Chapter 7

MATHEMATICAL SCIENCE LIBRARIES

The four tables in this chapter give data on the location of mathematical science libraries, the number of volumes and of journals received, opinions on the overall effectiveness of the libraries, and availability of electronic data bases.

As might be expected, there was an enormous difference between the holdings of libraries at the PhD universities and all other libraries. The library budget was an especially troubling item at both PhD and MA libraries.

The libraries reported on their holdings in the QA (or 510-519) classification. Data were not collected on holdings in computer science or statistics outside this category.

For four-year college and university mathematics see

Tables L.1, L.2, L.3, L.4.

TABLE L.1 Location of Mathematical Sciences library of four-year college and university Departments of Mathematics as a percent by type of school; also percent of these libraries that display current unbound Mathematical Sciences journals separately: Fall 1990.

	Univ (PhD)	Univ (MA)	College (BA)	ALL
Number of depts	165	236	1020	1421
Type of Math Science Library				
Separate MS or MS/CS	33%	3%	8%	10%
Contained within larger unit	55%	97%	92%	89%
Other	12%	0%	0%	1%
Current MS journals displayed separately	81%	52%	51%	55%

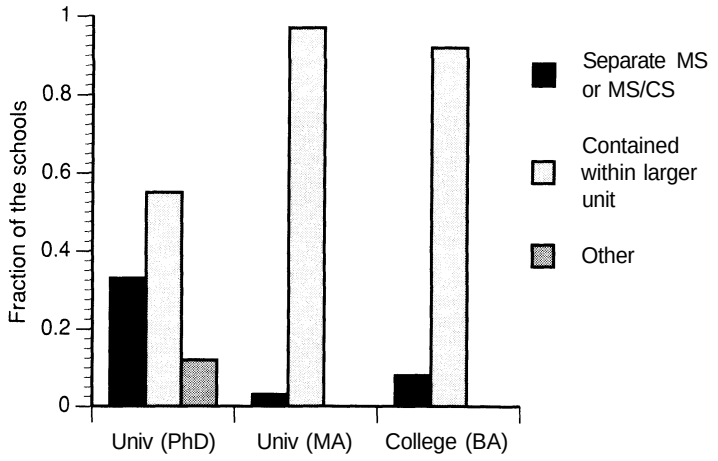

FIGURE L.1.1 Location of Mathematical Sciences library of four-year college and university Departments of Mathematics by type of school: Fall 1990.

TABLE L.1 In 1990, data on PhD Mathematical Sciences Libraries (only) were collected by a special American Mathematical Society committee. Their report appeared in the December 1991 issue of the Notices of the American Mathematical Society and was a more detailed survey. There was general agreement between comparable CBMS and AMS data, except on the availability of the mathematical science full database tapes as reported in Table L.4. This survey's percent is significantly higher than the AMS percent.

The separate display of current journals could be either in the library or in a departmental reading room. The "other" location of the mathematical science library includes such configurations as a mathematical science library combined with engineering, a mixture of an elaborate reading room and a main library and so on.

Data were collected only on the mathematical sciences library and the number of volumes was limited to those in the QA (or 510-519) classification.

TABLE L.2 Volumes in and mathematical sciences journals received by the mathematical sciences library of four-year college and university Departments of Mathematics by type of school: Fall 1990.

	Volumes in Math Sci Library			Math Sci Journals received		
	1st Quartile	Median	3rd Quartile	1st Quartile	Median	3rd Quartile
Math Dept						
Univ(PhD)	15700	29600	35000	136	265	378
Univ(MA)	5000	7500	12200	21	74	125
College(BA)	1200	2800	6000	5	12	40

