CURRENT CONTEXT FOR PERFORMANCE INDICATORS IN HIGHER EDUCATION:

AN OVERVIEW OF PERFORMANCE MEASURES IN HIGHER EDUCATION AND LIBRARIES

An edited version of this introduction appears as "An Overview of Performance Measures in Higher Education and Libraries," by Martha Kyrillidou, Senior Program Officer for Statistics and Measurement, in ARL 197: Special Issue on Measures (Apr. 1998). The introduction is revised and edited each year to add new information.

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 & World Report* are promoting. In the issue dedicated to ranking colleges for 1997, 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.

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,[16] with an emphasis on indicators that could be applicable internationally to all types of academic libraries, concentrating on measuring effectiveness (but not cost-effectiveness).

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.

Among recent developments in the area of library statistics, mention should be made of the revision of ISO 2789, the international standard on library statistics.[17] A survey is underway to determine the current implementations of the standard and to inform the recommendations for changes that are being drafted. The revisions potentially could include additions to the standard to address electronic resources and services. These developments may also influence the data definitions and collection activities in the United States.

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.[18] 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 1996* 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."[19]

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 for its academic members 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.

Through ARL's electronic edition of the annual statistics, any reader can calculate interactively any conceivable ratio among the ARL data elements. This printed ratios publication in some ways replicates part of what is available on the interactive web site, but it also provides a comparison of the 1995-96 and the 1996-97 years for each of these ratio values for each academic ARL institution. An effort was made to include those ratios that are perceived as being of interest to ARL university members; group discussions among ARL directors seem to build towards consensus that the 30 ratios presented in this report are useful and should be made publicly available.

Types of Ratios and Organization of the Tables

This report includes three types of ratios: percentages, relational, and annual changes.

There are thirty ratios in this report, each ratio being reported in three tables (Table a, Table b, and Table c for each ratio). For each ratio, tables a and b provide the value of the ratio in 1995-96 and in 1996-97, with the difference in the ratio between the two years. Table a is sorted on the value of the ratio in 1996-97, while Table b is sorted on the difference between the values of the ratio in 1995-96 and in 1996-97. Table c lists the data used to calculate the ratios for both 1995-96 and 1996-97 and is sorted alphabetically by institution name.

Caution is necessary when one tries to interpret these ratios. What is the appropriate level of relation between items borrowed and items loaned in the local library context? Is the relation between library expenditures per faculty or per student relevant to the goals of the specific library? Answers to these questions must be arrived at locally.

Percentages, i.e., part-whole relations, is one of the three types of ratios included in this report: a percentage describes the proportion of the whole represented by a specific category. For example, the number reported for total staff is the sum of three categories, professional staff, support staff, and student assistants. Ratios 1 through 3 report what percentage of total staff is represented by professionals, support staff, and student assistants, respectively, for each ARL library. Browsing through Table 1.a, which lists libraries based on the percentage of professional staff, one can see that Canadian libraries tend to have a smaller proportion of professional staff. Table 2.a, which reports percentage of support staff, indicates that many Canadian libraries have a larger proportion of support staff compared to most U.S. counterparts. The following ratios report percentages:

Ratio 1 Professional Staff as a Percentage of Total Staff
Ratio 2 Support Staff as a Percentage of Total Staff
Ratio 3 Student Assistants as a Percentage of Total Staff
Ratio 6 Serials Expenditures as a Percentage of Library Materials Expenditures
Ratio 7 Library Materials Expenditures as a Percentage of Total Library Expenditures
Ratio 8 Binding Expenditures as a Percentage of Total Library Expenditures
Ratio 9 Salary Expenditures as a Percentage of Total Library Expenditures
Ratio 10 Operating Expenditures as a Percentage of Total Library Expenditures

Relational change between two variables is the second type of ratio to be found here, i.e., how much of something for each unit of something else: If we are interested in the relation between two variables, we may want to describe the relation between them by dividing the two different quantities. For example, if we want to describe the relation in interlibrary lending/borrowing between items loaned and items borrowed by a library, we can divide items borrowed into items loaned and calculate Ratio 5. Here we have items loaned as the nominator and items borrowed as the denominator. Thus the ratio represents the number of items loaned for each item borrowed. If the number of items borrowed is larger than the number of items loaned, the resulting ratio will be less than one. As the reader can see in Table 5.a, there are only 17 ARL libraries that borrowed more items than they loaned. The majority of ARL libraries loaned slightly more items than they borrowed; the University of Minnesota library being an outlier by lending 13 items for each item it borrowed. This is because the University of Minnesota library serves the interlibrary loan needs for the entire state through its MINITEX consortium.

The relation between library expenditures and the size of the student/faculty body is also of interest to library and university administrators. Table 14.a reports total library expenditures per faculty, which range from $5,212 per faculty member to $40,617 per faculty member. It should be noted that approximately 80% of the values range between $500.00 to $2,000 for library expenditures per student (Table 23.a).

