

An Overview of Performance Measures in Higher Education and Libraries

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An April 4, 1997 article in *The Chronicle of Higher Education* reported that the South Carolina General Assembly approved a law instituting a system in which state appropriations to a public college would be based on how well the institution performs.¹ That action is one of many pieces of evidence that higher education in North America is being pressed for greater accountability and improved attention to quality. Legislators in many states are moving toward performance incentives based, at least in part, on whether universities and colleges are accomplishing stated goals. A public concerned with the balance between costs and benefits of higher education demands more information on institutional operations and outcomes. In particular, there is a great need to demonstrate the extent to which institutions are meeting their goals and objectives, and whether these goals and objectives are aligned with society's needs. A plethora of "useful" measures and other efforts has flooded the literature of higher education. Ultimately, it is the responsibility of each institution to define and describe its own goals, to place them in the context of peer group comparisons, and to demonstrate to the public the position it holds in higher education.

The concepts of accountability and quality assessment in higher education constitute an international phenomenon. National education systems call upon universities to establish performance indicators to measure progress towards the establishment of national goals. Universities increasingly are asked to describe in specific terms their contribution towards the national welfare and the relation between the welfare of a country and university teaching and research. In Europe and Australia, central governments are involved directly in establishing "indicators." In the United Kingdom, for example, quality control, quality audit, and quality assessment are being carried out by the Higher Education Quality Council and the three Higher Education Funding Councils. A new central agency to gather and analyze data, the Higher Education Statistics Agency (HESA), has also been established. More specifically, library performance indicators have flourished in the United Kingdom as the restructuring of the British higher education system proceeds.² The European Commission has been supporting an effort to create a reliable statistical base for libraries in Europe. In December 1997, the Commission hosted a workshop to focus attention on statistics that address service quality.³

In the U.S., there have been discussions about a greater federal role in institutional accreditation or if such a system might be based on "results" and "performance." Whether it is the federal government or some other entity that will undertake the responsibility to define "quality" for higher education in the U.S., critics of higher education have warned that, if "the academy does not respond, the public appetite for results will expand and crystallize around the use of external performance indicators to measure results. And the jury is still out on the results desired."⁴ To some extent, this is already happening through the crude but widespread ranking systems that popular magazines like *U.S. News and World Report* are promoting. In the 1997 issue dedicated to ranking colleges, the editors point out that "the

nation cannot afford to let higher education become less and less affordable for more and more students. The high cost of college is no longer just an academic affair; it is a national concern as well.”⁵

A recent report that presents the results of a two-year study by the Commission on National Investment in Higher Education highlights the fact that the “present course of higher education – in which costs and demand are rising much faster than funding – is unsustainable.” The authors call upon the “nation to address the fiscal crisis now, before millions of Americans are denied access to a college education” and they recommend “increased public-funding of higher education and wide-ranging institutional reforms.” In particular, they articulate the following five recommendations:

- America’s political leaders – the President, Congress, governors, mayors, and other state and local officials – should reallocate public resources to reflect the growing importance of education to the economic prosperity and social stability of the United States.
- Institutions of higher education should make major structural changes in their governance system so that decision makers can assess the relative value of departments, programs, and systems in order to reallocate scarce resources.
- As part of the overall restructuring, colleges and universities should pursue greater mission differentiation to streamline their services and better respond to the changing needs of their constituencies.
- Colleges and universities should develop sharing arrangements to improve productivity.
- It is time to redefine the appropriate level of education for all American workers in the 21st century. All citizens planning to enter the workforce should be encouraged to pursue – as a minimum – some form of postsecondary education or training.⁶

To some extent, these recommendations are the result of a fundamental societal transformation from the Industrial Age to the Information Age and the corresponding challenges and opportunities it presents for higher education. Performance measures are becoming the method of choice to track the transformation of higher education. Critics are calling for the development of a compelling vision for learning in the 21st century, a vision that would transform higher education by realigning it with three conditions: “1) the changing nature of information, knowledge, and scholarship; 2) the needs of individual learners; and 3) the changing nature of work and learning.”⁷

In the discussion regarding performance indicators in the U.S., the primary focus has been on cost efficiency and access to undergraduate education as well as on the long-term transformation of higher education and its effect on graduate education and research. There is

a real push for higher education institutions in the U.S. to be judged by a direct, observable connection to the country's economic welfare. Contemporary indicators that point toward this trend are: a stronger emphasis on scientific and technical education; efforts towards better management of the intellectual property produced at universities; investments in the Next Generation Internet (NGI);⁸ private initiatives, like Internet2;⁹ and the privatization of the National Information Infrastructure (NII).