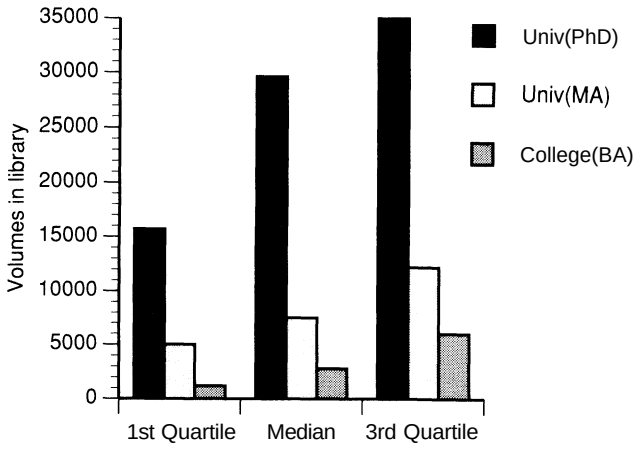

FIGURE L.2.1 Volumes in the mathematical sciences library of four-year college and university Departments of Mathematics by type of school: Fall 1990.

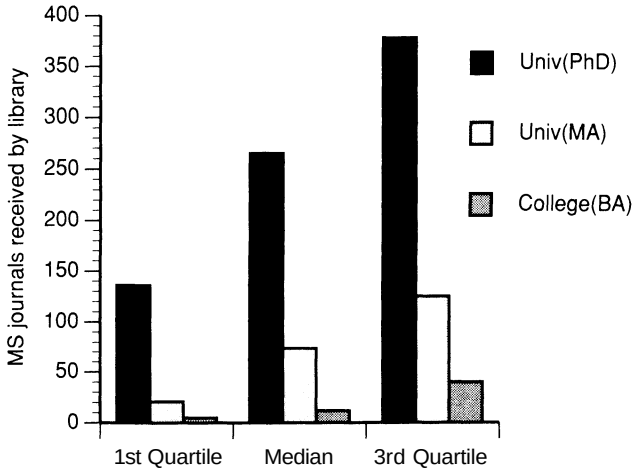

FIGURE L.2.2 Mathematical sciences journals received by the mathematical sciences library of four-year college and university Departments of Mathematics by type of school: Fall 1990.

TABLE L.2 Volumes in the library did not include those in remote storage. The survey showed that, overall, the number of volumes in remote storage was small. While one PhD university reported 24,800 volumes in remote storage, medians and quartiles for stored volumes were all zero except for the 3rd quartile for PhD universities which was 500.

Only currently received mathematical science journals were counted.

TABLE L.3 Overall effectiveness of the Mathematical Sciences library at four-year colleges and universities as judged by the Department of Mathematics by type of school: Fall 1990.

	Collection of books & journals	Physical facilities (incl. space)	Staffing	Hours open	Budget
Univ (PhD)					
Improved	35%	27%	15%	21%	19%
Little change	42%	54%	66%	72%	35%
Deteriorated	23%	19%	19%	7%	46%
Univ (MA)					
Improved	37%	23%	10%	10%	21%
Little change	48%	72%	85%	84%	35%
Deteriorated	15%	5%	5%	6%	44%
College (BA)					
Improved	38%	27%	16%	24%	31%
Little change	53%	70%	79%	71%	51%
Deteriorated	9%	3%	5%	5%	18%
ALL COMBINED					
Improved	38%	27%	15%	22%	28%
Little change	51%	68%	79%	73%	46%
Deteriorated	11%	5%	6%	5%	26%

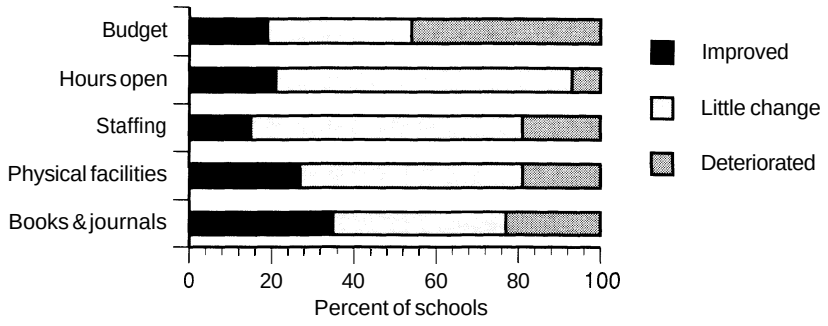

FIGURE L.3.1 Overall effectiveness of the Mathematical Sciences library at Univ (PhD) schools as judged by the Department of Mathematics: Fall 1990.

