Chapter 5

MATHEMATICAL SCIENCE OFFERINGS, ENROLLMENTS, AND INSTRUCTIONAL PRACTICES IN TWO-YEAR COLLEGES

This chapter reports estimated national enrollments in two-year college mathematical science courses for Fall 1975. The data are compared and contrasted with results of previous CBMS surveys in 1966 and 1970 and with general enrollment trends in two-year colleges.

Summary of Major Results

From Fall 1970 to Fall 1975 mathematical science course enrollments in two-year colleges increased from 584,000 to 874,000 or nearly 50%. This increase is not as great as the 60% growth in overall two-year college enrollments, but it is greater than the 38% growth rate of degree-credit students in two-year colleges. The main patterns of change in mathematical science enrollments are similar to those of four-year institutions -- less growth in courses leading to education, mathematics, physical science, or engineering majors and greatest growth in courses that are at a remedial level or that serve students heading for occupational, technical, or business programs.

--Enrollments in arithmetic increased by 86% to 67,000.
--Enrollments in elementary (high school level) algebra increased by 103% to 132,000 and intermediate algebra (high school level) increased by 75% to 105,000.
--Taken together high school level arithmetic, algebra, intermediate algebra, and geometry courses now account for 36% of all two-year college mathematics enrollments, compared with 26% in 1966 and 29% in 1970.
--Together, calculus and analytic geometry enrollments increased only slightly, by 7% to 73,000, with calculus increasing by 21% and analytic geometry decreasing by 70%.
--Mathematics of Finance and Business Mathematics enrollments increased by 139% to 79,000.

-- The new course title "Use of Hand Calculators" was estimated to cover 4,000 course enrollments, but still fell behind the 5,000 student total for "Slide Rule"!

Detailed course enrollment data and trends are presented in later sections of this chapter, following background data on the overall two-year college enrollment situation. In reading the chapter one should keep in mind that reported enrollments are estimated national totals for two-year colleges, unless specifically noted otherwise.

General Information about Two-Year Colleges

At the time of the 1960 Lindquist survey of collegiate mathematics programs [A], two-year college enrollments constituted only 15 % of all undergraduate enrollments. A solid majority of two-year students were then in full-time programs leading to a bachelor's degree after transfer to some appropriate four-year school. In 1975 the situation was much different. As Table 5.1 shows, two-year colleges now enroll nearly 3,900,000 students. Over half are studying part-time; the full-time equivalent enrollment is 39% of all undergraduate enrollment; students in non-degree credit programs, such as those leading to specific occupational training certificates, comprise over a third of the two-year college FTE students; and over 50% of all college freshmen enroll in two-year colleges. Furthermore, two-year colleges are now predominantly public, with only 4% of two-year students in the mostly small private colleges.

As relatively new institutions, the two-year colleges find their curricular emphases and student body still taking shape. The fluidity of the two-year college scene is also influenced by the ease of entry, exit, part-time study, and community education* involvement that are increasingly basic commitments in the community college concept.

Table 5.1 underscores these emerging characteristics of two-year colleges. While undergraduate enrollment in universities and four-year colleges has leveled off recently, two-year college

*Community education, people participating in non-credit activities sponsored by a college, was estimated at 1,337,267 in Fall 1975 by the American Association of Community and Junior Colleges [P].

Table 5.1

TRENDS IN TWO-YEAR COLLEGE ENROLLMENTS
(In Thousands)

Type of Enrollment	Fall 1966	Change	Fall 1970	Change	Fall 1975
Total Enrollment*	933	+63%	1517	+60%	2428
Degree Credit*	690	+63%	1127	+38%	1553
Non-Degree Credit*	243	+61%	391	+124%	875
Full-Time	737	+58%	1165	+47%	1707
Part-Time	589	+80%	1058	+105%	2164
First Time Freshmen*	406•	+67%	680	+33%	904
Mathematical Science Enrollments	348	+68%	584	+50%	874
Mathematical Science Enrollments per FTE Student	.37		.38		.36

Sources: NCES. Projections of Education Statistics to 1984-85 [E] and unpublished NCES data for 1975.
*Full Time Equivalent is the sum of full time enrollments and one-third of part-time enrollments.
•Estimated using non-degree credit equal to .35 degree credit.

enrollments have climbed steadily since 1960. The NCES projection [F] indicate that this growth is apt to continue at a slower pace during the next five years. But it is not clear whether the new students will come from a new clientele for higher education (perhaps requiring new kinds of mathematics instruction) or whether the two-year schools will draw students who might in other times have gone as freshmen to four-year institutions. There would be

important implications for program development and staffing in mathematics departments -- if only one could see into the future with some certainty.