Performance Indicators in Academic Libraries

Academic research libraries also feel the pressures that have resulted from the shift from a management system accustomed to increased revenue and growth to systems that demand more evidence of efficiency and effectiveness, accompanied by fundamental transformations. A 1992 study conducted by The Andrew W. Mellon Foundation analyzed the economic trends of research libraries in the context of the larger academic and publishing trends and identified historical and technological challenges that affect and transform academic libraries.¹⁰ The Mellon study found that the explosion in the quantity of desirable published material and a rapid escalation of unit prices for those items jeopardizes the traditional research library mission of creating and maintaining large, self-sufficient collections for their users. The study also recognized the potential of information technologies to transform the ways libraries organized collections and services. Updates of these trends are charted and presented through the annual publication of *ARL Statistics*.¹¹

As in higher education, libraries have also recognized the need for "output and performance measures." ARL responded to these calls by including data on circulation, instructional sessions, and reference transactions, together with interlibrary loan and document delivery statistics in the supplementary portions of *ARL Statistics*. Despite some concerns about the validity and reliability of such measures, these measures were added to the main *ARL Statistics* in 1995. In 1994, ARL also began distributing an annual report on selected ratios.¹² Efforts here are developing, in both senses of the word, i.e., they are still primitive *and* under development.

Institutional data collected through the *ARL Statistics* have also been packaged into an electronic publication that offers interactive statistical analysis through which one can compute any conceivable ratio or performance indicator based on the data of the collected variables.¹³ The interactive electronic edition of the *ARL Statistics*, prepared by the Geospatial and Statistical Data Center at the University of Virginia, can best be described as a basic decision support system (DSS) that can answer questions managers may have at the cross-institutional level, for instance, by comparing the performance of one institution to another or to a peer group through a variety of simple (ratio analysis) or complex (multivariate analysis) statistical techniques (see Kendon Stubbs' related article).

In addition to ARL's efforts, there have been a number of projects by other organizations that have tried to develop indicators or "benchmarks" for academic library operations, oftentimes

within a larger institutional framework. It is important that, as such library indicators are developed, they address the strengths and weaknesses of the different measures.

Two important activities are taking place at the international level. One that does not limit itself to academic libraries is the work done through ISO 11620, a recently approved international standard on Library Performance Indicators. ¹⁴ It specifies a set of 29 indicators grouped in the following areas: (a) user satisfaction; (b) public services, which includes general indicators as well as specific indicators on providing documents, retrieving documents, lending documents, document delivery from external sources, inquiry and reference services, information searching, and facilities; and (c) technical services, including indicators in the area of acquiring, processing, and cataloging documents. Notable points in this proposed standard are its initial emphasis on user satisfaction; its inclusion of cost-effectiveness indicators; its clear and distinct way of describing each indicator, accompanied by suggestions regarding the methodology to be used in collecting the data; and a description indicating how to most accurately interpret each indicator.

Related to the ISO 11620 effort, but with a special emphasis on academic libraries, is the International Federation of Library Associations and Institutions's (IFLA) development of international guidelines for performance measurement in academic libraries. ¹⁵ Seventeen select indicators are identified, with an emphasis on indicators that could be applicable internationally to all types of academic libraries, concentrating on measuring effectiveness (but not cost-effectiveness). ¹⁶

Both ISO 11620 and the IFLA guidelines are important works that bring attention to the issue of library performance measurement at the international level with an aim to promote acceptance of performance measurement. However, both efforts tend to emphasize indicators that require special effort to be collected, and, although they are useful in making historical comparisons within a library as long as the individual library's policies do not change, their usefulness is limited at the cross-institutional level since local policies (such as loan periods, number of books authorized for borrowing simultaneously, differing policies for different constituencies – students, graduate students, faculty, etc.) invalidate such comparisons.

An ambitious effort undertaken by the National Association of College and University Business Officers (NACUBO) aims to develop benchmarks for 39 functional areas in universities. ¹⁷ The "library" is just one of the 39 "functional areas" for which data were collected and is sandwiched between "legal affairs" and "mail room." ARL advised NACUBO on the development of the library portion of the survey and, as a result, the NACUBO library survey is almost a duplicate of the ARL survey. Unfortunately, some have taken the data collected by NACUBO as "indicators of efficiency" and "best practices," even as indicators of "quality," despite ARL's long-standing caution against such interpretations. Ratio analysis, which is the way most of the results were reported by NACUBO, is not benchmarking and does not *answer* questions; ratios of this sort provide a basis upon which to *ask* questions.

