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Editorial

LIS Extends to the Research Frontier

Advancements in research procedures (research designs and methodologies) and in the development of reliability and validity indicators occur on a cross-disciplinary and interdisciplinary basis. Researchers obviously should monitor these developments and, when appropriate, adapt them to their investigations. However, as Jeffrey N. Gatten indicates in a recent C&RL article, "a researcher investigating an interdisciplinary phenomenon...[may approach] the topic from a specific research paradigm rooted in a traditional structure of knowledge. The paradigm may force a particular perspective or approach to conducting research."1

Gatten further observes "that low subject dispersion within the professional literature of library science indicates little effort by librarians at looking towards another discipline...for theory or methodology."2 A number of library science researchers "adopt unsophisticated analytical techniques and utilize limited theoretical frameworks."3 They may depend exclusively on a mailed or hand-distributed questionnaire and either use descriptive statistics, rather than inferential statistics, or forego any statistical analysis.4

Gatten labels library science as an "applied discipline," one that often fails to reference in its literature "relevant research from other disciplines."5 The failure of "paradigmatic structures" to "cross the traditional boundaries of established disciplines...[inhibits] interdisciplinary [and cross-disciplinary] research."6 This editorial does not dispute Gatten's findings, the citation patterns of a number of library and information science (LIS) researchers, or the conclusion that LIS as an "applied discipline appears to be more self-contained" than a "research discipline," such as sociology.7

Nonetheless, LIS can draw (and has done so) on procedures and indicators of reliability and validity developed in disciplines such as anthropology, education, management, psychology, public administration, public policy, and sociology. Periodicals, such as Public Opinion Quarterly, and treatises produced by Sage and other publishers present procedural discussions, assessments, and investigations. In fact, guides, such as the Handbook of Research Design and Social Measurement,8 offer excellent synopses of procedural alternatives and make it more convenient for neophyte researchers to improve the quality and format of their data collection instruments.

Textbooks, monographs, periodicals, and treatises produced outside LIS apparently infrequently (if at all) reference the procedural, reliability, and validity advancements emanating from LIS. In fact, some readers of this editorial may be surprised to learn that there are such advancements. LIS has made a positive contribution to cross-disciplinary and interdisciplinary research relating to bibliometrics, unobtrusive testing, focus group interviewing, and in-person interviewing of ethnic-linguistic gatekeepers,9 to name a few areas. For example, Terence Crowley and Thomas Childers nudged unobtrusive testing in a new direction,10 while Charles R. McClure and I combined unobtrusive testing with an experimental design and applied twenty-five indicators of reliability and validity to our work.11 McClure et al. combined focus group interviewing with a quantitative data collection technique, and included measures of reliabil-
Based on the premise that information is culture specific, Cheryl Metoyer-Duran adapted traditional interviewer training techniques to reveal any non-English language patterns or cultural behaviors that might affect a study’s reliability and validity.\(^{12}\)

With some universities questioning the continuation of LIS schools,\(^{14}\) there is need for the conduct and reporting of more procedural studies and their inclusion in the published literature. LIS research-oriented journals, as well as funding organizations, ought to be supportive of such research.

What else can be done? We might:

- review research-based books produced in other professions and disciplines, noting the omission of important LIS procedural studies and coverage of the types of evaluations encountered in complex organizations, such as libraries and information centers;
- conduct procedural and other types of research with investigators from other professions and disciplines, thereby altering the self-contained paradigm noted by Gatten;
- expect more LIS faculty directing doctoral students, and the students themselves, to be well versed and experienced in the conduct of different types of research and the use of various theoretical frameworks;
- offer special awards and prizes for such research; and
- attend sessions of professional associations in which researchers present procedural studies.

However, implementation of suggestions such as these will have minimal impact as long as many librarians and library school educators demean or ignore the value of the LIS research literature and prize the literatures of other professions and disciplines more than they do their own.\(^{15}\) Clearly, it is imperative to attack the prevailing misperceptions about LIS literature if LIS is to mature as a profession and discipline and if we expect others to use and value our literature.

Mary Jo Lynch issued a challenge: change "the connection between research and librarianship . . . from one that is uneasy to one that is firm."\(^{16}\) To meet the challenge, she stressed that leaders in the field need to pay careful attention to several factors: to the numerous meanings of the word research and the different ways each kind of research affects librarianship; to educational programs that develop an ability to understand and conduct scientific research; to publications and programming that discuss work in progress and disseminate final results; to increasing the availability of funding; and, finally, to the incorporation of a research perspective into the way librarians think about what they do.\(^{17}\)

An added challenge is to focus on the type of research that makes a procedural contribution or gains recognition for LIS in the research methods literatures of other professions and disciplines.

PETER HERNON
Simmons College

REFERENCES AND NOTES

2. Ibid.
3. Ibid.
6. Ibid., p.583
7. Ibid.
9. Gatekeepers help individuals gain access to the resources needed to solve problems; they link people with solutions by serving as information providers and by moving between cultures.
14. See, for instance, Report of the Provost on the School of Library Service at Columbia (New York: Columbia Univ., 1990): "research . . . , in all library schools, is not on a level with university expectations. Even the best library schools, we are told, do not produce much research of real distinction. The lack of a national research capability in the field is widely deplored" (p.20).
17. Ibid.

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WE'RE LEADING THE WAY.
The Evolution of Cooperative Collection Development in Alabama Academic Libraries
Sue O. Medina

The historical poverty of Alabama's academic institutions required bold action if deficiencies in library resources were ever to be overcome. The Network of Alabama Academic Libraries has implemented a successful cooperative collection development program to strengthen resources available for graduate education and research. Recommendations resulting in the establishment of the Network are reviewed along with the conceptional decisions necessary for the implementation of the cooperative collection development program. Program funding, the formula for distribution of funds to disparate institutions, and corollary activities are discussed.

The Network of Alabama Academic Libraries (NAAL) was established in 1984 to coordinate resource sharing among the academic institutions in Alabama that offer graduate education. Its membership includes the state's coordinating body for higher education, the Alabama Commission on Higher Education (ACHE), and nineteen publicly and privately supported academic institutions. In addition, six other research and academic institutions are affiliated with the Network as cooperative members.

NAAL was created as the direct result of a 1983 report that surveyed the condition of Alabama's academic libraries and documented the deficiencies in the collective library resources needed to support graduate education and research. The report recommended a series of actions to overcome deficiencies identified in resources, collections, staffing, facilities, and the application of technology to library functions. Statewide cooperation and the reduction of unnecessary duplication were proposed to ensure more effective utilization of the state's limited financial resources.

Specific recommendations of the study addressed actions that would alleviate current conditions and provide a framework for establishing a resource-sharing network. One of the most important recommendations addressed the need for policies at the state level to ensure that adequate collections would be developed to support any proposed new academic programs. ACHE has responsibility for approving proposed academic programs; but its 1983 criteria did not require an evaluation of available library resources. Thus, the report recommended that:

The Alabama Commission on Higher Education in cooperation with ...[the] network ...[should] develop a reasonable mechanism for reviewing library collection adequacy as part of the process of review and approval of

Sue O. Medina is Director of the Network of Alabama Academic Libraries, Montgomery, Alabama 36104-3584.
new academic programs. This mechanism would ensure that collections adequate to support these programs are in place or will be funded within a minimum of five years from the program's approval.2

If implemented, this recommendation would ensure adequate library resources for new programs in the curriculum. The report also recommended actions to correct deficiencies in the existing collections:

[The network should] initiate a statewide series of coordinated academic library collection analyses to identify the collection strengths and weaknesses of each academic library. The data gathered from these studies will then support the successful implementation of the following actions:

a. Eliminate existing quantitative and qualitative collection deficiencies through a multi-year retrospective collection development program.
b. Continue, and enhance, a selective retrospective conversion project so that awareness of particularly strong collections can be made available to all.
c. Develop guidelines for a statewide academic library shared collection development policy and procedure.3

Access to the collective resources was addressed in a series of recommendations calling for each institution to support membership in OCLC/SOLINET and participate in statewide resource sharing.

In 1983, the Alabama legislature appropriated $580,000 for the NAAL. The Network was formally organized, and a plan of operation was adopted. Initial programs included statewide retrospective conversion and a statewide interlibrary loan program to address issues covered in the recommendations for the Network. Subsequent annual appropriations, reaching $1,085,513 in 1990-91, have enabled the Network to continue these programs and add other activities, such as cooperative collection development and professional development travel grants. Table 1 lists the members, their expenditures for library materials, and monograph volumes held as of September 30, 1989.

Knowledge of specific holdings was a prerequisite to an understanding of strengths and weaknesses of the collections and a necessary foundation for resource sharing. Therefore, the Network set as its first priority the addition of bibliographic records into the OCLC/SOLINET database. State funding for retrospective conversion of print materials began in 1984, and the last record was added in 1990. When the Network began, each institution that was not already a member joined OCLC/SOLINET and began to catalog all current acquisitions into the database. Consequently, the Network was responsible only for retrospective conversion of materials acquired prior to 1984.4

In the statewide resource-sharing program, NAAL members loan materials to other NAAL members on the same basis that they loan them to their own users. All charges, including photocopy costs and fees, are waived. With the assistance of HEA Title II-D, all thirty OCLC libraries in the general and cooperative member institutions received telefacsimile equipment enabling them to transmit all interlibrary loan requests that can be sent via telefacsimile. NAAL pays the basic monthly charges for the telefacsimile telephone line and funds ground-based package delivery via United Parcel Service for sending all other requests. Further, NAAL reimburses institutions for part of the cost for interlibrary loan to help cover photocopying and long-distance telephone charges for telefacsimile.5 This program helps make the collective resources of the institutions more accessible by removing geographical distance as a barrier to use.

ADEQUATE COLLECTIONS TO SUPPORT NEW PROGRAMS

One of the first actions of the new network was to create the Collection Development Committee and to charge it with implementing the recommendations of the report. The Committee’s first responsibility was to work with ACHE to develop a methodology for assessing the adequacy of library collections. ACHE agreed to require the results of an assess-
TABLE 1
NETWORK OF ALABAMA ACADEMIC LIBRARIES

<table>
<thead>
<tr>
<th>Institution</th>
<th>Materials Expenditures ($)</th>
<th>Volumes Held</th>
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<tbody>
<tr>
<td>Alabama A&amp;M University</td>
<td>336,228</td>
<td>223,482</td>
</tr>
<tr>
<td>Alabama State University</td>
<td>274,024</td>
<td>175,429</td>
</tr>
<tr>
<td>Auburn University</td>
<td>3,341,918</td>
<td>1,582,126</td>
</tr>
<tr>
<td>Auburn University at Montgomery</td>
<td>340,352</td>
<td>178,537</td>
</tr>
<tr>
<td>Birmingham Southern College</td>
<td>253,101</td>
<td>155,061</td>
</tr>
<tr>
<td>Jacksonville State University</td>
<td>505,287</td>
<td>484,535</td>
</tr>
<tr>
<td>Livingston University</td>
<td>106,680</td>
<td>96,491</td>
</tr>
<tr>
<td>Samford University</td>
<td>624,054</td>
<td>321,476</td>
</tr>
<tr>
<td>Spring Hill College</td>
<td>123,644</td>
<td>144,299</td>
</tr>
<tr>
<td>Troy State University</td>
<td>378,524</td>
<td>237,560</td>
</tr>
<tr>
<td>Troy State University at Dothan</td>
<td>124,705</td>
<td>73,658</td>
</tr>
<tr>
<td>Tuskegee University</td>
<td>355,786</td>
<td>257,359</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>2,527,176</td>
<td>1,772,934</td>
</tr>
<tr>
<td>University of Alabama at Birmingham</td>
<td>1,699,699</td>
<td>752,705</td>
</tr>
<tr>
<td>University of Alabama in Huntsville</td>
<td>685,101</td>
<td>263,422</td>
</tr>
<tr>
<td>University of Montevallo</td>
<td>184,917</td>
<td>190,212</td>
</tr>
<tr>
<td>University of North Alabama</td>
<td>321,025</td>
<td>201,689</td>
</tr>
<tr>
<td>University of South Alabama</td>
<td>953,603</td>
<td>285,729</td>
</tr>
<tr>
<td>U.S. Sports Academy</td>
<td>17,553</td>
<td>3,115</td>
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* Includes expenditures for library materials in all formats and preservation treatment such as binding

In 1985, the Network prepared guidelines, which were subsequently published, for the preparation of library assessment reports. The Collection Assessment Manual drew heavily on existing professional methodologies and on emerging strategies being developed for the Research Libraries Group (RLG) Conspectus. A series of workshops trained librarians in the specific evaluation techniques described in the Manual and in the preparation of the report for ACHE. Using the Manual for new program review provided the Network with an excellent test. In addition to the scheduled workshops, the Network office offered on-site training as well as assistance in interpreting data. Over the course of several years, the library faculty in all the institutions became familiar with the methodology and the report format. The assessment methodology described in the Manual could be applied consistently, the amount of work required was acceptable to the institutions, and the resulting report provided appropriate information to guide collection develop-
ment. As a result, the Manual could be used by NAAL for a statewide collection development program.

**COOPERATIVE COLLECTION DEVELOPMENT**

The Collection Development Committee was also charged with developing Network guidelines for a statewide cooperative collection development program. Use of the methodology by ACHE had demonstrated that the assessment report would provide appropriate data on the following factors:

a. strength of each collection in relation to available materials;
b. strength of each collection in relation to other collections on the same subject;
c. deficiencies and gaps in coverage within each subject collection;
d. deficiencies and gaps in coverage within the statewide resources;
e. current and anticipated demands of the graduate program supported by the collection;
f. unique collections and resources;
g. institutional resources available to maintain and strengthen the collection.

Many other issues related to the statewide program had to be addressed, and the committee engaged in careful deliberation to resolve these before NAAL actually began funding collection development. First, NAAL required each member to complete conversion of its records for monographs and serials before it would be eligible for funding for collection development. This allowed the Network to implement collection development on a small scale, test its policies, and make necessary changes before all nineteen members were affected by the policies governing this facet of NAAL’s activities.

Members of NAAL range from comprehensive universities offering a variety of doctoral degree and postdoctoral research programs to small liberal arts colleges offering only one master’s degree program. NAAL had to be flexible in meeting these disparate needs. The Network recognized not only the necessity of correcting existing collection deficiencies in the individual NAAL libraries but also the need to acquire research materials for Alabama that would lie beyond the capability of any one institution. Therefore, an early premise was that at some future time, the collection development program would support two activities:

a. Instructional Support—collection development at the master’s degree program level (RLG Level 3); and
b. Research Support—collection enhancement at the doctoral degree and research level (RLG Level 4).

The Network focused on implementing the instructional support activities first.

**INSTRUCTIONAL SUPPORT**

One of the most important debates centered on selecting subject areas that would receive NAAL funding assistance. One proposal was that NAAL identify a few academic programs, perhaps five, with special significance in terms of statewide economic development. NAAL would then fund acquisitions in these subjects for those institutions offering graduate education in those fields. Once adequacy was reached in one area, another program would be addressed. No time frame for concentrated support for each program was offered, but it was thought that this would ensure the development of adequate research collections in these subjects. Opponents argued that this approach would result in “spires of excellence on a swamp of mediocrity,” and, unless the institutions could guarantee a higher level of continuing financial support, the adequacy of the selected collections would erode once NAAL support ended. After much discussion, the Committee agreed that the local institution should select the subjects needing external assistance. Rather than selecting a few subjects for special emphasis at chosen libraries, the Network would ensure that each member would receive some funds to enhance the collection of its choice.

It was also agreed that subjects receiving NAAL assistance would have to be
linked directly to viable existing graduate education programs. Since ACHE required institutions to commit funding for adequate library resources as part of the approval of new programs, NAAL funds could not be used to develop collections for proposed or recently approved programs. Only academic programs already in the ACHE Inventory of Academic Programs would be eligible for assistance. The institutions would be required to submit information about the number of teaching faculty, number of enrolled graduate students, and number of conferred graduate degrees for each of the last three academic years. This would ensure that the programs were viable and that students and faculty would use the information resources obtained with NAAL funds.

The Network recognized... the need to acquire research materials for Alabama that would lie beyond the capability of any one institution.

Some discussion focused on the actual ownership of materials acquired with NAAL assistance. It was agreed that these items would be the physical property of the institution but would be available to all members through interlibrary loan. Further, to help ensure timely access, the institution would add the bibliographic records to the OCLC/SOLINET database within one year of the acquisition. In the case of major microform sets, the Network required only the record of the set, not the analytics for each title in the set.

The Network readily agreed that NAAL funding could not substitute for local funding. This simple assumption ultimately led to a more detailed policy requiring that institutions maintain their level of library funding in order to be eligible for NAAL funding in all areas, collection development as well as retrospective conversion, interlibrary loan, and professional development.

Over time, questions were raised about the kinds of materials that could be acquired with NAAL funds. The Network readily agreed that unnecessary duplication should be avoided. However, if duplication of materials would relieve an interlibrary loan burden, then duplication with another institution's holdings would be allowed. An institution could not, however, use NAAL funds to acquire duplicate copies of materials it already held or to replace lost or mutilated materials. Because serials subscriptions represent a long-term financial commitment, NAAL funds could not be used to enter a new subscription. The Network agreed that backfiles of serials for which the institution maintained a current subscription could be acquired if they reduced the burden of interlibrary loan. The Network initially allowed the acquisition of music recordings to accompany scores or to demonstrate a performance, but later approved only the acquisition of print materials when faculty began to pressure librarians to acquire multimedia materials intended primarily for classroom instruction. Microform materials, while not encouraged, were considered print surrogates and were acceptable acquisitions.

Finally, the Network required each institution to present an institutional plan for collection development detailing specific actions to correct the deficiencies identified in the assessment. Occasional problems have arisen when faculty felt a NAAL allocation should be used to support current acquisitions for their personal research interests. The Network requires that librarians with responsibility for collection development in the subject being addressed control expenditures made from NAAL funds. To review the results of NAAL funding, the Network requires an extensive end-of-project report at the completion of the second year following the award of funds. This report is a full assessment, including the librarian's judgment of the beginning and existing collection level and the current collecting intensity maintained by the institution. An important use of the end-of-project report is the assurance it provides auditors that NAAL funds were spent in accordance with the insti-
tutional plan approved by the Network. Thus, control of these expenditures remains with the library and with librarians who work within the statewide philosophy of NAAL.

Two institutions completed retrospective conversion and began NAAL-funded collection development activity in fiscal year 1985-1986. Funding available for collection development was $43,000, and it was used in three subject areas: public administration, eighteenth-century literature, and biomedical engineering. The next year, six institutions began collection development, and nearly $136,000 was available for twelve subjects. As more institutions began this activity, the collection development guidelines were adjusted to correct procedural problems. Most importantly, discussion centered on the development of a new formula for the distribution of NAAL funds.

**FUNDING COLLECTION DEVELOPMENT**

When the first priority for the Network was retrospective conversion, NAAL funds were allocated to each member on the basis of the number of volumes held when the Network began. This number ensured that each institution would receive full funding computed on the per-unit price for cataloging its retrospective records.

The retrospective conversion formula, based on the historical size of collections, provided the most money to the institution with the largest collection. For collection development, the Network sought to provide an incentive to improve institutional funding for current acquisitions. Therefore, the new formula recognized current effort rather than historical effort. Two elements decide the division of funds: expenditures for library materials and volumes added. By using expenditures as one factor, the formula recognizes the enormous cost of serials that contribute only a limited number of volumes to the volume-added factor. Volumes added recognizes innovative collection building, such as friends-controlled endowments in which the funds are not included in the library budget or aggressive gift campaigns that result in substantial gifts to the libraries. In addition, some libraries participate in the Library of Congress gift and exchange program and, accordingly, add a significant number of materials to their collections from this source. Finally, several of the newer institutions have acquired collections from closed liberal arts colleges and are adding these volumes at a very reasonable per-volume price. These materials add a retrospective depth to the liberal arts collections of institutions established in the early 1960s. The formula recognizes these practices.

During deliberations for the new formula, the Network also examined its maintenance of effort policy. The Network realized that if NAAL funding increased substantially, no provisions had been made to encourage an institution to increase its funding for resources. The policy merely required an institution to maintain level funding for the library. Thus, the new formula included a provision that NAAL funds could not exceed 25 percent of an institution's expenditure for library materials, thus capping the amount of funds an institution could receive. The new formula also included funding for research support by setting aside 20 percent of the collection development funds for this purpose.

Implementing the new formula would result in a substantial change in grants to individual institutions. To phase in the new formula, the Network approved a two-year transition period during which each institution received a base of $7,500; the remainder of the funds was allocated according to percentages derived from expenditures for library materials and volumes added. This ensured that no institution would suffer a sudden decrease in its allocation from NAAL. The base will be phased out by 1993-94. At that time, the 25 percent cap on NAAL funding will also be reduced to 15 percent (see appendix A).

In 1990-91, the Network allocated $835,014 to the Cooperative Collection Development Program. Of these funds,
80 percent are used for instructional support. The percentage of funds that each institution received was calculated using annual statistical report data submitted by each institution to the NAAL office. The largest grant made was for $140,610 for a library expending $3,341,918 on materials and adding 65,205 volumes. The smallest grant was for $4,388 and was limited by the 25 percent cap. These funds are paid quarterly to the institutions. The remaining 20 percent is used for research support awards, and these grants are paid in one payment.

The depth and breadth of library resources available to the state’s students, faculty, and other researchers have improved.

An analysis of subjects selected for instructional support since the collection development program began in 1985 indicates that acquisitions represent a wide spectrum of knowledge. Fears that NAAL funding would be used in a narrow range of subjects were unfounded (see graph 1). Institutions that are members of the Association of Southeastern Research Libraries have concentrated their funds in literature (emphasizing international literature) and science and technology (see graph 2). The regional public institutions’ historical role as teacher-training schools is readily apparent in the 1985–91 expenditures for acquisitions supporting teacher education (see graph 3). The graph for the private schools is skewed by Tuskegee University, one of the first NAAL members to begin collection development, which has used its allocations in support of allied health and food science collections (see graph 4).

RESEARCH SUPPORT

The research support awards were designed as competitive grants to add new material to the aggregate of the NAAL holdings. It was anticipated that institutions would submit proposals to acquire expensive, highly specialized materials unique to the statewide resources. The projects would not represent local collection-building activities, as is the case with instructional support, but would support a research effort within the state or the institution. Acquisitions could only be made in support of RLG level-four or five collecting intensity. In 1989–90, the first competitive awards were approved. Eight proposals were submitted by six institutions. Three were eliminated from consideration as not meeting the research support guidelines. The remaining five proposals exceeded the amount of funds available, and the Network had to decide whether to fund all five partially or to rank and fund the proposals until the funds were exhausted. The latter option was selected. Therefore, full funding was given to three proposals: Afro-American literature ($31,648 to Tuskegee University), eighteenth-century literature ($69,179 to the Mervyn H. Sterne Library of the University of Alabama at Birmingham), and music ($27,938 to the University of Alabama). One submitting institution agreed to accept partial funding for the acquisitions of U.S. patent literature ($44,876 to Auburn University) to support engineering resources in the state. One proposal in U.S. history, while meeting the criteria, was ranked lowest in priority and could not be funded.

The Collection Development Committee expressed concern that, with one exception, acquisitions funded through research support awards were for materials in microform. The time it takes to receive proposals, consider them in committee, and approve them in the executive council makes it difficult to use the funds for out-of-print or rare materials subject to prior sale. The Committee recognizes the problem and hopes that these grants will be used for acquisitions other than large microform sets.

The research support awards represented a significant departure for NAAL. Until these grants were made, each member benefitted directly from every NAAL program. Every NAAL institution received money for retrospective conversion; every member receives funds to support resource sharing, professional
GRAPH 1

NAAL 1985 - 1991

- 2.3% OTHER
- 16.2% TEACHER EDUCATION
- 19.5% SCIENCE/TECH
- 18.9% LITERATURE
- 11.4% SOCIAL SCIENCE
- 9.1% ART
- 13.1% BUSINESS
- 9.5% MED/ALLIED HEALTH

GRAPH 2

ASERL 1985 - 1991

- 2.1% OTHER
- 23.1% SCIENCE/TECH
- 26.6% LITERATURE
- 15.5% SOCIAL SCIENCE
- 5.7% BUSINESS
- 12.0% MED/ALLIED HEALTH
- 15.0% ART
development, and collection development. While the funds are not equally divided, they are equitably distributed, based on the level of contribution made by the institution to the statewide resources. Research support, while nominally open to any NAAL member, cannot be distributed equally or equitably because not all institutions engage in level-four collecting.

Another function of the education collection analysis was to determine if machine-readable records could assist in collection analysis.

However, Alabama needs to strengthen collections at a higher level than that required to support undergraduate and master's degrees. Institutions are not funded adequately to support the resources needed by their undergraduate and graduate students. NAAL funding for instructional support assists every institution to meet its instructional mission for graduate education. Research support recognizes the obligation of the state to support a higher level of collecting intensity within the total resources available statewide.