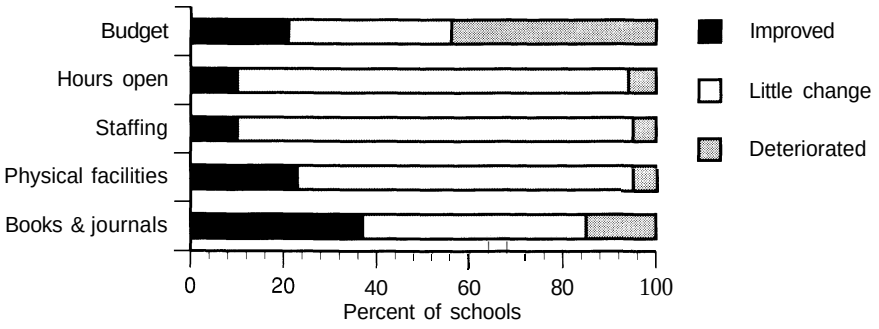

FIGURE L.3.2 Overall effectiveness of the Mathematical Sciences library at Univ (MA) schools as judged by the Department of Mathematics: Fall 1990.

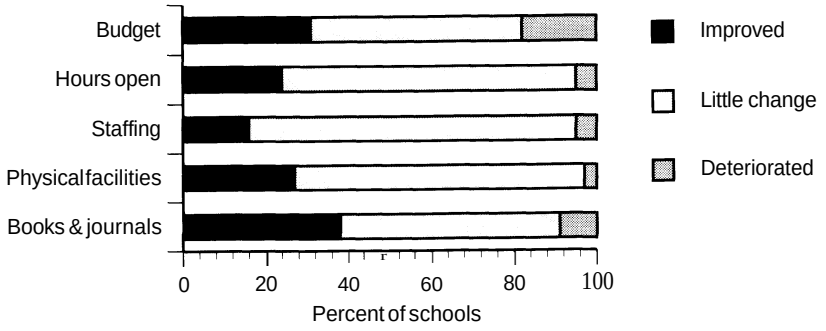

FIGURE L.3.3 Overall effectiveness of the Mathematical Sciences library at College (BA) schools as judged by the Department of Mathematics: Fall 1990.

TABLE L.3 These numbers are in general agreement with those reported in the 1990 AMS survey. This table reports on perceived changes in the mathematical sciences library for the period 1985-90.

TABLE L.4 Electronic products available in four-year college and university Mathematical Sciences libraries by type of school: Fall 1990.

	Univ (PhD)	Univ (MA)	College (BA)	ALL
Number of depts	165	236	1020	1421
Math Science tapes (full database)	16%	10%	4%	6%
Math Science on CD ROM	28%	10%	1%	6%
Science Citation Index on CD ROM	10%	5%	1%	3%

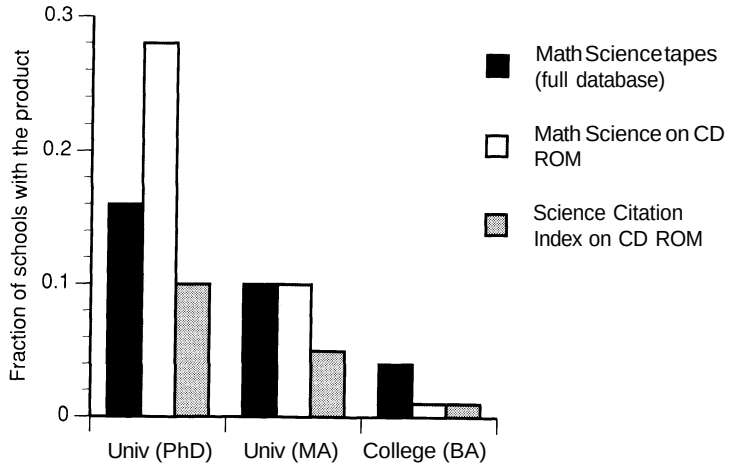

FIGURE L.4.1 Electronic products available in four-year college and university Mathematical Sciences libraries by type of school: Fall 1990.