Another organization conducting performance measurement initiatives is John Minter Associates. Their efforts to develop indicators in colleges and universities are built upon the

Integrated Postsecondary Education Data System (IPEDS) and thus are published with the same delay that afflicts IPEDS surveys. *Academic Library Statistical Norms 1994* is the latest of a series of publications issued by Minter since 1988 using the biennial IPEDS Academic Libraries datafile to report 101 “measures” on academic libraries. The publication reports ratios for different types of libraries in groups that are based on the Carnegie Classification System. The authors, however, understand the limitations of ratio analyses and clearly point out in the 1992 introduction that “each comparison takes on meaning only in light of management goals. Does the measure exceed, meet, or fall short of the desired goal? Why? In the absence of a stated goal the question then becomes, ‘Is the position of this measure where we wish it to be? Why?’ Operating measures are not of equal importance nor of the same importance to different institutions. It is unlikely that an institution will give equal consideration to all 101 measures. Institutional context and administrative vision are two reliable guides to the importance of particular measures. Over time, the focus on particular measures will shift as goals are achieved and institutional context changes.” [18](#)

To protect the confidentiality of individual institutions, both Minter and NACUBO report ratios for groups of institutions. Non-disclosure of institutional data works against the understanding of data anomalies and the subsequent correction of reported errors. Although ratios may be misinterpreted by those who are not familiar with an individual institution’s goals and circumstances, there is a value in disclosure. The challenge of a disclosure strategy involving individual institutional data entails investment of effort in educating the public, legislators, and university administrators about how to interpret numbers related to libraries and other higher education functions.

Factors Affecting the Reliability and Validity of Data

There are at least three major issues that need to be taken into account in assessing the reliability and validity of data generally and of academic library data in particular: consistency across institutions and through time; ease vs. utility in gathering data; and values, meaning, and measurements.

Consistency

Lack of consistency in the way data are collected from institution to institution and in the way data are collected over time within the same institution creates problems for describing cross-sectional comparisons and time-series trends. With no processes in place to guarantee compliance with standard definitions, comparability of data across institutions may legitimately be questioned. The existence of the extensive “Footnotes” section of the *ARL Statistics* publication testifies to the importance of recognizing the limitations of reported data.

One possible way to overcome inconsistencies from institution to institution is to develop standards for reporting data across common automated systems, such as those that have been

developed in higher education for transferring student records. In order to develop parallel applications for libraries, at least to the level of sophistication that exists for student records, concerns such as the confidentiality and privacy issues related to patron records and Internet transaction logs will have to be addressed.

Ease vs. Utility

Performance indicators are being developed from data that can be easily gathered. Of course, what is easy to measure is not necessarily what is desirable to measure. It is always tempting to set goals based on the data that are gathered, rather than developing a data-gathering system linked to assessing progress towards meeting established goals. For example, ARL's ratios report lists thirty ratios that are derived from the existing data that ARL collects on an annual basis. Because the ARL data reflect the historical and traditional roles of academic libraries, the ratios calculated and printed in this report are primarily *input* indicators—related to levels of staffing, collections, and expenditures. The difference between these ratios and the raw data published in the *ARL Statistics* is that certain ratios can reflect advancement towards specific, local objectives. The ratios can be viewed as supporting tools to assess progress towards achieving a certain objective, but the final judgment about the importance of a specific indicator must also take into account environmental factors that are part of the local institutional culture.

Values and Meaning

There is a danger of blurring the distinction between the value system that is reflected in certain indicators and the indicators themselves. For example, in developing a system of measures to track library performance regarding the cost of serial subscriptions or of monographs, there are certain values behind the numbers that can be fundamentally different from library to library. These values and the interpretation of the measures therefore may have meaning only in the context of local circumstances. For example, a low unit cost for serial subscriptions may be extremely important for one institution, while another may assert that high-quality service can be guaranteed only by acquiring the most costly scientific and technical journals, thus yielding a higher unit cost per serial subscription.

Another ratio that is often calculated is library expenditures per student or faculty: Does the library that spends more per student or per faculty offer better service? Or is this a sign of inefficiency? What is the relationship between library spending levels, usage, and educational achievement or user satisfaction? The data ARL collects *cannot* answer the latter questions; the meaning and value assigned to these ratios must be developed locally. Thus, one of the limitations of this approach is the absence of an interpretation for each indicator.

