability have emerged. Library goodness was never a self-justified outcome, but it becomes even less so in an environment that is highly competitive with multiple information providers (Kyrillidou, 1999). How do we know that the library is serving the needs of its users? That it is a highly valued resource? And that it is making a meaningful and positive contribution towards improving teaching quality, research productivity and life-long learning?

The increased competition for attention and channeling of information access is a global phenomenon. In places like Greece, where library development has been rapid over the last twenty years, librarians will need to actively question and shape the community's expectations in terms of what is critical and essential to maintain with local
resources versus what may need to continue to rely on central government funding or external grant funding.

The 1990s were the era of the sacred “fat” cows for Greek libraries, with plenty of funding pouring through government grants and benefactors contributing and supporting the development of libraries through institutions like the Vafopouleio Public Library and the Lambrakis Organization. During this period the available funding provided jobs to numerous librarians who may be too young to remember the era of the starving cows. Yet as recently as the 1980s libraries were hardly able to operate due to scarce funding and resources that were not directed to these institutions (Kyrillidou, 1993).

These observations are simply meant to provide a perspective that in a relatively short timeframe Greek libraries have improved. In turn, the notion that it may not take long for the situation to deteriorate may be as credible. Greek libraries need to be vigilant in preserving their relatively newly established position of respect and good service and be on the alert to serve the ever-changing needs of their users and achieving greater levels of service excellence and relevance and impact. It is the support of the users and their perspectives of how valuable libraries are in their lives that will generate the positive attitudes that are needed for continued and increased funding of library activities.

The need for library assessment is a universal concept and the call for accountability extends beyond national borders. Libraries, through both their public and their academic roles, are asked to prove their value more urgently today than ever before. The concept of universal and open access is within our reach and both public and academic libraries need to position themselves as key players in the provision of information services. They can contribute to this area by emphasizing the notion of access to information as a public good, as opposed to special or proprietary libraries or information services that may be more concerned with preserving the competitive advantage
and profitability of their companies and institutions. The call for accountability extends beyond North America, throughout the European Union and Australia, and is emerging strongly in Asia and Southeast Asia, including Japan, China, Malaysia, and Korea (Kyrillidou, Thompson & Blixtud, 2004). An example of this spreading interest is the recent request by a visiting delegation of librarians from China, who during a visit to the U.S. asked for a presentation on LibQUAL+™ after their stop at the Library of Congress.

**Today: ARL and the ARL Statistics and Measurement Program**

The rest of this paper will focus primarily on developments related to the tradition of North American research libraries and the role of the Association of Research Libraries and its Statistics and Measurement Program (Kyrillidou, 2000).

The Association of Research Libraries (ARL) is a nonprofit organization of 123 research libraries in North America. ARL’s members include university libraries, public libraries, government and national libraries. Its mission is to influence the changing environment of scholarly communication and the public policies that affect research libraries and the communities they serve. ARL programs and services promote barrier-free access to and effective uses of recorded knowledge in support of teaching, learning, research, and community service.

The ARL Statistics and Measurement Program (Blixtud, 2001) serves the objective of describing and measuring the performance of research libraries and their contributions to teaching, research, scholarship, and community service. Performance measures also include the New Measures Initiative, a series of projects and services that aim at developing new approaches for describing and evaluating library service effectiveness, diversity, and leadership. These efforts
are summarized in more detail below.

ARL serves a leadership role in the development, testing and application of academic library performance measures, statistics and management tools (Kyrillidou, 2001). Grounded in the tradition of the North American research library environment, the ARL Statistics and Measurement Program collects and reports quantitative and qualitative indicators of library collections, personnel and services by using a variety of evidence, gathering mechanisms, and tools. The longest and most credible data series in the history of higher education in the U.S. is credited to be the ARL Statistics (Association of Research Libraries, 2004b).

The ARL Statistics is a series of annual publications that describe the collections, expenditures, staffing, and service activities for the member libraries of the Association of Research Libraries. Statistics have been collected and published annually for the members of the Association since 1961-62. Important implications regarding the costs of serials and monographs as well as funding for research libraries are being monitored through a variety of well-known graphs. This data series continues the Gerould statistics series that started back in 1908.

Another annual publication, the ARL Annual Salary Survey, covers salaries for more than 12,000 professional positions on an annual basis (Association of Research Libraries, 2004a). These data are used to determine whether salaries are competitive, equitable across institutions and personal characteristics, and keeping up with inflation. The survey also tracks minority representation in U.S. ARL libraries and reports separate data for law and health sciences libraries. Statistics have been collected and published annually since 1980.

The priorities of the ARL Statistics and Measurement Program in 2004 were (these are discussed in more detail below):

► Describe human resource and institutional characteristics of
research libraries and monitor for trends.

- Provide comparable information from peer institutions.

- Support libraries seeking to understand changes in user behavior by collecting and interpreting library user feedback systematically over time.

- Increase assessment capacity for interpreting and acting on data by creating learning opportunities.

- Identify best practices in providing library services and assist libraries seeking to reposition in the new environment.

1. DESCRIBE HUMAN RESOURCES AND HUMAN CHARACTERISTICS

A series of annual publications describe salary compensation issues and institutional trends for research libraries. http://www.arl.org/stats/

- In 2003-04, according to the ARL Annual Salary Survey, university libraries employed 9,492 professional staff members and paid them a median salary of $53,000; non-universities paid their 3,877 professional staff a median salary of $70,048.

- ARL Statistics 2002-03 documented service trends, unit costs for serials and monographs, expenditure trends, and resources available per user.

- Electronic resources and access are rapidly changing the ways libraries are providing services according to the ARL Supplementary Statistics 2002-03.

- The ARL Academic Law Library Statistics 2002-03 and ARL Academic Health Sciences Library Statistics 2002-03 document institutional characteristics in these libraries.
The evolution of the preservation function is described in the
*ARL Preservation Statistics 2002-03.*

ARL members participated in the E-Metrics test implementation
between October 2003 and summer 2004. ARL staff clarified
definitions of E-Metrics data elements in the survey by incorpo-
rating feedback from last year’s participants as well as compar-
ing ARL definitions to the NISO Z39.7-2002 *Draft Standard for
Trial Use.* Some of the test findings were described by Martha
Kyrrillidou and Sarah Giersch (Kyrrillidou and Giersch, 2004).

The new surveys for the 2003-04 data collection cycle were
mailed in August of 2005. The ARL statistics survey was revised
to include expenditures for electronic resources previously col-
lected through the ARL supplementary statistics survey. The
supplementary statistics survey was revised to incorporate the
data elements tested through the E-Metrics pilot activities.

## 2. PROVIDE COMPARABLE INFORMATION
FROM PEER INSTITUTIONS

ARL provides a variety of custom data reports to interested mem-
ers. These reports are compiled primarily from the ARL annual
salary survey data but consist of a large number of approaches,
including special analysis of peer groups from the LibQUAL+™
data
base.

Norms tables for the spring 2003 and 2004 LibQUAL+™ surveys
allow librarians to interpret LibQUAL+™ scores with respect to
typical profiles at other institutions. 2003 norms are available
online at: http://www.coe.tamu.edu/~bthompson/libq2003.htm
2004 norms are online at:

- Individual institutional results notebooks, aggregate consortium notebooks, and the interactive statistics facilitate peer group comparisons using LibQUAL+™ data. The LibQUAL+™ site currently includes more than 500 analysis notebooks summarizing data from more than 300,000 users (Cook et al., 2004). For a history of LibQUAL+™ you may review the extensive literature and articles by Colleen Cook, Bruce Thompson, Fred Heath and other collaborators (Cook, Heath, Kyrillidou, Webster, 2001). The cross-cultural implementation of LibQUAL+™ has also been documented as applied in French in Canada (Kyrillidou et al., 2003).

- ARL Interactive Statistics, hosted at the Geostat Center of the University of Virginia, continues to be one of the most popular ways of accessing the annual data collected by ARL. The ranked lists allow users to pick from a list of more than 30 variables for data reports. http://fisher.lib.virginia.edu/arl/index.html

3. UNDERSTAND CHANGES IN USER BEHAVIOUR

Through a variety of New Measures Initiatives, ARL continues to develop new assessment methods for understanding changes in user behavior (Kyrillidou and Heath, 2001).

- LibQUAL+™ measures user perceptions of, and satisfaction with, library services. Aggregate 2004 data show that over 112,000 responses were gathered from users at 202 participating libraries. Survey results continue to show that the widest gap between library users' expectations and perceptions of library service is in the area of "information control." (Kyrillidou and Heath, 2004) http://www.libqual.org/
Kent State University Libraries and ARL are cosponsoring the Project for Standardized Assessment of Information Literacy Skills (SAILS) designed to develop an instrument for programmatic-level assessment of information literacy skills that is valid and credible to university administrators and other academic personnel. Thirty-eight libraries participated in Phase II of the project. Seventy-six North American libraries of all types have registered to participate in Phase III from August 2004 through July 2005. http://sails.lms.kent.edu.

In addition to trying to understand library user behavior in the familiar library environment, developmental work is underway for understanding user demographics, purpose of use, perceptions, and expectations in the digital library environment (Heath et al., 2003).

- e-QUAL (also known as DigiQUAL™), is partially supported by a grant from the National Science Foundation, National Science Digital Library (NSF/NSDL) (Cook et al., 2003). The goal is to develop an instrument to assess the dimensions of library service quality in the digital environment. As documented in "Evaluating the NSF National Science Digital Library Collections: Categories and Themes from MERLOT and DLESE" qualitative analysis has created a model and a number of key dimensions for evaluating digital libraries (Lincoln, Cook and Kyrillidou, 2004). Work is underway to develop an item bank and test the survey in different digital library settings (Kyrillidou and Giersch, 2005).

- MINES (Measuring the Impact of Networked Electronic Services) is a protocol for evaluating purpose of use and to collect user demographics for specific uses of electronic resources through a pop-up survey (Brinley and Plum, 2003). ARL has contracted with the Ontario Council of University Libraries (OCUL) to implement the protocol and analyze the data collected from June 2004 to May 2005.
4. INCREASE ASSESSMENT CAPACITY IN RESEARCH LIBRARIES

A key component of the assessment activities is training in qualitative and quantitative research methods, protocols and models for listening to users, marketing services training, and related areas.

➢ From October 2003 to September 2004, LibQUAL+™ trained more than 500 participants in using the survey results to improve library services. http://www.libqual.org/Events/index.cfm


➢ ARL presented a two-part webcast to assist libraries with collection of the new data elements in the ARL supplementary statistics survey that have migrated from the E-Metrics pilot. http://www.arl.org/stats/newmeas/emetrics/index.html

➢ A white paper on identifying "Strategies for Benchmarking Usage of Electronic Resources across Publishers and Vendors" is being developed by Jeff "Wonsik" Shim, Martha Kyrillidou, and Lynn Connaway for the October ARL Statistics and Measurement Committee meeting. In particular, the white paper will focus on (1) describing current developments underway by Project COUNTER, NISO, ISO, and related agencies and (2) developing recommendations for next steps that will improve libraries' ability to collect usage statistics for benchmarking usage of electronic content.

➢ In May, the ARL Statistics and Measurement Committee endorsed the official charge of the ARL Learning Outcomes Working Group: define a course of action for libraries to engage
on campus in promoting and evaluating libraries’ contributions to student learning outcomes. The emphasis will be on evaluating at the institutional programmatic level, not at the classroom or individual student level. The ARL Learning Outcomes Working Group members participated in a one-day workshop on June 24 led by Jeanne Hubelbank, Evaluation Consultant, to work through a process for evaluating the effect of the library on students’ learning outcomes that can be applied to individual ARL member campuses.

5. IDENTIFYING BEST PRACTICES IN PROVIDING LIBRARY SERVICES

➤ Steve Hiller, Head, Science Libraries and Library Assessment Coordinator at the University of Washington, and Jim Self, Director, Management Information Services and Co-Chair of the Collections Group at the University of Virginia, have been appointed ARL Visiting Program Officers to conduct an evaluation of library assessment efforts and needs. The goals of this project are to develop a design and conduct an evaluation of assessment needs and efforts at four to six different ARL member libraries from September 2004 to 2005 (Hiller, Self and Kyrillidou).

➤ Clemson University and the University of Texas, in collaboration with ARL, are promoting the concept of a university summit as a constructive next step in moving from LibQUAL+™ data to decision making. The library summit brings together people who have a stake in the library’s future. These individuals spend a full or half day in facilitated small-group discussions about the LibQUAL+™ results, adding depth and context to the survey numbers, and generating fresh solutions and suggestions for service improvements. Administrative, faculty, staff, and student endorsement of a summit sets the tone for campus-
wide collaboration in library success.

» *Libraries Act on their LibQUAL+™ Findings: From Data to Action,* a collection of 15 articles focusing on the experiences of the 2002 LibQUAL+™ participants edited by Fred Heath, Martha Kyrillidou, and Consuella Askew, was published in fall 2004. The book highlights the continued efforts of participating libraries that used the LibQUAL+™ survey data to assess and evaluate their service quality, resource allocations, staffing, technology, and policies.

» Three Share Fairs, offered in conjunction with LibQUAL+™ meetings, have provided a successful forum for identifying best practices in library service. Programs from the Share Fairs are available online:

New Measures Initiative:
Review and Status Report Published

In "Mainstreaming New Measures," Julia C. Blixtud takes stock of new measures in research libraries in a special double issue of the *ARL Bimonthly Report* (230/231, Oct/Dec 2003). The 32-page report documents a rich and varied set of new measures projects undertaken by ARL and some of its member libraries in recent years.
http://www.arl.org/newsltr/230/

The New Measures Initiative has been extremely influential in sensitizing member directors to the need for action and in garnering support for experimentation and continued development of new tools (Kyrillidou, forthcoming, preprint 9/7/2004). New models for measurement and evaluation that address issues of service quality, electronic resource usage and value, and outcomes assessment have
been developed through the initiative. The New Measures Initiative was officially started at the University of Arizona in 1999, at a small group retreat for library directors. An initial exploration of drafting key position papers on important assessment areas was followed by specific explorations using tools such as LibQUAL+™ (Kyrillidou and Hipps, 2001), E-Metrics, SAILS, DigiQUAL™, and MINES. In the last year, the focus has again shifted towards the development of key positions on issues related to learning outcomes and new ways to measure collections.