TABLE L.4 The aforementioned AMS survey reported less than 2% of PhD university libraries with the full mathematical science database tapes, as compared to this survey's 16% figure. All other data are in general agreement. The AMS survey included Canadian PhD departments.

AN OVERVIEW OF TWO-YEAR COLLEGES: THE BOOM CONTINUES

The 1200 community, technical, and junior colleges in the United States enroll almost six million students, four times as many as in 1966. About 65% of these students attend part-time. Two-year colleges now account for over 30% of the full-time equivalent enrollment in colleges and universities (and a much larger percentage of student "bodies") *[1990 Digest of Educational Statistics,* National Center for Education Statistics, U.S. Department of Education, Washington, DC].

This astonishing growth has coincided with the evolution of the "junior" college of 1966 into the "community" college of today. The primary mission of the junior college of twenty-five years ago was to provide a liberal arts education that prepared students for the university. Today, a minority of two-year college students are enrolled in transfer programs and transfer rates have declined. A reliable estimate of the percentage of two-year college students who eventually transfer to a four-year college or university is difficult to obtain. This percentage varies from state to state and has been estimated as fewer than 10% to as high as 30%.

Consideration of transfer rates alone, however, underestimates the importance of two-year colleges in American higher education. For example, a recent study in Washington state found that 48% of the graduates from Washington's regional four-year colleges were community college transfers, as were 29% of the graduates from Washington State University and the University of Washington, and 22% of the graduates from private colleges and universities ["A Study of the Role of Community Colleges in the Achievement of the Bachelor's Degree in Washington State," Washington State Board for Community College Education, Olympia, 1989].

Two-year colleges continue to provide the first two years of baccalaureate programs to students who want low cost, local schooling. In addition, they usually offer vocational and technical programs in fields such as nursing and computer repair; courses for professional certification; courses for adults who want to broaden either their general education or to learn skills as specific as using a spreadsheet or growing fruit trees; and, most notably, instruction in basic subjects traditionally taught in secondary schools.

> This modification of function has affected the institutions' people, processes, and programs. No aspect has been immune. Faculty have had to change teaching practices; the very number of pages they can expect students to read has plummeted. . . . In most colleges, ten sections of remedial reading or writing are offered for every one section of English or American literature. [Arthur M. Cohen, "Mathematics in today's community college," in *New Directions in Two-Year College Mathematics,* Donald J. Albers, Stephen B. Rodi, and Ann E. Watkins (Eds.), Springer-Verlag, New York, 1985, p. 3].

The composition of both the faculty and the students in two-year colleges has also changed since 1966. Today there is a larger percentage of faculty and a larger percentage of students in each of the following categories: women, minority, older, and part-time. A larger percentage of students require remedial work.

Two-year college instructors teach about 16 hours a week to relatively small classes, and many teach an additional class or two, usually for extra pay, or do work outside the college. A master's degree in the subject is the standard requirement for full-time employment in academic disciplines and a bachelor's degree with relevant experience is the usual requirement for employment in occupational programs. Twenty-five years ago, the majority of two-year college faculty were recruited from the high schools, but this is no longer the case. Although there is regional variation, most two-year college instructors are under no pressure to publish; promotion and tenure typically require adequate teaching and time in rank.

About 38% of all post-secondary mathematics, statistics, and computer science enrollments are in two-year colleges, up from 30% in 1985 (see Table S.1 and Figure S.1.2). In many state colleges and universities, a large percentage of mathematics majors began their studies in two-year colleges. In fact, "nearly 10 percent of U.S. students who receive a doctorate in the mathematical sciences began their undergraduate studies in a two-year college" [Moving Beyond Myths: Revitalizing Undergraduate Mathematics, National Research Council, Washington, DC, 1991, p.4].