Since 1970 the greatest growth in two-year colleges has been in non-degree credit and part-time study. The spectacular growth in occupational-technical enrollments, as measured by the non-degree credit enrollments, bears careful watching. It may be that part of the disparity between the overall enrollment growth rate of 60% and the mathematics growth of 50% is a consequence of broad shifts in student preference toward occupational-technical (O-T) programs. Many O-T programs have carried out mathematical instruction 'in house' for some time and will probably continue to do so. And from 1970 to 1975 it is estimated that enrollments in mathematics courses taught outside of mathematics departments in two-year colleges increased by 93%. Two-year college mathematics faculties have traditionally paid little attention to the mathematics service courses required by occupational-technical programs. The fact that for 1970-75 mathematics enrollment increases exceeded overall degree-credit increases (38%) provides some evidence that mathematics faculty are responding to the new service needs of O-T programs. If the two-year college shift away from academic emphasis persists or accelerates in the years ahead, mathematics departments will ignore the important service role at their own peril.

Patterns of Mathematics Enrollments

In Fall 1975 mathematics enrollments in two-year colleges were 874,000, a 50% increase over the enrollment in 1970, which was a 68% increase over the 1966 CBMS survey enrollment estimate. The rate of increase in mathematics enrollments was substantially lower than the 60% enrollment gain for all two-year colleges, but it was greater than the 38% increase in overall degree-credit enrollments. Dividing the mathematics enrollment (874,000) by the total number of full-time equivalent two-year college students (2,428,000) yields a ratio of .36 mathematics enrollments per FTE student. This ratio has been essentially constant since 1966.

Estimated national enrollments for individual mathematics courses in Fall 1975 are given in Table 5.2 where they can be compared with data from 1966 and 1970. There are two important types of baseline measure for judging the magnitude of any enrollment

Table 5.2

DETAILED ENROLLMENTS IN MATHEMATICAL SCIENCE COURSES IN TWO-YEAR COLLEGES
(In Thousands)

Subject	Fall 1966-67	Fall 1970-71	Fall 1975-76
1. Arithmetic	15	36	67
2. High School Geometry	5	9	9
3. Elementary Algebra (H.S.)	35	65	132
4. Intermediate Algebra (H.S.)	37	60	105
5. College Algebra	52	52	73
6. Trigonometry	18	25	30
7. College Algebra and Trigonometry, combined	15	36	30
8. Elementary Functions	7	11	16
9. Mathematics for Liberal Arts	22	57	72
10. General Mathematics	17	21	33
11. Finite Mathematics	3	12	12
12. Mathematics of Finance	4	5	9
13. Business Mathematics	17	28	70
14. Mathematics for Elementary School Teachers	16	25	12
15. Technical Mathematics	19	26	46
16. Technical Mathematics (calculus level)	1	3	7
17. Analytic Geometry	4	10	3
18. Analytic Geometry and Calculus	32	41	40
19. Calculus (mathematics, physics, and engineering sciences)	8	17	22
20. Calculus (biology, social, and management sciences) (New Course)	NA**	NA	8
21. Differential Equations	2	1	3
22. Linear Algebra	1	1	2
23. Differental Equations and Linear Algebra, combined (New Course)	NA	NA	L*
24. Elementary Statistics	4	11	23
25. Probability (and statistics)	1	5	4
26. Programming of Digital Computers	3	10	6
27. Other Computer Science Courses	2	3	4
28. Use of Hand Calculators (New Course)	NA	NA	4
29. Slide Rule	3	9	5
30. Other Courses	5	5	27
Total	348	584	874

*L denotes enrollment less than 500.
**NA denotes "not available".

change. First are the 1970-1975 composite growth rated of 50% in mathematics and 60% in all two-year college enrollment. Second, and perhaps most significant, is the percent of all mathematics enrollment concentrated in each course. For instance, in Fall 1975 the course 'Math for Liberal Arts' had an estimated national enrollment of 72,000 two-year college students. This was an increase of 15,000 or 26% from 1970, but as a share of the market it was a decline from 10% to 8%. Similarly, college algebra enrollment increased by 40% from 1966 to 1975, but as a fraction of all mathematics enrollment it declined from 15% to 8%.