Tomorrow: a Gateway to Library Assessment Tools

At a practical level, the development of new tools is based on a robust database architecture that has been expanded to include those tools in a seamless interface. The gateway to this architecture, called StatsQUAL™, leads the way to library assessment tools that describe the role, character and impact of physical and digital libraries (Kyrillidou, 2001). Through StatsQUAL™, libraries gain access to a number of resources that are used to assess a library’s effectiveness and its contributions to teaching, learning and research. StatsQUAL™ presents these tools in a single powerful interactive framework that integrates and enhances data mining and presentation both within and across institutions. It includes instruments and data such as LibQUAL+™, DigiQUAL™, and MINES for Libraries™, as well as a growing dataset of survey results.

StatsQUAL™ was developed under the leadership of the Association of Research Libraries and its long-standing role in the development, testing and application of performance measures, statistics, and management tools. Using traditional benchmarks as well as new models for measurement and evaluation, StatsQUAL™ addresses the urgent demand for libraries to demonstrate outcomes and contributions.
LibQUAL+™

Among the many tools developed through the New Measures Initiative, the concept of measuring library service quality quickly took root in the library world, not only because of the rich research framework on which it is based, but also because a number of libraries had been experimenting with issues related to measuring service quality since the 1980s. As a result LibQUAL+™ quickly emerged as a mature model for evaluating library service quality.

LibQUAL+™ is a suite of services that libraries use to solicit, track, understand, and act upon users’ opinions of service quality. The program’s centerpiece is a rigorously tested Web-based survey bundled with training that helps libraries assess and improve library services, change organizational culture, and market the library. The survey has been implemented at more than 600 libraries as of spring 2005. Results have been used to develop a better understanding of perceptions of library service quality, interpret user feedback systematically over time, and identify best practices across institutions.

LibQUAL+™ enables systematic assessment and measurement of library service quality, over time and across institutions. The LibQUAL+™ suite of services has been used in a variety of libraries, including college and university, community college, health science, law, and public libraries - some through various consortia, others as independent participants. The project has also expanded internationally, with participating libraries in the U.S., Canada, Europe, and Australia.

The LibQUAL+™ protocol was developed with support from the U.S. Department of Education Fund for the Improvement of Post-Secondary Education (FIPSE). Today, the growing LibQUAL+™ community of participants and its extensive dataset are rich resources for improving library services.
**DigiQUAL™**

DigiQUAL™ is an online survey for users of digital libraries. The survey - created through collaboration between ARL, Texas A&M University, and the University of Texas - evaluates digital libraries from the user perspective, emphasizing issues related to the reliability and trustworthiness of a Web site. DigiQUAL™ adapts the LibQUAL+™ protocol for use in the digital library environment (Lincoln, Cook and Kyrillidou, 2005).

DigiQUAL™ is a short online survey containing five questions and a comments box that libraries can offer through their Web site. It systematically collects feedback on the site’s services, functionality, and content. Survey questions are randomly drawn from a bank of more than 180 items that have been developed through extensive qualitative analysis of data from focus groups and interview transcripts.

Managers of digital libraries and collections are invited to participate in further testing and development of this protocol. The development of DigiQUAL™ has been supported by funding from the National Science Foundation’s (NSF) National Science Digital Library (NSDL) program.

**MINES for Libraries™**

Measuring the Impact of Networked Electronic Services (MINES) is an online transaction-based survey that collects data on the purpose of use of electronic resources and the demographics of users. As libraries implement access to electronic resources through portals, collaborations, and consortium arrangements, the MINES for Libraries™ protocol offers a convenient way to collect information from users in an environment where they no longer need to physical-
ly enter the library in order to access resources.

MINES for Libraries™ adapts a long-established methodology to account for the use of information resources in the digital environment. The survey is based on methods developed to determine the indirect costs of conducting grant-funded R&D activities, and was adopted as part of ARL’s New Measures Program in May 2003.

Sixteen libraries in Canada have implemented MINES for Libraries™ through a contract between ARL and the Ontario Council of University Libraries (OCUL). Additional institutions are involved in more extensive campus-wide cost analysis.

Conclusion

All these tools are providing rich resources for understanding library users both in a hybrid and in a digital environment. These tools can serve the international community of those interested in the survival of libraries, in creating libraries that are thriving entities that serve the teaching, research and learning needs of all users from the cradle to the grave.

References


Library Assessment. Why Today and Not Tomorrow?

From http://www.libqual.org/documents/admin/malaysia_paper_sent1.2.doc


Academic Library Performance, Quality and Evaluation in the UK and Europe

Stephen Town
Cranfield University
Shrivenham, UK

Introduction

Performance may be defined as "carrying things through in due form". The recent history of library performance measurement is one in which the perception of "due form" is changing. Some of this arises from service developments in the digital environment. Perhaps more fundamentally important are the changes in the perception of what makes a "quality" academic library. These arise from the wave of quality management theory and practices which have swept across western industry and public services since the early 80s. These have led towards more serious consideration of customer views and issues, and also towards the educational outcomes and impacts delivered or supported by academic libraries.

Surprisingly much of this was predicted by Lancour in a 1951 paper. In this he suggested that academic libraries would develop through three stages: the first a focus on "storehouse" issues (collections), then through a stage of focus on "service", and finally focussing on 'education' itself. The relatively recent moves in academic library performance measurement, from focus on input and activity counts, through customer satisfaction measures, and now towards
developing educational impact and outcome measures fulfills these predictions. It is this recent history which will be covered in this paper.

In terms of definition no real distinction is made here between "assessment", "evaluation" and "performance measurement". All might be seen as methods associated with achieving quality, improvement, accountability and reflecting value.

Much of this paper is based on the work of the UK and Irish Society of College, National and University Libraries' (SCONUL) Advisory Committee on Performance Improvement (ACPI), and their efforts to keep abreast of these changes by developing a toolkit of methods for measurement and assessment. Where relevant to the overall argument, some European and international projects and experience are added.

This presentation is structured around changing emphases in performance measurement which themselves are derived from developing definitions of, and differing approaches to, "quality". These might be considered to be:

1. Quality assurance and peer review
2. Batteries of performance indicators
3. Quality culture
4. Stakeholder perceptions and measurement frameworks

**Quality Assurance**

One of key drivers for reconsidering performance measurement in the last few years has been government pressure for "quality". However the definitions of quality used tend to be those which are safe for the government to apply because they focus on issues which
cannot simply be reduced to relative funding levels. Thus the concentration is on "process" definitions of quality rather than inputs or customer satisfaction, and on "inspection" and "peer assessment" as methods of judgement rather than customer feedback.

The UK Quality Assurance Agency and the Funding Councils (for Universities) have over the past 10 years subjected universities to regular "institutional audits" and also to reviews of both teaching and research in specific subject areas. Teaching quality assessments (TQA) relied on panels of assessors visiting universities and scoring teaching quality across a range of six dimensions, with a maximum potential score of 4 in each category (and therefore a maximum TQA score of 24) for an individual subject.

However pressure from some universities in relation to the amount of effort involved in these audits and inspections eventually resulted in a new "light touch" regime which combines TQA and institutional audits into a single inspection based on a self evaluation document, with further investigation only if performance is deemed to be poor. The Research Assessment Exercise (RAE) remains, which allocates the bulk of research funding on the basis of peer review panel's assessments of research quality conducted every five to seven years.

The dimensions of "teaching" quality assurance assessment have remained the same throughout this process. These are:

1. Course structure and curriculum
2. Learning and teaching strategy
3. Assessment strategy and methods
4. Student progression and achievement
5. Learning resources and support
6. Quality enhancement and standards maintenance (which includes students' views)
Academic libraries may be involved in learning and teaching strategies, and have an influence on student progression and achievement, but the area of learning resources and support is the one in which assessment of libraries takes place.

SCONUL has produced a set of detailed guidance for institutional auditors. The national academic library body is trying to ensure that inspectors understand what to look for, and to encourage reviewers to ask the right questions. With the advent of the Bologna Declaration, it is likely that similar forms of audit will spread throughout Europe, and it may therefore pay national academic library groupings to consider how best to influence similar processes locally.

Statistics & Performance Indicators

When faced with the performance measurement question, the natural refuge for academic librarians has been to resort to counting everything we can count. SCONUL, like ARL, has been collecting data from its members for a considerable time. The statistics are now input through web forms locally, and there is now a large database available as a result. A published document is produced annually through LISU who hold the contract for collection and collation. This also includes comments about trends, and splits the results into various accepted peer groups of libraries in the UK. SCONUL has recently commissioned an automation project to permit interrogation and customisation of results from the database, including the capability for statistical benchmarking.

The availability of library data for statistical benchmarking within Europe (30 countries) has been partially addressed through the LIBECON project. This builds on the work done in creating ISO 2789
(library statistics) and ISO 11620 (library performance indicators) through standardized methods of data collection and publication for library data. It draws on national collections of data, including that of SCONUL.

A number of years ago SCONUL concluded that the statistics were too complex and obscure for senior managers in universities to understand and make use of them. Therefore a decision was taken to create a simplified small set of performance indicators which could be directed towards those running UK higher education institutions. Cranfield University undertook the project. In addition to the set of six indicators, contextual data is also supplied from both libraries and institutions. Clearly there was some disagreement as to whether this was a necessary and sufficient list to describe the full performance of UK academic libraries. It was of course constructed in a time before the new digital environment began to have a profound effect on library activity and measurement.

SCONUL has recently concluded an e-measures project to expand its statistical collection and database to include a better reflection of the activities of libraries in the digital age, and to aid decision making in relation to electronic information services. Following the pilot involving 25 SCONUL members in 2003-04, a range of the new measures were selected for inclusion in the full statistical collection for 2004-05.

The European Commission-funded project EQUINOX also addressed the need for libraries to develop methods for performance measurement in the networked electronic environment. This work was led by CERLIM in the UK, and sought to achieve international agreement on electronic library performance measures, and also to develop and test an integrated quality management and performance measurement tool for library managers.

The eVALUED project is developing a toolkit for the evaluation of electronic information services in the academic sector, and in the
process discovered that there are low levels of awareness of projects such as EQUINOX. It might be that these international projects are not having the intended impact and penetration in the sector, or yet strongly affecting the practice of data collection in academic libraries.

The COUNTER project starts from the vendor and supplier end of electronic resource delivery, and seeks to apply a code of practice which will deliver standardized usage statistics to academic libraries for the resources to which they subscribe. This is already producing good results. It does not seek to consider user satisfaction or impact levels, but to provide a reliable basis for usage measurement.

Quality Culture

The desire to achieve a quality culture in academic libraries might suggest that the most relevant measures to collect will be those, and possibly only those, from library users. This drive has led to serious efforts to collect user views, and also to focus on the outcomes in users of library activity, rather than on the input, output or process measures described above.

Customer Focus & Surveys

Use of designed surveys has been a feature in the planning and improvement of services for over ten years in the UK.

SCONUL has a template for a satisfaction survey available on the web for individual institutions to draw down and use. It is adaptable to local circumstances in that additional questions or categories can be added, and has been designed for simple analysis through Libra software which is provided by Priority Research Limited. The methodology is one which sets satisfaction with an element against its importance. It can therefore provide a simple but clear agenda for improvement action.
LibQUAL+™ is probably now the market leading designed survey method in the UK sector, with 43 academic libraries now having participated between 2003 and 2005.

Benchmarking

Benchmarking has also been active within some UK academic libraries for over 10 years. The coincidence of timing with the introduction of surveys is not surprising; both techniques arose from the impact of industrial quality systems and initiatives on the UK public sector. As a result of the first systematic application of benchmarking within academic libraries (conducted by the Cranfield University RMCS Library), SCONUL ACPI commissioned a set of pilot benchmarking projects. These had the objectives of gaining practical experience of benchmarking techniques, enlarging the knowledge and results base, the creation of a standard methodology, and to provide a resource for facilitation of future projects. The pilot projects operated across 14 different UK institutions. Two groups considered the enquiry desk process, two the process of delivery of library information skills training, one compared counter services, and one the library environment.

The general conclusions were that benchmarking was a method which could be applied in libraries, and probably a desirable method for those libraries strongly committed to quality and with effective frameworks for change and improvement. The benchmarking methodology employed was successful, but in every pilot new measures were needed to assess the process adequately. Standard data collection in libraries did not provide the necessary insight into the processes and their outcomes for in depth benchmarking.

There appears to be a general willingness to engage in benchmarking amongst academic libraries, but it requires time and effort, and significant training of staff. Libraries are often not willing to share results openly, reflecting the competitive nature of the UK HE enterprise.
SCONUL subsequently published a Benchmarking Manual in 2000. This provides definitions, some information on context, and a specific model for benchmarking through a three phase method (planning, comparing and acting). Data from three of the pilot studies is also included.

Some of the universities that took part in the benchmarking pilot have subsequently formed a local benchmarking consortium, undertaking formal benchmarking on an annual cycle. The aim is to provide comparative data to support decision making, to ensure that their processes are subject to continuous improvement, and to establish best practice within the group. Different processes or services are chosen to benchmark each year. One remarkable element of this approach is the involvement of staff at all levels and the profoundly positive effect this has on their development.

**Information Literacy as an outcome**

Information literacy education and information skills training have become a core function of UK academic library services. SCONUL responded to this development with a joint ACPI and ACIL (Advisory Committee on Information Literacy) project to define a performance measurement framework for information literacy programs. This sought to determine critical success factors from which specific local performance measures could be derived.

More than sixty institutions contributed to the workshops, and the critical success factors areas thus defined were:

1. Competent library staff
2. Sufficient organisational resources
3. Identifiable student outcomes
4. Effective multi-dimensional partnerships
5. Institutional strategic framework
6. Sustained pedagogic quality

Outcome measurement

There is now a perceived need for academic libraries to demonstrate the impact or outcome (particularly in relation to learning and research) of their activities. SCONUL has now taken up this challenge through an impact measurement research project. Ten libraries across the UK have participated in the first phase of this initiative which is being conducted in association with the Library and Information Research Group. Each library chose an area that they wished to assess (many in the first phase selecting information literacy), following a common approach to assessing impact against specific objectives.