COROLLARY COLLECTION DEVELOPMENT ACTIVITIES

The NAAL Cooperative Collection Development Program is not limited to the grant program. A number of other projects have been undertaken to provide better collection management information.

In 1989, the Network completed a computer-generated analysis of its collective holdings classified in the field of education. When NAAL was founded, the question of duplication was repeatedly raised: What level of duplication was being supported by the state? Could unnecessary duplication be eliminated?

Teacher education programs are the most numerous offered by NAAL members because every NAAL member offers at least one graduate degree in this field. Additionally, many students attend graduate-level courses to meet the requirements for ongoing teacher certification. Consequently, the Network hypothesized that the level of duplication was potentially highest in materials classified in education.

All members were asked to complete retrospective conversion of their education holdings first. These machine-readable records were extracted from the OCLC/SOLINET database and analyzed for duplication. The study found that 51 percent of the titles were unique; that is, held by only one NAAL library. Overall, the rate of duplication was an average of only 2.6 volumes for each title. The Network concluded that this was a very low rate of duplication for a field with such a high level of productivity. Collectively, Alabama academic institutions do not acquire a sufficient number of replicated current materials for duplication at the instructional level to be a primary concern of the Network.8

Another function of the education collection analysis was to determine if machine-readable records could assist in collection analysis. For the education project, the cost and time outweighed the advantages of computerized analysis. Another approach was explored with EBSCO, Inc., a serials jobber, to determine if its records could provide meaningful data on deficiencies in serials collections. The Network hypothesized that the EBSCO current serials subscriptions database could be used to identify gaps in coverage for major indexing and abstracting services. It might be possible to identify serial titles needed to complete coverage and then use NAAL funds to acquire these titles so that all the titles would be available within the state.

EBSCO undertook extensive programming to allow its data to provide an exceptions list. The Education Index was used for the test because the NAAL office had manually compiled statewide holdings for this index. Unfortunately, the variations in fund accounting at the institution level made it impossible for EBSCO to compile an accurate record of the exceptions. In addition, a number of...
libraries will pay for an employee’s association membership, provided that person donates his or her serial subscription to the library. These serials do not appear in the database as current subscriptions. Both NAAL and EBSCO believed that this technique had merit and that it was unfortunate that the data were not available in the database.

Meaningful statewide collection development in Alabama must consider the large volume of material held in microform. Most large microform sets are not cataloged to the individual title level; NAAL is fortunate if the institution has the record for the set in the database. To incorporate these materials into planning for collection development, NAAL developed its Alabama Microform Project. The Network publishes Major Microform Sets Held in Alabama Libraries to identify sets held in Alabama and the indexes or other guides that make the sets more accessible. The Network used the first edition of the union list to acquire 250,553 set holding symbol displays on OCLC for 130,000 individual records in twenty-five sets owned by NAAL libraries for which machine-readable records were available. Each NAAL member agrees to lend its microform materials, in original or surrogate format, to other NAAL members to improve accessibility to these expensive materials. Auburn University used the Alabama Microform Project as part of its justification for HEA Title II-D funding to catalog two sets, Confederate Imprints and French Revolutionary Pamphlets, into OCLC/SOLINET. Set holding symbol displays will be acquired for other NAAL members owning these sets when the cataloging has been completed. NAAL will continue to acquire set holding symbol displays as they become available and plans to catalog analytics as funds permit.

CONCLUSIONS

The Network of Alabama Academic Libraries Cooperative Collection Development Program has provided very tangible benefits for the state of Alabama. First, and most obvious, it provides funds to increase the rate of acquisitions in selected academic programs. Students and faculty in these programs benefit by having needed research materials readily available. Strengthening an institution’s collection also strengthens its contribution to the statewide resources. The depth and breadth of library resources available to the state’s students, faculty, and other researchers have improved.

The librarians who participate in the NAAL Collection Development Committee have gained a wealth of knowledge related to planning for collection development.

Second, the Network has enhanced the skills of librarians responsible for collection development. The librarians who participate in the NAAL Collection Development Committee have gained a wealth of knowledge related to planning for collection development. They have analyzed the most pressing issues facing libraries and collecting policies. They have a better perspective of collections, based on their knowledge of shared resources and access. The librarians who prepare collection development proposals have markedly improved collection evaluation skills. They are better able to analyze their current collections, develop plans to correct deficiencies, provide cost data for implementation, and justify a proposal’s need to the Committee and to their own administrations. As a result, Alabama is well served by a cadre of skilled collection development librarians, the peers of any such group in the nation.

Third, NAAL provides a degree of protection against the erosion of institutional support for libraries. The maintenance of effort policy requires an institution to maintain level funding for its library to be eligible for NAAL funding. Teaching faculty working with librarians to assess collections become proponents for increased funding when they discover the inadequacies of collections in their disciplines. These allies are important where competition for institutional funds is strong.
The Network of Alabama Academic Libraries has made substantial progress in implementing a statewide cooperative collection development program that addresses the concerns raised in the 1983 study *Cooperative Library Resource Sharing among Institutions Offering Graduate Education*. The study broadly outlined what was needed to improve library resources and services supporting graduate education and research in Alabama. The mechanics to achieve these improvements were left to the librarians. They have worked diligently to mold an effective program that works in a state with a long history of library neglect.

**REFERENCES AND NOTES**

2. Ibid., p.47.
3. Ibid., p. 46-47.
4. In 1984, the Network funded retrospective conversion at $400,000 and used a unit price of $1.27 per record. The maximum funding in any year was $900,000, with a unit price of $1.16 per record. This initial project added records for print monographs and serials only. Other projects continue to add records for microforms, government publications, and materials in other formats.
5. In 1990–91, NAAL allocated $140,500 for the Resource Sharing Program. This includes $50,000 to reimburse institutions for interlibrary loan services, a $35,000 Libraries Services and Construction Act, Title III grant to reimburse NAAL for net lending to public libraries, $35,000 for UPS, $4,500 for telefacsimile equipment maintenance contracts, and $16,000 for monthly telephone lines for telefacsimile. Total interlibrary loan transactions for NAAL have grown from 9,401 in 1985–86 to 33,827 in 1989–90.
APPENDIX A

THE FORMULA FOR DISTRIBUTION OF NAAL FUNDS FOR COLLECTION DEVELOPMENT

NAAL will allocate 80% of the funds available for collection development to Instructional Support. Twenty percent (20%) of the available funds will be allocated to Research Support.

The NAAL formula for the distribution of instructional support funds will:
1. allocate a base amount for each institution;
2. use the number of volumes added annually by each institution expressed as a percentage of the total added for all institutions;
3. use the annual expenditures for library materials of each institution expressed as a percentage of the total expended by all institutions;

\[
\frac{V}{TV} + \frac{E}{TE} = P
\]

\( V \) = volumes added by "N" institution
\( TV \) = volumes added by NAAL members
\( E \) = expenditures for library materials by "N" institution
\( TE \) = expenditures for library materials by all NAAL members
\( P \) = percentage allocated to "N" institution

and

4. allocate an amount of NAAL funds that does not exceed 25% of the institution’s expenditure for library materials.

The source of data for the formula will be the annual statistical reports submitted by each institution.


† In addition, the percentage of NAAL funds in relation to the institution’s expenditure for library materials will be reduced until it reaches 15% by 1993-1994:

<table>
<thead>
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<th>Fiscal Year</th>
<th>Base</th>
<th>%</th>
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<tr>
<td>1992-1993</td>
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Science Literacy: A Discussion and an Information-based Definition
Gregg Sapp

Recently, science literacy has been the subject of much discussion in both the scholarly and popular press. The concept of science literacy encompasses two distinct but related dimensions: the first being concerns for the quality of scientific and technical education that American students receive at all levels, and the second being deficiencies and misconceptions that exist in the overall public understanding of science. Several definitions of science literacy identify the ability to find and to use appropriate information as being a fundamental characteristic of a scientifically literate individual. Building upon this idea, this article suggests that librarians—information experts—could play a significant role in the promotion of science literacy and recommends ways by which this might be accomplished.

Recently, critics in the popular, professional, and scholarly press alike have expressed concern regarding America's lack of "science literacy." Poor science literacy begins with the science education that children receive in grade school, then continues into college, where decreasing numbers of students choose to seek degrees in science and engineering (S/E), and finally results in an adult public that lacks a basic understanding of the science and technology that affects them daily as citizens and consumers. The need to improve America's science literacy has been cited by some as critical for a modern, democratic nation that wishes to remain economically competitive in a high-tech world.1 While the popular press has put science literacy in the news, and while it has also been studied and editorialized in the literature of various academic disciplines, scarcely a footnote has appeared in recent library literature.

This article reviews and describes the current crisis in science literacy and formulates an information-based definition of the term. In a very real sense, science is a process of information discovery, dissemination, application (or analysis), and retrieval. A person cannot be scientifically literate and informationally illiterate. All of this suggests that librarians—information experts—could have a vital role in the promotion of science literacy in America.

DIMENSIONS OF SCIENCE LITERACY

Science literacy has two distinct dimensions. The first relates to education, in which the concern is that U.S. students at all levels are comparatively deficient in the sciences to students in other countries. In his 1990 state of the union address, President George Bush optimistically proclaimed his goal that "by the year 2000, U.S. students must be first in the world in math and science achievement."2 Before this objective can be real-

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ized, however, some startling trends must be reversed. The entrenched problems in science education were the subject of a recent Newsweek feature, which asserted that "American science education serves not to nurture children's natural curiosity but to extinguish it with catalogs of dreary facts and terms." A 1988 report comparing science achievement in seventeen countries ranked the United States near the foot of the class in five out of five age groups, consistently behind such countries as Japan, Sweden, Singapore, Hungary, Australia, and Poland. Another area of particular concern is the dearth of American women and minorities in S/E. These groups consistently score below white males on SAT scores in technical sections and are approximately half as likely to seek a baccalaureate degree in S/E.

The number of college students majoring in S/E has been on the decline. Between 1966 and 1988, the percentage of college freshmen intending to major in mathematics dropped by half, from 12 percent to 6 percent. In 1986, just 24 percent of entering freshmen declared their intention to major in S/E, down 3 percent from 1978, and fewer than half of these successfully complete a B.S. degree (the defection rate in physics, for example, is 40 percent). Some educators refer to a science "pipeline," which is broad at the top, where students enter the educational system, but which narrows over the years as students abandon science studies, then finally chokes off to a mere trickle at more advanced levels of accomplishment. In all, of the four million high school sophomores who entered the pipeline in 1977, just 9,700 (0.2 percent) have earned or will have earned by the year 1992 a Ph.D. in a scientific or technical field.

Evidence shows that the numbers of students making it through the pipeline during this period may not be sufficient to meet projected industry demand. Currently, U.S. industry depends on new S/E graduates to fill 45 percent of vacant positions. This dependency is likely to increase because of a "graying" of those employed in S/E. In 1987, 34 percent of all professional scientists and 41 percent of engineers were over fifty years old. Privately employed scientists and engineers are generally younger than those in academe. Women and minorities are underrepresented in the work force, as they are in undergraduate programs. Approximately 13 percent of the S/E work force are women, and just 2 percent are black.

The second dimension of science literacy reflects the problems that occur when scientifically undereducated children become adults. The American public's understanding of science has been characterized as "deplorably low" by the director of the Public Opinions Laboratory at Northern Illinois University, Jon D. Miller, who has conducted the most thorough surveys of the science literacy of adult Americans. Miller conducted his first survey, commissioned by the National Science Foundation, in 1979. Since that time, there has been little overall improvement. For example, in 1979 Miller found that about 22 percent of adult Americans knew what DNA is; a subsequent survey in 1987 found that 16 percent did. Only 45 percent of Americans today know that the Earth revolves around the sun; fewer than half of the population believe in evolution. Further, the pseudosciences are more popular than ever: 39 percent of Americans would characterize astrology as a science. Finally, the image of scientists themselves is somewhat tainted: 53 percent of Americans believe that, because of their esoteric knowledge, scientists possess "dangerous powers." In his analysis of these figures, Miller estimates that a mere 5 percent of the adult American population are science literate, which he defines as those people "possessing a reasonable vocabulary of scientific and technical terms." Even if reforms are made in American education and President Bush's goal is
realized by the year 2000, the beneficiaries of these reforms will not become decision makers for another ten to twenty years. Is the country fated to have a scientifically illiterate population until these generations mature? In recent years, scientists from various disciplines have called for active and organized efforts to promote science education and public understanding of science. Increasingly, scientists are speaking to the public, appearing in the media, and writing for general readers. Additionally, new programs to foster an awareness and appreciation of science have been designed by various institutions and scientific organizations. The message in these efforts is that science literacy is a national priority. Librarians can play a role in promoting science education and literacy. Miller, along with co-authors Robert Suchner and Alan Voelker, notes in the book *Citizenship in an Age of Science* that a pattern of regular information acquisition is essential for developing and maintaining science literacy. Librarians should strive to provide the bibliographic and reference services by which clients can keep up with important scientific developments and make sense of the big picture.

**A BRIEF HISTORY OF SCIENCE LITERACY**

In the early seventeenth century, any educated person could keep up with and comprehend virtually all published scientific treatises of the era. The full range of science was generically called "natural science," and it subsumed all disciplines and specialties. By the turn of the century, however, several trends and developments had begun to erode the inclusiveness of this monolithic natural science. As a result of these developments, which have continued to this day and are at the root of contemporary deficiencies in science literacy, scientists began to work and communicate in specialized arenas that are less and less approachable to the general public.

In his three-volume classic on the history of science, René Taton writes of the seventeenth-century revolution: "In less than a century—from William Gilbert's *De Magnete* to Sir Isaac Newton's *Principia*—the face of science had changed almost beyond recognition." This century included such giants of science as Johann Kepler, Galileo, René Descartes, Francis Bacon, and Newton, whose various works challenged the authority of many ideas that had gone unquestioned since the Greeks. By questioning, these scientists encouraged the development of what is now called the "scientific method." Another factor that contributed to this revolution in science was the development of new technologies, such as the telescope, pioneered by Galileo, and the microscope, by Anthony van Leeuwenhoek. Finally, advances in mathematics, especially Newton's calculus, were leading increasingly and inevitably toward its adoption as the "language" of science. Galileo proclaimed, "Nature is written in mathematical language." All of these developments created barriers between science and public understanding. In Newton's lifetime, popularized accounts of his theories were created for those who could not understand the original work.

Librarians should strive to provide the bibliographic and reference services by which clients can keep up with important scientific developments.

With specialization, communication among scientists became much more of an esoteric process. Professional scientific societies were established, and, in them, scientists could meet and discuss issues with their elite circle of peers. The British Royal Society, for example, was founded in 1660. The scientific journal—a format designed for currency and specialization—emerged as the primary vehicle for conveying the results of new research. Within these journals, such as the Royal Society's *Philosophical Transactions* (1665), writing was technical, often mathematical, and aimed at an audience of specialists, rather than a general, educated public. The increasing numbers of journals published paralleled increases
in the research being done, a harbinger of today’s “information explosion.” In the early eighteenth century, in order to assist scientists in their efforts to keep up with the literature, the first indexes and review publications appeared.22

Still, throughout the eighteenth and into the nineteenth century, much science remained intelligible to lay people. Charles Darwin, for instance, wrote *On the Origin of Species* with the intent that it should be read by biologists and non-biologists alike.23 The early eighteenth century was an era when armchair scientists still made major contributions in observational sciences, such as biology and earth sciences, but had for the most part abandoned laboratory sciences such as physics and chemistry.24 Thus, popularizers appeared, such as Mary Somerville, who wrote the widely read *On the Connection of the Physical Sciences* (1846).25 Further, several scientists were themselves active popularizers. Michael Faraday, for example, performed a series of public lectures titled “The Chemistry of the Candle.”26

In America, where, by the mid-nineteenth century, there had developed a strong sense of science nationalism, science was viewed as being synonymous with progress. In the interest of furthering progress, efforts to popularize science were launched in order to debunk the misconceptions and superstitions that impeded it.27 The venerable *Scientific American* was first published in 1845. In contrast to this magazine, in which the contributors were themselves scientists or technical specialists, much popularization was done by journalists, educators, and civic leaders who lacked any detailed background in science. This phenomenon is the subject of John Burnham’s study *How Superstition Won and Science Lost*, in which he argues that, as science popularization drifted into the domain of these nonspecialists, the forces of “dilution” and “trivialization” undermined the original intent of popularization—to correct superstition.28

In the twentieth century, science popularization was conveyed in an ever-increasing variety of popular media. The first specialist science correspondents appeared in the 1920s and 1930s. Marcel LaFollette’s *Making Science Our Own* describes in detail the content of science features published in general interest magazines and, in doing so, demonstrates how many contemporary images of science were formed.29 Science fiction emerged as a distinct genre and, in part because of its voracious popularity and in part because of the lack of information from more informed sources, contributed to the public’s perception of what modern science could and could not do.30 Technology created numerous new vehicles for popularization, such as radio, motion pictures, and, later, television.

The public regards scientists as a group of latter-day Sadducean priests endowed with esoteric knowledge and decision-making authority.

In the immediate post–World War II era, the new science of nuclear physics, which abundantly displayed its potency at Hiroshima, stimulated a broad, media-based wave of popularization. Many of the popular images of science contained contradictions. On the one hand, the accomplishments of the Manhattan Project were depicted as a heroic triumph, which led not only to the end of the war, but also opened the door to the utopian technology of atomic power. On the other hand, the image of scientists suffered from the public’s perception that, by having meddled in the affairs of God, they had unleashed a horrible force upon the world.31 The persisting popular image of Albert Einstein displayed this paradox: he was at once widely admired for his genius and simultaneously incorrectly faulted for having unwittingly set into motion the chain of events that led to the bomb.32 The time lent itself to wild speculation and fears, and these were expressed in all varieties of popular media.

In *The New Priesthood* (1965), Ralph Lapp identified, for perhaps the first time, the potential danger to American democracy of a situation in which the
general public lacks a basic understanding of science. The public regards scientists as a group of latter-day Sadduceean priests endowed with esoteric knowledge and decision-making authority. Lapp addressed perceived conditions in an era when, despite the Sputnik-inspired national crusade to train competitive scientists and to reassert America’s scientific ascendancy, the general public’s knowledge of science was lacking.

Librarians can significantly influence America’s crusade to improve science education.

More recently, the commercial enterprise of science popularization has seen some ups and downs. The apex of the “boom” cycle might have been in the late 1970s and early 1980s with the inception of twenty new general science magazines (including such titles as Omni, Discover, Science 80, and a revamped Science Digest), seventeen new television shows (including “Nova,” “Omni,” “Walter Cronkite’s Universe,” and such PBS specials as “Cosmos” and “The Ascent of Man”), and more than sixty newspaper sections dedicated to popular science. A Time magazine cover story on Cosmos creator Carl Sagan declared that “ennui” about popular science “has turned into enthusiasm.” Former Fermilab director Robert Wilson called popularizations the “new literature of science” that would integrate a “technology of humanism into a common culture.” Some of these ventures were short-lived—Walter Cronkite’s Universe” and Science 86 both folded in 1986—because of market saturation and lack of advertising revenue. Nevertheless, if science popularization did not emerge as a blockbuster industry, it did prove that it can attract and sustain an audience.

Recognizing how science is perceived by the general public is essential for understanding why America’s science literacy is low and why so many students eschew science studies. The general public acquires meaningful information (or misinformation) about science through various media. Invariably, whenever professional scientists speak of the need to improve science literacy, they call for increased and better popularization. Thus, America’s science literacy can only be as good as the quality of the information that is available and the means by which it is sought and used. This idea lends itself to an information-based definition of science literacy.

Science literacy is built on a foundation of information; it is the result of successful, specialized information-seeking behavior. While many definitions are lengthy and multifaceted, this brief definition may serve for the present purpose: Science literacy is an active understanding of scientific methods and of the social and economic roles of science as they are conveyed through various media and is thus built on an ability to acquire, update, and use relevant information about science.

DEFINITIONS OF SCIENCE LITERACY

Science literacy is much less a measurement of technical knowledge than of science awareness. A person can know virtually nothing about quantum physics and still be scientifically literate. Some basic knowledge of fundamental scientific and technical concepts is characteristic of the scientifically literate person, but more vital is an awareness of how science affects our lives, an understanding of scientific methodology, and an ability to obtain and use information about science. Literacy, in this sense, does not mean the ability to read scientific jargon or mathematical notation, but rather means an ability to “follow scientists and engineers through society”; i.e., to perceive how technology affects us individually and societally. Science literacy also has an essentially participative and democratic aspect. Historian of science Michael Shortland writes, “In a word, to become scientifically literate is to become an active and effective citizen.”

Science literacy can be best defined by the attributes and attitudes of those who possess it. It is cultivated rather than learned. Shortland cites the following as
“components” of science literacy:

• An appreciation of the nature and aims of science and technology, including their historical origins and the epistemological and practical values which they embody.

• A knowledge of the way in which science and technology actually work, including the funding of research, the conventions of scientific practice, and the application of new discoveries.

• A basic grasp of how to interpret numerical data, especially relating to probability and statistics.

• A general grounding in selected areas of science, including a number of key interdisciplinary areas.

• An appreciation of the interrelationships between science, technology and society, including the role of scientists and technicians as experts in society.

• An ability to update and acquire new scientific information in the future.40

A similar, multifaceted definition of science literacy appeared in a 1983 Daedalus article by A. B. Arons.41 Because the word “literacy” can incorrectly imply an ability to read technical literature, the term has been challenged. Kenneth Prewitt, president of the Social Sciences Research Council, prefers the term “science savvy,” and writes of it:

“My understanding of the scientifically savvy citizen is a person who understands how science and technology impinge upon public lives. Although this understanding would be enriched by substantive knowledge of science, it is not coterminous with it.”42

Miller describes science literacy as occurring within an “attentive public,” a “self-selected group that has a high level of interest in, and a functional knowledge about, a given issue area.”43 The accompanying model, originally developed by G. A. Almond in 1950, depicts a stratified pyramid wherein the attentive public, which in this case is the scientific literate, occupies a block near the top of the pyramid, just below the decision makers and the policy leaders.44 A basic characteristic of the attentive public is its desire to seek information. Conversely, the nonattentive public, which in this case is the scientific illiterate, resides in the wide bottom half of the pyramid and is characterized as being either unwilling or unable to remain informed about issues and new developments.

Among the attentive public, Almond further distinguishes between those who are mobilized, who go beyond information seeking and attempt to influence policy, and the nonmobilized. The mobilized faction has characteristics of a group that British science policy analyst Maurice Goldsmith calls “science critics.”45 These laypersons rely on various media to follow the progress of science and, by virtue of their informed understanding of science and public policy, function as critics of modern science in a manner analogous to literary critics. Goldsmith sees these critics as being instrumental in shaping public understanding and appreciation of science. A society without individuals capable of playing this role is unlikely to initiate educational reforms or to improve overall science literacy.

Finally, scientific information must be accessible and comprehensible in order to be useful. Science popularization has been suggested as a means by which to accomplish science literacy. In his book Innumeracy, John Allen Paulos, lamenting the widespread mathematical illiteracy in America, suggests that mathematicians have a responsibility to popularize. He writes: “Mathematicians who don’t deign to communicate their subject to a wider audience are a little like multimillionaires who don’t contribute anything to charity.”46 Scientists are beginning to adopt this attitude. Several world-class scientists—including Stephen Hawking, Roger Penrose, Stephen Jay Gould, Steven Weinberg, Heinz Pagels, Richard Feynman, Freeman Dyson, Jane Goodall, Douglas Hofstadter, and Paul Davies—have all written technical books for general readers. Sigma Xi, the honorary scientific society, held an international symposium in 1988 on the subject of how scientists can work to improve public understanding of S/E.47 In recent years, editorials supporting popularization have appeared in American Scientist, Environmental Scien-
ence and Technology, Chemical and Engineering News, and American Journal of Physics. Increasingly, the scientific community is seeking to demystify science.

LIBRARY ISSUES AND CONCERNS

If information supplies the necessary infrastructure of science literacy, then, clearly, librarians, as information experts and gatekeepers, can significantly influence America's crusade to improve science education and to enhance the overall public understanding of science. In one of the few recent library articles on this subject, Beth Clewis writes:

Scientific literacy research offers an opportunity for librarians to collect data of use and interest to other fields, especially communications and education. At its most ambitious, such research can contribute to cross-disciplinary discourse, and in doing so accomplish the dual goal of providing a theoretical basis for library policy and opening up library research to a wider audience.

One area in which the library profession can lend its expertise is in fashioning a better understanding of the information-seeking behavior of science-literate individuals. Where and how is this information acquired? What factors inspire the information-seeking behavior? What media are preferred? How can access to relevant information be enhanced through library services? Library user studies may provide models that can be applied to the study of this specialized form of information-seeking behavior.