By any measure, the recent mathematics enrollment gains have been most striking in arithmetic (up by 31,000 to 8% of all mathematics enrollment), elementary algebra (up by 67,000 to 15% of the total), intermediate algebra (up by 45,000 to 12% of the total), and business mathematics (up by 42,000 to 8% of the total).

The sharp gains in remedial arithmetic and high school level algebra enrollments are in contrast to much slower growth in precalculus and calculus courses whose share of the total declined from 33% in 1970 to 26% in 1975 (See Table 5.3). The reasons for these shifts in enrollment concentration are probably complex. We have already discussed the apparent growth of non-degree credit enrollments in occupational-technical programs which generally do not demand sophisticated mathematical preparation. But the growth of remedial enrollments is also probably a consequence of declining mathematical training among entering freshmen. Over half of the survey respondents felt that such a decline has occurred recently and evidence from college entrance testing scores and other standardized measures of secondary school performance seem to confirm their judgment. The declining student performance in mathematics (and other school subjects, too) has been variously attributed to 'new math' curricula, television, recent social turmoil, and open admission policies in higher education. The College Entrance Examination Board has appointed an Advisory Panel on Score Declines and the Mathematical Association of America has recently appointed a Committee on the Reported Decline in Preparation of Students for Collegiate Mathematics.

In two-year colleges, as in four-year institutions, enrollments in mathematics for elementary school teachers dropped and enrollments in elementary statistics increased from 1970 to 1975. However, in contrast to the four-year situation, computer related enrollments decreased in two-year college mathematics departments (See Table 2.9 in Chapter 2).

Table 5.3 summarizes broad trends in the course by course enrollment data. It illustrates steady increase in the share of enrollments in remedial work, levelling off in the service course area, and the decline in relative size of pre-calculus and calculus enrollments.

Table 5.3

TOTAL ENROLLMENTS IN MATHEMATICAL SCIENCE COURSES
IN TWO-YEAR COLLEGES, BY LEVEL
(In Thousands)

Level	Fall 1966 Number	Fall 1966 Percent	Fall 1970 Number	Fall 1970 Percent	Fall 1975 Number	Fall 1975 Percent
Remedial (Courses 1-4,10)	109	31%	191	33%	346	40%
Precalculus (5-8)	92	26%	124	21%	149	17%
Calculus (17-21)	46	13%	69	12%	76	9%
Statistics (24-25)	5	1%	16	3%	27	3%
Computing (26-27)	5	1%	13	2%	10	1%
Service Courses (9,11-16,22,24, 25,28,29)	91	26%	182	31%	266	30%

Availability of Mathematics Courses

Of the 1100 public and private two-year colleges in the United States, roughly 60% have total enrollments under 2500 students -- full-and part-time, degree-and non-degree credit. The limited size of many of the community oriented institutions restricts availability of diverse mathematics courses and then

Table 5.4

AVAILABILITY OF MATHEMATICS IN PUBLIC TWO-YEAR COLLEGES

(Percent of Public Two-Year Institutions Offering each course sometime in 1975-76)

Subject	Enrollment			All Public Two-Year	
	Large	Medium	Small	1970-71	1975-76
1. Arithmetic	90%	75%	42%	43%	51%
2. High School Geometry	84	33	21	29	27
3. Elementary Algebra (H.S.)	97	99	57	59	68
4. Intermediate Algebra (H.S.)	100	92	70	65	76
5. College Algebra	74	69	74	58	73
6. Trigonometry	87	62	56	67	59
7. College Algebra and Trigonmetry	42	52	32	41	37
8. Elementary Functions	30	16	10	21	12
9. Mathematics for Liberal Arts	56	62	64	NA	63
10. General Mathematics	22	22	31	20	29
11. Finite Mathematics	42	40	13	21	20
12. Mathematics of Finance	17	16	16	15	19
13. Business Mathematics	26	56	56	39	54
14. Mathematics for Elementary School Teachers	74	56	37	59	43
15. Technical Mathematics	49	66	61	51	61
16. Technical Mathematics (Calculus Level)	30	23	24	24	24
17. Analytic Geometry	25	16	37	21	32
18. *Analytic Geometry and Calculus	83	62	49	68	53
19. *Calculus (mathematics, physics, and engineering science)	38	62	50	43	52
20. Calculus (biology, social and management science)	66	56	19	NA	29
21. Differential Equations	55	29	27	46	29
22. Linear Algebra	50	36	28	22	31
23. Differential Equations and Linear Algebra	29	13	5	NA	8
24. Elementary Statistics	78	79	24	46	38
25. Probability (and statistics)	33	19	22	NA	22
26. Programming of Digital Computers	57	27	14	32	19
27. Other Computer Science Courses	41	27	16	21	20
28. Use of Hand Calculators	23	20	12	NA	15
29. Slide Rule	19	16	16	30	16