Some benefits have been identified in the pilot phase. These include demonstrating that the library is supporting the university strategy, building closer links with academic staff, and enabling staff to gain a better understanding of academic processes. A second phase is now under way, with the focus on research support.

Measurement & Evaluation Frameworks

Some UK academic libraries are moving towards the view that their approach to measurement should be set in a framework or roadmap. These might be based on the needs of different stakeholders for different types or areas of measurement.

In particular the Balanced Scorecard model is now being used extensively in public sector organisations in the UK, and is beginning to be taken up by some academic libraries. This offers a set of perspectives deemed to be relevant to different groups of stakeholders.

The Capability Maturity Model was developed in the software industry to judge the level of capability of an organisation to under-
take multiple projects to high quality standards. This would seem relevant to those academic libraries which are responding to the digital age challenges of creating portals, repositories, and other value-added digital resource collections. An adapted model has been used to judge the long term effects of benchmarking in academic libraries.

Local Experience

I have included some examples on how some of these issues have played out within one academic library. These follow a framework of quality adopted over ten years ago based on customer focus, systematic performance improvement, and total staff involvement. Customer satisfaction is considered to be based not just on meeting immediate needs, but anticipating and prioritising potential future needs through designed surveys and benchmarking. Project management is used as a rational means of managing change, alongside more creative and devolved improvement activities. Sometimes planned change may be at the expense of creativity and of allowing staff to "just do it" when improvements are obviously needed. Staff development and support is critical to provide all with the tools to deliver quality and for all to feel permitted to be involved in developing quality. A defined situational leadership model allows negotiation of appropriate styles at all levels. Staff development programmes seek to move staff towards a future desired state rather than being simply reactive to perceived training needs. A clear and communicated vision underpins all the elements of the framework.

Acknowledgments

I would like to thank my colleagues on the SCONUL ACPI and within Cranfield University for their support for and work on the initia-
tives described here. I would also like to thank Selena Lock particularly for her contribution to this paper.
Research and Practice:
Key Elements of Success for LibQUAL+™

Bruce Thompson
Professor and Distinguished Research Scholar
Department of Educational Psychology
Texas A&M University
College Station, Texas

Libraries today confront escalating pressure to demonstrate impact. As Cullen (2001) recently noted,

Academic libraries are currently facing their greatest challenge since the explosion in tertiary education and academic publishing which began after World War II... [T]he emergence of the virtual university, supported by the virtual library, calls into question many of our basic assumptions about the role of the academic library, and the security of its future. Retaining and growing their customer base, and focusing more energy on meeting their customers’ expectations is the only way for academic libraries to survive in this volatile environment. (pp. 662-663)

In this environment, "A measure of library quality based solely on collections has become obsolete" (Nitecki, 1996, p. 181).

These considerations have prompted the Association of Research Libraries (ARL) to sponsor a number of "New Measures" initiatives. The New Measures efforts represent a collective determination on the part of the ARL membership to augment the collection-count and fis-
cal input measures that comprise the ARL Index and ARL Statistics, to date the most consistently collected statistics for research libraries, with outcome measures, such as assessments of service quality and satisfaction.

One New Measures initiative has been the LibQUAL+™ project (Cook, Heath, & Thompson, 2002; Heath, Cook, Kyrillidou, & Thompson, 2002; Thompson, Cook, & Heath, 2003a, 2003b; Thompson, Cook, & Thompson, 2002). Within a service-quality assessment model, "only customers judge quality; all other judgments are essentially irrelevant" (Zeithaml, Parasuraman, Berry, 1990, p. 16). Consequently, the selection of items employed with the LibQUAL+™ has been grounded in the users' perspective as revealed in a series of qualitative studies (Cook, 2002a; Cook & Heath, 2001).

LibQUAL+™ is a "way of listening" to users called a total market survey. As Berry (1995) explained,

When well designed and executed, total market surveys provide a range of information unmatched by any other method... A critical facet of total market surveys (and the reason for using the word "total") is the measurement of competitors' service quality. This [also] requires using noncustomers in the sample to rate the service of their suppliers. (p. 37)

Although (a) measuring perceptions of both users and non-users and (b) collecting perceptions data as regards peer institutions can provide important insights, LibQUAL+™ is only one form of only one (i.e., a total market survey) of 11 "ways of listening" (Berry, 1995, pp. 32-61).

To date, about four dozen journal articles have been written about LibQUAL+™. About half the articles describe how libraries are using LibQUAL+™ scores to improve library services (e.g., Cook, 2002b; Heath, Kyrillidou, & Askev, 2004). And the remaining roughly two dozen articles document the development of the measure, and pro-
vide extensive empirical evidence that LibQUAL+™ scores are trustworthy (e.g., Cook, Heath, & Thompson, 2002; Thompson, Cook, & Thompson, 2002; Wei, Thompson, & Cook, 2005).

Purposes of the Paper

The purpose of the present paper is to review ways that the trustworthiness of measures such as LibQUAL+™ can be established. First, the paper reviews ways to evaluate the integrity of scores in the aggregate (i.e., as a set) across library users at a given campus. Second, the paper reviews ways to evaluate the trustworthiness of scores provided by individual users.

Integrity of Score Sets

There are three primary questions that must be considered when evaluating whether the scores as a set (e.g., for all respondents at a given university, for all respondents in a given year) have sufficient integrity to be relied upon when making library improvement decisions:

1. Are the respondents representative of the users at given institutions?

2. Do the scores measure anything? and

3. If the scores measure something, do the scores measure the correct something, and only the correct something?

Representativeness
At the American Library Association mid-winter meeting in San Antonio in January, 2000, when LibQUAL+™ was in a sense born, participants were cautioned that response rates on the final LibQUAL+™ would probably range from 25% to 33%. Higher response rates can be realized (a) with shorter surveys that (b) are directly action-oriented (Cook, Heath, & R.L. Thompson, 2000). For example, a very high response rate could be realized by a library director administering the following one-item survey to users:

Instructions. Please tell us what time to close the library every day. In the future we will close at whatever time receives the most votes.

Should we close the library at?
A. 10pm  B. 11pm  C. midnight  D. 2pm

Lower response rates will be expected for total market surveys measuring general perceptions of users across institutions, and when an intentional effort is made to solicit perceptions of both users and non-users. Two considerations should govern the evaluation of LibQUAL+™ response rates.

Minimum Response Rates. Response rates are computed by dividing the number of completed surveys at an institution by the number of persons asked to complete the survey. However, we do not know the actual response rates on LibQUAL+™, because we do not know the correct denominators for these calculations.

For example, given inadequacy in records at schools, we are not sure how many e-mail addresses for users are accurate. And we do not know how many messages to invite participation were actually opened. In other words, what we know for LibQUAL+™ is the “lower-bound estimate” of response rates.

For example, if 200 out of 800 solicitations result in completed surveys, we know that the response rate is at least 25%. But because we are not sure whether 800 e-mail addresses were correct or that 800 e-mail messages were opened, we are not sure that 800 is the
correct denominator. The response rate involving only correct e-mail addresses might be 35% or 45%. We simply don’t know the exact response rate.

Representativeness versus Response Rate. If 100% of the 800 people we randomly selected to complete our survey did so, then we can be assured that the results are representative of all users. But if only 25% of the 800 users complete the survey, the representativeness of the results is not assured.

Representativeness is actually a matter of degree. And several institutions each with 25% response rates may have data with different degrees of representativeness.

We can never be sure about how representative our data are as long as not everyone completes the survey. But we can at least address this concern by comparing the demographic profiles of survey completers with the population (Thompson, 2000). At which university below would one feel more confident that LibQUAL+™ results were reasonably representative?

<table>
<thead>
<tr>
<th>Alpha University</th>
<th>Population (n=16,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completers (n=200/800)</td>
<td>Gender</td>
</tr>
<tr>
<td>Gender</td>
<td>Students 53% female</td>
</tr>
<tr>
<td>Students 53% female</td>
<td>Faculty 45% female</td>
</tr>
<tr>
<td>Faculty 45% female</td>
<td>Disciplines</td>
</tr>
<tr>
<td>Liberal Arts 40%</td>
<td>Science 15%</td>
</tr>
<tr>
<td>Science 15%</td>
<td>Other 45%</td>
</tr>
<tr>
<td>Liberal Arts 35%</td>
<td>Other 45%</td>
</tr>
</tbody>
</table>
Omega University

<table>
<thead>
<tr>
<th>Completers (n=200/800)</th>
<th>Population (n=23,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Gender</td>
</tr>
<tr>
<td>Students 35% female</td>
<td>Students 59% female</td>
</tr>
<tr>
<td>Faculty 65% female</td>
<td>Faculty 43% female</td>
</tr>
<tr>
<td>Disciplines</td>
<td>Disciplines</td>
</tr>
<tr>
<td>Liberal Arts 40%</td>
<td>Liberal Arts 15%</td>
</tr>
<tr>
<td>Science 20%</td>
<td>Science 35%</td>
</tr>
<tr>
<td>Other 40%</td>
<td>Other 50%</td>
</tr>
</tbody>
</table>

The persuasiveness of such analyses is greater as the number of variables used in the comparisons is greater. The LibQUAL+™ software automates these comparisons and outputs side-by-side graphs comparing sample and population profiles for given institutions. Show these to people who question result representativeness.

Reliability

As Thompson (2003) explains, many of us each morning weigh ourselves on a bathroom scale. If we are disappointed in the result, we may immediately reweigh ourselves, in the hope of a more favorable outcome. If the measurements taken over the course of a few moments are 80.0 kilos, 80.5 kilos, and 79.5 kilos, we may stop weighing ourselves, and interpret the results as meaning that we weigh roughly 80 kilos (or more hopefully, 79.5 kilos!).

But if our weights are 80.0 kilos, 111.0 kilos, and then 51.5 kilos, we probably would conclude that none of the scores are realistic. Instead, we would simply conclude that the scale was broken. Our scale measures nothing. A scale measures nothing when the scores
produced by the measurement fluctuate in a purely random fashion.

The question of whether scores measure nothing raises the issue of score reliability. There are formulas that quantify the degree to which scores measure something (versus nothing). The reliability coefficient would be 1.0 if the scores were perfect, and 100% of the variability in the scores was systematic. The reliability coefficient would be 0.0 if the scores measured only nothing. Consequently, reliability coefficients less than 0.0 are especially troubling!

No scores are perfectly reliable. Even the world's best clock, which measures times by counting atomic particle decay, loses one second every four centuries. But we hope that scores will have high reliability. And we expect the reliability coefficients to be higher when the consequences of misjudgments arising from imperfect measurement are more serious. For example, if we are deciding whether a hospital patient has any brain wave activity prior to disconnecting life support, we would expect very high reliability indeed, because the consequences of misjudgment would literally be life-threatening.

Numerous studies have been conducted addressing the reliability of LibQUAL+™ scores (cf. Cook & Thompson, 2001; Thompson & Cook, 2002; Thompson, Cook, & Heath, 2003b; Thompson, Cook, & Thompson, 2002). The scores tend to have exceptionally high reliability coefficients.

Validity

If scores measure something, only then the question arises as to what extent the scores measure the correct something, and only the correct something. In the context of our bathroom scale example, if our weight was 120, and we concluded that we must have a very high IQ, questions of validity would arise (Thompson, 2003!)

There are many ways to evaluate the validity of scores, including
methods called factor analysis (Thompson, 2004), and correlating LibQUAL+™ scores both with other scores with which they should be correlated, and other scores with which LibQUAL+™ scores should not be correlated. All these studies have been very supportive of a conclusion that LibQUAL+™ scores have reasonable validity (cf. Cook, Heath, & Thompson, 2003; Heath, Cook, Kyrillidou & Thompson, 2002; Thompson, Cook, & Kyrillidou, in press). It is also encouraging that library staff have found the scores useful in improving library service quality (e.g., Cook, 2002b; Heath, Kyrillidou, & Askew, 2004).

**Integrity of the Scores from a Given User**

LibQUAL+™ consists of 22 items. The 22 items measure perceptions of total service quality, as well as three subdimensions of perceived library quality: (a) Service Affect (9 items, such as "willingness to help users"); (b) Library as Place (5 items, such as "library space that inspires study and learning"); and (c) Information Control (8 items, such as "library website enabling me to locate information on my own").

However, as happens in any survey, some users provide incomplete data, or inconsistent data, or both. In compiling the LibQUAL+™ data and generating reports, several criteria are used to determine which data cases to omit from analyses because the data from given users lack reasonable integrity.

**Data Screening Criteria**

Complete Data. The web software that presents the 22 core items monitors whether a given user has completed all items. On each of these items, in order to proceed to the next survey page, users must
provide a rating of (a) minimally-acceptable service, (b) desired service, and (c) perceived service or rate the item "not applicable" ("NA").

If these conditions are not met, when the user attempts to leave the web page presenting the 22 core items, the software shows the user where missing data were located, and requests complete data. The user cannot exit the page containing the 22 items until all items are completed. Only records with complete data on the 22 items are retained in summary statistics.

Excessive "NA" Responses. Because some institutions provide access to a lottery drawing for an incentive (e.g., a Palm Pilot) for completing the survey, some users might have selected "NA" choices for all or most of the items rather than reporting their actual perceptions. Or some users may have views on such a narrow range of quality issues that their data are not very informative. In this survey we make the judgment that records containing more than 11 "NA" responses should be deleted.

Excessive Inconsistent Responses. On LibQUAL™ user perceptions can be interpreted by locating "perceived" results within the "zone of tolerance" defined by data from the "minimum" and the "desired" ratings. For example, a mean "perceived" rating on the 1-to-9 ("9" is highest) scale of 7.5 might be very good if the mean "desired" rating is 6.0. But a 7.5 perception score is less satisfactory if the mean "desired" rating is 8.6, or if the mean "minimum" rating is 7.7.

One appealing feature of such a "gap measurement model" is that the rating format provides a check for inconsistencies in the response data (Thompson, Cook, & Heath, 2000). Logically, on a given item the "minimum" rating should not be higher than the "desired" rating on the same item. For each user a count of such inconsistencies, ranging from "0" to "22" is made. Records containing more than 9 logical inconsistencies are deleted.
Triangulation with Qualitative Data

LibQUAL+™ is not 22 items each rated on minimally acceptable service level, perceived service level, and desired service level. Instead, LibQUAL+™ is “22 Items and a Box!” The box is the open-ended comments box provided to users as part of the survey. Each year, across institutions, roughly 40% of participants provide comments that flesh out their ratings.