The movement calling for performance indicators— which appears to be a near-universal phenomenon— derives in part from the need to define a value system for higher education in

an era of unprecedented change and technological innovation. As ARL further explores institutional value systems and establishes measures that reflect these values, the Statistics and Measurement Program hopes to be better able to define and measure quality in higher education and in academic and research libraries. As a first step, the ratios that ARL publishes can serve a dual purpose, although a limited one:

- (a) to identify whether a relative position in the rankings for a ratio is that expected and desired for an institution, and

(b) to compare an institution against its peers, especially over time.

ARL's previously mentioned electronic edition of the annual statistics allows a reader to move beyond those thirty ratios published by ARL and calculate interactively any conceivable ratio among the ARL data elements.

Recommendations for Research Libraries

In addition to the data currently collected in the *ARL Statistics*, it would probably be useful for ARL libraries to start adopting some cross-institutional performance indicators from the recently approved ISO 11620 standard and the IFLA guidelines. The major advantage of the indicators proposed through these sources is that there is a standard interpretation for them regarding the value of services. In particular, at the cross-institutional level ARL libraries can identify those indicators from the above sources that are impervious to variations in local library policies and explore their usefulness.

From the list of twenty-nine indicators in the ISO 11620 standard and the seventeen indicators listed in the IFLA guidelines, the following performance indicators could be easily adopted by ARL institutions:

(a) The IFLA guidelines define market penetration or percentage of target population reached as the proportion of the library's potential users who actually use the library.¹⁹ Although it would be more difficult to get an overall use measure of the various services (e.g., reference, circulation, in-house use), it should be relatively easy for a library to calculate with their online circulation system the extent of their circulation services' market penetration for each primary user group – faculty, graduate students, and undergraduates. Most ARL libraries, then, should be able to easily adopt such a “market penetration of circulation” measure.

(b) Although less important than market penetration and recognizing that ARL libraries have a strong archival function, collection turnover or collection use would be a useful indicator. The IFLA guidelines suggest combining the number of loans within a year and the number of in-house uses (which can be problematic for those libraries that do not keep in-house use statistics). However, the ISO 11620 standard restricts the definition of this indicator to the number of registered loans in a specified collection divided by the total number of documents in the specified collection, ignoring in-house use. Also, to control variations in the loan period

that would affect renewal numbers, it might be advisable to restrict the total number of loaned items to the number of initial loans, excluding renewals.

(c) Extremely important, although not as easily applicable, is the measurement of user satisfaction as a performance indicator. Its applicability across institutions needs to be further explored given the variations in the services provided by each library, but it is nonetheless a critical indicator of whether users' expectations are satisfied or not. Both the IFLA guidelines and the ISO 11620 standard recommend a five-point scale and suggest measuring both general user satisfaction as well as satisfaction with specific service areas. The IFLA guidelines describe the process of measuring user satisfaction in more detail and recommend a combination of satisfaction and importance that can help decision-making and action-taking; furthermore, the measurement of user satisfaction is not only recommended with local services, but also with services offered for remote use.

Librarians may not feel entirely comfortable undertaking such initiatives on their own, but there is a very strong influence towards this direction, partly coming from user-centered management practices. The ARL Statistics and Measurement Program has been providing workshops that familiarize librarians with the various aspects of the user survey research process, aiming to either help them initiate such activities on their own or to work effectively with consultants. A number of ARL libraries have been systematically applying results obtained from user satisfaction surveys when implementing changes and charting new directions for their organizations. GraceAnne DeCandido describes the results of such efforts in ARL libraries in an ARL SPEC publication entitled, *After the User Survey, What Then?* ²⁰

Lastly, it should also be pointed out that work is underway in the area of performance indicators for the electronic library. ARL efforts to date have concentrated primarily on measuring the monetary investments libraries make in electronic resources. Current work by Timothy Jewell, University of Washington, who analyzed data collected through the *ARL Supplementary Statistics* (an experimental testbed for new measures), has documented a clear trend of increasing investments in electronic resources that indicates ARL libraries invested about 7% of their materials budget in electronic resources in 1995-96. ²¹

Other efforts that have emphasized a more general evaluation of the academic network environment and information services of universities include *Assessing the Academic Network Environment*, by Charles McClure and Cynthia Lopata, ²² and *Management Information Systems and Performance Measurement for the Electronic Library: eLib Supporting Studies*, by Peter Brothy and Peter W. Wynne. ²³ Overall, there is general agreement that all these efforts attempting to define indicators for electronic resources and services are at the early stages of development and much more work needs to be done before meaningful cross-institutional comparisons can be made.