Another area in which librarians would be well qualified to contribute to existing research is in drawing composites of the characteristics of scientifically literate individuals. What are the origins of science literacy? It is known, for example, that a college education is one strong predictor of science literacy, and programs have been designed to exploit this connection. However, questions remain to be studied. Does this connection exist because these individuals learn basic science concepts in college, or, rather, is it that people who go to college simply have a greater predilection toward remaining informed? What factors affect the retention of scientific information? Since many of the survey instruments used to gauge science literacy have been criticized because they test knowledge of facts rather than the ability to find information, librarians can bring to the debate an insight that could redefine the very means by which science literacy is measured.

Librarians whose academic backgrounds tend to be in the humanities and social sciences cannot afford to be "blinded" by science.

Librarians must also be able to evaluate and apply the appropriate information resources. In a 1949 article published in Illinois Libraries, J. L. Crammer underscores the connection between science education and literacy and science popularizations. He writes:

But to make use of it (technology) demands not merely a few scientists, but a crowd of trained technicians who can work the factory processes and the techniques of modern agriculture, and a population of farmers willing to accept new agricultural methods and of citizens willing to live the industrial life. Popularization, therefore, may prepare the country as a whole for these scientific changes, but even more important is its job to attract recruits for training as technicians and scientists.

Crammer urges librarians to learn the difference between good and bad popularizations and to apply these principles properly to bibliographic, collection development, and reference services. Today, this injunction needs to be repeated. In a 1982 article, Miriam Pollet writes: "As long as a fast buck can be made on the human need for explanation, mystery, and fantasy—a lay fascination with the 'brave new world' that can be hustled by the media—librarians had better be wary." Certainly, the publication of sensationalized books on topics ranging from the environment to the extinction of the dinosaurs warrants selective acquisitions.
Several secondary sources provide reviews of and bibliographic access to new science popularizations. Many are already familiar to librarians: Science and Technology Books and Films (which, with the November/December 1989 issue began referring to itself as "the journal of science literacy"), Library Journal's annual "Best Sci-Tech Books" bibliography (published in March), the New York Public Library's New Technical Books list, Technical Book Review Index, and General Science Index. Librarians could also benefit from delving into the primary review sources in professional and specialized journals, such as those found in Science, Nature, Physics Today, BioScience, American Mathematical Monthly, Earth Science Reviews, Journal of the American Chemical Society, and American Scientist. Trends in professional journal literature are charted by the Institute of Scientific Information's Science Watch.

Finally, librarians, whose academic backgrounds tend to be in the humanities and social sciences, cannot afford to be "blinded" by science. Workshops and programs, such as that recommended by Tony Stankus for collection development issues related to science journals, can assist librarians without a science background in gaining facility with science information resources. To put it bluntly, scientifically illiterate librarians can do little to select materials and provide services that will contribute to making America the world leader in science literacy by the turn of the century. Last year, "information literacy" was ACRL's designated presidential theme. This important national priority continues to deserve attention and discussion.

REFERENCES AND NOTES

10. Ibid., p.59.
11. Ibid., p.62–84.
Broken down more specifically, Miller finds that 3 percent of high school-educated individuals are scientifically literate, while 12 percent with college degrees are. Further, by Miller’s definitions, just 18 percent of Ph.D.s qualify.


19. Ibid., p.186.


21. Ibid.


24. Ibid.


40. Ibid.


IN FORTHCOMING ISSUES OF COLLEGE & RESEARCH LIBRARIES

The Emergence of Paraprofessionals in Academic Libraries: Perceptions and Realities
Larry Oberg

Users’ Reactions to CD-ROM: The Penn State Experience
Cindy Faries

The Process and Value of Self-Study in a Medium-Sized University Library
William L. Beck and Marsha L. Nolf

Online Catalog Failure as Reflected through Interlibrary Loan Error Requests
Scott Seaman

Reconciling Pragmatism, Equity, and Need in the Formula Allocation of Book and Serial Funds
Charles Lowry

Selected Reference Books, 1991
Eileen Mcilvaine

Research Notes

The Economics of Economics Journals: A Statistical Analysis of Pricing Practices by Publishers
H. Craig Petersen
Ranking and Evaluating the ARL Library Map Collections
Charles A. Seavey

This study measures and analyzes the map collections of the Association of Research Libraries (ARL) using data from 1984 and 1988. The nature of the cartographic format means that the size of a map collection can, within limits, be viewed as a measure of information content. Problems with the collected map data are noted. Size of collections and growth rates are computed and elements of change noted. A composite index, based on size and growth figures, is developed and used to rank the ARL map collections. Cartographic collection ranks are compared to ARL library index ranks and found to have a weak correlation. Directions for future research are suggested.

Wilmer L. Hall has suggested that "Maps are often the stepchildren of libraries, receiving some attention at christening, but neglected henceforth." In one sense this statement is true. The map does not fit on conventional library shelving, does not convey information in textual format, does not conveniently fit into any cataloging code (present or past), is rarely treated as a topic in library schools, and often appears to be a vexatious problem to the harried library administrator. Yet the map is an invaluable medium of communication, often imparting in a single glance information that would require hours of reading. Regardless of the problems, academic libraries have long engaged in collecting and organizing maps, and today a collection of materials in the cartographic format is common in many academic libraries.

This article tests the hypothesis that map collections are stepchildren within Association of Research Library (ARL) institutions. Of course, no precise definition of Hall's characterization of map collections as "stepchildren" is possible. However, for the purposes of this investigation, it is assumed that if cartographic collections are stepchildren, then the ARL libraries will not expend the same amount of effort on collecting cartographic materials as they do on collecting other formats. The assumption leads to the statement: If the ARL libraries place equal emphasis on collecting both cartographic material and noncartographic material, then rank-orders for both types of collections should be the same.

In general, academic libraries have done little in the way of measuring or evaluating, in any quantitative sense, their collections of cartographic materials (here defined as maps, aerial photography, and remote sensing imagery). The ARL collects data on book, serials, and microform holdings but does not gather data for maps or other cartographic formats. Hence neither researchers nor library administrators have much in the way of data, let alone agreed-upon norms on which to base possible methods.
of evaluation for map collections. While the literature includes descriptions of individual map collections, or portions thereof, few studies attempt an overall description or analysis of more than one collection. Stanley D. Stevens surveyed twenty-six predominantly academic map collections in the western United States. His analysis dealt largely with personnel issues, although it did include some general observations on collections. David A. Cobb provided the first attempt to analyze the upper echelons of map collections in this country. His analysis was descriptive in nature and limited to the largest map collections in various categories. The second edition of the Guide to U.S. Map Resources contains a similar analysis. Beyond these first analyses no significant attempts to compare map collections exist.

The present study measures ARL map collections. This study assumes that size of collection is a strong indicator of the information content of the collection. A long-standing, almost unspoken, assumption in libraries is that a collection with more information content is of higher quality than one with lower information content. This assumption needs further explication.

The notion that collection size equals quality is implicit in the ARL library index and is discussed in the data section of this article. Widespread anecdotal evidence indicates that most librarians equate collection size with collection quality. Susan A. Cady flatly states, "The quality of a research library is still measured primarily by the size of its holdings" (italics in the original).

The equation of size with quality has come under a great deal of scrutiny in recent years. In A Planning Process for Public Libraries and in Output Measures for Public Libraries, the Public Library Association (PLA) has specifically rejected the notion. The Association of College and Research Libraries (ACRL), in Measuring Academic Library Performance, has produced a system conceptually similar, in many ways, to that of the Public Library Association. The Association of Research Libraries, however, still bases its measures and rankings largely on size of the collections being measured.

In the context of large research libraries, the argument can be made that size of book and serial collections equals information content and quality. Undeniably, larger collections contain more information than smaller ones. While the ARL measures, when compared with the PLA and ACRL methods, are simplistic in terms of library interaction with its user community, they do, in a fashion, address the notion of what a research library is all about.

In evaluating a collection of cartographic materials, the argument that size of collection equals information content is even stronger than a similar argument involving books and serials. Cartographic items are unique, or nearly so, in their information content. The size of most cartographic collections is largely determined by their holdings of large-scale topographic maps. It requires, for instance, 57,401 individual maps to cover the contiguous 48 states of the United States in the standard series of U.S. Geological Survey (USGS) 1:24,000 topographic quadrangles. USGS has map series at 1:50,000, 1:100,000, 1:250,000, 1:500,000, and 1:1,000,000 that either will, or do, cover the entire United States. Virtually all other nations have mapping projects employing a similar, or greater, range of scales. Such topographic maps are often used as base maps for thematic maps, such as soil or geologic maps, which are available at various levels of scale, or generalization.

Each topographic map is a unique item. If the user desires a large-scale topographic map of an area in northwest Albuquerque, New Mexico, there is only one choice. No alternative interpretations of the same body of information exist. A map, unlike subjects presented in book or article form, does not have a Marxist, or deconstructionist, or feminist alternative explanation. Maps can differ in scale or time of situation, but those features are also items of unique information content. While thematic, or subject, maps will occasionally have alternative explanations, these are in the minority. The
great bulk of cartographic items (topographic maps, or thematic maps based on topographic quadrangles) in a given collection are, therefore, unique and complete additions to the information content of the collection. Other information formats present overlapping amounts of information content. The unique contribution of an individual book to the knowledge base is considerably less than the contribution of an individual map.

Therefore, the claim that larger map collections contain, in absolute terms and assuming little or no duplication, more information content than do smaller ones is valid. A study that ranks cartographic collections according to variables associated with size and growth figures can provide some comparative data about cartographic information content within the ARL libraries. Within the context of the ARL libraries, if one accepts the idea that higher information content equals a higher-quality collection, then quality can be measured.

THE DATA
The ARL, as noted above, does not collect data on cartographic holdings. However, the Map and Geography Round Table (MAGERT) of the American Library Association (ALA) has produced two editions of the Guide to U.S. Map Resources, in 1986 and 1990. The data presented are for calendar years 1984 and 1989, respectively. Preparations for the first edition of the Guide started in 1983 and involved a large group of expert map librarians. The data-collection instrument went through several drafts. As data were collected, they were subject to review from a group of nineteen regional editors, chosen for their knowledge of their respective areas, and a final review by the compiler of the Guide. This process was repeated for the second edition. While no data-collection process is perfect, the data are sufficiently reliable for the variables and methodology employed in this study. Where weaknesses exist, they are in the original data reported by the various map collections. For example, size of collection (sheet count) is often expressed in figures ending in four or five zeroes (e.g., 40,000 or 200,000) which implies less-than-precise knowledge on the part of the reporting collection.

THE POPULATION
The cartographic holdings of eighty-eight ARL libraries were considered. The ARL population is actually higher, but the Guide does not report data on Canadian institutions. Further, some American institutions reported no data, and two collections (Howard and Georgetown) are so atypical that they were removed from the study. The eighty-eight ARL libraries in this study have among them 169 map collections. All collections associated with a given institution were counted on the assumption that they were all open for use by the libraries' public. Cartographic collections are often separated. Typically there might be collections in the main library, a geology or science collection, and a historical collection.

VARIABLES COLLECTED
The following variables were extracted from the two editions of the Guide.

1. Total sheet count. Traditionally, map collections have been counted by the number of individual map sheets held in the collection. While numerous maps are parts of sets, or series, individual sheets form separate bibliographic and information-bearing entities. Counting individual sheets does not address issues of multiple-copy teaching sets (which are in the collection at Louisiana State University, for instance) or the geographic areas covered by the collection.

2. Total count of aerial photographs. Aerial photography is both the basis for much map making and heavily used as a supplemental information source in map collections. A considerable amount of time can pass between editions of topographic maps for rural and lightly populated areas. Aerial photography is often available from various sources much more frequently. While some overlap exists among adjacent aerial photographs, this duplication is necessary for


<table>
<thead>
<tr>
<th>University</th>
<th>No. of Maps</th>
<th>University</th>
<th>No. of Maps</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCLA</td>
<td>700,780</td>
<td>Iowa State University</td>
<td>91,033</td>
</tr>
<tr>
<td>Harvard</td>
<td>520,000</td>
<td>Washington University (St. Louis)</td>
<td>89,112</td>
</tr>
<tr>
<td>Indiana University</td>
<td>510,575</td>
<td>Temple University</td>
<td>88,450</td>
</tr>
<tr>
<td>U.C. Berkeley</td>
<td>489,985</td>
<td>University of Pittsburgh</td>
<td>86,457</td>
</tr>
<tr>
<td>University of Illinois, Urbana</td>
<td>444,774</td>
<td>Mass. Institute of Technology</td>
<td>83,004</td>
</tr>
<tr>
<td>Louisiana State University</td>
<td>402,200</td>
<td>Brown University</td>
<td>75,000</td>
</tr>
<tr>
<td>Yale</td>
<td>385,500</td>
<td>University of Cincinnati</td>
<td>74,930</td>
</tr>
<tr>
<td>U.C. Santa Barbara</td>
<td>375,000</td>
<td>Colorado State University</td>
<td>34,799</td>
</tr>
<tr>
<td>University of Florida</td>
<td>373,854</td>
<td>Case Western Reserve University</td>
<td>32,500</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>359,199</td>
<td>U.C. Riverside</td>
<td>30,000</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>336,000</td>
<td>North Carolina State University</td>
<td>24,230</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>330,100</td>
<td>Wayne State University</td>
<td>22,000</td>
</tr>
<tr>
<td>University of Georgia</td>
<td>326,850</td>
<td>Rice University</td>
<td>21,000</td>
</tr>
<tr>
<td>University of Texas, Austin</td>
<td>323,163</td>
<td>Miami University</td>
<td>17,621</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>319,123</td>
<td>Tulane University</td>
<td>15,000</td>
</tr>
<tr>
<td>Princeton University</td>
<td>290,914</td>
<td>Washington State University</td>
<td>15,000</td>
</tr>
<tr>
<td>Kansas University</td>
<td>281,048</td>
<td>Boston University</td>
<td>10,500</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>242,900</td>
<td>University of Southern California</td>
<td>8,500</td>
</tr>
<tr>
<td>University of Washington</td>
<td>232,426</td>
<td>Rutgers</td>
<td>3,150</td>
</tr>
<tr>
<td>University of Oregon</td>
<td>230,000</td>
<td>U.C. Irvine</td>
<td>660</td>
</tr>
</tbody>
</table>

Mean = 177,303  
STD = 132,548

3. **Total count of remote sensing images.** Data on holdings in remote sensing imagery were collected from the 1990 edition of the Guide only. The earlier edition had not collected data on remote sensing imagery. Remote sensing imagery is just starting to become available to the ARL libraries and represents a new field of cartographic information. The current convention follows the model established in counting aerial photography: each image is a separate information-bearing item.

**DATA MANIPULATION**

The data were entered onto creation sheets and then transferred to the Quattro Pro spreadsheet program, which was used for all further data analysis. An initial printout was reviewed and various anomalies identified. Where anomalies existed, correspondence was initiated to ascertain the cause of the problem. Problems encountered included:

1. **Decrease in the size of the collection.** All institutions showing a decrease were contacted for explanations. The decreases, in general, may be attributed to two causes. First, multiple collections were consolidated between the two editions of the Guide, and the institution eliminated duplicate copies. Boston University,
### TABLE 2
**RANK, BY INCREASE IN MAP HOLDINGS, 1984–89**

<table>
<thead>
<tr>
<th>University</th>
<th>Growth</th>
<th>University</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Texas, Austin</td>
<td>116,163</td>
<td>University of Southern California</td>
<td>1,000</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>101,753</td>
<td>Rutgers University</td>
<td>650</td>
</tr>
<tr>
<td>UCLA</td>
<td>94,233</td>
<td>U.C. Irvine</td>
<td>60</td>
</tr>
<tr>
<td>University of Illinois, Urbana</td>
<td>83,044</td>
<td>Columbia University</td>
<td>0</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>80,500</td>
<td>University of Oklahoma</td>
<td>0</td>
</tr>
<tr>
<td>U.C. Santa Barbara</td>
<td>75,000</td>
<td>Vanderbilt University</td>
<td>0</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>63,800</td>
<td>Boston University</td>
<td>-1,500</td>
</tr>
<tr>
<td>U.C. Berkeley</td>
<td>56,415</td>
<td>University of Colorado</td>
<td>-5,201</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>55,100</td>
<td>SUNY Albany</td>
<td>-8,000</td>
</tr>
<tr>
<td>Duke University</td>
<td>52,900</td>
<td>Virginia Polytechnic</td>
<td>-9,900</td>
</tr>
<tr>
<td>University of Arizona</td>
<td>50,437</td>
<td>University of Virginia</td>
<td>-11,750</td>
</tr>
<tr>
<td>Emory University</td>
<td>50,000</td>
<td>University of Michigan</td>
<td>-17,100</td>
</tr>
<tr>
<td>Texas A&amp;M</td>
<td>48,792</td>
<td>Case Western Reserve</td>
<td>-17,500</td>
</tr>
<tr>
<td>University of Connecticut</td>
<td>47,000</td>
<td>Wayne State University</td>
<td>-20,000</td>
</tr>
<tr>
<td>U.C. San Diego</td>
<td>45,000</td>
<td>Ohio State University</td>
<td>-22,461</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>41,000</td>
<td>Washington State University</td>
<td>-25,000</td>
</tr>
<tr>
<td>S. Illinois University</td>
<td>40,253</td>
<td>University of Cincinnati</td>
<td>-35,070</td>
</tr>
<tr>
<td>Cornell University</td>
<td>38,400</td>
<td>University of Oklahoma</td>
<td>-54,820</td>
</tr>
<tr>
<td>Kansas University</td>
<td>37,716</td>
<td>Princeton University</td>
<td>-66,086</td>
</tr>
<tr>
<td>University of Florida</td>
<td>37,469</td>
<td>Louisiana State University</td>
<td>-99,300</td>
</tr>
</tbody>
</table>

Mean = 18,766  
STD = 32,500

for instance, consolidated three collections into two, eliminating duplication and decreasing their total sheet count. Second, the institution counted their collection and discovered it to be somewhat smaller than the previously estimated figure.  

### DESCRIPTIVE RESULTS

After gathering the supplemental information and correcting the spreadsheet, institutions were ranked according to the following variables.

1. Total map sheet count, 1991
2. Absolute increase in map sheet count, 1984–1989
3. Percentage increase in map sheet count, 1984–1989
4. Total cartographic holdings (maps, aerial photos, remote sensing images), 1989
5. Absolute increase in cartographic holdings, 1984–1989
6. Percentage increase in cartographic holdings, 1985–1989
7. A final, composite ranking, ex-
### Table 3

**RANK, BY PERCENTAGE INCREASE IN MAP HOLDINGS, 1984–89**

<table>
<thead>
<tr>
<th>University</th>
<th>% Growth</th>
<th>University</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Miami</td>
<td>1570</td>
<td>University of Oregon</td>
<td>4</td>
</tr>
<tr>
<td>U.C. Riverside</td>
<td>233</td>
<td>University of Wisconsin, Madison</td>
<td>3</td>
</tr>
<tr>
<td>N. Carolina State</td>
<td>193</td>
<td>Brown University</td>
<td>1</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>111</td>
<td>Harvard University</td>
<td>0</td>
</tr>
<tr>
<td>Emory University</td>
<td>100</td>
<td>Columbia University</td>
<td>0</td>
</tr>
<tr>
<td>Duke University</td>
<td>85</td>
<td>University of Oklahoma</td>
<td>0</td>
</tr>
<tr>
<td>Texas A&amp;M</td>
<td>59</td>
<td>Vanderbilt University</td>
<td>0</td>
</tr>
<tr>
<td>University of Texas, Austin</td>
<td>56</td>
<td>University of Virginia</td>
<td>-5</td>
</tr>
<tr>
<td>University of Connecticut</td>
<td>47</td>
<td>University of Michigan</td>
<td>-6</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>46</td>
<td>Virginia Polytechnic Institute</td>
<td>-7</td>
</tr>
<tr>
<td>Temple University</td>
<td>43</td>
<td>Boston University</td>
<td>-12</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>39</td>
<td>Colorado State University</td>
<td>-13</td>
</tr>
<tr>
<td>Rice University</td>
<td>36</td>
<td>Princeton University</td>
<td>-18</td>
</tr>
<tr>
<td>University of Hawaii</td>
<td>35</td>
<td>Ohio State University</td>
<td>-18</td>
</tr>
<tr>
<td>Arizona State University</td>
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<td>Louisiana State University</td>
<td>-19</td>
</tr>
<tr>
<td>University of New Mexico</td>
<td>31</td>
<td>University of Cincinnati</td>
<td>-31</td>
</tr>
<tr>
<td>University of Arizona</td>
<td>30</td>
<td>Oklahoma State University</td>
<td>-33</td>
</tr>
<tr>
<td>University of Utah</td>
<td>29</td>
<td>Case Western Reserve</td>
<td>-35</td>
</tr>
<tr>
<td>U.C. San Diego</td>
<td>29</td>
<td>Wayne State University</td>
<td>-47</td>
</tr>
<tr>
<td>Rutgers University</td>
<td>26</td>
<td>Washington State University</td>
<td>-62</td>
</tr>
</tbody>
</table>

Table 3, explained below, composed of variables 1–6.

Absolute increase is an indicator of the willingness, and ability, of the library to acquire new material. Collections that score high in these categories are working to acquire new material (information) and to keep current as new maps and aerial photographs are produced.

Percentage increases tend to reward the smaller collections, since they are starting from a smaller base. Collections that score high in these categories are being more active in acquisition. It can be argued that smaller collections are aware of a small information base and are working on improving that base.

Table 1 presents the top and bottom twenty collections in terms of holdings of maps in 1989.

Table 1 does not present the same rankings in the second edition of the Guide. Because of additional requests for information made for this article, more complete data are presented here than in the Guide.

Table 2 presents the top and bottom twenty collections by absolute increase in map holdings, 1984–1989.

As mentioned above, the increases in holdings for both the universities of Tennessee and Texas may be more related to data-collection issues than actual increases in size. Table 3 presents the top and bottom twenty collections by percentage increase in map holdings, 1984–1989.

The University of Miami has an extremely small collection (17,621 sheets), and the University of California, Riverside, is only 30,000 sheets. After those two, larger collections appear in the top twenty growth collections. Interestingly, some of the large collections, such as
TABLE 4
RANK, BY TOTAL CARTOGRAPHIC HOLDINGS, 1989

<table>
<thead>
<tr>
<th>University</th>
<th>Holdings</th>
<th>University</th>
<th>Holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.C. Santa Barbara</td>
<td>4,075,000</td>
<td>Vanderbilt University</td>
<td>100,000</td>
</tr>
<tr>
<td>UCLA</td>
<td>839,471</td>
<td>Ohio State University</td>
<td>96,000</td>
</tr>
<tr>
<td>U.C. Berkeley</td>
<td>660,437</td>
<td>Temple University</td>
<td>88,450</td>
</tr>
<tr>
<td>University of Oregon</td>
<td>628,000</td>
<td>University of Pittsburgh</td>
<td>86,457</td>
</tr>
<tr>
<td>Cornell University</td>
<td>595,400</td>
<td>Mass. Institute of Technology</td>
<td>83,004</td>
</tr>
<tr>
<td>University of Illinois, Urbana</td>
<td>592,614</td>
<td>Brown University</td>
<td>75,000</td>
</tr>
<tr>
<td>University of Florida</td>
<td>548,716</td>
<td>University of Cincinnati</td>
<td>74,930</td>
</tr>
<tr>
<td>University of Georgia</td>
<td>547,250</td>
<td>Colorado State University</td>
<td>34,999</td>
</tr>
<tr>
<td>Indiana University</td>
<td>521,425</td>
<td>U.C. Riverside</td>
<td>32,500</td>
</tr>
<tr>
<td>Harvard University</td>
<td>520,000</td>
<td>Case Western Reserve</td>
<td>32,500</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>487,929</td>
<td>N. Carolina State University</td>
<td>24,230</td>
</tr>
<tr>
<td>University of Hawaii</td>
<td>478,259</td>
<td>Wayne State University</td>
<td>22,000</td>
</tr>
<tr>
<td>Louisiana State University</td>
<td>472,225</td>
<td>Rice University</td>
<td>21,400</td>
</tr>
<tr>
<td>Yale University</td>
<td>385,503</td>
<td>University of Miami</td>
<td>17,621</td>
</tr>
<tr>
<td>Kansas University</td>
<td>376,698</td>
<td>Tulane University</td>
<td>15,000</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>359,199</td>
<td>Washington State University</td>
<td>15,000</td>
</tr>
<tr>
<td>University of Wisconsin, Madison</td>
<td>344,324</td>
<td>Boston University</td>
<td>11,050</td>
</tr>
<tr>
<td>Washington University (St. Louis)</td>
<td>339,112</td>
<td>University of Southern California</td>
<td>8,500</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>339,100</td>
<td>Rutgers University</td>
<td>3,170</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>337,336</td>
<td>U.C. Irvine</td>
<td>1,180</td>
</tr>
</tbody>
</table>

Mean = 252,098
STD = 439,190

Harvard and Michigan are static or actually shrinking.