These comments are at least as important as the ratings. Users tend to explain the basis for their views when they feel particularly strongly, either positively or negatively. Furthermore, when users are unhappy, they may feel compelled to be constructive in their criticisms, and they may say exactly what they would like done differently in the library.

The comments for a given user each have a unique participant identification number that can be used to match comments with the ratings data from the 22 items, and with user demographic information. Making these linkages also informs judgment regarding the integrity of a given user’s responses. Obviously, the comments and the ratings should be reasonably consonant with each other.

Summary

The LibQUAL+™ program is now in its sixth year of operation. LibQUAL+™ has been tested in every state in the United States but two. The protocol has been used as well as in Canada, Australia, Egypt, England, France, Ireland, Scotland, Sweden, the Netherlands, and the United Arab Emirates, and will be used this year in South Africa.

Data have been collected from over three hundred thousand users. The current survey instrument is available in seven language varia-

LibQUAL+™ hopefully is an important tool in the New Measures toolbox that librarians can use to improve service quality. But, even more fundamentally, the LibQUAL+™ initiative is more than a single tool. LibQUAL+™ is an effort to create a culture of data-driven service quality assessment and service quality improvement within libraries. Such a culture must be informed by more than one tool, and by more than only one of the 11 ways of listening to users.

In some cases LibQUAL+™ data may confirm prior expectations and library staff will readily formulate action plans to remedy perceived deficiencies. But in many cases library decision-makers will seek additional information to corroborate interpretations or to better understand the dynamics underlying user perceptions.

For example, once an interpretation is formulated, library staff might review recent submissions of users to suggestion boxes to evaluate whether LibQUAL+™ data are consistent with interpretations, and the suggestion box data perhaps also provide user suggestions for remedies. User focus groups also provide a powerful way to explore problems and potential solutions. Cook (2002b) and Heath, Kyrillidou and Askew (2004) provided case study reports of how staff at various libraries have employed data from prior renditions of LibQUAL+™ to improve library service quality.

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The Free Press.


The Importance of the LibQUAL+™ Survey for the Association of Research Libraries and Texas A&M University

Colleen Cook
Dean of Libraries
Texas A&M University
College Station, Texas

Introduction

Assessment in academic libraries in North America is more important today than ever before. Universities and their libraries must justify themselves as social and economic goods to funding agencies that are beset by competing needs. When state governments set priorities for awarding scarce tax dollars, higher education must compete with K-12 school education, social and medical services. In the United States funding for higher education has been reduced in state after state, year after year.

Then too, once universities receive their funding, libraries must compete with other priorities at the institution level. The state of Texas, for instance, must grow the number of available seats in colleges and universities by over a third of its present capacity, or 600,000 seats by 2015, to accommodate the anticipated need for higher education of a rapidly growing population. Under such pres-
sures Texas libraries must compete with other local needs such as hiring new faculty members, constructing new buildings and funding other technological infrastructure for networking and computing.

At the same time that funding is being reduced for higher education generally, the value of delivering library service in the traditional manner is being questioned. Since 1995 traditional libraries face competition with the internet in a similar manner to medieval scriptoriums with the introduction of movable type in the 15th century. Why, local administrators ask, since Google is digitizing the contents of several of the premier libraries in the world, including those at Oxford, Stanford and Harvard, should we continue to fund libraries to the extent we have in the past? Isn’t all scholarly work going to be available in digital form? Why isn’t all knowledge virtually free to the consumer since authors can upload Word files to the internet and incur no publisher added cost? Why do libraries continue to buy books at all? Why would libraries ever need to build more stack space? Why don’t libraries simply digitize all their collections? How can digital journals be more expensive than print versions? Musing on these questions many state legislators and university administrators conclude that funding libraries today as in the past simply does not seem to be a good value for the taxpayer. What, then, is the continuing value of libraries in the internet world, particularly when the internet, unlike a traditional library, is available 24 by 7?

The ARL New Measures Initiative

In this context the Association of Research Libraries (ARL) embarked on a New Measures Initiative to investigate means of assessing the value of information delivery by research libraries in North America, and now, around the world. There was general dissatisfaction with time honored, input based ARL statistics, although few would argue that these statistics, as the longest longitudinal
measures in North American higher education, do not have intrinsic value. While the historical corpus of ARL statistics is useful, it is no longer sufficient to evaluate the effectiveness of the over $3.2 billion investment made by the 123 ARL libraries in North America annually. As input measures, the statistics do not assess what is now uppermost in the minds of higher education stakeholders, i.e., outcomes. In other words, what is the impact and effect of the huge investment made by society in academic libraries? What contribution do libraries make to students who use them and carry that experience throughout their lives? How do libraries contribute to the research of faculty and graduate students in concrete, actual, and therefore measurable, terms? How do academic libraries contribute to pedagogy in discoverable, manifest ways that can be articulated and repeated?

Libraries have collected some sort of statistics for assessment and evaluation purposes for decades. For years counts of volume holdings and door counts have substituted for quality measures. The notion that the more volumes a given library had on its shelves, the higher quality the library was, made a good deal of sense in a print based world. Although visionaries had long contemplated the effect of technology upon delivery of information, the rapid assimilation of the internet into the global culture in the late 1990s, still caught libraries surprisingly unaware. Research libraries now struggle to assess how well they conduct their missions, and as their missions become more complex in the face of Google, assessment must increase in like complexity.

In the past twenty-five years the world has moved from product based industries that manufactured and sold tangible goods to a predominately service-based economy that markets and sells services. Driven by similar forces as commerce, particularly advancements in technology, libraries are traveling a similar path. Whereas counting volumes, or library products, was at one time sufficient for judging the quality of a library, libraries are now service providers, and the
resources, or products of libraries are often intangible, licensed, or rented digital materials or service exchanges. In this world, assessing service quality is equally as important as counting collections in evaluating how well a given library satisfies its mission.

The Development of LibQUAL+™ and its Importance to ARL

Sarah Pritchard (1996) writing in Library Trends succinctly stated the essence of the problem with library assessment:

The difficulty lies in trying to find a single model or set of simple indicators that can be used by different institutions, and that will compare something across large groups that is by definition only locally applicable—i.e., how well a library meets the needs of its institution. Librarians have either made do with oversimplified national data or have undertaken customized local evaluations of effectiveness, but there has not been devised an effective way to link the two (pp. 579-579).

For years library assessment was considered to be regulated to the local environment of a given library, largely for two reasons, one theoretical, the other practical. Firstly, there was a theoretical concern that there was not consensus on a common set of descriptors across libraries connoting service quality from a user perspective, i.e., a theoretical model of what constitutes library service quality from a user perspective did not exist. Secondly, there was not an efficient delivery mechanism until the advent of the internet and web-delivered surveys for collecting large amounts of data quickly across institutions. Paper and pencil surveys were too expensive and cumbersome to permit gathering, keying and analyzing data from multiple libraries over time.
In addressing the first problem in cross-institutional assessment, LibQUAL+™ researchers used rigorous qualitative and quantitative research methods to derive a theoretical model for user centric quality library service with a common set of dimensions and expectations that users incorporate when approaching a library. Methodologically, LibQUAL+™ researchers used constructivist grounded theory (cf. Charmaz, 2000) as an analytical framework in re-grounding the premier services marketing evaluation instrument for the commercial environment, ServQUAL, developed by Leonard L. Berry, A. Parasuraman and Valarie Zeithaml, for the research library context (cf. Parasuraman, Berry & Zeithaml, 1988, 1991; Parasuraman, Zeithaml & Berry, 1985, 1994; Zeithaml, Berry & Parasuraman, 1996; Zeithaml, Parasuraman & Berry, 1990). The set of library service quality dimensions consists of higher order constructs that cut across contexts and include Library as Place, Information Control, and Affect of service. Lower level, context specific issues such as the presence or absence of convenient and serviceable copy machines, or water fountains are not transferable across library environments and therefore generalizing assessment on such factors is neither practical nor useful. Local assessments are necessary but not for the benchmarking purposes intrinsic to the concept of a total market survey which seeks to evaluate a service across a service industry and which surveys both customers and non-customers. Leonard L. Berry (1995) writes in On Great Service,

When well designed and executed, total market surveys provide a range of information unmatched by any other method. Among the information that should be gathered are customers’ service expectations and perceptions, the relative importance of service dimensions, and customers’ behavioral intentions . . . . A critical facet of total market surveys (and the reason for using the word “total”) is the measurement of competitors’ service quality. This requires including noncustomers in the sample to rate the service of their suppliers (p. 37).
LibQUAL™ was developed to satisfy the need for a total market survey in the library sphere to compare and to assess service in libraries longitudinally for benchmarking and best practices purposes.

In addressing the practical concern in managing cross library assessment, technology transformed survey methodology by harnessing the powerful vehicle of the web for survey transmission and data collection. When surveys are delivered through the web, scaling to large numbers of participants across many institutions is cost and process efficient. Human intervention is minimal, therefore there is no associated data keying cost and human data input error is virtually eliminated. There are also no mailing and printing costs. Survey response data can be immediately tabulated and analyzed; therefore web surveying is also efficient in terms of time. As a result of carefully constructing a basis for a theory of user-centered library service quality, and the use of the web for transmission of surveys, library assessment was no longer inextricably tied to the local context and libraries could be benchmarked against one another longitudinally.

LibQUAL+™ at Texas A&M University

Texas A&M University is a comprehensive, Research I institution of higher learning in the United States. One of two flagship institutions in the second largest state in terms of both population and area in the United States, Texas A&M University has a student body of 45,000 undergraduate and graduate students, and a faculty of 2,000. In addition to Colleges of Liberal Arts and Science, the University has strong professional colleges of Engineering, Agriculture, Veterinary and Human Medicine, Education, Business and Architecture. The University is a land grant, sea grant and space grant institution. The Libraries at Texas A&M University have 3.5 million volumes, 49,000 serials subscriptions, and spend roughly $26 million annually.
Given the broad mission of the university, and the large amount of money invested in operating its library, the need for assessment of the Texas A&M University Libraries, not only in terms of dollars spent and volumes on the shelves, but also in terms of service satisfaction and outcomes is paramount.

As Dean of Libraries at Texas A&M I have found LibQUAL+™ to be very useful locally in making management decisions and in tracking changes in user expectations over time.

**Management Decisions**

At the local level, data from the LibQUAL+™ survey has been instrumental in making management decisions. As Dean I was in the enviable position of having LibQUAL+™ data to justify how the libraries would use a recent windfall of funds. The President of the University had funds to disperse to the Libraries, but only if they could be shown to have direct benefit to undergraduate students. I could use information from LibQUAL+™ data to show that undergraduate students at Texas &M wanted four enhancements to library services in the following order of importance:

1. Increased open hours of library facilities, preferably 24 hour access to some buildings
2. Increased availability of group study rooms in the Medical Sciences and Business libraries
3. Comfortable, inviting and secure physical environments in the libraries
4. Increased access to collections, particularly in digital form.

To make my case to university administrators I used both quantitative and qualitative data from LibQUAL+™. From LibQUAL+™
quantitative data I knew that undergraduates, as opposed to other user groups, i.e. faculty and graduate students, scored Library as Place as very important to them. From comments, i.e., qualitative LibQUAL+™ data, I knew that undergraduate students wanted increased open hours, comfortable physical facilities and as much digital content as we could provide as shown in Charts 1-3. Chart 4 shows how often respondents volunteered comments on services they particularly like, and Chart 5 targeted problem areas for service improvement. Unlike other Texas A&M University administrators who do not participate in assessment programs like LibQUAL+™, I could immediately provide current data-driven recommendations from undergraduates for library services at the university. I readily had data at hand collected in the spring of 2005, and therefore, I could make a recommendation to university administrators based on actual and current input from undergraduate students.

Let me give another example of how we used LibQUAL+™ data at Texas A&M for management decisions. When the libraries received a technology grant of $750,000 three years ago, we had to decide what our highest priority for technological improvements was. Over several annual administrations of LibQUAL+™ we knew that our users scored Personal Control of Information highest in terms of desired expectations, and least in terms of perceptions of current service. Our users wanted to control how, when and where they accessed and used information. Therefore we dedicated the technology grant to web development and purchased and implemented a content management system.

Longitudinal Views

Administering the LibQUAL+™ survey annually at Texas A&M allows us to observe whether user behavior is changing over time. For instance, we have observed - over the past five years - a relative-
ly short time period - that undergraduates in particular are less and less inclined to consult librarians when they have questions. As shown in Chart 6 the desired responses to the question “Giving users individual attention” is steadily declining, while desired mean responses to questions that stress providing access capabilities that allow users to find information on their own, continue to be high as indicated in Charts 7 and 8. It appears that undergraduates now matriculating into universities have been continuously more exposed to internet capabilities and are accustomed to self-explanatory navigation of the internet. Rather than asking a human being how to find information, students want to access information through intuitive and self-directed mechanisms.

In this user environment it is reasonable to invest in services such as virtual reference, web design enhancements (based upon careful usability analysis), and the acquisition of any and all available digital resources. It is also reasonable to consider redirecting resources from real-time, physical reference interactions at a traditional reference desk and to prepare staff for more intense face to face user interactions when they occur. If users will ask a human being a question only as a last resort, they could likely be frustrated in not having been able to find what they wanted on their own, or could have truly difficult questions. Reference desk personnel should be prepared to interact more empathetically with today’s users for whom face to face human reference interactions involve higher stakes in terms of time and energy than in the pre internet era.

General Observations from LibQUAL+™

Since LibQUAL+™ has been administered in hundreds of libraries and a database of hundreds of thousands of responses has been assimilated, there are several conclusions that can be made that generalize to the community of modern academic libraries as a whole.
The first observation is the marked difference in importance of the dimension of Library as Place for undergraduates as opposed to faculty, and to a lesser extent, graduate students. Library spaces are extremely important to undergraduate students and many place a high value on the availability of group study facilities. However, although undergraduates want inviting library spaces for study and research, faculty place a value on being able to access library resources electronically without having to walk into library spaces.