¹ Peter Schmidt, "Rancor and Confusion Greet a Change in South Carolina's Budgeting System," *The Chronicle of Higher Education* (4 Apr. 1997): A26.

² See, for example, Ian Winkworth's, "Performance Indicators," in *Librarianship and Information Work Worldwide* (Graham McKenzie and Ray Prychirch, eds., London: Bower Saur, 1993: 171-191).

³ An executive summary of the workshop can be found at: [Page no longer available: 7/23/2001].

⁴ Gerald Gaither, Brian P. Nedwek, and John E. Neal, *Measuring Up: the Promises and Pitfalls of Performance Indicators in Higher Education*, ASHE-ERIC Higher Education Report No. 5 (Washington, DC: George Washington University, Graduate School of Education and Human Development, 1994), v.

⁵ *America's Best Colleges* (Washington, DC: U.S. News & World Report, 1996), 11

⁶ Council for Aid to Education, *Breaking the Social Contract: The Fiscal Crisis in Higher Education*. Online. Rand Corporation. Available: <http://www.rand.org/publications/CAE/CAE100/index.html>. 3 April 1998.

⁷ Michael G. Dolence and Donald M. Norris, *Transforming Higher Education: A Vision for Learning in the 21st Century* (Ann Arbor, MI: Society for College and University Planning, 1995): 22.

⁸ *FARNET's Washington Update*, November 7, 1997 issue, informs us that NGI's recent success in garnering \$95 million will be allocated on Internet issues relevant to each agency's "particular expertise and agency mission – DARPA's focus will be on advanced network research, NASA's on specialized network testbeds, NIST will concentrate on standards development, NSF will continue to cultivate its relationship with the academic community, and the NIH will focus on health care applications." Copies of this newsletter are distributed through cni-announce@cni.org and this issue can be retrieved through the cni-announce archives.

⁹ <http://www.internet2.edu/>

¹⁰ Anthony M. Cummings, et. al, *University Libraries and Scholarly Communication* (Washington, DC: Association of Research Libraries, 1992).

¹¹ Association of Research Libraries, *ARL Statistics* (Washington, DC: Association of Research Libraries). Annual.

¹² Association of Research Libraries, *Developing Indicators for Academic Library Performance*:

Ratios from the ARL Statistics (Washington, DC: Association of Research Libraries). Annual.

¹³ <http://www.lib.virginia.edu/socsci/newarl/>

¹⁴ ISO 11620, *Information and Documentation–Library Performance Indicators* (Geneva: International Organization for Standardization). To be published June 1998.

¹⁵ Roswintha Poll and Peter te Boekhorst, *Measuring Quality: International Guidelines for Performance Measurement in Academic Libraries* (London: K.G. Saur, 1996).

¹⁶ 1) Market penetration, 2) opening hours compared to demand, 3) expert checklists, 4) collection use, 5) subject collection use, 6) documents not used, 7) known-item search, 8) subject search, 9) acquisition speed, 10) book processing speed, 11) availability, 12) document delivery time, 13) interlibrary loan speed, 14) correct answer fill rate, 15) remote uses per capita, 16) user satisfaction, and 17) user satisfaction with services offered for remote use.

¹⁷ NACUBO, “Benchmarking for Process Improvement in Higher Education: A Prospectus” Coopers and Lybrand with the assistance of Barbara S. Shafer and Associates, FY 1994. Online. Available: <http://www.nacubo.org/website/benchmarking/index.html>

¹⁸ *Academic Library Statistical Norms 1992* (Boulder, CO: John Minter Associates): 2.

¹⁹ *Measuring Quality*, 45.

²⁰ GraceAnne A. DeCandido, *After the User Survey, What Then?* ARL SPEC Kit 226 (Washington, DC: Association of Research Libraries, 1997).

²¹ Timothy D. Jewell, “Recent Trends in ARL Electronic and Access Services Data,” a report submitted to the Association of Research Libraries, 1997. Available at: <http://www.arl.org/stats/specproj/etrends.htm> .

²² <http://www.cni.org/projects/assessing/>

²³ <http://www.ukoln.ac.uk/dlis/models/studies/>

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