Particular attention has been paid to the size and growth of the map portions of the collections. The map remains the primary information carrier and the largest proportion of most cartographic collections. Tables 4 and 5 are based on total cartographic holdings. Here the effect of collecting aerial photos and remote sensing imagery is apparent. The more technologically advanced collections rank higher in these listings.

The University of California, Santa Barbara, has a large map collection, but the large difference between it and second-ranked UCLA results directly from U.C., Santa Barbara's large (2.5 million) aerial photo collection and its 1.2 million remote sensing images. Washington University in St. Louis is a bottom-twenty map collection, but the library there has acquired 250,000 remote sensing images to bring its collection into the top twenty in terms of total cartographic holdings.

The earlier comments about the growth rates of U.C., Santa Barbara and Washington University apply in Table 6 as well.

As noted previously, the University of Miami has a very small collection, but some of the other large-growth collections are far from small. U.C., Santa Barbara's ranking is particularly impressive. Rank by percentage increase highlights the collections that are inactive or simply not collecting or reporting data.

OVERALL RANKING

The overall ranking was computed by assigning a rank to each institution for
TABLE 5  
RANK, BY INCREASE IN CARTOGRAPHIC HOLDINGS, 1984–89

<table>
<thead>
<tr>
<th>University</th>
<th>Growth</th>
<th>University</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.C. Santa Barbara</td>
<td>3,475,000</td>
<td>Rutgers University</td>
<td>669</td>
</tr>
<tr>
<td>Cornell University</td>
<td>434,400</td>
<td>U.C. Irvine</td>
<td>579</td>
</tr>
<tr>
<td>University of Hawaii</td>
<td>368,659</td>
<td>Columbia University</td>
<td>-1</td>
</tr>
<tr>
<td>Washington University (St. Louis)</td>
<td>255,896</td>
<td>University of Oklahoma</td>
<td>-1</td>
</tr>
<tr>
<td>UCLA</td>
<td>222,500</td>
<td>Vanderbilt University</td>
<td>-1</td>
</tr>
<tr>
<td>Purdue University</td>
<td>179,500</td>
<td>Boston University</td>
<td>-1,450</td>
</tr>
<tr>
<td>Kansas University</td>
<td>133,166</td>
<td>Colorado State University</td>
<td>-5,102</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>131,400</td>
<td>SUNY Albany</td>
<td>-8,001</td>
</tr>
<tr>
<td>University of Texas, Austin</td>
<td>120,167</td>
<td>University of Virginia</td>
<td>-11,750</td>
</tr>
<tr>
<td>U.C. Berkeley</td>
<td>114,376</td>
<td>University of Michigan</td>
<td>-16,500</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>101,752</td>
<td>Case Western Reserve</td>
<td>-17,501</td>
</tr>
<tr>
<td>University of Illinois, Urbana</td>
<td>86,570</td>
<td>Brigham Young University</td>
<td>-18,914</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>80,490</td>
<td>Wayne State University</td>
<td>-20,020</td>
</tr>
<tr>
<td>University of Oregon</td>
<td>73,823</td>
<td>Ohio State University</td>
<td>-22,462</td>
</tr>
<tr>
<td>University of Georgia</td>
<td>65,150</td>
<td>Washington State University</td>
<td>-25,030</td>
</tr>
<tr>
<td>University of Connecticut</td>
<td>62,999</td>
<td>University of Cincinnati</td>
<td>-37,570</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>54,600</td>
<td>Va. Polytechnic Institute</td>
<td>-43,400</td>
</tr>
<tr>
<td>Duke University</td>
<td>52,950</td>
<td>Oklahoma State University</td>
<td>-56,738</td>
</tr>
<tr>
<td>Emory University</td>
<td>49,999</td>
<td>Princeton University</td>
<td>-66,086</td>
</tr>
<tr>
<td>University of Arizona</td>
<td>49,661</td>
<td>Louisiana State University</td>
<td>-89,275</td>
</tr>
</tbody>
</table>

Mean = 73,945  
STD = 366,410

each of the six variables presented above. A score was then assigned based on the reciprocal of that rank, using 100 as a base. In other words, if a collection ranked first on a given variable, it received 99 points. If the collection ranked 30th, it received 70 points (100-30), and so forth. The overall ranking was computed by adding the six variable scores and dividing by six. A perfect score would have been 99.18 The numerical scores obtained by this process are statistically meaningless. They serve only to present a rank order of the collections and hence are not reported.

Any ranking system will have its critics. This one attempts to reward collections that have a large information content (i.e., large holdings), are active in acquiring new holdings, and are active in acquiring technologically advanced cartographic formats. The rankings are based on the theory that size equals information content and, perhaps, quality. The rankings do not tell us anything about usage, effectiveness of collection development, or other variables explicitly addressed by the PLA and ACRL systems mentioned above.

TESTING THE HYPOTHESIS

Readers familiar with the ARL composite rankings will note that the rankings presented in table 7 differ considerably from those published by the ARL. Some very highly ranked ARL collections fair poorly in this study. The University of Wisconsin, Madison, for instance, which ranks 13th in the ARL, ranks 58th in this study. The top-rated collection in this
TABLE 6
RANK, BY PERCENTAGE INCREASE IN CARTOGRAPHIC HOLDINGS, 1984–89

<table>
<thead>
<tr>
<th>University</th>
<th>% Growth</th>
<th>University</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Miami</td>
<td>1,568</td>
<td>Brown University</td>
<td>1</td>
</tr>
<tr>
<td>U.C. Santa Barbara</td>
<td>579</td>
<td>Univ. of Wis., Madison</td>
<td>1</td>
</tr>
<tr>
<td>University of Hawaii</td>
<td>336</td>
<td>Harvard University</td>
<td>1</td>
</tr>
<tr>
<td>Washington University</td>
<td>307</td>
<td>Columbia University</td>
<td>-0</td>
</tr>
<tr>
<td>Cornell University</td>
<td>269</td>
<td>University of Oklahoma</td>
<td>-0</td>
</tr>
<tr>
<td>U.C. Riverside</td>
<td>256</td>
<td>Vanderbilt University</td>
<td>-0</td>
</tr>
<tr>
<td>North Carolina State</td>
<td>193</td>
<td>University of Virginia</td>
<td>-5</td>
</tr>
<tr>
<td>Purdue University</td>
<td>119</td>
<td>University of Michigan</td>
<td>-6</td>
</tr>
<tr>
<td>University of Maryland</td>
<td>111</td>
<td>Brigham Young University</td>
<td>-8</td>
</tr>
<tr>
<td>Emory University</td>
<td>99</td>
<td>Boston University</td>
<td>-11</td>
</tr>
<tr>
<td>U.C. Irvine</td>
<td>96</td>
<td>Colorado State University</td>
<td>-12</td>
</tr>
<tr>
<td>University of Alabama</td>
<td>94</td>
<td>Louisiana State University</td>
<td>-15</td>
</tr>
<tr>
<td>Duke University</td>
<td>85</td>
<td>Princeton University</td>
<td>-18</td>
</tr>
<tr>
<td>University of Connecticut</td>
<td>62</td>
<td>Ohio State University</td>
<td>-18</td>
</tr>
<tr>
<td>Texas A&amp;M</td>
<td>58</td>
<td>Oklahoma State University</td>
<td>-25</td>
</tr>
<tr>
<td>University of Texas, Austin</td>
<td>57</td>
<td>Va. Polytechnic Institute</td>
<td>-26</td>
</tr>
<tr>
<td>Kansas University</td>
<td>54</td>
<td>University of Cincinnati</td>
<td>-33</td>
</tr>
<tr>
<td>Temple University</td>
<td>43</td>
<td>Case Western Reserve</td>
<td>-35</td>
</tr>
<tr>
<td>Arizona State University</td>
<td>40</td>
<td>Wayne State University</td>
<td>-47</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>39</td>
<td>Wa. State University</td>
<td>-62</td>
</tr>
</tbody>
</table>

* -0 means growth was negative, but less than 1%.

study, the University of California, Santa Barbara, is ranked 46th by ARL.

This study assumes that size of collection is a strong indicator of the information content of the collection.

The basic issue being investigated in this study is whether cartographic materials are stepchildren in ARL libraries. The method employed is to develop a ranking of ARL cartographic materials collections that is similar conceptually to the familiar ARL rankings largely based on size and growth rate of book and serial holdings. If cartographic collections receive the same emphasis in collection development enjoyed by book and serial collections, the ARL rankings and the ranking produced by this study should be closely related.

The statistical technique selected to measure the relationship between the two rankings is Spearman’s rank order coefficient, or rho. Spearman’s rho (rs) is commonly used to compare matched-pair rankings. Spearman’s rho requires that each set of ranks be ordinal-level data, so the ARL library index list was matched to the eighty-eight institutions considered in this study. That is, they were ranked 1-88, rather than being ranked within the total ARL population.

Spearman’s rho produces a correlation coefficient that measures the strength of the relationship between the two rankings. Rho can vary from -1 to +1, where 1 expresses a perfect negative or positive correlation. One statistician has suggested the following guidelines...
TABLE 7
RANK, BASED ON COMPOSITE SIZE/GROWTH RANKINGS, 1989

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Rank</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U.C. Santa Barbara</td>
<td>39</td>
<td>University of Kentucky</td>
</tr>
<tr>
<td>2</td>
<td>University of Texas, Austin</td>
<td>40</td>
<td>University of Nebraska</td>
</tr>
<tr>
<td>3</td>
<td>UCLA</td>
<td>41</td>
<td>University of Massachusetts, Amherst</td>
</tr>
<tr>
<td>4</td>
<td>University of Tennessee</td>
<td>42</td>
<td>Dartmouth University</td>
</tr>
<tr>
<td>5</td>
<td>Cornell University</td>
<td>43</td>
<td>Yale University</td>
</tr>
<tr>
<td>6</td>
<td>University of Illinois, Urbana</td>
<td>44</td>
<td>U.C. Davis</td>
</tr>
<tr>
<td>7</td>
<td>University of Alabama</td>
<td>45</td>
<td>University of Miami</td>
</tr>
<tr>
<td>8</td>
<td>U.C. Berkeley</td>
<td>46</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>9</td>
<td>University of Hawaii</td>
<td>47</td>
<td>Northwestern University</td>
</tr>
<tr>
<td>10</td>
<td>Kansas University</td>
<td>48</td>
<td>North Carolina State</td>
</tr>
<tr>
<td>11</td>
<td>University of Chicago</td>
<td>49</td>
<td>Harvard University</td>
</tr>
<tr>
<td>12</td>
<td>University of Maryland</td>
<td>50</td>
<td>Florida State University</td>
</tr>
<tr>
<td>13</td>
<td>University of Arizona</td>
<td>51</td>
<td>Johns Hopkins University</td>
</tr>
<tr>
<td>14</td>
<td>Purdue University</td>
<td>52</td>
<td>North Carolina, Chapel Hill</td>
</tr>
<tr>
<td>15</td>
<td>U.C. San Diego</td>
<td>53</td>
<td>University of Missouri</td>
</tr>
<tr>
<td>16</td>
<td>University of Connecticut</td>
<td>54</td>
<td>Brigham Young University</td>
</tr>
<tr>
<td>17</td>
<td>Southern Illinois University</td>
<td>55</td>
<td>Iowa State University</td>
</tr>
<tr>
<td>18</td>
<td>University of Georgia</td>
<td>56</td>
<td>University of Pennsylvania</td>
</tr>
<tr>
<td>19</td>
<td>Pennsylvania State University</td>
<td>57</td>
<td>University of Wisconsin, Madison</td>
</tr>
<tr>
<td>20</td>
<td>Texas A&amp;M</td>
<td>58</td>
<td>SUNY Buffalo</td>
</tr>
<tr>
<td>21</td>
<td>Duke University</td>
<td>59</td>
<td>University of Michigan</td>
</tr>
<tr>
<td>22</td>
<td>University of Florida</td>
<td>60</td>
<td>University of Delaware</td>
</tr>
<tr>
<td>23</td>
<td>Arizona State University</td>
<td>61</td>
<td>Rice University</td>
</tr>
<tr>
<td>24</td>
<td>University of Iowa</td>
<td>62</td>
<td>Syracuse University</td>
</tr>
<tr>
<td>25</td>
<td>Stanford University</td>
<td>63</td>
<td>SUNY Stony Brook</td>
</tr>
<tr>
<td>26</td>
<td>Emory University</td>
<td>64</td>
<td>Notre Dame</td>
</tr>
<tr>
<td>27</td>
<td>University of New Mexico</td>
<td>65</td>
<td>University of Pittsburgh</td>
</tr>
<tr>
<td>28</td>
<td>University of Utah</td>
<td>66</td>
<td>Rutgers University</td>
</tr>
<tr>
<td>29</td>
<td>University of Washington</td>
<td>67</td>
<td>Louisiana State University</td>
</tr>
<tr>
<td>30</td>
<td>Washington University (St. Louis)</td>
<td>68</td>
<td>University of Colorado</td>
</tr>
<tr>
<td>31</td>
<td>University of Minnesota</td>
<td>69</td>
<td>Columbia University</td>
</tr>
<tr>
<td>32</td>
<td>Indiana University</td>
<td>70</td>
<td>University of Virginia</td>
</tr>
<tr>
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<td>University of South Carolina</td>
<td>71</td>
<td>Princeton University</td>
</tr>
<tr>
<td>34</td>
<td>University of Oregon</td>
<td>72</td>
<td>Tulane University</td>
</tr>
<tr>
<td>35</td>
<td>Temple University</td>
<td>73</td>
<td>U.C. Irvine</td>
</tr>
<tr>
<td>36</td>
<td>U.C. Riverside</td>
<td>74</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>37</td>
<td>Georgia Tech</td>
<td>75</td>
<td>University of Oklahoma</td>
</tr>
<tr>
<td>38</td>
<td>Kent State University</td>
<td>76</td>
<td>University of Southern California</td>
</tr>
</tbody>
</table>
TABLE 7
RANK, BASED ON COMPOSITE SIZE/GROWTH RANKINGS, 1989 (cont.)

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>Brown University</td>
</tr>
<tr>
<td>78</td>
<td>Vanderbilt University</td>
</tr>
<tr>
<td>79</td>
<td>Oklahoma State University</td>
</tr>
<tr>
<td>80</td>
<td>Virginia Polytechnic Institute</td>
</tr>
<tr>
<td>81</td>
<td>Colorado State University</td>
</tr>
<tr>
<td>82</td>
<td>Ohio State University</td>
</tr>
<tr>
<td>83</td>
<td>Boston University</td>
</tr>
<tr>
<td>84</td>
<td>Case Western Reserve</td>
</tr>
<tr>
<td>85</td>
<td>University of Cincinnati</td>
</tr>
<tr>
<td>86</td>
<td>Wayne State University</td>
</tr>
<tr>
<td>87</td>
<td>Washington State University</td>
</tr>
</tbody>
</table>

For interpreting values between 0 and 1:

- **r value** | **Interpretation** |
  - <.20     | Slight, almost negligible relationship |
  - .20-.40  | Low correlation, definite, but small relationship |
  - .40-.70  | Moderate correlation; substantial relationship |
  - .70-.90  | High correlation; marked relationship |
  - .90-1.0  | Very high correlation; very dependable relationship |

The hypothesis being tested involves the strength of the relationship between the two rankings. Statistical significance is not an issue in this situation because sampling error is not involved. The question is: Is the observed $r_s$ strong enough to dispute the idea that cartographic materials are stepchildren in the matter of size and growth of the collection?

The ARL rankings and the rankings in this study were found to correlate at $r_s = 0.31$. This means that there is a positive relationship between the two ranking systems. The strength of the relationship, however, falls in the low, or weak category in the scheme noted above. An observed $r_s$ of 0.31 suggests that the relationship between the ARL rankings and those obtained in this study is low. This suggests that little consensus about the importance of the cartographic format exists within the ARL libraries. Some of the libraries at the top of the ARL list—Texas, UCLA, Cornell, and the University of Illinois, Urbana, for example—seem to place cartographic materials on approximately the same level of importance as other formats. Other top ARL collections—Yale, Harvard, and Columbia being the notable examples—do not seem to value cartographic material as much as other formats.

**SUMMARY AND CONCLUSIONS**

The map collections of the ARL libraries have been measured and ranked according to a composite index based on size and growth figures for both maps and other cartographic formats. The rankings reflect not only absolute collection size, but also the rate of increase in all cartographic formats. The rankings should provide a useful measure for comparisons among ARL libraries interested in one measure of their collections and also provide possible benchmark data for non-ARL libraries to consider. Given the low correlation between ARL rankings and rankings in this study, it seems that Wilmer Hall's comment about map collections as stepchildren is as correct now as it was in 1925.

It is hoped that this study will prompt ARL chief collection development officers to discuss the cartographic format. Clearly, at a number of institutions the relationship between effort expended in collection development for books and serials and that for cartographic materials is insignificant.

Equally clear from this study is that individuals in charge of map collections at ARL institutions have work to do in improving the nature of the data they are reporting. As was noted above, such basic elements as collection size appear to be estimates in all too many cases. Other data elements need similar atten-
tion. Reporting on number of staff was so inconsistent that the editor of the Guide considered eliminating the category from the published version. The ARL libraries fare no better than any others in this category.

The collection index is limited conceptually in that it does not address issues of user interaction with the collection or the relationship of the cartographic collection with the rest of the library or parent institution. Because of limits imposed by institutional reporting of data, more sophisticated measures, such as those suggested in Output Measures or Measuring Academic Library Performance, cannot be generated for all ARL map collections at this time. Future studies drawn from data in the two editions of the Guide will attempt to develop measures related to user-collection interaction, facilities, and collection-institution interaction for the subset of ARL libraries with sufficiently complete data.

REFERENCES AND NOTES
3. For instance, Map Collections in the United States and Canada (New York: Special Libraries Association, 1978) listed 345 map collections in academic institutions. Both editions of the Guide to U.S. Map Resources contain considerably more academic map collections than that. Of special significance to the spread of map collections has been the inclusion of U.S. Geological Survey and other federal mapping agency products into the U.S. Government Printing Office depository system in the mid-1980s.
15. The instrument is included as an appendix in both editions of the Guide.
16. Both collections have fewer than 1,000 maps. However, they are both in the Washington, D.C., area and have access to the largest concentration of cartographic holdings in the country: the collections of the Library of Congress and the National Archives.
17. An ARL collection under the author's care went from an estimated size of 120,000 sheets to an actual count of 85,061. This is not an uncommon phenomenon, which certainly indicates that the ARL libraries, and probably all collections, need to establish better record-keeping procedures than currently employed.

18. The ARL index used to produce overall rankings based on the variables noted in note 10 is considerably more complex in construction than the method employed here. The ARL has had years of experience in collecting and refining the reliability of its data. In this researcher's judgment the data presented in the Guide are simply not reliable enough to be subjected to the rigorous statistical manipulations employed by the ARL.


21. Interpretation of correlation tests is subject to considerable debate. Obtaining a statistically significant correlation with Spearman's rho, or the more rigorous Pearson's $r$, is largely a function of the size of N and need only be employed when samples, rather than populations, are being tested. The interpretation of the strength of relationship presented here is a conservative one. Guilford's scheme is usable, but problematic, particularly in the middle interval. Given the data employed in this study and general approach to correlational statistics, this researcher would not describe correlations as "strong" until values above $r_s = .75$ are obtained. Others are free to interpret the obtained value as they choose.

22. The 1990 edition of the Guide, in both the published version and a prepublication version in the possession of this author, carries statements to the effect that staff data were not included because of reliability problems (see page xv, published version). The published version does report staffing levels for most collections.

23. For instance, many institutions either do not circulate cartographic materials or fail to collect (or report) such data if they do.
Are Patrons Ready for "Do-It-Yourself" Services?

Nancy Larsen Helmick

In very few libraries does funding increase proportionately to the demand for provision of services. If, however, restrictions prohibiting patrons from accessing their own files are eliminated, enabling them to provide for themselves services formerly provided by library staff, will they willingly accept the challenge? In fact, the public does seem willing, even enthusiastic, about self-serve features, as evidenced by the results of an experiment in which the Ohio State University Libraries' automated circulation and online catalog system was programmed to accept patron-initiated renewal and save commands from library-housed and dial-access terminals. Attempting to forestall problems before they were created was essential to the planning, and the methods used are applicable to other libraries considering such enhancements.

Frequently the strongest opposition to change comes from within the institution or organization being changed. In libraries, practices and policies have rarely changed without dissension. A long debate, for example, raged over whether the public should have direct access to library materials. Critics of this idea, most notably Melvil Dewey, feared the possible chaos and potential thievery. Despite fears of anarchy and pandemonium, the shelves of the Cleveland Public Library were opened as early as 1890 by librarian William Howard Brett, who feared a dishonest public less than the limitations imposed by keeping people away from books. With a belief in the basic integrity of the public, he countered critical arguments with the promise of better service. After shelves were opened, not only were long waits eliminated, but fewer books were lost and circulation increased as much as 44% despite a reduction of staff.

Such improvements to service were the primary goals the Ohio State University Libraries (OSUL) sought to attain in 1970, when the stacks were opened to the entire university community and the Library Control System (LCS), the automated circulation and online catalog system, was introduced.

Patrons were invited to search the University Libraries' holdings for authors, titles, or subjects, using public terminals located in the main library and each of the department libraries beginning in 1974. In 1980, users with home or office computers and modems began to request dial access to LCS.

The complete holdings file, eventually to include order and processing records, was accessible to patrons using either public or personal computer terminals.

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The author wishes to express appreciation to the following: Professors Jennifer Kuehn, Susan Logan, and Nancyanne O'Hanlon of the Ohio State University Libraries, and Keith M. Kilty of the Ohio State University College of Social Work.
but access to circulation functions was restricted to staff terminals. Patrons were encouraged to request a "save" (a term synonymous with "hold" at OSUL) for items in circulation, but doing so required assistance from library staff, either at a circulation desk or via the libraries' telephone center, where callers often encountered a queue or a busy signal.

One reason for the difficulty in reaching the telephone center was that patrons were also trying to renew books. Patrons are permitted to renew books an unlimited number of times, but are accountable for maintaining a current renewal status to avoid penalties for long-overdue materials. Since all circulation functions were suppressed at public terminals, patrons also needed staff assistance to fulfill this obligation.

OSUL decided to allow the public to enter their own renewal and save transactions on a trial basis.

Like many university libraries, OSUL perpetually operates on a less than ideal budget, trying to do more with less. At circulation desks, where the day-to-day operations already taxed the available staff, the influx of calls generated by the overdue notice mailings produced an even greater workload. The telephone center, limited by the number of staff who could answer the phones, had an alarmingly high number of abandoned calls, with many patrons hanging up in frustration before the staff could provide any service.

To maintain the convenient service desired by the public without diminishing quality of service, the libraries needed either to increase staffing, equipment, and telephone lines or to create another solution. Choosing the latter option, OSUL decided to allow the public to enter their own renewal and save transactions on a trial basis. Assuming patrons would be willing to do so, and these options could be presented without an overwhelming collection of choices and documents, how might they respond? Would the library system benefit or suffer in the effort? If the public response was demonstrably positive and the library benefitted by employing staff more efficiently, then perhaps enhancements that allowed patrons to access other LCS features could be introduced with some assurance that patrons could be enticed to try them. This paper examines the results of this venture.

**BACKGROUND**

OSU Libraries implemented patron-initiated renewal and save capability using LCS in the fall of 1989. Targeted users were OSUL patrons, including faculty, employees, and students of the Ohio State University, users of the State Library of Ohio, and courtesy card patrons—altogether, potentially more than 80,000 patrons. Because this audience has varying levels of computer skills, instructions had to be widely accessible and simply written.

Because so many patrons wait until books are overdue to renew them, renewal requests usually come in response to overdue notices. A guide was prepared to be sent with each overdue notice to assist patrons in resolving overdue problems. Since some patrons would be unable to access either a personal or a library terminal, patron-initiated renewal was only one of several renewal methods described in the guide. The guide made no reference to the placement of saves.

A brochure was distributed to requestors of dial-access service and displayed at the public terminals. This brochure, "LCS Renewal and Save Instructions," was written with the assumption that the patron using it for renewal purposes might have a book but not an overdue notice in hand. The brochure also included instructions on how to place a save on a record retrieved during the course of a search.

Aside from the style and the inclusion of save instructions, the two instructional aids differed in one other important way. The guide inserted with the overdue notice encouraged patrons to locate and to use title numbers (numeric computer-as-
signed identifiers) since our experience with telephone renewal requests was that the letter and number combinations of LC call numbers could be confusing. The brochure detailed renewal procedures using either call numbers or line numbers retrieved from a title search, and saves using call numbers only, but did not refer to title numbers.

The results indicate that not only is the public eager to participate further but that libraries can benefit from a self-services policy without sacrificing quality of service.

Regardless of which aid or method used, screen responses had to be carefully worded so that unsuccessful attempts would not dead-end. If the request failed, patrons should either be able to tell what went wrong and know how to fix it or be instructed that assistance from the circulation staff was necessary.