A second observation is the insatiable demand of high end users for content, particularly journal literature. Prior to LibQUAL+™ many librarians felt that some users, somewhere were satisfied with their library's holdings. They were probably at Harvard or Cambridge or Berkeley. Now it is understood that the most high end users, faculty and graduate students at research institutions, want convenient, timely and unhampered access to literally all content. There are no research level users who are totally satisfied with the delivery of content, not even those at the world's largest and most prestigious institutions. An obvious lesson to be gleaned from this observation is that in a world where no single institution can do it all, collaboration across libraries in content acquisition and delivery is ever more important.

A third trend discernable from LibQUAL+™ data is particularly difficult for some librarians to absorb because it lies at the core of how librarians view themselves. As shown in Chart 9, LibQUAL+™ revealed that users want to navigate the information world on their own terms, in their own physical and time spaces, and they want paths to information so well laid out that they do not need to involve others in their discovery process - even, and perhaps particularly, librarians. They no longer value individualized service. And when these users cannot find or access the most perfect source, a decent, "sufficient" source will serve perfectly well in most circumstances. For the library profession that places a high premium on face to face, real time service to the individual, and the delivery of the best, most
Authoritative source - to digest the reality that users really don't want to ask librarians questions, is counter-intuitive to some and emotionally wrenching to others.

A fourth lesson learned from LibQUAL+™ data sheds some light on the profession’s most difficult and elusive assessment challenge, i.e., how to evaluate outcomes of library usage to the higher education enterprise as a whole? The Holy Grail of library assessment in North America is outcomes assessment. Accrediting bodies for academic institutions seek to understand the role that libraries play in higher education missions of teaching, learning and research. A set of five outcomes questions has been developed for the latest version of LibQUAL+™. On a scale of 1-9 with 1 being "strongly disagree" and 9 representing "strongly agree" users are asked to rate the following statements:

➤ The library helps me stay abreast of developments in my field(s) of interest

➤ The library aids my advancement in my academic discipline

➤ The library enables me to be more efficient in my academic pursuits

➤ The library helps me distinguish between trustworthy and untrustworthy information

➤ The library provides me with the information skills I need in my work or study.

Just in their raw scores, LibQUAL+™ outcomes data has given the profession a beginning in tackling the intractable outcomes assessment problem. It is also revealing, as indicated in Table 1, that the Service Affect dimension is most highly correlated with overall LibQUAL+™ satisfaction scores, while Information Control is most highly correlated with the overall Outcomes scores. Thus satisfaction is most highly related to service delivery and outcomes most highly
associated with content provision. But it is clear that both service and content are essential components of library service quality.

Conclusion

LibQUAL+™ has been an important contribution to the work of library assessment both for local management decision making and resource allocation and cross institutional benchmarking and identification of best practices. It has overcome the theoretical and practical obstacles that previously prevented large scale, multi institutional assessment in libraries. LibQUAL+™ assesses three overarching dimensions of library service based upon the first generally accepted theoretical model for library service quality from a user perspective. As a web delivered and managed survey, administering LibQUAL+™ is easy, and cost effective in terms of time and money. A well crafted interactive management process for the survey is under continual refinement and allows the survey to be run simultaneously across hundreds of institutions throughout the world with a turnaround for data and analysis of only a few days.

Viewed from the most general perspective, LibQUAL+™ longitudinal data has provided rich insights into differences in expectations by user group and has focused the attention of librarians on the importance of Library as Place for undergraduates and Information Control for all users, but particularly for faculty who have an insatiable demand for journal literature in particular. Results have shown that users want to navigate the information universe on their own terms, self reliantly whenever and wherever convenient. LibQUAL+™ longitudinal data has also shown how quickly user perceptions, and desired and minimum expectations have changed over the five years of survey administration. Finally, LibQUAL+™ data have yielded the first glimpses into how users assess the value added by libraries for higher education outcomes in teaching, learning and research.
References


Table 1
Correlations of LibQUAL+ Dimensions with Total Scores

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<th>Total Perceived</th>
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Chart 2
LibQUAL+ Comments
Library as Place - Texas A&M University

Chart 3
LibQUAL+ Comments
Information Control - Texas A&M University
Chart 4
LibQUAL+ Comments
Service Affect - Compliments - Texas A&M University

Chart 5
LibQUAL+ Comments
Service Affect - Problems - Texas A&M University
Chart 6
Texas A&M University
"Giving users individual attention"

Chart 7
Texas A&M University
"Making electronic resources accessible from my home or office"
Chart 8
Texas A&M University

"A library Web site enabling me to locate information on my own"

Chart 9
Aggregated Means of ARL Libraries 2004
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<th>Question Text</th>
<th>Minimum Mean</th>
<th>Desired Mean</th>
<th>Perceived Mean</th>
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<td>IC 4 The electronic information resources I need</td>
<td>6.41</td>
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<td>IC 5 Modern equipment that lets me easily access needed information</td>
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<td>IC 6 Easy-to-use access tools that allow me to find things on my own</td>
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<td>IC 7 Making information easily accessible for independent use</td>
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<td>AS 6 Employees who deal with users in a caring fashion</td>
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<td>7.76</td>
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<td>AS 7 Employees who understand the needs of their users</td>
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<td>AS 8 Willingness to help users</td>
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<td>AS 9 Dependability in handling users’ service problems</td>
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<tr>
<td>LP 2 Quiet space for individual activities</td>
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</tr>
<tr>
<td>LP 3 A comfortable and inviting location</td>
<td>6.31</td>
<td>8.01</td>
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</tr>
<tr>
<td>LP 4 A gateway for study, learning, or research</td>
<td>6.36</td>
<td>8.01</td>
<td>6.99</td>
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<tr>
<td>LP 5 Community Space for group learning and group study</td>
<td>5.87</td>
<td>7.51</td>
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Measuring the Impact of Networked Electronic Services (MINES):
The North American Experience

Brinley Franklin

Vice Provost, University Libraries
University of Connecticut
Storrs, Connecticut

Introduction

The digital information environment has dramatically changed the way that users access information worldwide. Libraries around the world have established a role for themselves in this "digital revolution" by negotiating for and providing networked electronic services that publishers and vendors formerly sold as print materials. These include electronic indexes and abstracts, reference materials, electronic journals, and electronic books, just to name a few. It is not unusual for a North American academic library, in 2005, to spend at least half of its collections budget on access to electronic resources and to offer traditional library services like interlibrary loan and reserve services electronically.

Electronic information resources also provide a means for measuring resource usage that was not as readily available in the print environment. As early as 1999, when the Association of Research Libraries’ Statistics and Measurement Committee convened its first meeting on "New Measures," participating librarians identified the
need for quantifying the impact that electronic resources were having on their libraries. ARL subsequently sponsored the "E-Metrics" project (http://www.arl.org.stats.newmeas/emetrics/) that all 123 ARL members are currently engaged in.


A recent study by two New Zealand librarians (McDowell and Gorman, 2004) found that while New Zealand academic libraries utilize vendors' usage statistics for informing collection management decisions, there was no significant correlation between the vendors' usage statistics currently provided and those desired by academic librarians. While the authors concluded that the usefulness of vendors' usage statistics is improved if the publisher adopts either COUNTER or ICOLC standards, academic librarians also had differing needs from those met through even standardized usage statistics.

Librarians also seek to determine the impact that electronic resources and other library collections and services are having on their constituencies or their institutions' core missions. For academic research libraries, these core missions are typically instruction, research, and public service. The author developed a study in the 1980s which estimated the extent to which traditional academic research library expenditures in the United States supported their universities' core missions (Franklin, 1989). By the late 1990s, the increasing popularity of electronic information among faculty and students had made it necessary to update the study's methodology to address networked electronic resource use.
Measuring the Impact of Networked Electronic Services, or MINES for Libraries™ (http://www.arl.org.stats.newmeas/mines.html), thus originated to supplement a library cost analysis study that was originally developed in the 1980s. MINES for Libraries™ was subsequently developed as an online transaction-based survey. Progress reports on survey results using the MINES for Libraries™ methodology have been published periodically (Franklin and Plum, 2002; Franklin and Plum, 2004). MINES for Libraries™ was adopted as part of the Association of Research Libraries New Measures program in May 2003 and is now one of ARL’s library assessment tools offered through StatsQUAL™ (www.statsqual.org).

This paper provides an overview of the MINES for Libraries™ methodology, as well as recent results from 14 individual academic libraries in the United States and a consortium of 19 university libraries in Ontario, Canada. It concludes with an overview of the value of the methodology to librarians as they attempt to assess the impact of networked electronic resources on their core constituencies.

Methodological Considerations

MINES for Libraries™ initially grew out of an earlier library cost analysis study methodology that focused on surveying in-house users as they entered the library at randomly selected times throughout the year to use traditional library collections and services. Because the cost study was used in negotiations with the U.S. government regarding reimbursement for library expenses that supported federally-funded research, federal auditors imposed several requirements on the conduct of its library user survey.

One of those requirements was related to the sampling plan. The
government required that the surveys be conducted year round, with every hour that the library was open eligible for sampling. Thus the sampling frame became all library users during a specified twelve-month period. A time sampling procedure was employed so that all library users would be surveyed during a specified number of time periods throughout the year. Consequently, the library user survey methodology utilized the random moments sampling technique. Over the course of a year, during randomly selected two-hour time periods at each surveyed library, a census survey of library users was conducted.

To determine an appropriate sample size, two statisticians reviewed library usage patterns at nine academic libraries representing more than 17,500 library uses at a variety of types of libraries (Dayton and Scheers, 1990). The two statisticians determined that, when trying to estimate total sponsored research use as a percentage of total library use, the three largest contributors to the prediction equations were the sample size, the ratio of sponsored research use to total use, and the coefficient of variation for research use. These three variables accounted for 96% of the variance in the standard error in the actual library usage data examined at the nine libraries studied. In practice, sample size can be fairly accurately predicted if the investigator can anticipate a reasonable estimate for the mean and standard deviation of sponsored research use.

In the United States, MINES for Libraries™ has typically been implemented as part of a comprehensive library cost analysis study. The survey of networked electronic resources users has coincided with the dates and times of in-house library user surveys conducted as part of the comprehensive study for comparative purposes.

A networked electronic resources user survey can, however, also be a stand-alone study. The Ontario Council of University Libraries completed such a study in 2004-2005. To determine the sample size for a stand-alone networked electronic resources user survey, a third statistician, Uwe Koehn, reviewed electronic services usage data pro-
vided by the author from three academic health sciences libraries and two academic main libraries.

Koehn reported that, in the electronic environment, the sample size (n) required for accuracy (A) is n=1/A2 (Koehn, 2003). Koehn recommended stratifying survey periods among the various distinct times of the year (academic sessions, summer sessions, inter-sessions). Ideally, the size of the sample drawn during each segment of the academic year would be in the same proportion as the fraction of electronic services use during that academic cycle to the total electronic services usage over the course of the year.

In addition to sampling plan and sample size, there are several other methodological considerations to address. An important factor is whether users will be required to complete a survey during survey periods before they are connected to the networked electronic resource they are selecting. Employing a mandatory survey approach leads to a more reliable sample insofar as all users during the randomly selected time period are being surveyed. If the survey is optional, some percentage of users will not participate and the completeness of the sample is compromised. Preliminary comparisons of mandatory versus optional survey participation also demonstrate that the two approaches yield significantly different results, suggesting that non-respondents exhibit different use characteristics than those who voluntarily participate.

The survey instrument was customized for each institution and then pre-tested in each local situation. Content validity was increased through several meetings with local librarians and information technology staff who were familiar with the environment and the population of the participating university, university consortium, or medical center. The surveys were viewed under several browsers for consistency.

Web-based user surveys were conducted over the course of a year for each institution. The web-based survey form (see Exhibit 1) was
activated during survey periods as users accessed one of the library’s networked electronic services. The survey form typically determined users’ status (e.g., undergraduate student, graduate/professional student, faculty/staff, or other user), affiliation (e.g., school of medicine, school of law, college of arts and sciences, etc.), location (e.g., in the library or outside the library), and purpose of use (e.g., sponsored research, instruction, patient care, all other activities). The date and time of the survey, originating IP address, and electronic resource selected for each use are also typically captured. Additional or even different questions can, of course, be chosen by the surveying library or consortium.

Libraries that construct gateways to networked electronic resources collect the most complete sample of networked electronic resource use. Gateways can be constructed of a variety of database-to-web solutions or proxy re-writers. Some examples of these are: open source PHP/MySQL, Zope/PostgreSQL, perl pass-through scripts, ColdFusion, Microsoft ASP, federated searching through the ILS, MyLibrary personalization structures, or rewriting proxy services such as EZProxy. Libraries with flat HTML pages, the links of which could be copied to bookmarks, departmental web pages, personal pages, subject bibliography or quick shortcut pages, the 856 field of MARC records, or other avenues were much less likely to be able to control access (or collect commensurable data) in order to insert the web-based survey at the prescribed times.

Libraries that do not have gateways are unable to create referral pages for every electronic resource, and so tend to insert the survey at the point of the list of databases, ebooks or ejournals rather than at the point of use of the specific electronic resource. This drawback has been described by others:

If the user bypasses the library web site (e.g., typing the database vendor’s website directly or through stored bookmark), that access cannot be captured. The big advantage of the click-through mechanism is that uniform usage
Measuring the Impact of Networked Electronic Services (MINES): The North American Experience

data can be collected . . . (Shim and McClure, 2002)

To address repeated searches or downloads by a single user during the same session, the user’s initial demographic characteristics and location are used to repopulate each subsequent survey instrument. In order to access another electronic resource, the user simply enters the purpose of use for the additional resource(s). This approach minimizes inconvenience to users, yet still captures all of their usage.

A typical MINES for Libraries™ web-based survey instrument is presented as Exhibit 1:

Exhibit 1

Networked Electronic Services Library User Survey

This survey is being conducted by the University in order to assess usage of the Library’s electronic services.

All responses are anonymous.

After completing the survey, you will be connected to the service you selected. Thank you for your help.