The ratios reporting relations between two variables in this report are:

Ratio 4 Ratio of Professional Staff to Support Staff
Ratio 5 Items Loaned over Items Borrowed
Ratio 13 Items Borrowed per Faculty
Ratio 14 Total Library Expenditures per Faculty
Ratio 15 Volumes Added (Gross) per Faculty
Ratio 16 Volumes Held per Faculty
Ratio 17 Paid Serial Subscriptions per Faculty

Ratio 18 Monographs Purchased per Faculty
Ratio 19 Total Staff per Faculty
Ratio 20 Library Materials Expenditures per Faculty
Ratio 21 Serials Expenditures per Faculty
Ratio 22 Items Borrowed per Student
Ratio 23 Total Library Expenditures per Student
Ratio 24 Volumes Added (Gross) per Student
Ratio 25 Volumes Held per Student
Ratio 26 Paid Serial Subscriptions per Student
Ratio 27 Monographs Purchased per Student
Ratio 28 Total Staff per Student
Ratio 29 Library Materials Expenditures per Student
Ratio 30 Serials Expenditures per Student

A special subcategory of relations between two variables is the case when one variable represents expenditures and the other variable represents units bought or served. For example, if we divide the expenditures for serial subscriptions by the number of paid subscriptions, we calculate the unit cost per subscription; Table 12.a reports the smallest institutional unit cost per subscription ($131.71) vs. the highest ($411.21). Unit costs in this report include:

Ratio 11 Unit Price of Monographs
Ratio 12 Unit Price of Serials

Last, annual changes in the ratio values is the third type of ratio calculated here, i.e., in what direction is a specific ratio moving (up or down) through time and is this a reflection of changes in local goals and objectives or unforeseen externalities and pressures? In this report, for each ratio we have calculated the difference between 1995-96 and 1996-97 and sorted Table b for each ratio based on the difference between the value of the ratio in these two consecutive years. For example, Table 12.b reports that the unit price per serial subscription has gone down in 17 ARL libraries (more than the 12 libraries that managed to reduce their unit cost last year, but comparable to the 17 libraries of the year before). Was this a reflection of any local decisions to cancel serial subscriptions with high costs and to increase the number of serial subscriptions with low unit cost? And, since the number of libraries reducing their serial unit costs year after year seems somewhat stable, a question is raised about whether this strategy has approached its limits.

On the other hand, many libraries paid much more per serial subscription in 1996-97 than the year before, despite the fact that they canceled large numbers of serial subscriptions in the meantime. Is this an indication that serial subscription cancellations have taken place based on other criteria, such as the relative importance of some departments to the mission of the university, etc., and as a result of such a decision the unit costs have increased?

In making comparisons *across time* for specific institutions, special care should be given to the fact that organizational data may vary for a multitude of reasons that are not obvious to an observer unfamiliar with the local scene. Before reaching any conclusions, it is essential to follow up with questions to individual institutions and to identify specific circumstances that may have resulted in an apparent change in numbers.

Organization of the Report

The ratios have been organized in three groups. The first group (Ratios 1 through 12) includes the first twelve ratios that report data on internal library operations. Summary statistics on this group of ratios have been reported in the *ARL Statistics* since 1977-78. There are distinct subgroups among these twelve ratios; for example, the first four ratios describe relations between staffing groups (professional, support, and student assistants); another subgroup consists of the ratios reporting percentages from total library expenditures (i.e., library materials, salaries, binding, and operating expenditures).

The second group of ratios (Ratios 13 through 21) report resources per faculty, and the third group of ratios (Ratios 22 through 30) report resources per full-time student.

Interpreting Ratios and Percentages

For a more complete understanding of why a ratio value is trending up or down, it is essential to look at the third table for each ratio, where the actual data are reported. Ratio analysis can be useful in describing general trends, but one should remember that a ratio can increase in two ways — a larger numerator or a smaller denominator — thus, examining the actual data is of paramount importance. Also, we are dealing with only two years of data; trend analysis typically requires more years of data. Gradually, through annual compilations of this report, ARL libraries will be able to build graphs depicting the development of key measures among these thirty ratios.

Caution also needs to be exercised when one is interpreting percentages. For example, a 100% increase may mean that a library has doubled its size in a variable, but this value can reflect quite different numbers. For example, it is one thing if the library bought 10,000 monographs in a given year instead of 5,000 the year before, and quite another if a library bought 60,000 monographs instead of 30,000 the year before. Both cases represent a 100% increase, but obviously quite different circumstances. A case that exemplifies the above point is Harvard University. Table 7.a lists the expenditures for library materials as a percent of total library expenditures. Harvard is listed as the library that spends 24.74% for library materials out of its total budget, the smallest percentage among all ARL libraries. However, Harvard spent by far the largest amount for library materials among all ARL libraries ($17,546,513 in 1996-97).

Ratios are not the only indicators that can be used to describe the condition of research libraries. Techniques such as regression analysis and growth rates can be employed. Factor analysis is another method that ARL has used in developing what is known as the ARL membership index,[20] a summary indicator of the investment made by a university in library resources.

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 29 indicators in the ISO 11620 standard and the 17 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.[21] 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[22] 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?*[23]

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.[24] Preliminary estimates for 1996-97 indicate the figure will be closer to 9% of materials budget expenditures invested in electronic resources. This data on institutional expenditures is being coupled with data on expenditures made by consortia or other units within the parent institution for electronic resources on behalf of the library, in order to develop a better picture of how libraries are funding electronic resources. A next step is to collect data in a consistent manner that describes the resources themselves and to determine methods to collect data on how those resources are used. From those efforts will come designs and models for performance indicators for electronic resources.

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, and *Management Information Systems and Performance Measurement for the Electronic Library: eLib Supporting Studies*, by Peter Brothy and Peter W. Wynne.

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.

And work goes on.

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[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, From Quantity To Quality: Collection, Analysis and Use of Statistics for Libraries, Luxembourg, 9-10 December 1997, can be found at: <http://www.cordis.lu/libraries/en/statwks.html>.

[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*, Rand Corporation. 3 Apr. 1998 <http://www.rand.org/publications/CAE/CAE100/index.html>.

[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] University Corporation for Advanced Internet Development. 21 Sept. 1998 <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] Association of Research Libraries Statistics. 21 Sept. 1998 <http://fisher.lib.Virginia.EDU/newarl/>.

[14] ISO 11620:1998, *Information and Documentation–Library Performance Indicators* (Geneva: International Organization for Standardization, 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.

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