**CONCERNS AND SOLUTIONS**

Kenneth Dowlin described innovation as "the process of creating small, incremental improvements on what is accepted today," but people commonly resist change. One source of resistance is the perceived threat of a loss of power. The mere suggestion of enhancing LCS to allow patrons to enter their own renewal and save commands precipitated a variety of skeptical reactions, including doubts about whether effective instructions could be written, concerns as to whether we were serving the elite or the masses, and fears that patrons might inadvertently (or even intentionally) alter circulation records. Some staff members objected that the impact on library staff would be negative, with time that should be invested into "real" problems being diverted to explaining these services. Others objected to the appearance that we were attempting to shift our workload to the public. Only success would convert the doubters among the library staff.

Preventing improper use of these transactions was an important concern. The system needed to prevent one patron from unwittingly renewing another's books, since they might assume they had resolved their own overdue status. The renewal transaction was programmed to succeed only if the patron identification number were entered as part of the request, and only if the number entered matched the one in the circulation file for that title and copy.

Saves were even more problematic because saves at OSUL are essentially delayed check-outs. Even without public access to saves, we had witnessed and wanted to avoid "prank" saves. We had also experienced the problem created when patrons placed saves on items already checked out to themselves, generating fines unnecessarily. To discourage saves from being placed maliciously, OSUL does not send via campus mail items saved at publicly accessible terminals; a picture ID card must be presented. Inadvertently placed saves were avoided by programming the system not to accept a save when the request included an identification number that matched one already in the circulation file.

**METHODOLOGY**

To measure the public's acceptance of these capabilities, to determine which command type (and, therefore, which instructional aid) was most frequently used, and to assess the impact of these operations on staff activity, monthly transaction statistics of renewal and save activity from all staff, telephone center, and publicly accessible terminals were reviewed from the fall of 1989 through the summer of 1990. These statistics were then compared with statistics from the academic year 1988-1989, when the features were not available systemwide.

As a matter of coincidence, the method of generating overdue notices had been changed in the fall of 1989 so that each patron class (faculty/staff and student/courtesy card) received notices once every other month. All student patrons and courtesy card holders received notices in September, November, January, March, May, and July. Faculty and staff (including graduate teaching assistants)
received notices in the alternate months. Therefore, to make the 1988–1989 population groups’ statistics comparable to later statistics, months studied were combined into two-month segments (January/February, April/May, July/August, and October/November), roughly reflecting the quarters of the academic year.

FINDINGS
Impact on Staff Activity
Public reaction, reflected in the growing use of the features as recorded in the transaction logs, seemed enthusiastic. More than 33,000 renewal transactions, over 13% of the total number of all renewal transactions, were logged at publicly accessible terminals during the 1989–1990 academic year. Significantly more than 7,000 save transactions, over 19% of the total number of saves placed during the entire year, were placed at public terminals.

During the four quarters before patron-initiated commands were introduced, the telephone center entered 197,928 of the 277,017 renewal commands entered systemwide, peaking at 75% by the end of the summer of 1989 and averaging 71% for the entire year. In the year after the public terminals were authorized to enter these commands, the telephone center handled 151,345 (60%) of the 251,884 total number of renewal commands. Using a standard t-test, this change was found to be statistically significant at the .01 level. Staff terminals (operated by library personnel, but excluding telephone center terminals) were affected, too, although to a lesser degree. In the academic year 1988–1989, staff terminals fielded 28% of the total number of requests; between fall of 1989 and fall of 1990, only 26% of the total number were entered at staff terminals.

For 1988–1989, the percentage of renewals entered at public terminals theoretically should have been zero since public terminals were not programmed to accept renewal transactions before fall of 1989. However, the transaction logs used for this study did not distinguish between successful and failed attempts. Therefore, the handful of renewal transactions entered at public terminals during 1988–1989 probably were failed attempts. In the summer of 1990, one year after the public terminals were authorized to accept renewal commands, the percentage had risen to 16%.

During 1988–1989, the preponderance of saves (roughly 85%) was entered at staff terminals. The number of saves placed at public terminals averaged 2%, although, as previously mentioned, some of these numbers represent failed attempts. However, since patrons in the Health Sciences Library have been able to place saves at public terminals since 1974, some of the save transactions can be assumed to have been successfully entered commands. Once patrons were able to place their own saves, the percentage dropped steadily to 70% during the summer of 1990, and the percentage placed at public and dial-access terminals increasingly rose to 23%. The number of saves placed at the telephone center, averaging 13% of the save transactions during 1988–1989, diminished to 9% during the summer of 1990.

Command Preference
As each record is added to LCS, it is assigned a title number, which is similar to an accession number in that it is composed entirely of numerals. We believed patrons would find a title number easier to use than a call number. To determine whether patrons actually did prefer using title numbers versus call numbers, statistics from dial-access terminals for the postimplementation period only were used. Libraries that had only one circulation desk terminal sometimes diverted activity to public terminals in order to minimize lines of patrons waiting for assistance at circulation desks. Unfortunately, it is not possible to determine which transactions at library public terminals were performed by patrons and which were entered by staff for patrons. Therefore, the dial-access terminals gave a more accurate picture of patron preference.

The guide accompanying the overdue notice described and encouraged the use of title numbers for renewing materials, so it is not surprising that patrons used title numbers more often than call numbers.
to renew books (56% of all renewal transactions were entered using title numbers).

The brochure posted near public terminals and distributed to requestors of dial-access service, on the other hand, described the renewal procedure using call numbers. Patrons who may not have carried an overdue notice and the accompanying guide to a public terminal would have used a brochure, so a fairly substantial number of renewals (32%) were entered using call numbers. The brochure was the only source of instruction regarding the placement of saves. Since it described the procedures using call numbers only, the number of saves placed using call numbers was, naturally, quite high (88%).

Copy-specific saves were discouraged (limited instruction was provided) and blocked for all patron classes except special library-coded identification numbers to avoid the complications that could be created if saves were placed on serial volumes or newly added copies of titles, so those numbers were, as anticipated, low (less than 3%).

Obviously, a little instruction goes a long way, and patron education played an important role in the selection of commands. A more detailed breakdown of transaction logs, isolating the progression from failed to successful or aborted attempt, was not used for this study, but would surely provide guidance in the preparation of other instructional aids or help screens and would provide a mechanism for future research in the area of patron instruction.

CONCLUSION

With surges in circulation resulting from open stacks and automated systems, it is apparent that patrons are eager for improved services, even if improvement requires greater efforts on their parts. Ultimately, however, it is not only the public who is intrigued by these features. Library staff will be encouraged to try more adventuresome experimentation once they realize that the number of patrons served increases even as staff and equipment resources level off and the number of routine activities at staff-assisted stations decreases, allowing expansion of services for more "needy" patrons.

In his 1989 Library Journal article, Richard De Gennaro writes, "We are entering a new era and the only way libraries can conserve what they have built in the past and perform their vital mission in the future is by innovating." The possibilities for expansion of self-serve features include touch-tone phone renewals and patron-initiated check-out using remotely accessible terminals. Resistance and doubt, at least initially, can be expected, but extended access is, as Bernard G. Sloan observed, a "logical, even inevitable, extension of on-site public access," and we should make every effort to make services convenient, empowering patrons to use all available resources.

REFERENCES AND NOTES

The Academic Library Job Market: A Content Analysis Comparing Public and Technical Services
David W. Reser and Anita P. Schuneman

This study analyzes the differences between public and technical services positions as described in job advertisements. Eleven hundred thirty-three jobs advertised by 480 institutions in 1988 were examined using content analysis to determine differences in the levels of computer skills, foreign-language requirements, previous work experience, educational requirements, and minimum salary offered. Analysis of the data included cross-tabulation and tests to determine statistical significance. Technical services position advertisements require more computer skills and previous work experience and are more than twice as likely to require foreign-language skills. Public services candidates are expected to have more advanced degrees. Minimum salaries advertised for the two groups are nearly equal for lower-level positions, but public services salaries rise faster as administrative responsibilities grow. These differences should be considered by persons preparing for or choosing a specialization.

Public and technical services are the two most common divisions in the organizational structure of academic libraries. Librarians frequently choose one or the other of these specialties and stay within it throughout their careers. A recent survey of library school graduates found that while nearly 30% of the new librarians perceived reference jobs as "most desirable," cataloging and other technical services jobs were desired by only 8% and 8%, respectively.¹ As a result, a well-reported crisis in the recruitment of qualified catalogers and other technical services personnel seems to be in force.² Studies have been initiated to examine the problem, and a conference was held on how to recruit better new technical services librarians.³ Numerous articles have appeared in the library literature hypothesizing about the low level of technical services recruitment. These articles blame everything from library school curricula and instruction methods to the perceived tedious nature of technical services jobs.

In casually reading job advertisements for academic librarians, the authors observed what they perceived to be substantial differences in the stated job requirements for technical and public services positions. This study grew out of a desire to examine and document

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these differences, differences that may shed some new light on the recruitment problems concerning technical services. The hypotheses tested in this study are:

- Technical services jobs are more likely to include administrative responsibilities;
- Technical services jobs are more likely to require computer skills;
- Technical services jobs are more likely to require foreign-language skills;
- Technical services jobs are more likely to require previous work experience;
- There will be no difference in the requirement of an American Library Association-accredited degree between public and technical services, but advanced subject degrees will be more often required for public services jobs; and, finally,
- Higher salaries will be associated with public services positions.

**METHODOLOGY**

To ascertain the qualifications necessary for academic librarians, the authors used content analysis to examine jobs advertised in *American Libraries*, *College & Research Libraries News*, and *Library Journal* during 1988. These professional journals were selected because they all enjoy a wide circulation among librarians and are generally regarded as having the most job advertisements. Professional library positions found in the *Chronicle of Higher Education* were also included after a prestudy revealed that their periodical contained more unique jobs (i.e., advertised in only one source) than the others. Although the journals analyzed are used heavily in advertising professional vacancies, not all jobs are nationally advertised. Regionally or locally advertised jobs are not represented in this study.

Advertisements included were from a college or university in the United States (junior and community colleges were excluded) and advertised for full-time positions (35 or more hours per week). Temporary positions were included only if the appointments were to last at least one year.

After eliminating duplicate announcements (jobs found in more than one journal, or more than one issue of the same journal), the authors coded each job into various classifications according to predefined and mutually exclusive categories. Wherever possible, the categories of analysis were obtained from previous content analysis studies found in the library science literature. Some categories were based on a preliminary study. The categories chosen for this study included type of position (job title), geographic region of the institution, presence of administrative duties, computer skills, language skills, previous work experience, educational levels, and salary. The operational definitions for these categories follow in the appropriate discussion sections.

**Previous library work experience is more often required for technical services librarians, which means that fewer entry-level jobs are available in this area.**

Because the authors shared responsibility for coding the data, a test was performed to determine the rate of intercoder reliability, or the rate at which both coders analyzed the same data in the same manner. The first 50 jobs were analyzed by both authors, and the results were compared. This test revealed a very high (98%) level of agreement. The Statistical Package for the Social Sciences (SPSSPC+) was used to analyze the coded data and to provide the descriptive and inferential statistics used to test the hypotheses.

**FINDINGS**

A total of 1,133 positions were identified and analyzed. By far, the largest number, almost half, were reference positions. The next-largest category, cataloging, accounted for 22.8% of the total positions (see table 1).

The classification of these positions into categories of public or technical services was based largely on classifications used in previous content analyses. Six hundred ninety-eight positions, or 62%, were public services, and 435, or 38%, were technical services.
TABLE 1

<table>
<thead>
<tr>
<th>Job Title</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>560</td>
<td>49.4</td>
</tr>
<tr>
<td>Head of Public Services</td>
<td>42</td>
<td>3.7</td>
</tr>
<tr>
<td>Bibliographic Instruction</td>
<td>37</td>
<td>3.3</td>
</tr>
<tr>
<td>Circulation</td>
<td>37</td>
<td>3.3</td>
</tr>
<tr>
<td>ILL</td>
<td>17</td>
<td>1.5</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total Public Services</strong></td>
<td>698</td>
<td>61.6</td>
</tr>
<tr>
<td>Cataloging</td>
<td>259</td>
<td>22.9</td>
</tr>
<tr>
<td>Head of Tech Services</td>
<td>69</td>
<td>6.1</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>54</td>
<td>4.8</td>
</tr>
<tr>
<td>Serials</td>
<td>26</td>
<td>2.3</td>
</tr>
<tr>
<td>Preservation</td>
<td>15</td>
<td>1.3</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>1.1</td>
</tr>
<tr>
<td><strong>Total Tech Services</strong></td>
<td>435</td>
<td>38.5</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>1,133</td>
<td>100.1</td>
</tr>
</tbody>
</table>

The geographic location of each opening was coded to the state level. The state with the largest number of positions was New York, with 126 (10%); Texas was the distant runner-up, with 79 positions (6%). The state with the fewest advertisements was Alaska—no jobs in the state meeting the profile for this state were advertised in these publications during 1988. The states were combined into the geographic regions used by the ALA Survey of Librarian Salaries.7 As table 2 shows, the North Atlantic region offered the largest number of positions and the Southeast the fewest.

Each position advertised was analyzed for the presence of administrative duties (defined as the head or assistant head of a unit, department, section, etc.). Administrative duties were found in 436, or 39%, of the jobs. The breakdown by division shows that 46% of the technical services positions had some type of administrative duties, while only 34% of the public services positions did. This finding suggests that those working in technical services in academic libraries are more likely to have administrative responsibilities as part of their regular job duties. Findings for the variables concerning computer skills, foreign languages, previous work experience, educational requirements, and salary are reported in the following sections.

COMPUTER SKILLS

As academic libraries become more dependent on computerized activities, the degree to which institutions advertise for librarians with computer skills becomes an important concern. For this study, "computer skill" was defined broadly to include knowledge of, or experience with, any of a wide variety of computer applications, including bibliographic utilities, online database searching, CD-ROM, and other microcomputer uses.

Statistically significant differences between public and technical services were found when such skills were examined (see table 3). More than half (52%) of the technical services positions required computer skills, while only one-third (33%) of the public services jobs had this requirement.

These figures demonstrate a much greater demand for this skill among technical services librarians. Considering the extent to which libraries have automated, however, it is surprising that so few positions in either division required computer skills.

Combining the "required" and "preferred/desired" categories yields another perspective: 79% of the technical services positions requested computer skills, compared to 64% for public services. A similar analysis conducted in 1985 by David Block found that 59% of technical services positions requested computer skills, and only 33% for public services.8 Comparing the current study's
TABLE 3
COMPUTER SKILLS, BY DIVISION

<table>
<thead>
<tr>
<th></th>
<th>Public Services</th>
<th>Technical Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Not stated</td>
<td>243</td>
<td>34.8</td>
<td>90</td>
</tr>
<tr>
<td>Preferred</td>
<td>222</td>
<td>31.8</td>
<td>119</td>
</tr>
<tr>
<td>Required</td>
<td>233</td>
<td>33.4</td>
<td>226</td>
</tr>
<tr>
<td>Totals</td>
<td>698</td>
<td>100.0</td>
<td>435</td>
</tr>
</tbody>
</table>

$X^2 = 42.8; \text{ df } = 2; p < .01$

TABLE 4
FOREIGN LANGUAGE REQUIREMENTS, BY DIVISION

<table>
<thead>
<tr>
<th></th>
<th>Public Services</th>
<th>Technical Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Not stated</td>
<td>587</td>
<td>84.1</td>
<td>273</td>
</tr>
<tr>
<td>Preferred</td>
<td>64</td>
<td>9.2</td>
<td>64</td>
</tr>
<tr>
<td>Required</td>
<td>47</td>
<td>6.7</td>
<td>98</td>
</tr>
<tr>
<td>Totals</td>
<td>698</td>
<td>100.0</td>
<td>435</td>
</tr>
</tbody>
</table>

$X^2 = 75.6; \text{ df } = 2; p < .01$

results with Block's reveals that the demand for these skills is increasing in both divisions. The more rapid increase shown in public services may be because widespread use of automation in the form of bibliographic utilities for technical services work has been the norm for many years, while only recently have online databases and other computer applications become available for reference use. Other librarians writing on the effect of automation agree that technical services has experienced the earliest and greatest impact.9

FOREIGN LANGUAGE

The advertisements were also examined to determine the foreign-language requirements. Any mention of foreign languages, whether "required" or "preferred/desired," and the level of skill requested were coded. Significant differences between the divisions were found. As hypothesized, technical services positions were more likely to require these skills than public services—more than three times as likely. Only 7% of the public services jobs required a foreign language, compared to 23% of the technical services positions (see table 4).

This finding suggests that those working in technical services in academic libraries are more likely to have administrative responsibilities as part of their regular job duties.

Although foreign-language skills have been a component in several content analysis studies,10 only Block examined the differences between public and technical services. Further analysis of the data in his study of academic library job announcements reveals that 39% of the technical services positions requested foreign-language skills, compared to 19% of public services positions. Block's data include announcements that either require or prefer a foreign-language skill. Analyzed in a similar way, the current study found that 37% of technical services advertisements mention foreign-language skills, compared to the 16% for public services. While there is some variance in the
positions coded and the source of the advertisements, the figures are remarkably similar. The greater demand for these skills by both divisions in 1988 may suggest a trend toward an increased need for librarians to have a knowledge of foreign languages. Both studies show that technical services librarians are much more likely to need a foreign language. This is probably because general reference service in academic libraries is, for the most part, delivered in English. Academic libraries collect materials in many languages, however, so technical services librarians need skills in these languages in order to process the materials.

None of the earlier content analysis studies reported data on the level of language skill requested. For this study, three skill levels were used—fluent, reading, and working. These levels have been defined by Barbara I. Dewey. Cross-tabulations show no statistically significant differences between skill levels specified for public and technical services. Nevertheless, the findings are interesting. Sixty percent of the positions requesting fluent knowledge of a foreign language were in public services. At the working knowledge level, the findings are reversed (see table 5). A possible explanation for this finding is that, in technical services, working knowledge of a language may be adequate to provide access to the material, while in public services, any direct contact with speakers of other languages demands a higher skill level.

### WORK EXPERIENCE

Each job advertisement was analyzed to determine if previous work experience was mentioned, and then was classified as "work experience required," "work experience preferred/desired," or "no work experience or none stated." For inclusion in the last category, the announcements (1) had no work experience mentioned in the advertisement; (2) had a statement specifying that no experience was necessary; or (3) were labeled "entry level." These classifications are similar to previous content analysis studies.

Some of the job announcements specified the type or level of experience required or preferred (i.e., professional or paraprofessional, specialized or general), but since there was little consistency in the manner in which libraries phrased this information, no attempt was made to distinguish the type of experience when coding for this study.

The findings indicate that minimum qualifications for 18% of all positions advertised could be met by those with no previous experience, 31% had experience desired or preferred, and more than half required some previous library work (see table 6). The heavy bias toward experience-required positions might be attributable to some institutions being reluctant to advertise nationally for entry-level positions.

The cross-tabulation comparing public and technical services reveals that tech-
Technical services positions are more likely to require experience and that a smaller proportion of technical services than public services positions can be considered entry level.

Perhaps this can be explained by comparing the two most represented positions in public and technical services—reference and cataloging. While basic skills are needed by both for entry-level positions, the complex collection of rules involved in cataloging require that more time be spent training a cataloger than training a beginning reference librarian to learn the collection he or she will serve. A beginning cataloger will probably require supervision longer than a beginning reference librarian. This greater investment of time is a substantial economic incentive to seeking catalogers with solid work experience.

This need for previous library work experience should be an important consideration for library school students choosing a specialization. Two recent studies of library and information science students examined library work experience prior to graduate study. Kathleen M. Heim and William E. Moen found that 34% of students had full-time library experience, although only 13% had experience in four-year colleges or universities. Richard C. Pearson and T. D. Webb found that only 17% of library school students had major library experience (full-time or near full-time) when they began their graduate programs.

EDUCATIONAL REQUIREMENTS

As expected, this study found that most (98%) professional positions in public and technical services at academic institutions require a master's degree in library science (M.L.S.) from an ALA-accredited program. This finding can be related to an earlier study which tracked the M.L.S. requirement for twenty years, showing that the need for an ALA-accredited degree has grown dramatically since 1959, although it should be noted that this study examined all academic library jobs, not just public and technical services. Other recent studies have found that the M.L.S. requirement (either accredited or unaccredited) is found in more than 90% of the academic, public, and special library job advertisements. Findings such as these may have led to Phyllis J. Hudson's conclusion that "the ALA-accredited MLS degree is universally recognized as the basic requirement for entry into academic librarianship."

A cross-tabulation of the data concerning the M.L.S. requirement found no statistically significant differences between public and technical services. However, statistical differences were found when considering requirements for advanced degrees, defined as subject master's, law, or doctoral degrees. In fact, advanced degrees were required for the public services positions analyzed in this study five times more often than for technical services positions (see table 7). This finding, which confirms the hypothesis, is not surprising considering the need for subject specializations for many reference positions. From examining the advertisements, it was evident that many more public services positions included a component of book selection or

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**TABLE 6**

**PREVIOUS WORK EXPERIENCE, BY DIVISION**

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Public Services</th>
<th></th>
<th>Technical Services</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>None or not stated</td>
<td>132</td>
<td>18.9</td>
<td>69</td>
<td>15.9</td>
<td>201</td>
<td>17.7</td>
</tr>
<tr>
<td>Preferred</td>
<td>238</td>
<td>34.1</td>
<td>115</td>
<td>26.4</td>
<td>353</td>
<td>31.2</td>
</tr>
<tr>
<td>Required</td>
<td>328</td>
<td>47.0</td>
<td>251</td>
<td>57.7</td>
<td>579</td>
<td>51.1</td>
</tr>
<tr>
<td>Totals</td>
<td>698</td>
<td>100.0</td>
<td>435</td>
<td>100.0</td>
<td>1,133</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 12.5; df = 2; p < .01 \]
TABLE 7
ADVANCED DEGREE REQUIREMENTS, BY DIVISION

<table>
<thead>
<tr>
<th>Division</th>
<th>Public Services</th>
<th>Technical Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>None or not stated</td>
<td>484 69.3</td>
<td>381 87.6</td>
<td>865 76.3</td>
</tr>
<tr>
<td>Advanced preferred</td>
<td>173 24.8</td>
<td>49 11.3</td>
<td>222 19.6</td>
</tr>
<tr>
<td>Advanced required</td>
<td>41 5.9</td>
<td>5 1.1</td>
<td>46 4.1</td>
</tr>
<tr>
<td>Totals</td>
<td>698 100.0</td>
<td>435 100.0</td>
<td>1,133 100.0</td>
</tr>
</tbody>
</table>

\[X^2 = 51.4; \text{df} = 2; p < .01\]

collection development in a specific subject area. Libraries seek to hire individuals with academic qualifications in those areas. Some have noted that it has become almost routine for academic librarians to have advanced degrees in addition to the M.L.S. and that this requirement could become mandatory in the future. In a survey of 30 academic research libraries, Sheila Creth and Faith Harders found that even those libraries that did not require an advanced degree used it as a screening device because the libraries believed it "a good indicator of promise in scholarship and subject mastery required for promotion and tenure."

TABLE 8
MEAN MINIMUM SALARIES, BY POSITION
(IN DESCENDING ORDER)

<table>
<thead>
<tr>
<th>Position</th>
<th>No.</th>
<th>Mean Salary ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head of Public Services</td>
<td>32</td>
<td>31,260</td>
</tr>
<tr>
<td>Other Public Services</td>
<td>4</td>
<td>29,699</td>
</tr>
<tr>
<td>Head of Technical Services</td>
<td>54</td>
<td>26,820</td>
</tr>
<tr>
<td>Preservation</td>
<td>13</td>
<td>24,958</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>44</td>
<td>23,830</td>
</tr>
<tr>
<td>Circulation</td>
<td>26</td>
<td>23,616</td>
</tr>
<tr>
<td>Other Technical Services</td>
<td>11</td>
<td>23,522</td>
</tr>
<tr>
<td>Cataloging (Multiformat)</td>
<td>154</td>
<td>22,837</td>
</tr>
<tr>
<td>Reference</td>
<td>485</td>
<td>22,656</td>
</tr>
<tr>
<td>Serials</td>
<td>21</td>
<td>22,493</td>
</tr>
<tr>
<td>ILL</td>
<td>17</td>
<td>22,327</td>
</tr>
<tr>
<td>Bibliographic Instruction</td>
<td>30</td>
<td>22,272</td>
</tr>
<tr>
<td>Cataloging (Serials)</td>
<td>26</td>
<td>22,181</td>
</tr>
<tr>
<td>Cataloging (Monographs)</td>
<td>43</td>
<td>21,193</td>
</tr>
</tbody>
</table>

Certainly one of the most important elements in a job advertisement from the perspective of a job seeker is the salary. For the purposes of this study, "salary" has been defined as the minimum salary figure listed in the advertisement. Although some previous studies of job advertisements used the midpoint of stated salary ranges as the figure for analysis, only 28% (316) of the jobs analyzed in this study specified a range in the advertisements; while a minimum salary figure was present in 85% (960) of the advertisements (see table 8).