Patron Status: Select Patron Status
Affiliation: Select Affiliation
Location: Select Location
Purpose for Using:
  o A. Sponsored (Funded) Research — Definition
  o B. Instruction/Education/Departmental Research — Definition
  o C. Sponsored (Funded) Public/Community Service — Definition
  o D. Other Activities, Including Patient Care — Definition

Online Resources:

Please fill out Status, Affiliation, Location, and Purpose Fields.

Submit Response
MINES Results from Academic Health Sciences Libraries in the United States

Seven academic health sciences libraries in the United States implemented the MINES methodology between January, 2003 and April, 2005 as part of a larger, more comprehensive library cost analysis study. More than 27,000 uses of networked electronic services, including databases, indexes, online public access catalogs, electronic journals, electronic document delivery and interlibrary loan, and electronic books were surveyed. Approximately 33% of the networked electronic services uses at these academic health sciences libraries were related to sponsored research projects; 37% were related to instruction, education, and unfunded research.

As Table 1 demonstrates, sponsored researchers at these seven health sciences libraries used networked electronic services most frequently from on-campus, but not from in the library. Approximately 82% of sponsored research use took place on-campus (including in the library); but only about 24% of funded research use of networked resources actually took place in the library (6,590 of 27,390).

<table>
<thead>
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<th>Table 1: Purpose of Use By Location</th>
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<td>LIBRARY 2</td>
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<td>Academic Health Sciences Libraries</td>
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<td>LIBRARY 1</td>
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<td><strong>OFF-CAMPUS</strong></td>
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At these academic health sciences libraries, the classifications of networked electronic services users varied significantly based on their location (see Table 2). Library, faculty and staff usage represented about 46% of total use and graduate student usage accounted for about 31% of use. On-campus, but not in the library, faculty and staff represented 52% of all usage, clinical and other users accounted for about 26% of the usage, and graduate students totaled about 20% of the usage. Off campus, faculty and staff accounted for about 48% of networked electronic services usage; clinical/other users and graduate students each represented about 25% of off-campus networked electronic services usage.

<table>
<thead>
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<th>Table 2: Classification of Users By Location</th>
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<td>51</td>
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<td>LIBRARY 6</td>
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<td>81</td>
<td>126</td>
<td>114</td>
<td>335</td>
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<td>21</td>
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<td>49</td>
<td>22</td>
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<tr>
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<td>263</td>
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<td>1,770</td>
<td>1,596</td>
<td>5,482</td>
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<tr>
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<td>34%</td>
<td>32%</td>
<td>29%</td>
<td>100%</td>
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<tr>
<td>TOTAL</td>
<td>971</td>
<td>7,818</td>
<td>15,279</td>
<td>7,815</td>
<td>31,883</td>
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<td>3%</td>
<td>25%</td>
<td>48%</td>
<td>24%</td>
<td>100%</td>
</tr>
</tbody>
</table>

MINES Results from Academic Main Campus Libraries in the United States

At the seven main campus libraries, sponsored research use represented 11% of total electronic services use. Approximately 84% (2,502 of 2,971) of the sponsored research uses of networked electronic resources occurred outside the library, while 64% of all electronic services use took place outside the library (see Table 3).
Table 3: Purpose of Use By Location

<table>
<thead>
<tr>
<th>Academic Main Libraries</th>
<th>Funded Research</th>
<th>Instruction</th>
<th>Other Sponsored Activities</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN THE LIBRARY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIBRARY 8</td>
<td>98</td>
<td>694</td>
<td>72</td>
<td>335</td>
<td>1,199</td>
</tr>
<tr>
<td>LIBRARY 9</td>
<td>78</td>
<td>1,492</td>
<td>95</td>
<td>393</td>
<td>2,058</td>
</tr>
<tr>
<td>LIBRARY 10</td>
<td>55</td>
<td>1,110</td>
<td>78</td>
<td>577</td>
<td>1,820</td>
</tr>
<tr>
<td>LIBRARY 11</td>
<td>38</td>
<td>734</td>
<td>211</td>
<td>983</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 12</td>
<td>110</td>
<td>590</td>
<td>333</td>
<td>1,033</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 13</td>
<td>17</td>
<td>1,465</td>
<td>535</td>
<td>2,017</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 14</td>
<td>73</td>
<td>322</td>
<td>35</td>
<td>193</td>
<td>623</td>
</tr>
<tr>
<td>TOTAL</td>
<td>469</td>
<td>6,407</td>
<td>280</td>
<td>2,577</td>
<td>9,733</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>66%</td>
<td>3%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>ON-CAMPUS, NOT IN THE LIBRARY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIBRARY 8</td>
<td>256</td>
<td>459</td>
<td>32</td>
<td>161</td>
<td>908</td>
</tr>
<tr>
<td>LIBRARY 9</td>
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<td>210</td>
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<td>364</td>
<td>2,501</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 13</td>
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<td>593</td>
<td>211</td>
<td>993</td>
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<td>335</td>
<td>265</td>
<td>7</td>
<td>107</td>
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<tr>
<td>TOTAL</td>
<td>2,005</td>
<td>5,925</td>
<td>151</td>
<td>1,379</td>
<td>9,460</td>
</tr>
<tr>
<td></td>
<td>21%</td>
<td>63%</td>
<td>2%</td>
<td>14%</td>
<td>100%</td>
</tr>
<tr>
<td>OFF-CAMPUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIBRARY 8</td>
<td>74</td>
<td>316</td>
<td>24</td>
<td>174</td>
<td>588</td>
</tr>
<tr>
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<td>50</td>
<td>326</td>
<td>1,915</td>
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<td>2,747</td>
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<td>62</td>
<td>488</td>
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</tr>
<tr>
<td>LIBRARY 12</td>
<td>89</td>
<td>462</td>
<td>345</td>
<td>896</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 13</td>
<td>20</td>
<td>451</td>
<td>104</td>
<td>575</td>
<td></td>
</tr>
<tr>
<td>LIBRARY 14</td>
<td>111</td>
<td>301</td>
<td>21</td>
<td>148</td>
<td>581</td>
</tr>
<tr>
<td>TOTAL</td>
<td>497</td>
<td>4,510</td>
<td>132</td>
<td>2,651</td>
<td>7,790</td>
</tr>
<tr>
<td></td>
<td>6%</td>
<td>58%</td>
<td>2%</td>
<td>34%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 3 (continued): Purpose of Use By Location

<table>
<thead>
<tr>
<th>Academic Main Libraries</th>
<th>Funded Research</th>
<th>Instruction</th>
<th>Other Sponsored Activities</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1,469</td>
<td>128</td>
<td>670</td>
<td>2,695</td>
</tr>
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<td>237</td>
<td>961</td>
<td>6,308</td>
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<td>5,592</td>
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<td>16,842</td>
<td>563</td>
<td>6,607</td>
<td>26,983</td>
</tr>
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</table>

At the main campus libraries, there were about 1.8 networked resources uses outside the library for each use inside the library. The difference was even more pronounced at academic health sciences libraries, where there were roughly 3 networked resources uses outside the library for each use inside the library.

Inside the library, undergraduate student use of networked electronic resources was heavy, representing 43% of all in-house use. On-campus, but not in the library, graduate student usage was heaviest (40%) followed by faculty/staff (31%) and undergraduate students (25%). Off-campus use of networked electronic resources was heaviest by other users (40%), primarily those users not affiliated with the university offering the resources (see Table 4).
<table>
<thead>
<tr>
<th>Academic Main Libraries</th>
<th>Funded Research</th>
<th>Instruction</th>
<th>Other Sponsored Activities</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IN THE LIBRARY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIBRARY 8</td>
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<td>162</td>
<td>45</td>
<td>889</td>
</tr>
<tr>
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<td>354</td>
<td>70</td>
<td>1,035</td>
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<tr>
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<td>94</td>
<td>2,027</td>
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<td>230</td>
<td>54</td>
<td>741</td>
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<td>TOTAL</td>
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<td>2,196</td>
<td>2,276</td>
<td>725</td>
<td>9,172</td>
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<tr>
<td></td>
<td>43%</td>
<td>24%</td>
<td>25%</td>
<td>8%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>ON-CAMPUS, NOT IN THE LIBRARY</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<td>655</td>
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<td>326</td>
<td>34</td>
<td>860</td>
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<td>3,525</td>
<td>2,772</td>
<td>293</td>
<td>8,838</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>40%</td>
<td>31%</td>
<td>4%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>OFF CAMPUS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIBRARY 8</td>
<td>110</td>
<td>123</td>
<td>37</td>
<td>92</td>
<td>362</td>
</tr>
<tr>
<td>LIBRARY 9</td>
<td>294</td>
<td>815</td>
<td>288</td>
<td>242</td>
<td>1,639</td>
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<td>284</td>
<td>146</td>
<td>2,274</td>
<td>2,959</td>
</tr>
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<td>117</td>
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<td>64</td>
<td>371</td>
</tr>
<tr>
<td>LIBRARY 12</td>
<td>207</td>
<td>256</td>
<td>147</td>
<td>286</td>
<td>896</td>
</tr>
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<td>324</td>
<td>153</td>
<td>70</td>
<td>38</td>
<td>585</td>
</tr>
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<td>LIBRARY 14</td>
<td>260</td>
<td>404</td>
<td>123</td>
<td>89</td>
<td>876</td>
</tr>
<tr>
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<td>2,152</td>
<td>871</td>
<td>3,085</td>
<td>7,688</td>
</tr>
<tr>
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<td>21%</td>
<td>28%</td>
<td>11%</td>
<td>40%</td>
<td>100%</td>
</tr>
</tbody>
</table>
MINES Results from the Ontario Council of University Libraries in Canada

Canadian Libraries are heavily engaged in jointly licensing networked electronic resources through consortium purchases. Canadian libraries have access to a number of electronic resources through the Canadian National Site Licensing Project and also through more local consortial purchases.

The Ontario Council of Libraries (OCUL) launched its Scholar’s Portal in 2001 as the major component of its Ontario Information Infrastructure (OII). The Scholar’s Portal provides access to networked electronic resources purchased consortially by 20 Ontario universities, known collectively as The Ontario Council of Libraries. OCUL’s assessment team partnered with the Association of Research Libraries Statistics and Measurement Program in 2004-2005 on a project to help assess the value of networked electronic services jointly licensed by OCUL. The goals of the project were:

- To capture in-library and remote web usage of the OII Scholars Portal in a sound representative sample using the MINES methodology;

- To identify the demographic differences between in-house library users as compared to remote users by status of user;

- To identify users’ purposes for accessing Scholars Portal electronic services (funded research, non-funded research, instruction/education use, student research papers and course work); and

- To develop an OII infrastructure to make studies of patron usage of OCUL networked electronic resources routine, robust and integrated into the decision-making process.
All but one OCUL member agreed to survey its networked resources users using the MINES for Libraries™ methodology. OCUL-licensed electronic resources are mounted on a central server at the University of Toronto and the user survey was conducted over the course of a year during one randomly scheduled two hour survey period each month. Because retrospective Scholar’s Portal usage totals were available by day of the week and time of day, the probability of a particular day of the week and time of day was weighted accordingly to ensure a representative sample.

More than 20,000 networked electronic resource uses through the Scholar’s Portal were sampled between May, 2004 and April, 2005. As Table 5 illustrates, the largest category of users was undergraduate students (46%), followed by graduate/professional students.

<table>
<thead>
<tr>
<th>Table 5: OCUL Scholars Portal Users By Classification</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACULTY</td>
<td>2,2261</td>
<td>11.14%</td>
</tr>
<tr>
<td>GRADUATE/PROFESSIONAL STUDENT</td>
<td>6,545</td>
<td>32.24%</td>
</tr>
<tr>
<td>LIBRARY STAFF</td>
<td>328</td>
<td>1.61%</td>
</tr>
<tr>
<td>OTHER</td>
<td>721</td>
<td>3.55%</td>
</tr>
<tr>
<td>STAFF</td>
<td>1,128</td>
<td>5.56%</td>
</tr>
<tr>
<td>UNDERGRADUATE</td>
<td>9,317</td>
<td>45.90%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20,300</td>
<td>100%</td>
</tr>
</tbody>
</table>

More than 80% of the Scholar’s Portal uses sampled originated from outside OCUL libraries (see Table 6). Off-campus use represented more than 45% of all networked electronic resource usage; almost 35% originated on-campus, but not in the library.
Table 6: OCUL Scholars Portal Users By Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN THE LIBRARY</td>
<td>4,047</td>
<td>19.94%</td>
</tr>
<tr>
<td>OFF-CAMPUS</td>
<td>9,163</td>
<td>45.14%</td>
</tr>
<tr>
<td>ON-CAMPUS, BUT NOT IN THE LIBRARY</td>
<td>7,090</td>
<td>34.92%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20,300</td>
<td>100%</td>
</tr>
</tbody>
</table>

The purpose of use categories selected by OCUL were slightly different from those selected by U.S. libraries (See Table 7). At the Ontario libraries, roughly 26% of all Scholar’s Portal use was related to sponsored research. Almost half (47.69%) pertained to coursework or teaching.

