



Recent Trends in ARL Electronic and Access Services Data

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As an ARL Visiting Program Officer for the past year, working on a study funded by the Council on Library and Information Resources titled "The Character and Nature of Research Library Investments in Electronic Resources," I have reviewed the applicable data gathered by ARL the last few years through their Supplemental Surveys. Partly as a way to introduce some conference groups to some of the relevant measurement and definitional issues for discussion purposes, I developed graphs and charts to see what might be concluded from the data, and what follows is a summary of some major points from those presentations.

Those familiar with the Supplemental Surveys will remember that ARL has asked two kinds of questions related to electronic resources: two have dealt with the numbers of computer files and databases available, and others with expenditures -- for electronic resources and hardware and software. Although perhaps not directly relevant to the "Electronic Resources" study, questions about expenditures for Interlibrary Loan/Document Delivery and Bibliographic Utility/Consortia have also been asked the last few years. Those especially familiar with the surveys will also know that, since the questions are intended to be "experimental," some of the definitions and instructions have changed in some ways over time. This obviously makes trend-spotting a bit trickier than it might otherwise. To assist with comparability, data for the non-academic ARL members has been left out of the analysis.

a. Database/Computer File Comparisons

The survey question concerning computer files originated with the 1991-1992 Supplemental Survey, and was moved to the regular survey the following year; the "databases" question has been a part of the Supplemental Survey since 1991-1992, although the definition has been changed somewhat. The instructions for the computer files question indicates that the "number of pieces" that are ". . . locally held as part of the library's collections" should be reported, whereas the instructions for reporting on the number of databases refers to the number of titles available through "library system terminals." Currently, the databases reported need not necessarily be owned or paid for by the library, and can include remote databases available through "gateways." As shown in Table 1 (next page), response rates for both have been similar and fairly high -- ranging from 80 (of 107 Academic ARL's in the survey at that time) for the Computer Files question in 1990-1991 to 100 (of 108) in 1995-1996. Unfortunately, responses to the "databases" question have shown an unusual degree of volatility -- with a few very high numbers and large swings from year to year reported by some institutions. To compensate for this, a few of the extreme cases (especially for 1993-1994) were excluded.

As might be expected, there are very large differences between the two sets of reported numbers, but both show a fairly steady progression and substantial increases over the last several years. For instance, the average number of computer files reported more than tripled between 1990-1991 and 1995-1996, while the median figure was six times higher. The average number of reported databases available on institutional computers in 1995-1996 was almost nine times what was reported in 1990-1991, increasing from 11 to 96. the median figure of 58 reported for

1995-1996 was nearly twenty times the 1990-1991 figure of 3. Despite the definitional changes and response volatility just alluded to, I think these data provide useful and fairly dramatic documentation for the increasing availability of computer files and databases in ARL libraries. However, the growth and diversification of web-based resources, and discussions with several groups over the past year have pointed to an inherent difficulty in using "database" as a unit of measurement in the future.

Table 1: Computer File and Database Questions

Computer Files	90-91	91-92	92-93	93-94	94-95	95-96
Total	66,993	82,204	116,171	164,561	243,559	282,914
Median	406	686	849	1,183	1,804	2,441
Average	837	990	1,185	1,646	2,460	2,801
N= (of 109 ARL Academics)	80	83	98	100	99	100
Databases						
Total	955	1,660	4,068	4,088	4,631	9,547
Median	3	7	15	22	27	58
Average	11	17	43	45	48	96
N= (of 108 Acad. ARLs through 94-95, 109 in 95-96)	90	99	95	94	97	99

b. Electronic Resources and Library Materials Expenditures.

The rest of the figures to be discussed involve expenditures, and only go back to 1992-1993. In that year, a question on expenditures for "Computer files and search services" was introduced, defined as including "expenditures for software and machine-readable materials considered part of the collections, whether purchased or leased," and expenditures for online searches of databases. It excludes expenses for library system and staff software, and for

"bibliographic utilities, networks and consortia," and according to the instructions, only those expenses that would have been counted in the regular survey as part of expenditures for "Other Library Materials or Miscellaneous" were to be included. In 1994-1995 a question on "Expenditures for Electronic Serials", covering subscriptions whose primary format is electronic, was added. In this case, the instructions stated that only those expenses that would have been reported in the regular survey as part of "Current Serials" were to be included.

Overall, there has been a reasonably good (and apparently improving) response rate for these questions, with 82 of the 108 Academic ARL's providing a non-zero figure for the "Computer Files and Search Services" in 1992-1993, and 101 of 109 providing a non-zero response either or both of the questions in 1994-1995. As was the case with the "computer files" and "databases" questions discussed above, the responses themselves ranged widely, with some very large figures reported. Although I have not excluded any responses on this basis, I have provided both average and median figures. As can be seen in Table 2, the amount reported spent on computer files increased more than \$10 million overall between 1992-1993 and 1995-1996. When expenditures for electronic serials are added for the last two years, the total (what I am calling "electronic resources") nearly tripled from more than \$14 million in 1992-1993 to nearly \$40 million last year. The average and median figures have both doubled in that period. The percentage of Library Materials Expenditures devoted to electronic resources has almost doubled, from 3.6% in 1992-1993 to nearly 7.0 % in 1995-1996.

There are a couple of reasons the available figures underestimate the actual expenditures by some unknown amount. For instance, the largest jump in reported expenditures occurred in 1994-1995, when the question on electronic serials expenditures was introduced. This suggests that actual expenditures the prior two years were higher than reported. In addition, after having done a thorough review of the intent of the survey questions, and of my home institution's responses, I realize that we had understated our investments in electronic resources because our local record-keeping practices have made it difficult to respond correctly until now, and I have heard similar remarks from librarians elsewhere. It also seems likely that some expenditures in this area are actually being paid out of Operations funds, which would theoretically not be reported in either question (this suggestion was endorsed by several people who attended the ARL Survey Coordinators' meeting at ALA midwinter), and possibly out of Consortial and Network Expenditures. Beyond this, several people have remarked that their libraries provide access to resources that are purchased on their behalf by a state-funded consortium, and that these expenditures also go unreported.