The resulting salary data have certain limitations. First, the salaries listed in the advertisements are presumably only guidelines. In many cases, the actual salary would be higher after negotiations between employer and employee. Second, the data should not be compared with salary data found in listings such as the ALA Survey of Librarian Salaries, the ARL Salary Survey, or Carol L. Learmont and Stephen Van Houten's Library Journal article, "Placements and Salaries," all of which are annual surveys based on actual salaries. Finally, because of the lack of conformity in reporting benefits packages in the advertisements, no attempt was made to adjust the minimum salary figures for nonwage benefits, which should also be of great concern to the job seeker. Because the percentage of advertisements for positions carrying a less-than-12-month appointment was
very small, there was no attempt to adjust salary figures for 9- and 10-month appointments to 12-month figures.

In order to make comparisons between public and technical services more meaningful, three subgroups from each division were identified and compared (see table 9). Catalogers and reference librarians were chosen for comparison because they compose the largest segment of their respective divisions; the other two pairs were selected because they represent a logical career progression from the original pair. The findings indicate that cataloging and reference positions without administrative duties have mean salaries that are nearly identical. For the same positions with administrative duties, the reference advertisements average more than $1,200 more per year. For heads of public and technical services divisions, the mean minimum salary for public services heads was more than $4,400 higher. Although the comparative rise in public services salaries as levels of administrative responsibility grow is evident from examining the means, t-tests show that they are not significantly different, probably due to the high standard deviations found. A possible explanation for this disparity may be the size of technical services departments and the number and level of employees supervised. Many technical services departments are traditionally smaller than public services departments and tend to rely heavily on paraprofessional employees. More research is needed to determine if these or other factors are responsible for the salary differences.

CONCLUSION

This study determined that there are statistically significant differences in the requirements for nationally advertised public and technical services positions in academic libraries. As hypothesized, technical services positions are more likely to include administrative responsibilities than are public services. Technical services jobs are also more likely to require foreign-language skills and computer skills. While public services positions are more likely to require advanced subject degrees in other academic areas, both public and technical services require an ALA-accredited M.L.S. degree at equally high levels. One of the most important findings is that previous library work experience is more often required for technical services librarians, which means that fewer entry-level jobs are available in this area.

There are statistically significant differences in the requirements for nationally advertised public and technical services positions in academic libraries.

If salary should be based on the amount of education, previous experience, and the level and complexity of the skills required for the job, those positions requiring more skills, experience, and education should offer higher salaries. The higher demands for skills and experience for technical services librari-
ans do not seem to be reflected in salary figures. According to James M. Matarazzo, "Our best recruitment tool will be to bring librarians' salaries up to a level where we can attract new and needed members to the profession and retain our experienced members for longer periods of time."  

Those already recruited to the profession—particularly library school students—as well as librarians considering a change in specialization, need to be aware of these substantial differences between public and technical services. Technical services candidates should realize that they will be more frequently asked for foreign-language skills, computer skills, previous library work experience, and administrative skills than their public services counterparts. In addition, the findings, though not conclusive, suggest that technical services librarians will receive lower salaries than public services librarians as they acquire administrative responsibilities. For definitive answers, more research is needed in the area of salary.

This study clearly shows that, on the one hand, technical services librarians are more frequently asked for skills beyond those traditionally learned in library schools, as well as previous work experience. On the other hand, public services candidates more frequently need advanced degrees in a subject area—degrees that represent a substantial investment of time and money. With this in mind, library school educators may need to reevaluate the ways in which they recruit and select students for their programs and prepare them for the job market.

These findings should also be of interest to library administrators and personnel officers who face a shortage of qualified applicants for cataloging and other technical services positions. Perhaps the increased requirements for technical services librarians documented in this study reflect the ideal candidates that library managers would like to hire, not what they are willing to accept. Attracting more applicants may require raising salaries or relaxing certain job requirements and expectations. At a recent symposium that addressed recruitment problems for cataloging positions, one library manager suggested that "in academic libraries, unless there is an institutional mandate, do not require a second master's degree, do not require a foreign language . . . do not require anything that is not necessary for the successful execution of the duties of this office."  

By relaxing requirements, potential candidate pools would grow, and perhaps more library school students could be encouraged to choose technical services specializations, confident that there will be a market for entry-level librarians and a career track that will be professionally and financially rewarding.

REFERENCES AND NOTES


ANNOUNCING

MultiCultural Review
Dedicated to a better understanding of ethnic, racial and religious diversity

If your library is already committed to building a balanced collection of multicultural materials—and increasingly library patrons and school boards are demanding such collections—you know how difficult, time-consuming, expensive, and unsystematic it is to turn to the many special-interest magazines and newsletters that frequently are the only source of guidance.

Now a new journal, MultiCultural Review, has been developed that is a comprehensive, authoritative, affordable and efficient tool for reviewing material on and relating to multiculturalism. It seeks to increase awareness and sensitivity to pluralism through a celebration of diverse cultures and common bonds.

Comprehensive

MultiCultural Review provides reviews organized by broad subject categories; each review will contain thorough citation information as well as an evaluative discussion of the material. The Review offers columns in each issue on serials and poetry and regular articles and reviews on audio/video products, electronic media, and juvenile materials, as well as numerous other topics.

Authoritative

Editor Brenda Mitchell-Powell has recruited recognized figures from the library and scholarly communities to serve on the Advisory Board for the Review, plus other specialists serve as essayists and reviewers. These individuals know the problems involved in creating a useful, representative collection—they’ve had to do it themselves. Let their expertise work for you in shaping your collection through a subscription to MultiCultural Review.

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—Jessie Carney Smith
University Librarian, Fisk University

"At last, a genuine attempt to give serious attention to the serious writing from the many cultures within the United States—such an all-American review has an admirable mission and enormous potential."

—Stanley W. Lindberg
Editor, The Georgia Review
Academic Library Responses to Journal Price Discrimination
Jean Walstrom Haley and James Talaga

The ability of libraries to mitigate the effects of high journal prices is constrained by publishers' ability to use price discrimination. Based upon this theoretical framework, a mail survey of 213 academic libraries was conducted. It is found that success rates for the most commonly tried strategies are proportionately lower than success rates for less commonly used strategies. It is also found that the price of a particular journal does not seem to drive the selection/de-selection decisions in many libraries. These findings are consistent with a price discrimination view of journal pricing. Finally, alternative strategies are suggested that libraries might employ to deal with the joint problems of publishers' price discrimination and high journal prices.

Some journal publishers, particularly those publishing scientific, technical, and medical journals, employ a multiple price policy for their products. This practice is known as price discrimination. Discriminatory pricing by journal publishers assumes two forms: (1) higher prices for institutional subscribers and (2) prices for foreign subscribers that far exceed postage and handling and exchange rate fluctuations. This article briefly discusses the nature and extent of journal price discrimination and reports on a survey of academic library responses to this problem.

Virtually all of the literature on journal pricing deals with the problem of high prices. Only infrequently do discussions of high journal prices consider price discrimination. The ability to engage in price discrimination is central to publishers' ability to charge high prices to libraries. As we noted in a previous article in another journal, all of the criteria necessary for successful price discrimination presently exist in the library marketplace. Publishers can accommodate the need to cover increased costs and realize profits through the use of a dual-pricing structure—one that charges high prices to libraries and lower prices to individuals. Thus, a discussion of price discrimination is central to the more general problem of high serials prices. Based on an analysis of the relationship between high prices and price discrimination, the authors conclude that any strategy used to combat high prices must simultaneously address price discrimination; any strategy that is successful against price discrimination should result in lower prices.

NATURE OF THE PROBLEM

As noted above, price discrimination takes two forms: (1) higher prices for institutions and (2) higher prices for foreign subscribers. In the first case, a publisher sets up multiple prices for different classes of subscribers. Typically, the lowest rates apply to personal, individual

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subscriptions. Publishers then apply a second, higher rate to institutional subscribers such as libraries, schools, corporations, government agencies, and so on.

In the case of foreign subscribers, a publisher sets up multiple prices on the basis of the country to which the subscription will be sent. The price is usually in excess of the additional postage and handling required for overseas delivery and in excess of the amount needed to offset exchange rate fluctuations. In some cases, the subscriber is not allowed choice of currency nor is the subscriber allowed to assume the exchange risk. In some instances, both institutional subscriber and foreign subscriber price discrimination are applied. Since separating the two forms of price discrimination is difficult (for example, foreign publishers may engage in both practices), they will be considered together.

EXTENT OF THE PROBLEM

A number of studies document the extent of price discrimination. While each of these studies is limited either by the number of titles in the study or by the subject area of concern, they demonstrate that the practice of charging libraries higher prices for journals is widespread. For example, Patrick Joyce and Thomas Merz indicate that of 89 academic journals, 66 (74%) charged higher prices to institutions than were charged to individual subscribers.

Evidence exists that publishers price discriminate in a deliberate pattern, charging more for journals that are in higher demand (indexed, heavily cited, etc.). Glenn R. Wittig found that price discrimination for general readership magazines (such as those indexed in the Reader’s Guide) was nonexistent. Joyce and Merz found that the “best” journals do engage in price discrimination, with “best” defined by scholars in the respective disciplines rather than by citation frequency or other measures. Robert L. Houbeck, in a comprehensive study of British publishers, found higher prices charged for journals that were heavily used (cited) or had high value (recommended, heavily used).

Finally, evidence indicates that some publishers seem to engage more actively in price discrimination than others. James C. Thompson indicates that at the University of California, Riverside, 1% of journals account for 25% of annual journal expenditures. He notes that one of the major contributors to the problem is the propensity of publishers to price discriminate.

COST OF THE PROBLEM

Joyce and Merz suggest that the differentials between individual subscription prices and institutional subscription prices are, on average, nearly 200%. Differences vary from discipline to discipline, with chemistry journals having a mean differential of 389% and economics journals having a mean differential of 69%. Deana L. Astle and Charles Hamaker find that U.S. subscribers pay, on average, 39% more than British subscribers, in addition to any already existing price differential for institutional subscribers. If these figures are correct, it could be argued that discriminatory pricing practices of journal publishers consume as much as one-half of an average academic library’s serials budget. A library with a serials budget of $500,000 is thus paying perhaps $250,000 more than individual subscribers. Academic libraries that specialize in the sciences pay a higher proportion in discriminatory price charges, while libraries that specialize in the humanities and social sciences pay a lower proportion.

THE SURVEY: ACTUAL LIBRARY BEHAVIOR

In order to understand better library behavior in response to price discrimination, we conducted a mail survey of academic libraries. The sample consisted of 213 academic libraries: the 107 largest U.S. academic libraries (referred to below as “large” libraries) and a randomly selected sample of 106 academic libraries with 1,000 to 1,200 current journal subscriptions (referred to below as “small” libraries). Excluded from this latter group were medical libraries, community college libraries, and seminary
TABLE 1
RESPONSES ACTUALLY USED BY ACADEMIC LIBRARIES TO MITIGATE THE IMPACT OF PRICE DISCRIMINATION

<table>
<thead>
<tr>
<th>Responses</th>
<th>Have Done This Frequency (%)</th>
<th>Have Not Done This Frequency (%)</th>
<th>Don't Know If Done Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Increased reliance on ILL</td>
<td>96 (75.6)</td>
<td>28 (22.8)</td>
<td>3 (2.4)</td>
</tr>
<tr>
<td>b. Informal resource-sharing agreements</td>
<td>71 (57.7)</td>
<td>49 (39.8)</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>c. Notifying faculty of journal prices</td>
<td>107 (84.9)</td>
<td>18 (14.3)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>d. Formal complaints to publishers (as individual library)</td>
<td>32 (25.6)</td>
<td>87 (69.6)</td>
<td>6 (4.8)</td>
</tr>
<tr>
<td>e. Formal complaints to publishers (as part of group, e.g., ARL, RLG)</td>
<td>62 (49.6)</td>
<td>55 (44.0)</td>
<td>8 (6.4)</td>
</tr>
<tr>
<td>f. Cancellation of subscription (more as a protest than because of high price)</td>
<td>41 (33.9)</td>
<td>75 (62.0)</td>
<td>5 (4.1)</td>
</tr>
<tr>
<td>g. Seeking outside funding for journals</td>
<td>41 (33.9)</td>
<td>78 (62.9)</td>
<td>5 (4.0)</td>
</tr>
<tr>
<td>h. Shifting complete responsibility to faculty for journal selection</td>
<td>13 (10.6)</td>
<td>108 (87.8)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>i. Shifting funds from monograph budget</td>
<td>99 (78.6)</td>
<td>24 (19.0)</td>
<td>3 (2.4)</td>
</tr>
<tr>
<td>j. Reliance on journal donations from individual subscribers</td>
<td>41 (32.5)</td>
<td>83 (65.9)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>k. Increased reliance on document delivery systems (e.g., DIALORDER)</td>
<td>36 (29.8)</td>
<td>82 (67.8)</td>
<td>3 (2.4)</td>
</tr>
<tr>
<td>l. Other</td>
<td>28 (21.9)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

libraries. The sample was selected from the current online version of the American Library Directory.

The ability to engage in price discrimination is central to publishers' ability to charge high prices to libraries.

Each library in the sample was mailed a cover letter explaining the nature of the study, a survey form, and a stamped return envelope. In all cases, the material was sent to the library director, who was asked either to fill the survey out or to forward it to the appropriate person in the library. A follow-up mailing consisting of the same materials was sent to those libraries that did not respond after a reasonable length of time.

One hundred thirty-four libraries returned a total of 128 completed, usable responses. Sixty-five small libraries returned completed survey forms; 63 large libraries returned completed survey forms. The response rates are as follows:

- Total responses: 134 (62.9%)
- Usable responses: 128 (60.1%)
- Small libraries: 65 (61.3%)
- Large libraries: 63 (58.9%)

Although response rates of 60% were somewhat below expectations, the authors are confident of the generalizability of the findings. Libraries that did not respond apparently did so on a random basis.

We recognize that every study is limited in some way. The following limitations in this study are noted:

- Only the very largest libraries and a sample of relatively small libraries were included. Libraries with different
collection sizes, particularly very small academic libraries, may have slightly variant behaviors.  

- The cover letter and the survey explicitly requested that the respondent answer in terms of price discrimination. However, some respondents may have replied in terms of high prices. This does not seem to us to be a serious problem since the strategies used to combat price discrimination and high prices appear to be generally interchangeable. The responses listed in the questionnaire can be used as effectively (or ineffectively) against both price discrimination and high prices. 

- About one-third of the respondents provided no data, incomplete data, or inaccurate data with regard to numbers and prices of titles added and dropped. The 77 libraries that did provide all the data reported the addition of a total of 20,202 titles and the dropping of 27,843 titles. In instances where the numbers reported seemed to be out of line (e.g., dropping more than 10% of the titles in the collection), we verified the results before including them in the survey data.

**FINDINGS: ACTUAL LIBRARY BEHAVIOR**

The survey asked libraries questions about three types of behavior: (1) what practices do they follow to mitigate the impact of price discrimination? (2) what practices do they think would actually work in mitigating discriminatory practices? and (3) what was their actual behavior regarding the adding and dropping of journals?

What practices do libraries actually follow to mitigate the impact of price discrimination? The data are presented in tables 1 and 2. Most libraries have tried a variety of responses, and every
TABLE 3
ACADEMIC LIBRARIES’ PERCEPTION OF SUCCESS RATES OF STRATEGIES AVAILABLE TO MITIGATE THE IMPACT OF PRICE DISCRIMINATION

<table>
<thead>
<tr>
<th>Strategy</th>
<th>A Very Successful Strategy</th>
<th>Neither</th>
<th>Not A Very Successful Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Increased reliance on ILL</td>
<td>59 (48.8)</td>
<td>36 (29.8)</td>
<td>26 (21.5)</td>
</tr>
<tr>
<td>b. Informal resource-sharing agreements</td>
<td>67 (55.8)</td>
<td>21 (17.5)</td>
<td>32 (26.7)</td>
</tr>
<tr>
<td>c. Notifying faculty of journal prices</td>
<td>50 (40.3)</td>
<td>36 (29.0)</td>
<td>38 (30.6)</td>
</tr>
<tr>
<td>d. Formal complaints to publishers (individual library)</td>
<td>17 (13.9)</td>
<td>30 (24.6)</td>
<td>75 (61.5)</td>
</tr>
<tr>
<td>e. Formal complaints to publishers (as part of group—e.g., ARL, RLG)</td>
<td>56 (45.9)</td>
<td>36 (29.5)</td>
<td>30 (24.6)</td>
</tr>
<tr>
<td>f. Cancellation of subscription (more as a protest than because of high price)</td>
<td>54 (43.5)</td>
<td>34 (27.4)</td>
<td>36 (29.0)</td>
</tr>
<tr>
<td>g. Seeking outside funding for journals</td>
<td>15 (12.2)</td>
<td>50 (40.7)</td>
<td>58 (47.2)</td>
</tr>
<tr>
<td>h. Shifting complete responsibility to faculty for journal selection</td>
<td>6 (4.7)</td>
<td>26 (20.8)</td>
<td>93 (74.4)</td>
</tr>
<tr>
<td>i. Shifting funds from monograph budget</td>
<td>29 (23.6)</td>
<td>44 (35.8)</td>
<td>50 (40.7)</td>
</tr>
<tr>
<td>j. Reliance on journal donations from individual subscribers</td>
<td>9 (7.2)</td>
<td>23 (18.4)</td>
<td>93 (74.4)</td>
</tr>
<tr>
<td>k. Increased reliance on document delivery systems (e.g., DIALORDER)</td>
<td>52 (43.0)</td>
<td>46 (38.0)</td>
<td>23 (19.0)</td>
</tr>
<tr>
<td>l. Other</td>
<td>19 (95.0)</td>
<td>0 (0.0)</td>
<td>1 (5.0)</td>
</tr>
</tbody>
</table>

approach has been tried by at least one library.

The three most frequent responses were: notify faculty about journal prices (85% have done this); shift funds from the monograph budget (79%); and increase reliance on interlibrary loan (ILL) (76%). The least frequently tried approaches were shifting complete responsibility for journal selection to faculty (11% have tried this); formal, individual complaints to publishers (26%); and increased reliance on document delivery systems (30%).

Because a library states that it has used an approach does not necessarily mean that the approach was extensively used by all libraries. Data in table 2 report on what were the most frequently and least frequently used library strategies. Every strategy was considered as the most or second most common strategy by at least one library. The two most frequently used responses were increased reliance on ILLs (47% cited this as the most or second most common strategy) and shifting funds from the monograph budget (45% did this as either the most or the second most common strategy). Most respondents used one or both of these strategies. The least commonly used strategies were shifting complete responsibility to faculty (38% considered this their least likely strategy) and relying on individual subscriber donations (26%).

What libraries actually do may not represent what they think is the best strategy (because of budgeting, political, or other constraints). Questions were asked, therefore, about what strategies libraries think would be the most successful in combating the problem of price discrimination, regardless of whether or not they use them. Libraries were free to use whatever standard they thought appropriate in judging success, although the question implied that success meant obtaining some form of price relief. Table 3 indicates that no one strategy stood out as best.
Several respondents indicated that none of the strategies had any success potential. The three strategies thought to be potentially the most successful were informal resource-sharing agreements (56% thought this to be a very successful strategy); increased reliance on ILL (49%); and formal complaints to publishers as part of a group—e.g., Association of Research Libraries, Research Library Group (46%). The three strategies thought to be the least successful were reliance on journal donations from individual subscribers (74% thought this to be a very unsuccessful strategy); shifting complete responsibility for journal selection to faculty (74%); and formal complaints to publishers as individual libraries (62%).

Several interesting comparisons can be made between what libraries think might be successful and what they actually do. Comparing the most frequently used strategies with their perceived success rates, we note some small discrepancies: notify faculty about journal prices (85% have used the strategy; 40% view it as successful); shift funds from the monograph budget (79% have done this; 24% view it as successful); and increase reliance on ILL (76% have done this; 49% view it as successful). Generally, libraries do not consider the strategies they have tried to be successful.

In comparing the least frequently tried approaches with their perceived success rates, we find the following: shift complete responsibility for journal selection to faculty (11% have tried this; 74% view it as unsuccessful); make formal, individual complaints to publishers (26% have tried this; 62% view it as unsuccessful); and increase reliance on document delivery systems (30% have tried this; 19% view it as unsuccessful).

Libraries that had actually tried a particular strategy rated that strategy as more successful than did libraries that had not tried the strategy. For example, while 56% of all respondents thought informal resource sharing was potentially a very successful strategy, 65% of respondents that had actually tried resource sharing thought that it was a very successful strategy. The strategies that elicited the greatest positive response from libraries that had actually tried them were: shift responsibility to faculty (30% that tried this found it to be successful versus 5% of all respondents who felt it was a potentially successful strategy); protest cancellations (68% versus 44%); and make individual complaints (29% versus 14%).

What libraries actually do may not represent what they think is the best strategy.

What was actual library behavior with regard to the adding and dropping of journals? If, on the one hand, libraries worried only about price in selecting journals, increases in journal prices would result in large numbers of canceled journals. If, on the other hand, libraries make selection and deselection decisions based on factors other than price, increases in prices would cause relatively little net decrease in subscriptions. To test this hypothesis, the authors asked libraries to indicate the number of titles both added and dropped during 1987-88 and 1988-89. Also asked were the approximate subscription costs and savings associated with adding and dropping journals. About one-third of respondents either had no available information about this area or had only partial data. As a result, fewer respondents are included here than in the above sections.

Tables 4 through 7 use four categories: $0.00; $0.01-100.00; $100.01-250.00; and over $250.00. The first category includes those libraries that neither spent nor saved money on added or dropped journals for the given year. The second category represents libraries that added or dropped almost exclusively inexpensive journals. Using Thompson's 1989 figures as a guide (mean physical journal prices = $431.62; mean humanities/social science journal price = $76.09), we calculate that a library that dropped ten humanities/social science journals for every one physical science journal...
TABLE 4
MEAN REPORTED PRICES OF JOURNALS ADDED, 1987–88

<table>
<thead>
<tr>
<th>Prices</th>
<th>All Libraries</th>
<th>Large Libraries</th>
<th>Small Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>$0.00</td>
<td>17 (21.5)</td>
<td>13 (40.6)</td>
<td>4 (8.5)</td>
</tr>
<tr>
<td>$0.01–100.00</td>
<td>44 (55.7)</td>
<td>11 (34.4)</td>
<td>33 (70.2)</td>
</tr>
<tr>
<td>$100.01–250.00</td>
<td>15 (19.0)</td>
<td>6 (18.8)</td>
<td>9 (19.1)</td>
</tr>
<tr>
<td>Over $250.00</td>
<td>3 (3.8)</td>
<td>2 (6.2)</td>
<td>1 (2.1)</td>
</tr>
<tr>
<td>Total</td>
<td>79 (100.0)</td>
<td>32 (100.0)</td>
<td>47 (100.0)</td>
</tr>
</tbody>
</table>

TABLE 5
MEAN REPORTED PRICES OF JOURNALS DROPPED, 1987–88

<table>
<thead>
<tr>
<th>Prices</th>
<th>All Libraries</th>
<th>Large Libraries</th>
<th>Small Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>$0.00</td>
<td>22 (26.8)</td>
<td>11 (33.3)</td>
<td>11 (22.4)</td>
</tr>
<tr>
<td>$0.01–100.00</td>
<td>26 (31.7)</td>
<td>7 (21.1)</td>
<td>19 (38.8)</td>
</tr>
<tr>
<td>$100.01–250.00</td>
<td>21 (25.6)</td>
<td>10 (30.2)</td>
<td>11 (22.4)</td>
</tr>
<tr>
<td>Over $250.00</td>
<td>13 (15.9)</td>
<td>5 (15.2)</td>
<td>8 (16.3)</td>
</tr>
<tr>
<td>Total</td>
<td>82 (100.0)</td>
<td>33 (100.0)</td>
<td>49 (100.0)</td>
</tr>
</tbody>
</table>

would average savings of about $100 per journal dropped. Similarly, if a library added ten humanities/social science journals for every one physical science journal, the average increased expenditure per journal would be about $100.

The third category represents those libraries that added or dropped *predominantly inexpensive* journals. A library that dropped three humanities/social science journals for every one physical science journal would save, on average, about $165 for every journal dropped. Finally, the last category represents libraries that added or dropped *predominantly expensive* journals. A library that dropped one humanities/social science journal for every one physical science journal would have average savings of about $250 for every journal dropped. Average costs and savings of journals added and dropped during 1987–88 are presented in tables 4 and 5.

We make two observations: first, few libraries tended either to add or drop predominantly expensive journals. Only 4% of all libraries added journals that had average prices of $250 or more, while only 16% of all libraries dropped journals that had average prices of $250 or more. Second, a large number of libraries reported neither adding nor dropping journals (22% reported adding no journals, 27% reported dropping no journals). Tables 6 and 7 show an increase in cancellation of expensive journals in 1988–89.