Table 7: OCUL Scholars Portal Users By Purpose of Use

<table>
<thead>
<tr>
<th>Purpose of Use</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>COURSEWORK</td>
<td>8,537</td>
<td>42.05%</td>
</tr>
<tr>
<td>OTHER ACTIVITIES</td>
<td>1,523</td>
<td>7.50%</td>
</tr>
<tr>
<td>OTHER RESEARCH</td>
<td>3,290</td>
<td>16.21%</td>
</tr>
<tr>
<td>PATIENT CARE</td>
<td>487</td>
<td>2.40%</td>
</tr>
<tr>
<td>SPONSORED RESEARCH</td>
<td>5,318</td>
<td>26.20%</td>
</tr>
<tr>
<td>TEACHING</td>
<td>1,145</td>
<td>5.64%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20,300</td>
<td>100%</td>
</tr>
</tbody>
</table>

Lastly, the academic affiliations of the Scholar’s Portal users sampled in the study were determined. Of the 20,300 Scholar’s Portal uses sampled in 2004-2005, more than 37% were from users in the sciences and applied sciences. Sciences and applied sciences users, when combined with health sciences users, totaled almost 60% of all Scholar’s Portal uses, while humanities and fine arts user accounted for only about 4% of all uses (see Table 8).
Table 8: OCUL Scholars Portal Users By Affiliation

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLIED SCIENCES</td>
<td>2,930</td>
<td>14.43%</td>
</tr>
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<td>BUSINESS</td>
<td>814</td>
<td>4.01%</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>881</td>
<td>4.34%</td>
</tr>
<tr>
<td>ENVIRONMENTAL STUDIES</td>
<td>867</td>
<td>4.27%</td>
</tr>
<tr>
<td>FINE ARTS</td>
<td>160</td>
<td>0.79%</td>
</tr>
<tr>
<td>HUMANITIES</td>
<td>600</td>
<td>2.96%</td>
</tr>
<tr>
<td>LAW</td>
<td>117</td>
<td>0.58%</td>
</tr>
<tr>
<td>MEDICAL HEALTH</td>
<td>4,391</td>
<td>21.63%</td>
</tr>
<tr>
<td>OTHER</td>
<td>948</td>
<td>4.67%</td>
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<td>23.14%</td>
</tr>
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<td>SOCIAL SCIENCES</td>
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<td>19.18%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20,300</td>
<td>100%</td>
</tr>
</tbody>
</table>

Conclusion

The networked electronic information environment yields usage data for collection development and other management decisions that were not nearly as robust in the traditional print environment. Standardized usage data, including the recently published Release 2 of the COUNTER Code of Practice for Journals and Databases (http://www.projectCounter.org) allows librarians to compare the value of different electronic offerings to their constituencies utilizing frequency of use.

The networked electronic information environment also affords an opportunity to assess characteristics of networked electronic information usage in real-time. The MINES for Libraries™ methodology permits librarians to gauge the demographic characteristics of users, their location, the date and time of use, the specific resource used, and their purpose of use as they actually utilize an electronic resource. Other usage measures are also possible, and results can be
presented either as frequencies (illustrated in this paper by OCUL results) or by cross-tabulating different measures (such as location and either purpose of use or classifications of users, as illustrated in this paper by results from U.S. libraries).

The MINES for Libraries™ methodology is already being used by American libraries to determine to what extent electronic resources support sponsored research, instruction, and other key academic endeavors. It has been employed by a Canadian consortium of libraries to assess the value of jointly licensed electronic products to its broad range of constituents. The methodology also permits a library to analyze, resource by resource, electronic services' usefulness to different constituencies and different institutional missions. When used responsibly, this data can give librarians tremendous insights into how their electronic resources are being used and even some sense of which electronic resources are having the most profound impact on their institutions' core missions.

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Evaluating the Usage of Library Networked Electronic Resources

Terry Plum
Assistant Dean
Simmons Graduate School of Library
and Information Science
Boston, Massachusetts

Introduction

Why should libraries collect information about the usage of their networked electronic resources? As Bertot and Davis (2004, xi) point out, there are at least two reasons:

1. To develop access to critical data that can help libraries make decisions regarding services and resources

2. To develop data-rich evidence for the patron communities that the library serves attesting to the value of the library-enabled networked services and resources

In addition, the evaluation of the usage of electronic resources can help determine the cost-benefit return of network electronic resources for collection development decisions; it can generate outputs for performance assessment; it can lead to the assessment of service quality; and it can contribute to outcomes assessment. For example, collecting, presenting and analyzing vendor-supplied, usage data for a library’s networked electronic resources informs collection development decisions by generating cost/use data or market penetration metrics, that is, the percentage of the relevant population reached by the networked electronic resource.
This paper focuses on data collection techniques representing the use of library networked electronic resources. It briefly notes some of the e-metrics initiatives of the Association of Research Libraries (ARL), and lists the relevant standards for vendor supplied data. This paper argues that as libraries become increasingly less dependent upon vendor-supplied, subscription ejournals and fulltext databases for access to scholarly information, so web-based surveys coupled with a networked infrastructure of assessment, such as suggested by the MINES for Libraries™ project, will become more important tools for evaluating networked electronic resources. Web-based usage surveys are increasingly relevant to the collection of usage data to make collection development and service decisions, to document evidence of usage by certain patron populations, and to collect and analyze performance outputs.

Although framed by management needs for data-driven decisions, much of the impetus to measure usage is, in fact, driven by the escalating cost of serial subscriptions supported by the libraries. Association of Research Libraries members spend 215% more per serial unit cost in 2003 than they did in 1986, which is far beyond the 68% rise in the U.S. government’s baseline Consumer Price Index in this period. (Association of Research Libraries, 2004) The average expenditures for serial subscriptions for all serials (not just scholarly journals) in ARL academic libraries in 2003 are $5.46 million. (Association of Research Libraries. University of Virginia Library, 2004) From 1993 to 2002, the United States Periodical Price Index shows an average annual increase in the serial subscription price of 10.7% in chemistry and physics journals, 11.12% in medicine, and 7.8% in business and economics.

From 1984 to 2002, business and economics journals increased in price 423.7%, chemistry and physics journals increased 664%, and journals in medicine by 628.7% (Albee and Dingley, 2004). Irrespective of how they are measured, scholarly journal prices are high and are continuing to increase. According to Young and Kyrillidou (2004),

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in every year since 1992-93, average expenditures on electronic resources have increased at least twice as fast, and in some cases more than six times faster, than average library materials expenditures. As libraries spend an increasing percentage of their budget on electronic resources (in 2003 ARL libraries spend on serials 28.3% of their total expenditures including salaries, or 65.2% of their materials budget), the importance of collecting data to evaluate these resources has become more urgent.

Vendor supplied usage data

the *Data Collection Manual* written by Shim and others (2001).

The problems with vendor supplied data that these various groups are attempting to solve, as Shim and McClure (2002), and others have pointed out, are:

1. Vendor reports do not provide sufficiently detailed information
2. Vendor reports are inconsistent in their application of the definitions of variables
3. Vendor reports are not commensurable between each other
4. Some vendors do not report anything

In practice, the E-Metrics project of ARL pulls together the fruits of these standards-setting efforts. As summarized by Blixrud and Kyrillidou (2003), it asks for the following data from ARL libraries for measuring use of networked electronic resources, data which most libraries can only provide by collecting and analyzing vendor-supplied transaction data:

- Number of login (sessions) to networked electronic resources
- Number of queries (searches) in networked electronic resources
- Number of items requested in networked electronic resources

Why is there such an emphasis on vendor-supplied data for evaluating electronic resources? Vendor supplied output data of networked electronic resources have been considered trustworthy because they are based on patrons' interaction with the networked electronic resource marketed or paid for by the library. The units of measure generally agreed upon across the relevant standards setting groups count usage of the resource in some way; usage by session, queries, views, downloads, prints, etc. The closer the usage data are to the actual transactions or use of the resource, it seems the more reliable the data is assumed to be. For example, the number of sessions is not regarded as reliable to be as the number of prints because
some sessions may last a long time with many prints, and other sessions may be quite short with just a few prints. Usage data elements, such as fulltext items requested or searches, are almost atomic, that is, indivisible, structural, determinant, and fundamental, whereas other usage data elements, such as sessions, are molecular in that they are comprised of different types of usage data stuck together with properties different from and greater than the sum of the atoms or more discrete usage data.

Web survey data

Another type of data collection of users and usage of networked electronic resources can be done through the web survey. However, the web survey has usually not been regarded as trustworthy to produce valid and reliable usage data for several reasons.

1. The quantitative usage data such as prints, queries, etc., are usually a census, in which all events are counted, whereas the web survey is based upon a sample

2. A truly random sample research design is difficult to create using web surveys

3. The samples of many web surveys are non-probability based, and therefore not open to inferential statistical statements about the populations

4. The non-response rate for web surveys is often high, and may introduce bias. The respondents may not be representative of the population

5. Web surveys have in the past been used to collect data about users or about sessions but not about usage. Therefore the data they collect are not the more fundamental or atomic usage data collected by vendors of networked electronic resources
One user may have generate much or little usage

6. The population or frame may not be well-defined

7. Web surveys, because they focus on users, are often collections of impressions or opinions, not the more concrete actual usage, and are therefore not trusted to yield reliable data that can be compared to itself over time

8. Web surveys are often not based on real usage, but upon predicted, intended or remembered use, introducing error

9. Web surveys may not appear consistently when viewed in different browsers, thus affecting the results in unanticipated ways

10. Because users have unequal access to the Internet, web surveys introduce coverage error


A web survey technique that attempts to address some of these problems is the Measuring the Impact of Networked Electronic Services, or MINES for Libraries™ (http://www.arl.org.stats.newmeas/mines.html), described by Franklin earlier in this volume. The primary difference between the MINES for Libraries™ approach and many of the other web-based user surveys, such as those enumerated by Covery (2002) and Tenopir (2003), is the emphasis on usage. Although user identification information is collected, the web survey is really a usage survey, not a user survey. The respondent must choose or select the networked electronic resource in order to be presented with the survey, thus memory or impression management errors are prevented. Users are presented with the survey as they select the desired networked electronic resource or service. Once the survey is completed, the respondent’s browser is forwarded to the desired networked electronic resource. This approach is consistent
with the random moments sampling technique. Each survey period is at least two hours per month, so each survey period in itself is only a snap-shot or picture of usage. Because the survey periods are randomly chosen over the course of a year and result in at least twenty-four hours of surveying, the total of the survey periods represents a true random sample, and inferences about the population are valid.

The survey samples usage of networked electronic resources in the university environment. Therefore there is no coverage error, since inferential statements are made only about usage and users, not non-users. Also reducing coverage error is the ubiquity of computers on most university campuses. As the EDUCAUSE Core Data Services 2003 Summary Report states, most surveyed students report using their own computers. The mean of students reported to be using their own computers ranges from 77% in doctoral institutions, 69.4% in masters institutions, and 78.2% in bachelors institutions. There was a significant increase from 2002 to 2003 for US institutions for which data is available for both years, so one could expect some increase from 2003 as well. In universities and colleges, there is effectively no digital divide, and therefore no coverage error.

The MINES for Libraries™ survey is mandatory for respondents, and based on usage or uses, not on users. One way to reduce the inconvenience to patrons of repeated surveys with each subsequent use of a networked electronic resource during the sample period is to auto-populate the survey with the previous values, so that each time the survey is presented, the patron can simply click through, if none of the answers have changed. This methodology has worked well for several years, passing numerous Institutional Review Board (IRB) reviews, but patrons have become more sensitive to their options as web-based marketing has increased. In some sense, library surveys suffer from guilt by association as they follow the lead of web marketing firms and repeatedly survey their patrons.

Therefore, the next iteration of MINES will record the values chosen in the initial survey for any subsequent usage by the patron of
other electronic resources, and will invisibly (to the patron) submit those values again for any subsequent use of a networked electronic resource. The user demographics do not change during a session in which more than one networked resource is used. Additionally, an examination of the MINES data collected to date shows that repeat users rarely change their purpose of use. At workstations where there are more than one patron, such as public workstations in a library, a timeout mechanism will be implemented.

MINES has followed the web survey design guidelines recommended by Dillman (2000) and Couper, Traugott, and Lamias (2001). Dillman has suggested fourteen principles for the design of web surveys to reduce the traditional sources of web survey error: sampling, coverage, measurement and non-response. To mitigate the effects on the respondents of different renderings of the survey by different workstation browsers, the survey used simple text for its questions, only using graphics for branding or logos. The survey is short, with only a few questions, easy to navigate, and plain. Questions are presented consistently that is, either with radio buttons or drop down menus. A short paragraph explains the purpose of the survey, with IRB contact information, if required.

The MINES methodology also recommends a library web architecture or a gateway in order to be certain that all respondents in the sample period are surveyed, and that web pages other than the library web site, bookmarks, short cuts, and other links all go through a central point. This library web architecture is called the infrastructure of assessment.

An Infrastructure of Assessment

The importance of a library gateway through which patron access is provided to networked electronic resources (sometimes called a click-through mechanism) has been pointed out by a number of
authors (Shim and McClure 2002, p. 235; Bertot and Davis 2004, p. 68). Often the gateway discussion is framed in the context of log files and counters. A number of libraries have instituted click-through arrangement to generate consistent counter methods for comparing database use and identifying trends and patterns (see, for example, Samson, Derry and Eggleston 2004; Van Epps 2001; Duy and Vaughan 2003). Unfortunately, the data collected by gateways through log files or transaction log data are not very rich. It is usually the elements found in the proxy server protocol or in the HTTP/TCPIP protocol. Although inconsistent, vendor-supplied data is much more informative.

Franklin and Plum (2002, 2004) have shown the importance of the gateway architecture or an infrastructure of assessment for web surveys, where much richer data can be collected through simple questions. The infrastructure of the gateway itself can be comprised of scripts, OpenURL servers, database-to-web architectures such as ColdFusion or php-MySQL, a referral server, a re-writing proxy server, or any other mechanism that the library can implement which assures that all requests by patrons for network services and resources go through a central gateway at which point the survey can be inserted. Antelman (2002) has a useful survey of such architectures.

An example of the infrastructure of assessment is the following diagram of a university library web architecture. Note that there are three client groups, defined by location: in the library, on campus but not in the library, and off-campus. In this diagram, the rewriting proxy server at the top, or the database-to-web solutions at the bottom of the diagram, the A-Z serials list (e.g., Serials Solutions) or possibly the OpenURL server in the upper right of the diagram could all serve as possible gateways or web survey interdiction points. The patron would request a remote database, ejournals, online catalog or other resource, and would be presented with the web survey served by the gateway. There might also be a referrer server to which all
requests that went through the proxy re-writer, the A-Z serials list, and other gateways were sent. The web survey would be placed on the referrer server. The referrer server would count all requests in some manner, and then at the appropriate times enable the web survey.

Example of an Infrastructure of Assessment

The imposition of a web-based survey at the gateway mitigates the effect of technological change on the vendor side. Information providers constantly change their technology and their offerings. The infrastructure of assessment or middle layer assessment metrics will protect the survey from unannounced architectural or technological changes at the information provider.
In an infrastructure of assessment the library can define for itself what its networked services are, and not have to limit its definition of electronic resources to only those for which the information provider can supply usage data. To be tied to the publishers for output data in this tumultuous period for scholarly communication is not a wise choice. Libraries are of course free to push the vendor supplied data as far as it will go, but by creating a gateway, free internet resources with presumably some sort of value added information, arrangement, marketing or access, could be folded into the library’s suite of networked electronic resources and therefore evaluated for impact, usage, purpose, and other measures. For example, the OpenURL server could incorporate Google Scholar into its list of services. It could bring added value to Google Scholar by customizing some of its options for its patrons. Then patrons might be tempted to go through the OpenURL server instead of going directly to Google Scholar, creating usage for a library enhanced networked electronic resource, and creating the opportunity to measure and evaluate a service that the library thought was sufficiently important to implement.