Table 2: Electronic Resources and Library Materials Expenditures

Computer File Expenditures	92-93	93-94	94-95	95-96
Total	\$14,147,625	\$20,132,553	\$22,030,727	\$24,609,821
Average	\$172,532	\$236,854	\$249,286	\$253,709
Median	\$148,158	\$212,936	\$226,318	\$210,890

Electronic Serial Expenditures				
Total			\$11,847,577	\$15,170,972
Average			\$188,057	\$174,379
Median			\$156,754	\$148,166
Electronic Resources (total of above)				
Total	\$14,147,625	\$20,132,553	\$33,878,304	\$39,780,793
Average	\$172,532	\$236,854	\$349,261	\$364,961
Median	\$148,158	\$212,936	\$278,404	\$301,992
Library Materials Expenditures for Respondents				
Total	\$393,271,073	\$425,287,651	\$489,664,539	\$571,145,986
Average	\$4,795,989	\$5,003,384	\$5,380,929	\$5,654,911
Median	3.60%	4.73%	6.92%	6.97%
N= (of 108 Academic ARLs through 94-95, 109 in 95-96)	82	85	97	101

c. Hardware and Software Expenditures

A question on "expenditures from the library budget for computer hardware and software used to support library operations" was also introduced in the 1992-1993 Supplemental Survey.

As indicated in Table 3, the response rate for this question has also been good, increasing from 90 in 1992-1993 to 98 in 1995-1996. Although there were substantial increases over this time (the average reported figures rose 75%, and the median 67%), it was not as large as those for expenditures on electronic resources.

Table 3: Hardware and Software Expenditures

Hardware and Software Expenditures	92-93	93-94	94-95	95-96
Total	\$29,497,542	\$40,651,689	\$44,780,669	\$57,496,243
Median	\$255,610	\$388,764	\$394,183	\$428,905
Average	\$331,433	\$451,685	\$481,513	\$580,770
N= (of 108 Academic ARLs through 94-95, 109 in 95-96)	90	91	94	98

And as shown in Table 4 (which provides the relevant Operations expenditures for all the respondents to this question during each year), expenditures on hardware and software have begun to take a significant share of Operating budgets: from just below 18% in 1992-1993 to over 26% in 1995-1996. This is a substantially larger portion than the 7% of Library Materials Expenditures spent on electronic resources. In addition, many libraries report having spent substantial amounts of money on related infrastructure costs like wiring, routers, network servers, etc. and since those expenditures have not been specifically asked for in the question wording or instructions, have probably not been included in responses to this question.

Table 4: Hardware and Software Expenditures vs. Operating Expenditures for Responding Institutions

Hardware and Software Expenditures	92-93	93-94	94-95	95-96
Total	\$26,853,985	\$38,693,896	\$44,147,579	\$57,496,243
Median	\$255,610	\$417,391	\$394,183	\$428,905
Average	\$331,531	\$471,877	\$485,138	\$580,770

Operating Expenditures				
Total	\$149,336,595	\$171,406,511	\$192,447,235	\$216,506,815
Median	\$1,570,342	\$1,768,166	\$1,854,568	\$1,875,567
Average	\$1,821,178	\$2,016,547	\$2,115,134	\$2,209,253
HW and SW \$ as Percent of Operating	17.98%	22.57%	22.94%	26.56%
N= (of 108 Academic ARLs through 94-95, 109 in 95-96)	81	82	92	98

d. Document Delivery and Interlibrary Loan Expenditures

As shown in Table 5 for some reason the response rate for this question has been consistently on the low side (between 83 and 85) for the 4 years in which it has been included in the Supplemental, and generalizations are somewhat more risky as a result. As might be expected from the recent attention given to reliance on document delivery as an alternative to local ownership of some serials, there has been a definite upward trend in spending on these services. Interestingly, while the average increased about 62%, the median almost doubled during the same period.

Table 5: Interlibrary Loan and Document Delivery Expenditures

	92-93	93-94	94-95	95-96
Total	\$3,698,202	\$4,489,796	\$5,518,667	\$6,077,997
Median	\$29,004	\$41,674	\$47,597	\$61,248
Average	\$44,557	\$52,821	\$66,490	\$72,357
N= (of 108 Academic ARLs through 94-95, 109 in 95-96)	83	85	83	84

e. Expenditures for Bibliographic Utilities, Networks, and Consortia

In contrast to the significant upward patterns shown for all the other questions discussed to this point -- numbers of computer files and databases, and expenditures for electronic resources, computer hardware and software, and document delivery/interlibrary loan services, there appears to have been little growth in expenditures for services provided by "national, regional, and local bibliographic utilities, networks, and consortia, such as OCLC and RLG." As shown in Table 6, based on a somewhat better response rate than that for document delivery/interlibrary loan, the average expenditure increased less than 6%, and the median less than 4%.

Table 6: Expenditures for Bibliographic Utilities, Networks, and Consortia

	92-93	93-94	94-95	95-96
Total	\$18,257,710	\$19,163,241	\$20,014,786	\$19,740,179
Median	\$171,468	\$176,215	\$170,067	\$177,530
Average	\$200,634	\$212,925	\$208,487	\$212,160
N= (of 108 Academic ARLs through 94-95, 109 in 95-96)	91	90	96	93



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