The percentage of libraries adding expensive journals remained nearly constant (4%), while the percentage dropping expensive journals rose to 22% of the total. Large libraries were virtually unchanged in terms of dropping expensive journals—most of the increase in cancellation of expensive journals was by smaller libraries. About one-fourth of the responding libraries reported that they were dropping predominantly more expensive journals.

Finally, table 8 shows that during 1987–88, slightly more than 44% of the respondents spent more money for added journals than they saved from journal deletions. Slightly more than 48% saved more money from journal deletions than they spent on new journal
<table>
<thead>
<tr>
<th>Prices</th>
<th>All Libraries</th>
<th>Large Libraries</th>
<th>Small Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>$0.00</td>
<td>14 (15.2)</td>
<td>7 (17.9)</td>
<td>7 (13.2)</td>
</tr>
<tr>
<td>$0.01-100.00</td>
<td>56 (60.9)</td>
<td>18 (46.2)</td>
<td>38 (71.7)</td>
</tr>
<tr>
<td>$100.01-250.00</td>
<td>18 (19.6)</td>
<td>12 (30.8)</td>
<td>6 (11.3)</td>
</tr>
<tr>
<td>Over $250.00</td>
<td>4 (4.3)</td>
<td>2 (5.1)</td>
<td>2 (3.9)</td>
</tr>
<tr>
<td>Total</td>
<td>92 (100.0)</td>
<td>39 (100.0)</td>
<td>53 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Prices</th>
<th>All Libraries</th>
<th>Large Libraries</th>
<th>Small Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>$0.00</td>
<td>21 (25.3)</td>
<td>12 (37.5)</td>
<td>9 (17.6)</td>
</tr>
<tr>
<td>$0.01-100.00</td>
<td>27 (32.5)</td>
<td>6 (18.8)</td>
<td>21 (41.2)</td>
</tr>
<tr>
<td>$100.01-250.00</td>
<td>17 (20.5)</td>
<td>9 (28.1)</td>
<td>8 (15.7)</td>
</tr>
<tr>
<td>Over $250.00</td>
<td>18 (21.7)</td>
<td>5 (15.6)</td>
<td>13 (25.5)</td>
</tr>
<tr>
<td>Total</td>
<td>83 (100.0)</td>
<td>32 (100.0)</td>
<td>51 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change</th>
<th>1987-88</th>
<th>(%)</th>
<th>1988-89</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased over $10,000</td>
<td>7</td>
<td>(10.0)</td>
<td>12</td>
<td>(15.0)</td>
</tr>
<tr>
<td>Increased $1,000-9,999</td>
<td>18</td>
<td>(25.7)</td>
<td>18</td>
<td>(22.5)</td>
</tr>
<tr>
<td>Increased $1-999</td>
<td>6</td>
<td>(8.6)</td>
<td>10</td>
<td>(12.5)</td>
</tr>
<tr>
<td>Budget unchanged $0</td>
<td>5</td>
<td>(7.1)</td>
<td>7</td>
<td>(8.8)</td>
</tr>
<tr>
<td>Decreased $1-999</td>
<td>10</td>
<td>(14.3)</td>
<td>8</td>
<td>(10.0)</td>
</tr>
<tr>
<td>Decreased $1,000-9,999</td>
<td>15</td>
<td>(21.4)</td>
<td>15</td>
<td>(18.7)</td>
</tr>
<tr>
<td>Decreased over $10,000</td>
<td>9</td>
<td>(12.9)</td>
<td>10</td>
<td>(12.5)</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>(100.0)</td>
<td>80</td>
<td>(100.0)</td>
</tr>
</tbody>
</table>

The above data lead us to the following conclusions: (1) Libraries appear to make selection and deselection decisions based on factors other than price alone and are hence vulnerable to price discrimination. (2) In 1987–88, only one in six libraries canceled predominantly expensive journals. If the number adding predominantly expensive journals is refigured in, about one in ten libraries tended to deselect expensive journals. During 1987–88, 90% of libraries tended to deselect less-expensive journals. (3) In titles. Only 13% of all respondents saved more than $10,000. During 1988–89, 50% spent more money for added journals than they saved from journal deletions, and 42% saved more money from journal deletions than they spent on added titles. Only 13% saved more than $10,000.
1988–89, only one in four libraries deselected predominantly expensive journals. After adjusting for additions, about one in five libraries tended to deselect expensive journals. Thus, 80% of libraries during 1988–89 tended to deselect less-expensive journals.

CONCLUSIONS AND IMPLICATIONS

A discrepancy exists between what libraries think are potentially effective strategies and what strategies they actually use. The two most commonly used strategies, increased reliance on ILL and shifting funds from monographs, are not viewed as being the most likely to be successful. In fact, shifting funds from monographs is viewed as being one of the least likely to be successful strategies. The two strategies believed to have the most potential for success, protest cancellations and group complaints to publishers, are not commonly used strategies. Fewer than 10% of libraries used protest cancellations, and fewer than 2% used group complaints.

The two most commonly used strategies, increasing reliance on ILL and shifting funds from monographs, are not viewed as being the most likely to be successful.

Libraries that actually try a strategy consider it to be more successful than do libraries that have not tried the strategy. This does not imply that every strategy tried will be successful. However, the strategies open to libraries are more potentially successful than they think.

Although libraries have expressed concern about the effects of price discrimination (such as high prices), few libraries do anything about it. This lack of reaction reinforces publishers’ perceptions that prices can be raised without fear of library retaliation. Evidence about library selection and deselection practices supports the position that libraries are vulnerable to price discrimination.

Finally, despite concern about high prices, many libraries actually increased spending on new journal titles (this excludes the increased costs due to inflation). Apparently, few libraries practice a vigorous program of journal title deletions in an effort to decrease their serials budgets.

The ability of libraries to deal with high journal prices depends on the ability of libraries to modify or reduce the power that journal publishers now have over them. The relationships between the library and the faculty as well as the relationship between the library and the publisher needs to be changed. Based on what libraries perceive to be successful strategies and on what libraries actually do, the following would appear to have some potential for success:

1. Libraries could engage in protest cancellations of expensive journals. If this is to be an effective strategy, however, the number and frequency of library actions needs to be substantial. Sporadic, irregular, and unpulicized cancellations are unlikely to have much, if any impact on publishers.

2. Library actions (along with the rationale) need to be made known to the faculty. If the library wants to reduce the ability of publishers to price discriminate, the library needs to integrate the faculty more closely into the journal management process. Faculty need to have explicit and detailed knowledge of serials pricing practices in order to view price discrimination as a problem shared by the entire academic community.

3. Increased resource sharing, either through formal methods, such as ILL and formalized resource-sharing agreements, or through informal agreements, should be used to reduce the cost of journals to any particular library. We note, however, that resource sharing does not reduce journal prices to libraries that are not part of resource-sharing agreements. This seems to us to be a partial solution.

4. Libraries may wish to enter into price negotiations with journal publishers. While a publisher may be willing to
negotiate with one or a few libraries, a large number of negotiations would substantially increase the publisher's transactions costs (as well as each library's) and may result in a willingness to decrease prices in order to avoid negotiation costs. Again, for this to be an effective strategy, libraries would need to be willing and able to carry through on a threat to drop the journal.

While the above strategies may not be successful for all libraries, we are convinced that failure to change library behavior will ensure that the problem of price discrimination and the attendant high prices will not disappear in the near term.

REFERENCES AND NOTES


11. This argument is further developed in Talaga and Haley, "Marketing Theory," passim. In essence, since libraries frequently act as information intermediaries, they do not often directly control the demand for any given journal title.

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Research Notes
User Characteristics of Keyword Searching in an OPAC
Pat Ensor

Keyword and Boolean searching modes are now becoming more commonly available on online public access catalogs (OPACs), and questions have arisen regarding their use by library patrons. Which patrons use keyword searching, and which do not? This study attempts to begin providing answers to this question in the context of an academic library that uses the Northwestern Online Total Integrated System (NOTIS) online catalog.

Many Northwestern Online Total Integrated System (NOTIS) libraries that had their online catalog available prior to the advent of keyword searching tended to look upon the capability as a frill, an advanced function to be taught after other forms of searching. This neglect was encouraged initially by slow response time for keyword searches, by questions about how many people could use keyword simultaneously, and by the complexities of keyword. This unenthusiastic response to keyword searching was not, indeed, limited to NOTIS libraries; librarians at other institutions approached it in a similarly cautious manner.1

After the keyword mode became available at Indiana State University (ISU) Libraries, questions began to arise. The percentage of searches performed in keyword mode rose steadily, from 15.6% in November 1988, to 21.4% in November 1989, when it leveled off. Did certain users prefer keyword searching all the time and not use the other modes? Who tended to use keyword searching more?

The author studied patron perceptions and demographics related to keyword searching on NOTIS to try to answer some of the questions posed above. The guiding thesis of the study is: The use or nonuse of keyword searching on NOTIS is related to variables such as age, computer experience, subject area, status, and frequency of searching the OPAC. (The full project report, submitted to ERIC, details other aspects of patron keyword searching.)2

The findings of this study represent users’ early reception of keyword searching. Future studies could compare these findings to similar data collected about keyword searching and user reactions to proposed OPAC features.

The University. ISU has approximately 9,000 undergraduate and 2,000 graduate students. A few doctorates are

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offered in the fields of education and psychology. Master's degrees are awarded in all schools, including the college of arts and sciences, and the schools of business, education, nursing, technology, and health, physical education, and recreation. The university has approximately 700 faculty members.

The Library. ISU Libraries include a main library, Cunningham Memorial Library, as well as a science library that covers chemistry, biology, and geology. Since March 1985, the ISU Libraries have made the NOTIS online catalog, LUIS, available to the public. It lists more than 99% of the library's holdings, with 1,751,000 bibliographic records. It also includes the holdings of two nearby smaller institutions—Rose-Hulman Institute of Technology, an engineering school, and St. Mary-of-the-Woods College, a liberal arts institution.

Keyword Searching. ISU Libraries made the keyword mode of searching available on LUIS in the late spring of 1988; thus, it had been available for almost two years when this study was conducted. Prior to the introduction of keyword/Boolean searching, NOTIS had three modes of searching available: author, title, and subject.

Keyword searching on LUIS is executed in its most basic form by entering "k=[word or phrase]." More elaborate searching may be done using the syntax of BRS search language. LUIS has a series of eight easily accessed keyword help screens. The keyword searching mode is listed on the LUIS welcoming screen, along with author, title, and subject searching options.

LITERATURE REVIEW

The author did not discover similar attempts to survey patrons extensively about their use of keyword searching on any online catalog. A relevant Council on Library Resources study report appeared in November of 1982; Joseph Matthews surveyed users of six computer systems in seven libraries, including the Mankato State University's (MSU's) OPAC, which provided early keyword searching. About 45% of the searching on MSU's catalog was keyword searching, as compared with about 19% subject heading searching. The overall Matthews report about the massive 29-institution CLR OPAC study reports that keyword searching was used frequently when available but was not usually a requested future enhancement where it was not. Systems with the keyword/Boolean feature logged more subject searching and were more successful in known-item searching than systems without keyword.

The percentage of respondents who learned of the availability of keyword searching from library instruction classes or workshops drops as individuals progress from underclassmen to upperclassmen and from graduate students to faculty.

In 1983, researchers at Bell Laboratories built two online catalog systems for their library: one was a menu-based system, using a hierarchy based on Dewey Decimal categories, and one allowed keyword searching of author, title, and subject heading terms. The keyword system was overwhelmingly preferred (80% of all searches). Keyword searchers tended to do simple one- to two-word searches. The users of this system would, of course, have been quite sophisticated technologically.

In 1984, Nancy C. Kranich and others from New York University reported the results of interviews carried out with patrons who used the library's Geac OPAC, the card catalog, or both to find information. Of 34 OPAC users, only one performed a keyword search. The researchers believed that the users were not generally aware of this option. The authors hypothesized that the users confused keyword and subject heading searches.

In a study that surveys faculty use of subject searching in card and online catalogs at the University of Houston-University Park, Carolyn Frost found that 27.5% of the faculty used keyword searching "always" or "frequently." She
noted that "the percentage of frequent users of the keyword search was twice as high among humanities and social science faculty as it was among science and engineering faculty." An interesting United Kingdom study about retrieval modes for pictorial information on videodisc shows that 51% of the users prefer keyword modes to browsing and using a joystick. Of the four groups of users, librarianship students and librarians were twice as likely to do a keyword search as where school children and postgraduate students.

METHODOLOGY

The Questionnaire

The author concluded that a questionnaire would be the most useful and feasible way to obtain the information desired. Questionnaires have some shortcomings but are more affordable than individual interviews. Because the author wished to have a large sample size to work with, individual interviews were not feasible.

Seventy-three percent of all respondents had done a keyword search, and more than 20% of those who had not done a keyword search planned to do one.

The final form of the survey had 27 questions, with one question having ten parts. Questions 1 through 16 were designed for both users and nonusers of keyword/Boolean, and the first ten of them were designed to elicit demographic and other user characteristics. Question 17 was aimed at nonusers of keyword/Boolean searching, and the rest were written for users of keyword/Boolean searching. (Copies of the questionnaire are available from the author.)

Questionnaire Administration

The author personally administered the questionnaire from the end of January 1990 to April 1990. Users of the main LUIS terminal cluster on the first floor of the university library were approached and asked to fill out the survey, primarily during evenings and weekends. Library workers were not approached to answer the questionnaire. An attempt was made to approach anyone using a LUIS terminal during the sampling period, although with only one questionnaire administrator, some users were inevitably missed. Even though the campus has a science library, questionnaires were not given out there because the collection covers a narrow range of subject areas. Nevertheless, approximately 25% of the respondents were in a science or technology area anyway. The only exception to the above procedure was made in an attempt to elicit adequate faculty response. Because few faculty members were doing searches at the main cluster, the author chose approximately 60 faculty in all disciplines that she knew to be LUIS searchers and mailed the questionnaire to them. This effort produced a nearly 50% response rate. Ultimately, 400 usable questionnaire responses were obtained. The author estimates the response rate to have been about 35%. The data retrieved were processed using the Kwikstat statistical program.

RESULTS FOR DEMOGRAPHIC AND OTHER USER CHARACTERISTICS

Keyword Search Performance

Seventy-three percent of all respondents had done a keyword search, and more than 20% of those who had not done a keyword search planned to do one. These figures indicate widespread knowledge of the concept of keyword searching and its availability. The user characteristics varied significantly with performance of keyword searching, future keyword searching plans, or lack of keyword searching.

Status

Status (type of student, faculty) proved to be a useful factor for classifying respondents. The raw numbers and percentages are shown in table 1. Aggregate totals are 312 students (78%) and 60 faculty (15%). Analysis using only ISU respondents showed meaningful variation with use of keyword searching. In some
A steady regression in keyword use from ISU underclassmen to faculty exists (see table 2). More than one-third of the ISU faculty responding had not used keyword searching, versus no more than about one-fourth of any group of students.

Because other survey results showed that the different groups have not used LUIS for significantly different lengths of time and because freshmen and sophomores used LUIS significantly less frequently, LUIS experience would not seem to account for this difference.

One possibility is that faculty are doing more known-item searching. One question in this study asked what respondents entered on their last LUIS search. The answers did not vary significantly based on status, but faculty tended to do more author searching and less subject searching. Thirty-six percent of ISU faculty reported doing an author search the last time they used LUIS, versus 13% to 16% of the different student groups. Only 44% of the ISU faculty reported searching for a Library of Congress subject heading or topic words, versus 54% to 62% of the students.

Another possibility is that faculty have not received as much instruction in this area. The percentage of respondents who learned of the availability of keyword searching from library instruction classes or workshops drops as individuals progress from underclassmen to upperclassmen and from graduate students to faculty. Almost half (48%) of ISU freshmen and sophomores learned of keyword instruction classes and workshops, compared with 26% of juniors and seniors, 27% of graduate students, but only 14% of the faculty. ISU freshmen and sophomores had been introduced to keyword searching in their English classes in the last two years, but the other groups have been taught in the same way.

**Age Range**

Age differences are similar to the status-based differences. In some cases, older respondents from a returning student population performed similarly to
faculty. The small under-18 category was dropped, and the highest three categories, 41 to 50, 51 to 60, and 61 or above, were collapsed (see table 3).

Whether or not the respondent has performed keyword searching varies significantly with age, and the results are somewhat similar to those for status. At the highest level, 87% of the 18- to 20-year-olds had done keyword searching. The range that searched at the lowest rate was 23- to 30-year-olds, at 39 of 60 (65%). Fifty-one of 69 (74%) 31- to 40-year-olds had done keyword, and 35 of 50 (70%) of the oldest range had done it. Around 70% of all the older groups had done keyword searching, versus almost 90% of the youngest group.

**Frequency of LUIS Use**

Question six elicited the reported frequency of LUIS use. Basic numbers for different replies are given in table 4. The tendency to have done a keyword search drops steadily with less frequent LUIS use. Ninety percent of those who search LUIS a few times a week have done keyword searching. Of those who searched LUIS no more than a few times a month, 83% had done a keyword search, as had only 70% of those who searched it no more than a few times a year. Even 69% of those who had used LUIS only a few times had done keyword searching. Forty-four percent of those who had never searched LUIS before that day had, nonetheless, still done a keyword search.

The most frequent users of LUIS were much more likely than other groups to say they planned to use keyword again—more than 90% (see table 5). Generally, the lower the frequency of LUIS use, the less likely the respondent was to plan to use keyword searching again. The steady drop was interrupted by those who had searched LUIS only a few times; a higher percentage of them planned to do a keyword search again than those who searched LUIS a few times a year. The less frequent the use of LUIS, the more ambivalent the respondent was about whether keyword searching would be used again.

**Years of LUIS Experience**

Thirty-one percent of the respondents had zero to one years of LUIS experience, 30% had one to two years, and 39% had three to five years. Years of LUIS experience related to a difference in reasons for not having used keyword searching. Because very small numbers were being dealt with, however, the results should be looked at with caution (see table 6).

---

**TABLE 4**

<table>
<thead>
<tr>
<th>FREQUENCY OF LUIS USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Several times a week</td>
</tr>
<tr>
<td>No more than several times a month</td>
</tr>
<tr>
<td>No more than several times a year</td>
</tr>
<tr>
<td>Only a few times</td>
</tr>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Unusable answer</td>
</tr>
</tbody>
</table>

**TABLE 5**

<table>
<thead>
<tr>
<th>FUTURE KEYWORD SEARCHING PLANS BY FREQUENCY OF LUIS USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Several times/week</td>
</tr>
<tr>
<td>Several times/month</td>
</tr>
<tr>
<td>Several times/year</td>
</tr>
<tr>
<td>Only a few times</td>
</tr>
<tr>
<td>Never</td>
</tr>
</tbody>
</table>

Percentages do not always equal 100% due to rounding.
TABLE 6
REASONS FOR NOT USING KEYWORD SEARCHING BY LENGTH OF LUIS EXPERIENCE

<table>
<thead>
<tr>
<th>Reason</th>
<th>0–1 Yrs. (%)</th>
<th>1–2 Yrs. (%)</th>
<th>3–5 Yrs. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is too difficult to learn</td>
<td>4 (10)</td>
<td>0</td>
<td>3 (6.7)</td>
</tr>
<tr>
<td>It takes too long to learn</td>
<td>0</td>
<td>0</td>
<td>3 (6.7)</td>
</tr>
<tr>
<td>I don't need to; other forms of searching are adequate for me</td>
<td>10 (25)</td>
<td>13 (40.6)</td>
<td>10 (22.2)</td>
</tr>
<tr>
<td>I don't search very often, so I wouldn't remember how to do it</td>
<td>2 (5)</td>
<td>3 (9.4)</td>
<td>6 (13.3)</td>
</tr>
<tr>
<td>I haven't been able to go to a library instruction session on it</td>
<td>8 (20)</td>
<td>1 (3.1)</td>
<td>3 (6.7)</td>
</tr>
<tr>
<td>There hasn't been staff available to assist me</td>
<td>2 (5)</td>
<td>2 (6.3)</td>
<td>0</td>
</tr>
<tr>
<td>I wasn't aware of this form of searching at all</td>
<td>14 (35)</td>
<td>10 (31.3)</td>
<td>20 (44.4)</td>
</tr>
<tr>
<td>Its response time is too slow</td>
<td>0</td>
<td>3 (9.4)</td>
<td>0</td>
</tr>
</tbody>
</table>

Percentages do not always have to equal 100% due to rounding.

No one with one to two years' experience said keyword searching is too difficult to learn, as opposed to 7% for the more experienced and 10% for the less experienced. The only people who said keyword searching takes too long to learn were those who had been using LUIS for three to five years. A comparatively high percentage of those with the longest LUIS experience said they did not search often and tended to forget how to do keyword searching. Understandably, a comparatively high percentage of the least experienced group said that they had not had a chance to go to a library instruction session on keyword searching. A surprisingly high percentage of the most experienced LUIS searchers said they were not aware of keyword searching at all.

Previous Computer Experience

Respondents' previous computer experience is reported in table 7. Those who had no other computer experience were less likely to plan to do keyword searching in the future. Sixty percent of those with no other computer experience said they planned to do keyword searching in the future, as opposed to 78% of those who had other computer experience. Eight percent did not know, as opposed to 2% of the latter group. Thirty-two percent of those who had not searched other computer systems did not plan to do keyword searching in the future, versus only 20% of those who had searched other systems.

Users of OCLC (who were probably in a beginning library science course, where they have to do OCLC and keyword exercises) were much more likely to have used keyword searching on

TABLE 7
PREVIOUS COMPUTER EXPERIENCE

<table>
<thead>
<tr>
<th>Experience</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No other computer systems</td>
<td>37 (9.3)</td>
</tr>
<tr>
<td>Another library's computerized catalog</td>
<td>88 (22)</td>
</tr>
<tr>
<td>CD-ROM databases (like ERIC, ABI/Inform)</td>
<td>140 (35)</td>
</tr>
<tr>
<td>Online dial-up databases (like Dialog, BRS)</td>
<td>32 (8.0)</td>
</tr>
<tr>
<td>OCLC terminal</td>
<td>41 (10.3)</td>
</tr>
<tr>
<td>Computer at home</td>
<td>211 (52.8)</td>
</tr>
<tr>
<td>Computer at work</td>
<td>185 (46.3)</td>
</tr>
<tr>
<td>Computer at school for a noncomputer course</td>
<td>178 (44.5)</td>
</tr>
<tr>
<td>Computer at school for a computer course</td>
<td>191 (47.8)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (3.8)</td>
</tr>
</tbody>
</table>

Each percentage given is from the total 400 respondents, since any number of options could be checked.
Users of a school computer for a non-computer course were somewhat more likely to have done a keyword search than the rest of the respondents—85%, as opposed to 75%. Users of a school computer for a computer course were more likely to have done a computer search—86% had, versus 73% of those without that experience.

Those using a computer for a computer course varied in their future keyword-searching plans. Eighty-three percent planned to do keyword searching in the future, compared with 71% of the rest of the respondents. Only one person with this kind of computer experience reported plans to do another keyword search, whereas nine of the other respondents did plan another search. Twenty-five percent of those without this type of computer experience said they did not know if they would do another keyword search, versus 17% of those with school computer experience in a computer course.

**Table 8**

<table>
<thead>
<tr>
<th>Entry Type</th>
<th>No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author's full or last name</td>
<td>67</td>
<td>(16.8)</td>
</tr>
<tr>
<td>Author's first name</td>
<td>3</td>
<td>(.8)</td>
</tr>
<tr>
<td>Complete title or the first part of it</td>
<td>86</td>
<td>(21.5)</td>
</tr>
<tr>
<td>Part of the title other than the first part</td>
<td>5</td>
<td>(1.3)</td>
</tr>
<tr>
<td>Library of Congress Subject Heading</td>
<td>69</td>
<td>(17.3)</td>
</tr>
<tr>
<td>Topic words</td>
<td>150</td>
<td>(37.5)</td>
</tr>
<tr>
<td>Unusable response</td>
<td>13</td>
<td>(3.3)</td>
</tr>
<tr>
<td>Blank</td>
<td>7</td>
<td>(1.8)</td>
</tr>
</tbody>
</table>

Percentages do not always equal 100% due to rounding.

**LUIS Search Type**

Table 8 shows the entry type of the last LUIS search executed. Performance of keyword searching varied significantly (to .05) with this factor (see table 9). Non-keyword users tended to search by title or the first part of the title more than the keyword users. Nonkeyword searchers also did substantially more searching with LC subject headings than did keyword searchers, and they did less topic word searching (searching by words that are not necessarily LC subject headings), but they still did some; more than one-fourth of them checked this option.