Open Access and the Non-utility of Vendor Supplied Data

What is a networked electronic resource? Many academic and public libraries enthusiastically created subject or liaison web-based lists for their patrons, mixing and indexing free internet resources along with subscription resources paid for by the library. In academic libraries the inclusion of the free internet resources is justified because of their scholarly quality and importance to teaching or research, for example, PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi). In public libraries, the free sources are included because of their quality and relevance to the community. Despite drawing the patron’s attention to both types of resources, the library
and librarians usually did not take the same level of responsibility for free internet resources. Free resources are almost regarded as found objects. It is good fortune that they exist, and even better fortune that the librarians could find them and, if not make them available, at least recommend them to their patrons. The library might even add value to the presentation of these found objects of databases and ejournals, providing annotations, subject terms, etc., even though the free sources may suffer from link rot, lack of a permanent URL, and possible degradation in quality as the originators move on to other projects, unable to sustain the business model.

The International Standards Organization (ISO) standards for the electronic collection (ISO 2789 sec.3.2.1) includes ebooks, electronic databases, ejournals, and digital documents. ISO breaks out free Internet resources to be counted separately, but focuses only the free resources cataloged in the OPAC, presumably government documents. (Bertot and Davis, 2004, 128). The National Information Standards Organization (NISO Z39.7 sec.4.10) defines the electronic collection as electronic databases, ejournals and digital documents. It also recommends counting separately the free internet resources in the catalog. EQUINOX excluded free Internet resources by describing electronic materials as "documents held locally and documents on remote resources for which access rights have been acquired at least for a certain period of time." (Bertot and Davis 2004, 128).

In the definitions of networked electronic resources by the standards setting bodies, free Internet resources are excluded or counted separately, usually because cost or expense is an important part of the metric. However, in the lists and services that academic and public libraries present to the public, free internet resources often are included. Usage of free resources may be as important to the library to measure as it was to highlight for the patron, but vendor supplied statistics will not help. Therefore, as important as ICOLC and Project COUNTER have been to encouraging vendors to supply consistent and commensurable data, the importance of these data will diminish
in the coming years.

There are four other drivers, in addition to the libraries’ enrolling free resources into their electronic resources mix for patrons, which argue against the growing non-utility of vendor supplied data. It is paradoxical that just as the measures are becoming accepted and widely used, their limitations become more apparent, primarily because of the rapidly changing scene of scholarly communication. These other collections push the definition of scholarly resources into new directions and new environments. For the academic library, all are viable alternatives to subscription vendors, both for the library and for their patrons.

1. Digital libraries

2. Pre-print and post-print servers

3. Open access journals

4. Open access repositories such as institutional repositories

1. Digital libraries

In the ARL E-Metrics test questions, the use of the library digital collection is a separate question from the use of networked electronic resources. Digital libraries usually represent local resources brought up by the library as part of a digitization project. In university libraries which have elected to make available and market extensive digital libraries collections, we find that as much as 40% of the usage of the library resources is from patrons not associated with the university, almost all of them from off campus (unpublished MINES data, 2005). This group would not be able to use the IP limited, vendor supplied resources, but is making extensive use of local digital library resources, typically comprised of scholarly or archival materials free of copyright or licensing restrictions. If 40% of the usage of
the university libraries' networked electronic resources is taking place outside of the vendor-supplied databases, the necessity for capturing this data becomes evident.

2. Pre-print and post-print servers

There has been a proliferation of pre-print servers or gray literature. The technology of the Web has enabled a number of pre-print servers to make technical reports, working papers, business documents, and conference proceedings available to all, even to those not in the knowledge flow for a particular subspecialty. In the spirit of open access to pre-peer reviewed publications, these papers are indexed, abstracted, and are available full text within such pre-print environments as arXiv.org e-Print Archive (http://www.arxiv.org), RePEc - Research Papers in Economics, (http://www.repec.org) and SSRN - Social Science Research Network, (http://www.ssrn.com/). To date the accumulation of pre-print servers does not seem to have affected the transmission of scholarly knowledge through journals, but has remained an added-value service for scholars and students, especially for those who would not have otherwise had access to the network of collegial distribution. The contents of these services and their usage are enormous. These pre-print servers are now important services for the library to market to students and faculty in their client group.

3. Open access journals

Peter Suber, in a discussion of open access definitions in the SPARC Open Access Newsletter, #64, defines open access literature as online, free of charge, and free of most copyright, licensing and permissions restrictions. Open access journals have a number of possible models, most of which are described in the Open Society
Institute’s Guide to Business Planning for Launching a New Open Access Journal. The methods include author submission or publication charges, article processing fees, offprint sales, advertising, sponsorships, journal publication in off-line media, electronic marketplace, dues surcharge, grants and contributions, and partnerships. Many of these models depend upon the university or grant funding organizations, the author-pays model the most obvious example. Open access journals are not incorporated into vendor packages and do not offer similar vendor supplied data. Open access journals will strive to keep down costs, and will not be able to follow ICOCL or Project COUNTER recommendations for metrics because they do not have subscription relationships with their clients. The Directory of Open Access Journals (http://www.doaj.org) lists over 1500 journals available to the patrons of libraries.

4. Institutional repositories or university post-print servers

Lynch (2003) describes the development of institutional repositories through which libraries can assume a much more active role in scholarly communication and also leverage alliances on campus. "A university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members."

The services it offers are stewardship, organization, access and distribution. It is also committed to digital preservation, including format migration. Although Lynch takes pains to distinguish scholarly communication from scholarly publishing, and specifically makes the point that the institutional repository is not a journal and should not be managed like one, the institutional repository will change the role of the library. These institutional repositories will include both
pre-prints and post-prints, represent a considerable investment of library resources, and should have evaluation mechanisms built into their services.

The contents of all four of these open repositories - the digital library, pre-print discipline repositories, open access journals, and university institutional repositories - could be made harvestable by Open Access Initiative Protocol for Metadata Harvesting (OAI-PMH) and OpenURL search engines. Google Scholar (http://scholar.google.com) is just the beginning of searchable access to free scholarly content. It will become more and more effective as these repositories become richer in scholarly materials, and as OpenURL and OAI-PMH standards are increasingly adopted so that these materials can be found.

ICOLC, in their revised Guidelines for Statistical Measures of Usage of Web-Based Information Resources (Update: December 2001) states that "The use of licensed electronic information resources will continue to expand and in some cases become the sole or dominant means of access to content." With the popularity of pre-print discipline repositories, open access journals, and institutional repositories, this statement is probably outdated, and no longer true. Although journals titles have in fact increased, it is very likely that licensed electronic information resources will not become the sole or dominant means of access to content for libraries, but will be only one means of access in a suite of scholarly offerings, many based upon principles of open access.

Assessment Gateway

Building on the infrastructure of assessment is the assessment gateway.
The Assessment Gateway

Most of the existing gateways for library resources exist not for assessment purposes, but to solve other problems. Rewriting proxy servers provide off-site access for electronic resources, and incidentally serve as a gateway through which all patrons must pass. XHTML databases and ejournal alphabetical and subject lists are created by scripts and databases or XML to solve the problem of updating XHTML and consistency across the web site. OpenURL servers link journal articles through DOIs to citations in databases to leverage the availability of the ejournals, to reduce the cost/use by increasing use, and to offer a powerful access tool.

Yet, with an assessment infrastructure, the library web architec-
ture could be planned to include the collection of counter and web survey data. Such data would be consistent not only across disparate databases but also across disparate services, such as the varied components of the digital library. An assessment infrastructure would channel all patron requests for ejournals and for local digital collections through the same gateway, collecting commensurable data. It could also reach across digital formats, providing usage data for movies, sound files, graphics, office applications, as well as text or Acrobat files. The library would highlight the digital libraries, preprint servers, open access journals, institutional repositories, and other databases and ejournals containing freely searchable and downloadable material. As patrons used the library’s links to these sources, the usage would be captured in the assessment gateway. Relationships would build up, not only between the libraries and information providers, as has been the case with the standards-setting institutions, but also between libraries and the various open services.

As libraries claim these open services for their patrons, the assessment gateway could register quantitative usage through log files and counters, but more importantly ask more sophisticated questions about usage through point-of-use web surveys, served by the gateway. A complex picture of usage of all of the networked electronic resources offered by the library would be built up, and library services could be crafted to address the needs found through the analysis of the data. The assessment infrastructure would position the library for determining the added value of electronic resource of all kinds for its community, measuring and evaluating the networked resources of the future.

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Evaluating the Usage of Library Networked Electronic Resources


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Curricula Vitae

Colleen Cook, Dean of Texas A&M University Libraries. Colleen oversaw the administration of the ServQUAL protocol to the University library community in 1995, 1997, and 1999, which led to her current role as a Project Manager for the ARL LibQUAL+™ project. She also holds the Wright Professorship in Library Science at the University. During her 20-year tenure on the faculty at Texas A&M University Libraries, she has served as Associate Dean for Administration, Assistant Director for Technical Services, Head of Acquisitions, Library Automation Coordinator, and Head of Access Services. She has published journal articles and book chapters and made numerous presentations in the fields of library science, history, and research methodology. She specializes in qualitative and quantitative methodologies.

Brinley Franklin has been Director of Libraries at the University of Connecticut since 1999. He also serves as a consulting associate for several international management-consulting firms, specializing in library cost, user and management studies. Brinley earned Bachelor of Arts and Master of Library Science degrees from the University of Maryland, College Park and a Master of Business Administration degree in Information Systems Management from The George Washington University in Washington, DC. Brinley currently serves on the Management Council and Board of Directors of the Boston Library Consortium and is Chair of the NELINET Board of Directors. He is an elected member of the IFLA Standing Committee on Statistics, and serves on the National Center for Education Statistics Academic Libraries Advisory Committee, the Association of College and Research Libraries Statistics Committee, and the Harvard/ACRL Leadership Institute Advisory Committee. Brinley also chairs the Association of Research Libraries’ Statistics and Measurement Committee, speaks on a variety of topics related to library management, and publishes internationally in the fields of
library management and performance assessment.

Martha Kyrillisou has been directing the ARL Statistics and Measurement Program since 1994. In her capacity as Director of the ARL Statistics and Measurement Program she is responsible for all aspects of the production of the annual statistical surveys of the Association of Research Libraries and among them the longest running library statistical data series, ARL Statistics. Martha manages the New Measures Initiative and the establishment of innovative evaluation tools for research libraries. Two of these tools are LibQUAL+™ and MINES and they have had wider success and appeal. She is also Project Manager of the ARL project funded by the National Science Foundation for modifying LibQUAL+™ for the digital library environment. Martha has experience and interdisciplinary training in libraries and evaluation and measurement, having worked at the Library Research Center at the University of Illinois at Urbana-Champaign and at the Bureau of Research of the Department of Education at Kent State University. She has also worked closely with libraries in Greece advising on projects related to collection development, staff training and assessment at Aristotle University and the University of Ioannina. She is active in presenting, publishing and helping libraries understand the changes of the rapidly changing external environment.

Terry Plum Assistant Dean, Simmons Graduate School of Library and Information Science, is responsible for managing technology and a satellite site campus for Simmons GSLIS. He is the co-developer of MINES with Brinley Franklin, and has presented and published on the use of networked electronic resources in libraries. He is a consultant for library user studies on the web, and is also a consultant for the training of international librarians in the United States, most recently, librarians from Kyrgyzstan, Georgia, and Kosovo. He has taught graduate courses in networking, reference, research methods and the management of information technology, and has offered numerous workshops on Internet security, authentication, and data
networking for practicing librarians. Previous to coming to Simmons GSLIS, he accrued over twenty years experience with digital resources as a librarian in academic libraries, including the libraries of SUNY Plattsburgh, Middlebury College, and the University of Connecticut.

Bruce Thompson, Professor and Distinguished Research Scholar, Department of Educational Psychology, Texas A&M University, and Adjunct Professor of Community and Family Medicine, Baylor College of Medicine (Houston). Bruce is also serving on the Steering Committee for the LibQUAL+™ service that has been established at ARL and frequently speaks at various national and international meetings (e.g., South Africa, Malaysia, Great Britain) about the value of assessment in libraries and the application of LibQUAL+™. He is also a Co-PI on the ARL project funded by the National Science Foundation for modifying LibQUAL+™ for the digital library environment. Bruce is a research methodologist who has devoted his career to psychological measurement and he is one of the key people who contributed numerous studies regarding the reliability and validity of LibQUAL+™ scores. Bruce is a fellow of the American Psychological Association and the Co-editor of AERJ:TLHD, and previously for nine years edited Educational and Psychological Measurement, and two other journals, and the series, Advances in Social Science Methodology. He is the author/editor of 10 books and 182 articles, and has conducted over 100 statistics and measurement continuing education sessions at professional meetings. He is a Past-President of the Association for Assessment in Counseling and of the Southwest Educational Research Association, and was selected as a 2005 nominee to be President of the American Educational Research Association.

J. Stephen Town is Director of Information Services for Cranfield University at the Royal Military College of Science, Defence Academy of the United Kingdom. This includes responsibility for Library services, Media services and for the content of a range of other informa-
tion services including the college web site and intranet. Information Services is now also heavily engaged in delivering a number of e-learning packages for the Defence Academy. Stephen also holds the additional title of Deputy University Librarian. Stephen is active in teaching, research, and consultancy and advice. He teaches on the MSc in Information & Library Management at the University of Bristol, and has published widely in the fields of library management, quality and performance, and information literacy. Stephen is a member of two SCONUL Advisory Committees, two journal Editorial Boards, and the Boards of two international conferences. He has provided advice and consultancy at home and abroad to the British Council, the British Library, Oxford University, the NHS, the Open University, and the Swedish International Development Agency amongst others.