*When one looks at the number of institutions offering either "calculus and analytic geometry or calculus (mathematics, physics, science, engineering) the percents approach 100 in each size category.

enrollments. Table 5.4 shows the percent of two-year colleges now offering each lower division mathematics course. The data are given by institutional size category for 1975, and compared in total with 1970. Information on this question is given only for public colleges because of the extremely small private college sample.

As expected, nearly every course is more readily available in large and medium sized colleges than in small colleges (average total enrollment 1550). Mathematics for elementary school teachers, differential equations, and computer programming are notably less available now than in 1970. The last decline is somewhat puzzling, though perhaps related to the rise in "Use of Hand Calculators" which seems mercifully to be ending the role of "Slide Rule".

Mathematics Courses Taught outside of Mathematics Programs

Earlier in this chapter we noted the phenomenal (124%) growth in non-degree credit occupational-technical enrollments in two-year colleges and suggested that these O-T programs probably include substantial amounts of mathematics instruction not given by the regular mathematics faculty. To get a rough measure of the magnitude of such mathematics offerings outside of mathematics departments or divisions, the survey questionnaire asked for estimates of enrollments in mathematics courses given by other divisions or departments. The estimates are probably not as reliable as other data presented in this report, because respondents did not have direct responsibility for these outside courses. There is some reason to believe that the estimated figures in Table 5.5 are less than actual enrollments in outside courses.

The estimated 178,000 enrollments in mathematics courses taught outside mathematics departments represent a 93% increase over the 92,000 figure in 1970-71. The increase, and nearly all outside mathematics enrollment, is concentrated in business divisions and in computer programming courses taught in various programs. Arithmetic taught in business departments increased from 5,000 in 1970-71 to 15,000 in 1975-76 or 200%; business mathematics was up from 33,000 to 52,000 or 58%; computer programming in business departments was up from 7,000 to 26,000 or 270%; and computer programming in "other" departments was up from 2,000 to 16,000 or 700%.

Table 5.5

ESTIMATED ENROLLMENTS IN MATHEMATICS COURSES TAUGHT OUTSIDE OF MATHEMATICS PROGRAMS IN TWO-YEAR COLLEGES, ALL TERMS ACADEMIC YEAR 1975-76
(In Thousands)

	Enrollment in courses given by division specializing in:					
Courses	Natural Sciences	Occupation-al Programs	Business	Social Sciences	Other (specify)	Total
Arithmetic	1	9	15	L	2	27
Business Mathematics	-	1	52	L	-	53
Statistics	L	L	7	4	3	14
Probability	L	-	-	-	-	L
Pre-calculus College Math.	12	4	L	1	-	17
Calculus or Diff. Equations	3	1	L	-	-	4
Computer Science & Programming	1	8	26	-	16	51
Other	L	4	3	-	5	12
Total	17	27	103	5	26	178

L = some, but less than 500

The spectacular growth of demand for mathematics courses in areas outside regular mathematics offerings presents a real challenge to two-year college mathematics faculties. While often quick to scorn the substance and quality of such outside courses, mathematics departments have generally shown little interest in providing the courses themselves. Since overall mathematics enrollments have recently increased more rapidly than all degree-credit enrollments, there is reason to believe that mathematics departments have been partially successful in providing necessary

service for occupational-technical programs. But there is apparently still a very large and growing untapped market for mathematics instruction.