**Keyword Searching Plans**

Seventy-six percent planned to do a keyword search in the future. Only 3% did not plan to; 21% did not know. Ninety-one percent of those who had done keyword searching before planned to do it again in the future. Only 1% of them did not plan to do it again; 8.2% did

**Table 9**

<table>
<thead>
<tr>
<th>Entry Type</th>
<th>Keyword Srch. Done No.</th>
<th>(%)</th>
<th>Keyword Srch. Never Done No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author’s full or last name</td>
<td>56</td>
<td>(18.4)</td>
<td>11</td>
<td>(14.7)</td>
</tr>
<tr>
<td>Author’s first name</td>
<td>3</td>
<td>(1)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Complete title or first part of it</td>
<td>63</td>
<td>(20.7)</td>
<td>23</td>
<td>(30.7)</td>
</tr>
<tr>
<td>Part of the title other than first</td>
<td>5</td>
<td>(16.4)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Library of Congress Subject Heading</td>
<td>48</td>
<td>(15.7)</td>
<td>21</td>
<td>(28)</td>
</tr>
<tr>
<td>Topic words</td>
<td>130</td>
<td>(42.6)</td>
<td>20</td>
<td>(26.7)</td>
</tr>
</tbody>
</table>

Percentages do not always equal 100% due to rounding.
TABLE 10
REASONS FOR NEVER HAVING USED KEYWORD SEARCHING

<table>
<thead>
<tr>
<th>Reason</th>
<th>No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is too difficult to learn</td>
<td>7</td>
<td>(5.9)</td>
</tr>
<tr>
<td>It takes too long to learn</td>
<td>3</td>
<td>(2.5)</td>
</tr>
<tr>
<td>I don’t need to; other forms of searching are adequate for me</td>
<td>34</td>
<td>(28.6)</td>
</tr>
<tr>
<td>I don’t search very often, so I wouldn’t remember how to do it</td>
<td>12</td>
<td>(10.1)</td>
</tr>
<tr>
<td>I haven’t been able to go to a library instruction session on it</td>
<td>12</td>
<td>(10.1)</td>
</tr>
<tr>
<td>There hasn’t been staff available to assist me</td>
<td>4</td>
<td>(3.4)</td>
</tr>
<tr>
<td>I wasn’t aware of this form of searching at all</td>
<td>44</td>
<td>(37)</td>
</tr>
<tr>
<td>Its response time is too slow</td>
<td>3</td>
<td>(2.5)</td>
</tr>
</tbody>
</table>

* Respondents could check up to two items; percentage is of total number of reasons checked, 119.

Percentages do not always equal 100% due to rounding.

not know. More interestingly, 21% of those who had not done a keyword search before planned to do one in the future. Only 9% said they would not ever be doing one. Seventy-one percent were not sure. This means that 84% of the respondents had either done a keyword search or were planning to do one. Only 2% of the respondents had never done a keyword search and never planned to.

Reasons for Never Having Done Keyword Searching

Respondents were asked to check up to two reasons for never having done a keyword search. The most frequently cited response was that people were unaware of the existence of keyword searching. This implies that these people might do keyword searching in the future and not that they are opposed to it (see table 10).

CONCLUSION

The reported use of keyword searching in this study varies significantly with status, age range, frequency of LUIS searching, use of an OCLC terminal, school computer use for computer and noncomputer courses, and type of last LUIS search entry. Faculty, older respondents, and less-frequent LUIS searchers were less likely to have done keyword searching. Those who had used an OCLC terminal or a school computer used keyword more, as had those who said their last LUIS search entry was for topic words.

Those who searched LUIS frequently, those who had used a school computer, and those who had already done a keyword search were more likely to plan to do one in the future. Those who had never used a computer system before were less likely to plan to do a keyword search in the future.

Those who had not done keyword searching before were quite likely not to have been aware of its existence, but some thought that they did not need to do it. Whether or not they have done keyword searching seems to relate most to age factors and computer experience, with gender and subject area not relating to significant variations in keyword searching usage. Future studies could profitably examine the use of keyword search capabilities in other OPACs, among other audiences, and with periodical article databases to see if these conclusions are supported.

REFERENCES AND NOTES

2. *Keyword/Boolean Searching on an Online Public Access Catalog: Patrons and Their Perceptions* has been submitted as an ERIC document.


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Letters

To the Editor:

We have some additional information on a trend reported in our article, "ARL Directors: Two Decades of Changes," College & Research Libraries 52:241-54 (May 1991). In the period 1985–1989, there was an unusual pattern of gender changes, with 54 percent of the new hires replacing a director of the opposite gender. It appeared that male directors were being replaced by females, and female directors were being replaced by males. To ascertain if this pattern is continuing, we analyzed the comparable data for the period July 1, 1990 through June 30, 1991.

During that period, ten directorships were filled with permanent appointees. Of the ten, seven or 70 percent were gender switches: one was a male replacing a female director and six were females replacing male directors. The data indicate that the pattern of replacement by opposite gender is continuing, as is the trend of an increase in the percentage of ARL directors who are female. Female applicants still have a better chance of being offered a position in an institution that had previously been directed by a male than one that had a female director. Male applicants continue to have an equal chance of replacing a male or a female director.

MARCIA J. MYERS
Associate Dean of Libraries for Administrative Services
University of Tennessee, Knoxville
PAULA T. KAUFMAN
Dean of Libraries

To the Editor:

While any librarian concerned with public services must be disturbed by the results of the Elzy, Nourie, Lancaster, and Joseph study ("Evaluating Reference Service in a Large Academic Library," [C&RL 52:454-65 (September 1991)]), I am even more troubled by what the article left out. What was presented as a dispassionate academic analysis of performance levels might equally be characterized as a violation of the professional relationship between department head and reference librarian. The authors seem oblivious to the ethical questions raised by using student patrons as anonymous performance evaluators, and the suggestion that the results of such a study might be used to make salary and tenure decisions would be ludicrous were it not so appalling. Can ten transactions at a busy reference desk possibly be a statistically significant sample? The authors do not present us with sufficient data to judge, but I very much doubt that that is the case.

I for one would be very interested in hearing from the reference librarians at Illinois State University's Milner Library. I am sure that they would be able to offer your readers a trenchant commentary on the merits and methodology of this study.

CHARLES J. TEN BRINK
Head of Public Services
University of Chicago

To the editor:

Mr. Ten Brink raises no issue that we have not discussed again and again ourselves. An in-depth response to his letter could easily fill yet another article for your journal. Our article was written to report the methodology and results of what started out to be
an in-house research project with some practical value. Most research reports are indeed dispassionate and academic. Discussing the concerns raised in Ten Brink’s letter would necessarily take the form of an opinion article or a personal account.

Public university administrators across the state of Illinois are requiring increased accountability among their faculty for teaching effectiveness. On our campus every faculty member except the library faculty must undergo anonymous performance evaluations filled out by students near the end of each term. These evaluations are used as an important part of the process to distribute merit pay, as well as in tenure recommendations. Evaluation of reference effectiveness is a logical parallel to the anonymous performance evaluations which scrutinize teaching effectiveness. Ten Brink may not be aware that the tenure process generally involves from three to seven years. Should the library faculty decide to incorporate some form of reference evaluation in the tenure recommendation, documentation of performance using a manageable number of questions spanning three to seven years may indeed be valuable as one component in determining a tenure recommendation—particularly in the case of consistently poor performance.

The question of the ethics of unobtrusive evaluation has been debated since the method was first developed over twenty years ago and was debated before and after this project by Milner faculty. Ethical questions were discussed at some length both among the researchers, in general public service faculty meetings, and in a two-day workshop on reference effectiveness conducted by Dr. Thomas Childers for our reference librarians in October of last year. There was, of course, no resolution to the discussion—but all were given the chance to voice concerns.

While no one really enjoys evaluation from either end of the process, it is a necessary activity—and one which we feel is far better accomplished from within the profession and within the institution than by consultants from outside.

Milner Library has formed a committee which will have as one of its charges finding an effective and acceptable method of evaluating reference service. This committee was formed as a direct result of the evaluation project. While unobtrusive study may not be the preferred or popular method of evaluation, it is an effective catalyst for change.

CHERYL ELZY and ALAN NOURIE
Illinois State University
Milner Library
Book Reviews


In the second half of the 1980s, scholarly communication began to flourish on noncommercial international computer networks like BITNET and Internet. Person-to-person e-mail and file transfers gave the "invisible college" new tools for exchanging preprints and other information. Computer conferences, which are typically called "lists," significantly opened up the scholarly dialogue to include a much larger and more diverse group of participants. Open subscription lists allowed anyone to contribute to ongoing discussions. Well-known and unknown scholars suddenly found themselves exchanging information and engaging in sometimes heated debate about the issues of the day. Information flowed freely and, in large lists, abundantly. As time passed, this collective effort produced both invaluable new information sources and information overload. The role of the "moderator," a person who could control information distribution on a list, gained importance.

As lists grew more numerous, some scholars began to see the possibility of using the "Net" for more formal types of communication, and network-based electronic serials were born. Electronic newsletters and special interest magazines appeared. More significantly, a handful of electronic journals emerged. Although the definitive history of network-based e-journals remains to be written, it is likely that New Horizons in Adult Education was the first refereed e-journal on the Net. This publication was followed by other e-journals, such as Ejournal, the Journal of the International Academy of Hospitality Research, Postmodern Culture, Psychotherapy, and the Public-Access Computer Systems Review.

Some of these e-journals emulated traditional print journals. Others created new journal conventions like single-article issues. Most of them were distributed in electronic form for free. All of them benefitted from the strengths of network-based electronic publishing, such as low production costs and rapid on-demand information delivery, and they suffered from its weaknesses, such as an inability to replicate the information richness of the printed page with its color, illustrations, and typographical sophistication. As e-serials and lists on the Net proliferated, it became increasingly difficult for users to keep track of them. There were a few electronic resources and services on the Net that provided limited directory information for users who knew how to ferret out and access them; however, coverage of e-serials was very incomplete and usually outdated.

As is characteristic of the Net, two individuals, Diane Kovacs and Michael Strangelove, volunteered their services to remedy this problem. Kovacs produced a selective directory of academic lists. The directory classified them by their primary subject and provided, if available, brief descriptive information about them. Strangelove created a directory of e-serials that grouped them into three categories: electronic journals, electronic newsletters, and HyperCard stacks, digest newsletters, and others. Editors of the e-serials listed in the directory usually wrote or reviewed the descriptions of their publications.
Recognizing the importance of these efforts to the scholarly community, Ann Okerson, director of the Association of Research Libraries’ Office of Scientific and Academic Publishing, edited these two contributions into a low-cost directory. (Kovacs and Stangelove’s directories are also available as free files on the Net.)

The Directory of Electronic Journals, Newsletters and Academic Discussion Lists is currently the best source of information about network-based e-serials and lists. But it has some minor flaws. E-serials could be classified into more meaningful and discrete categories (e.g., scholarly journals could be separated from special interest magazines). Lists that are not “open” for user-initiated subscription could be identified as such. The list directory does not include a number of computer-oriented lists. Nevertheless, the compilers should be commended for creating this directory, and ARL should be commended for publishing it. It most usefully simplifies the process of identifying and accessing appropriate e-serials and lists, thereby helping to open the frontiers of electronic information.—Charles W. Bailey, Jr., University of Houston, Texas.


The contents page of each LOGOS quarterly issue carries a message from the publisher that begins: “LOGOS is written and read by book people in twenty-nine countries. It offers to the world book community a forum in which it can debate the issues which concern it and which both unite and divide it. LOGOS subscribers include librarians, booksellers, publishers, literary agents, authors, printers, designers and bibliophiles—all who are in some way involved in the writing, production, distribution and reading of books.”

Certainly the journal’s geographic coverage is impressive. Of the thirty-six articles published in the initial volume, for example, only one-third focus on specific aspects of Anglo-American publishing; another third cover developments in non-European countries; and the remaining articles feature topics such as the effects of technology, the author/editor interview, and preservation. Contributions range from Hans Zell’s explanation of the crisis in book publishing in Africa to John Sumson’s analysis of Public Lending Right, with views from publishers regularly included (e.g., Frances Pinter’s “The Independent Publisher” and Christopher Hurst’s “On Being Small, Commercial, and Scholarly”). In his column, publisher Colin Whurr describes accurately the elements he seeks for articles in the journal: “A typical LOGOS contribution mingles history, personal experience, contemporary analysis and a view of the future on its chosen topic. The focus is on meanings, not views. Experiences are interpreted, not merely reported.”

Carrying no news or advertising, this journal also avoids footnotes, academic jargon, book reviews, and single-theme issues, although contrasting views on a subject are occasionally juxtaposed in one issue (the second issue for 1991 includes two articles on the Net Book Agreement, for example). Readers thus are free to concentrate on the eight or nine contributions in each issue, as well as an occasional editorial and an opinion column, including Martyn Goff’s perspective on the Nobel Prize for Literature and Piers Paul Read’s definition of the enemies of literature.

More eclectic in content than Publishing Research Quarterly, LOGOS is also less academic; most articles are rooted in the contributors’ experience, rather than in statistics or documented research. Yet the result is definitely not the typical “how we do it good” potpourri found in too many specialist periodicals. The authors try to place their views in the context of the universe of contemporary publishing and more often than not succeed in tying a specific issue to a wider problem. Vic Gray’s “Preservation vs. Use: The Archivist’s Dilemma,” for example, manages to tie local problems in Essex County, England, to the global scene with authority, clarity, and humor.

If LOGOS is not a vital purchase for academic libraries—it is not scholarly, is
not indexed in standard sources, and some articles are of current interest only—it can be recommended as a very useful addition to bibliography collections. Any reader, and certainly any librarian, with an interest in the future of the book should welcome LOGOS as a unique source of information about the publishing world and its relationship to libraries, technologies, and developing economies. As a bonus, the articles are readable. Editor Gordon Graham writes that “if any LOGOS reader reads an article from a sense of duty, we have failed.” He need not worry.—Marcia Jebb, Cornell University, Ithaca, New York.


At the 1974 ALA conference in New York City, Dwight R. Ladd, a professor in the Whittemore School of Business and Economics at the University of New Hampshire, spoke about the political environment and organization of the American university. He identified and described the various power bases on campus, commented on the focus of significant decision making, and explored the elements of community and consensus within the academy. He described the academy as a collection of diverse groups with separate and distinct goals. In such an environment, he said, conflict, not consensus, is the campus reality. Ladd identified the myths on which many librarians have based their views of how campuses work. His paper, published in College & Research Libraries in March 1975, remains an excellent introduction to the political structure of the campus.

In his book, The Academic Library in the American University, Stephen E. Atkins ignores the politics of American academic life, and assumes that librarians are ignorant of the political process in the academic environment, that they do not operate in such an environment, and that, if they try to do so, they do it rather badly. The assumption guides Atkins’s review of the development of higher education in the United States and determines the selection of the sources he uses in offering support for his thesis. He is convinced that participation by librarians, as full members of the faculty, in the shared governance of the campus is the only road to success for academic libraries in the future. His book is an effort to convince others.

The book grew out of a paper Atkins presented at the ACRL national conference in Baltimore in 1986. In that paper, subsequently published in Energies for Transition (1986), Atkins opined, “Librarians must realize that decisions concerning the library will continue to be made without their input unless they start participating in university governance.” Atkins has embraced the myth, as Ladd would call it, that the faculty govern the university. That the development of college and university libraries in the United States, one of higher education’s success stories, was accomplished without faculty status for librarians on many campuses is not addressed.

In the book’s first chapter, Atkins sketches the history of the university and...
the academic library from 1638 to 1945 and concludes that academic libraries expanded in those institutions in which there was strong presidential leadership and support. Although this fact has been acknowledged by library historians and other observers, they, however, also chronicle the contributions of the great librarians appointed by these presidents and comment on the importance of professional education to the quality of the staff who have worked in these libraries. Chapter two traces the history of the university and the academic library from 1945 to the present. In this chapter, Atkins outlines the emergence of technology in library operations and expresses concern over the future of automation in the library. He believes that librarians will be required to convince the person in charge of campus computing, as well as the budget people and others, of the library's needs. As in the first chapter, Atkins does little to chronicle the influence of individual librarians on the development of their operations.

Chapter three considers the budget issues and outlines approaches to budgeting used on various campuses. The discussion is not very illuminating. Atkins observes that the library must follow institutional directives regarding the budget and goes on to write, "The semiautonomous position of the academic library within the institution still allows the library administration considerable freedom to consider alternatives after the original allocation decision is made." This observation is not developed, so the reader must speculate as to the prevalence and impact of this autonomy.

In chapter four, "The University Administration and the Academic Library," Atkins tries to understand the structure of the university in the context of organizational theory. He assumes, regrettably, that there is one best way to organize and misses the point that it is good management practice to allow units within the university to organize in ways that best suit them. Instead he observes that libraries subscribe to a bureaucratic model or a political model, while in his view, a collegial model is most appropriate. A greater understanding of how organizations behave would have helped the author refine some of these opinions.

Chapter five, "The Teaching Faculty and the Academic Library," and chapter six, "Academic Librarians and the University," continue the author's effort to bolster the argument that faculty status for librarians is essential for the continuing success of the library in American higher education. One of the main points of this book is that librarians, not just the directors of libraries, must work to improve and to elevate the profession. Few would disagree with that statement. Many, however, would disagree with the means proposed by Atkins, that is, full faculty status for librarians. This book exhorts; it does not convince or offer evidence.

The present environments and political realities on most college and university campuses are turbulent, complex, and filled with competition and conflict. Coalitions are formed, used, abandoned, and reshaped routinely. There are many players in this environment. The successful librarians will be those who can assess the environments, help form and shape the coalitions, and know how to operate within them. Ladd suggested that in 1974. Successful librarians have operated that way for years and have improved and enhanced the profession while doing so. Atkins has missed those successes and the reasons for them.—Beverly P. Lynch, University of California, Los Angeles.


In the preface to this second edition of The Bibliographic Record, Ronald Hagler states that this is not a how-to book, but a "why" book. While he does not hesitate to explain the specifics of bibliographic records, his overall emphasis is on the bibliographic principles that have shaped the details of cataloging practice. Hagler has attempted a systematic arrangement of concepts that are "the common currency of people professionally concerned with the many aspects of bibliographic
control." Because the book does not focus on the production of bibliographic records, it is addressed to all who compile and use bibliographic information, not just prospective or practicing catalogers. Hagler's care in defining terms, providing historical context for current practices, and pointing out the connections between theory and practice result in a work accessible to the nonspecialist or novice, useful to a library administrator responsible for planning for the future management of bibliographic files, and helpful to a library school student interested in putting into perspective the enormous detail of the bibliographic record, especially in machine-readable form. As Hagler reviews bibliographic control in twentieth-century practice, certain themes recur. Most obvious is the impact of computer technology as a force in changing attitudes as well as specific practices. Hagler shows how both have been shaped by the constraints and possibilities of available technology. Standardization, always necessary for the identification and retrieval of bibliographic records, has gained new importance in the computer era.

In part 1, "Principles of Bibliographic Control," Hagler considers the bibliographic record in its widest possible context, including abstracting and indexing publications as well as the library catalog. In both practice and theory, the bibliographic record is becoming more uniform across types of tools and agencies (libraries, archives, galleries, museums). The entry for a book in a library catalog used to be considered only marginally related to the listing of a journal article in an abstracting and indexing publication because the two were created in administratively separate environments and in different physical media. The growing practice of merging, abstracting, and indexing databases with local library catalogs, however, makes the need to standardize formats between libraries and abstracting and indexing services more urgent.

As libraries make transitions from manual to automated processes, the terminology used by practitioners changes, but gradually. Hagler recognizes that students
learning new concepts in library school may become confused when encountering old and new terms in the literature. He explains that the computer revolution has changed the nature of many parts of bibliographic control and made new terminology desirable. Generic terms are replacing those whose primary meanings are related to books and to print. Hagler explains such old/new terms as entry/record, heading/access point, and collation/physical description, putting the definition of the old terms into historical perspective and showing why they are now too restrictive.

Part 2 of the book, "Library Standards," includes clear explanations of such concepts as name authority work, controlled subject vocabularies, uniform titles, and superimposition. Hagler stresses the importance of standardization for adequate identification of a document and consistency of description to avoid unnecessary ambiguity. In the past, a library created its own rules of practice independently. Common standards and practices are now widely followed by libraries in creating and communicating their catalog records. With common rules, institutions can contribute records to a useful union catalog, use each others' records interchangeably, and acquire records produced from a central source. Compatibility is needed, not necessarily uniformity. A library obtaining some of its records externally naturally adjusts its internal cataloging practices to conform. Idiosyncratic variants tend to disappear.

Rapid changes in the nature of bibliographic control led the author to begin this revision of the 1982 edition in 1985. Future changes will probably lead to subsequent editions. The present edition quite adequately describes what the bibliographic record is today and how it came to be that way.—Elaine A. Franco, University of California, Davis.


Readers interested in the history of books before the advent of printing previously either had to be content with brief preliminary surveys found in histories of the printed book or had to work through numerous specialized publications. Scribes, Script, and Books is an attempt to remedy this situation. While it primarily focuses on manuscripts and books, it touches on such areas as epigraphy and numismatics as well. Some general historical and literary background material is included also to set the development of writing and books in context.

Avrin sets the stage with a brief introductory overview. She then treats in detail the early history of writing and the development of the alphabet. Individual chapters are devoted to books and to writing among each of the major ancient civilizations: Mesopotamian, Egyptian, Hebrew, Greek, and Roman. The discussion of Roman books leads directly into a survey of Latin scripts from early Roman inscriptions to modern calligraphy. Avrin next deals with medieval manuscripts and illumination. Islamic books are discussed separately. Chapters on papermaking, bookbinding, and block printing round out the work.

The chapters on Hebrew and Islamic books are particularly useful, since these topics have seldom been treated in any detail for the nonspecialist. Avrin's discussion of Hebrew manuscripts is comprehensive and extends from ancient and medieval scribes and manuscripts to the modern preparation of Torah scrolls and other texts for religious use. Her coverage of Islamic book arts draws attention to the many influences that these have had on Western bookmaking. In addition to preserving and later restoring to the West many classical Greek scientific and philosophical works, the Islamic world introduced to Europe the Chinese inventions of paper and marbled paper. Islamic binders also heavily influenced the techniques and materials used by Western bookbinders.

Avrin stresses the essentially conservative nature of bookmaking throughout her work. Innovations occur in materials and technique and are duly noted, but
many of the basic characteristics of the book arose at an early date and have persisted. For example, Avrin traces the development of the author's portrait from royal portraits at the head of Babylonian inscriptions through late antique Roman and medieval manuscripts to modern books. Similarly, colophons were found in ancient Egyptian and Greek manuscripts and persist even in some printed books today. Avrin also relates the modern practice of printing reference works with multiple columns per page to the appearance of the ancient papyrus rolls with their multiple columns. Those who wonder how new electronic formats might influence the presentation of text will note that it has so far changed very little, despite thousands of years and many technical developments.

Avrin discusses many interesting topics, such as the manufacture of parchment and the mixing of inks in different eras, and she includes much useful supplementary material. Numerous maps and chronological tables help the reader to set developments in geographical and historical perspective. The brief summaries of historical and cultural developments that appear in most chapters are helpful, although there is some oversimplification and the occasional inaccuracy. For example, the history of Roman provincial administration and the development of the equestrian order are oversimplified to the point of being misleading (and might be better omitted altogether). The Greco-Persian wars concluded in 479 B.C., not 489, as stated in one of the tables. Avrin incorrectly implies that a number of well-known authors of the Roman Republic (Plautus, Terence, Lucilius, and others) actually lived during the imperial period. Such mistakes do not affect the central concerns of the book, but readers should still be wary.

Footnotes are few, which adds to the readability of the text, but also hinders the reader's further pursuit of particular topics and anecdotes. This is partly remedied by the division of the bibliography into sections by chapter, with repetition where needed. Avrin's bibliography is generally a good guide to further study, although there are some surprising omissions, e.g., Bernhard Bischoff's Paläographie des römischen Altertums und abendländischen Mittelalters (now available in English) and Arthur E. Gordon's Illustrated Introduction to Latin Epigraphy. Avrin has also made a practice of citing only first editions, although some (e.g., those of Sir Eric Turner on papyrology) have been superseded by substantially revised and expanded later ones.

As befits a work on the book arts, Scribes, Script, and Books is handsomely produced. The type is clear and attractive, the margins generous, and the binding appealing and functional. Typographical errors are few and minor. The illustrations are both numerous and well chosen; it is a pity that none could be printed in color, especially for the chapters on manuscript illumination and the Islamic book.

Avrin's work is a remarkably readable synthesis of the vast scholarly literature on the development of the book in the Near East and Europe before Gutenberg. It will provide a real service to the non-specialist reader and student and will undoubtedly be widely used as a basic text in book history courses.—Fred W. Jenkins, University of Dayton, Ohio.
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**Acknowledgment**

The C&RL Editor and the Board wish to thank Eldon W. Tamblyn for his continuing contribution of the annual index. Mr. Tamblyn has performed this service for the journal since 1975. Because his work helps ACRL members to find materials more effectively, he has the additional gratitude of the whole membership.
## FILING

Filing is word-by-word

### ABBREVIATIONS

Standard abbreviations are used except in titles. Names of some organizations, ALA, ACRL, LC, etc., are also abbreviated and are alphabetized as if spelled out.

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