Computer and Hand Calculator Use

The phenomenal growth of the computer industry has affected programs of two-year colleges in at least three major ways. First, computer programming and data processing have become topics of technical training programs. Second, computers are used as an adjunct to regular mathematics instruction in calculus, statistics, and other appropriate courses. Third, computers are sometimes used as a medium or manager of instruction in many different kinds of courses. Since the 1970 CBMS survey, student access to computers in two-year colleges has increased substantally. However, the fraction of two-year college faculty making substantial use of computer facilities in their teaching has remained essentially unchanged since 1970 at 14%. Table 5.6 gives additional details on computer access and use in two-year colleges.

Given the high cost of even small computers, it is no surprise that access to computing facilities is inversely related to institutional size. However, small and powerful hand calculators do not require major financial outlays for students or mathematics departments and their rapid emergence as an adjunct to mathematics instruction is clearly shown in Table 5.7.

The uniform widespread acceptance of hand calculators for both homework and examinations in two-year college mathematics courses in striking, particularly in view of the limited acceptance of calculators by university and four-year college mathematics departments. Though two-year college mathematics enrollment patterns indicate a heavy concentration on remedial basic skill courses like arithmetic and algebra, it appears that teachers are quite willing to allow students the assistance of hand calculators with those skills as they go ahead to learn more substantial mathematical ideas. This conjecture is confirmed by the data indicating courses in which calculator use is recommended, given in Table 5.8.

Table 5.6

COMPUTER ACCESS AND USE IN TWO-YEAR COLLEGES

	Public Colleges			All Colleges	
	Large	Medium	Small	Public	Private
Departments reporting access to computers	98%	71%	50%	57%	36%
Departments reporting some use of computers in courses other than programming	61%	26%	24%	26%	18%
Usage rate = Use/Access	62%	37%	48%	46%	50%
Faculty making substantial use of computers in teaching	25%	17%	14%	15%	NA

Table 5.7

PERCENT OF MATHEMATICS DEPARTMENTS IN TWO-YEAR COLLEGES RECOMMENDING HAND CALCULATOR USE IN SOME MATHEMATICS COURSES

	Public Colleges			All Colleges	
	Large	Medium	Small	Public	Private
Use of Calculators Recommended for Homework	86%	84%	82%	82%	82%
Use of Calculators Recommended for Examinations	67%	64%	75%	72%	73%

Table 5.8

USE OF POCKET CALCULATORS IN MATHEMATICAL SCIENCE COURSES IN PUBLIC TWO-YEAR COLLEGES

	Large Enrollment	Medium Enrollment	Small Enrollment	All Public Two-Year Colleges
Statistics				
% Giving Course	78%	79%	24%	38%
% Using Calculators	42%	45%	24%	29%
Usage Rate = $\frac{\%\ \text{Using}}{\%\ \text{Giving}}$	54%	57%	100%	76%
Analytic Geometry and Calculus				
% Giving Course	83%	61%	49%	53%
% Using Calculators	23%	30%	27%	27%
Usage Rate	28%	49%	55%	51%
Technical Mathematics				
% Giving Course	49%	66%	61%	61%
% Using Calculators	25%	27%	26%	26%
Usate Rate	51%	41%	43%	43%
Trigonometry				
% Giving Course	87%	61%	56%	59%
% Using Calculators	45%	14%	16%	17%
Usage Rate	52%	23%	29%	29%

At every level of education, from kindergarten through graduate school, teachers commonly protest against large class size, particularly in mathematics where help with problems of individual learners is often essential. Table 5.9 gives average class size for two-year college mathematics courses that are widely available.

The table reveals that generally large classes are found in large schools, much as in the four-year situation where universities and public colleges had larger class size averages than private colleges. Though many believe that the average class size has increased recently, data necessary for such a comparison were

Table 5.9

AVERAGE CLASS SIZE IN PUBLIC TWO-YEAR COLLEGES

	Very Large Colleges: Average Enrollment = 22,500	Large Colleges: Average Enrollment = 15,700	Medium Colleges: Average Enrollment = 6,500	Small Colleges: Average Enrollment = 2,200
Arithmetic	37	38	31	26
Geometry (H.S.)	34	32	25	29
Elementary Algebra (H.S.)	39	33	32	25
Intermediate Algebra (H.S.)	38	33	30	30
College Algebra	37	31	27	28
Trigonometry	36	30	33	24
College Algebra and Trigonometry	31	37	30	27
Mathematics for Liberal Arts	30	30	28	32
Finite Mathematics	34	28	27	22
Business Mathematics	38	28	29	30
Mathematics for Elementary School Teachers	33	28	24	22
Technical Mathematics	36	30	29	26
Analytic Geometry and Calculus	30	28	26	24
Calculus (mathematics, physical science, engineering)	32	26	21	19
Calculus (biology, social, management science)	36	24	26	27
Linear Algebra	25	20	18	20
Elementary Statistics	31	34	27	25
Overall Average	34	30	27	26

not collected in the 1970 CBMS survey. However, information given in the next chapter lends support to the conjecture. As a preview we mention only that the average number of students taught per mathematics faculty member has increased from 104 in 1970-71 to 123 in 1975-76.

Instructional Techniques

The vast majority of public two-year colleges are young institutions. They were founded and grew to maturity during a period of spirited educational innovation. Thus their physical facilities, staff, and programs were planned to offer not only

alternatives to traditional college curricula, but alternatives to the traditional lecture-recitation system of instruction. The efforts at innovation have generated a new category of educational jargon including modules, audio-tutorial, personalized system of instruction (PSI), learning resource centers, and multi-media instruction. These labels certainly signify different practices in different institutions, but to get a rough idea of how frequently the various alternatives are used in two-year college mathematics teaching, the survey questionnaire asked respondents to indicate which alternatives were used in their department. The results are given in Table 5.10.

Table 5.10

PERCENT OF RESPONDING TWO-YEAR COLLEGES USING ALTERNATIVE INSTRUCTION TECHNIQUES

Technique	Percent Using Technique
Courses by programmed instruction	47%
Organized program of independent study	45%
Audio-tutorial	37%
Modules	37%
Large lecture classes with help sessions	15%
Computer assisted instruction (CAI)	13%
PSI	10%
Courses by television	6%
Large lecture classes with small quiz sections	4%
Courses by film	3%

As in 1970 the most common alternative is programmed instruction. However, the most striking aspect of Table 5.10 is the sudden emergence of a variety of self-pacing methods: Organized programs of independent study doubled in frequency between 1970 and 1975; Audio-tutorial and PSI were not even mentioned in the 1970 questionnaire and in 1975 appear in substantial numbers of institutions; Computer Assisted Instruction has grown in popularity, though still available in only a limited number of schools. Furthermore, over a third of responding two-year college mathematics departments reported some use of modularized instructional techniques.

Admission and Placement of Students

One of the basic purposes of the recent boom in two-year community colleges was to ease entrance to higher education for students whose financial resources or secondary school training would not ordinarily have permitted them to attend a four-year college. Thus it is not surprising that admission examinations are now given by only 42% of all public two-year colleges, down sharply from 81% in 1970. The decrease is even more pronounced in large institutions, where only one in four now give such examinations. Only 45% of the responding private two year colleges reported requiring admission examinations.

Because entering students at two-year colleges bring widely varied background knowledge and abilities, placement of these students in appropriate mathematics courses has become a prime concern of many two-year colleges (See Table 5.11).

Table 5.11

PLACEMENT EXAMINATIONS IN TWO-YEAR COLLEGE MATHEMATICS DEPARTMENTS

Percent of public two-year colleges which administer a placement exam in mathematics	57%
Percent of two-year colleges in which placement exam tests for	
arithmetic	81%
algebra	80%
geometry	19%
trigonometry	25%

The percent of two-year colleges requiring a placement exam in mathematics is up only slightly over the 1970 figure, but the emphasis of placement examination has changed markedly. In 1970 over 40% of such exams tested for knowledge of geometry, and roughly 60% tested for knowledge of trigonometry. It appears that in 1975 the focus of placement testing has shifted to basic skills.

Coordination of Transfer Programs with Four-Year Institutions

For two-year colleges with large degree-credit programs it is important to coordinate program offerings, advisement, and academic standards with the most likely four-year college or university destination of their students. About 70% of public two-year colleges apparently do consult regularly with four-year schools on transfer designated courses. One might hope that two-year and four-year colleges and universities would coordinate other activities such as colloquia, curriculum experiments and the like. However, only 16% of all public two-year colleges reported such activities involving their mathematics faculty with mathematics departments of four-year institutions. This figure is down from 39% in 1970 and suggests a growing estrangement of the two types of institutions -- hardly in the best interest of either.