Chapter 4

INTRODUCTORY COURSES IN CALCULUS, STATISTICS, AND COMPUTER SCIENCE

The five tables in this chapter give detailed enrollment and section size in calculus-level courses, instructional formats for mainstream and non-mainstream calculus I, elementary statistics, and computer programming I, and the number of sections in mainstream calculus I and II incorporating various instructional features.

More detailed information on course enrollments is given in Appendix I.

Because of the change in the reporting format, direct comparisons with the 1985 data are not possible. In addition, the corresponding 1985 data aggregated figures for five introductory courses. PhD departments in all disciplines taught a substantial number of sections in the large lecture with quiz format.

The number of sections of calculus I and II requiring graphics calculators, use of computers, and group projects was quite small. A modest number of (mostly BA) departments required a writing component.

For information on four-year college and university mathematics see

Tables C.1, C.2, C.3, C.4, C.5.

For information on four-year college and university statistics see

Table C.4.

For information on four-year college and university computer science see

Table C.5.

TABLE C.1 Enrollment in thousands and average section size in some Calculus level courses in four-year college and university Departments of Mathematics by type of school: Fall 1990.

	Enrollment (thousands)				Average section size			
	Univ (PhD)	Univ (MA)	College (BA)	TOTAL	Univ (PhD)	Univ (MA)	College (BA)	ALL
Mainstream Calculus I	101	39	62	202	40	32	25	32
Mainstream Calculus II	47	17	23	87	41	29	22	31
Mainstream Calculus III, IV etc	45	16	22	83	37	27	20	28
Differential Equations	27	8	5	40	39	27	21	32
Linear Algebra	23	7	13	43	37	24	18	27
Non-mainstream Calculus I	73	25	50	148	46	30	29	36
Non-mainstream Calculus II,III etc	11	2	2	15	44	26	22	36
TOTAL	327	114	177	618				

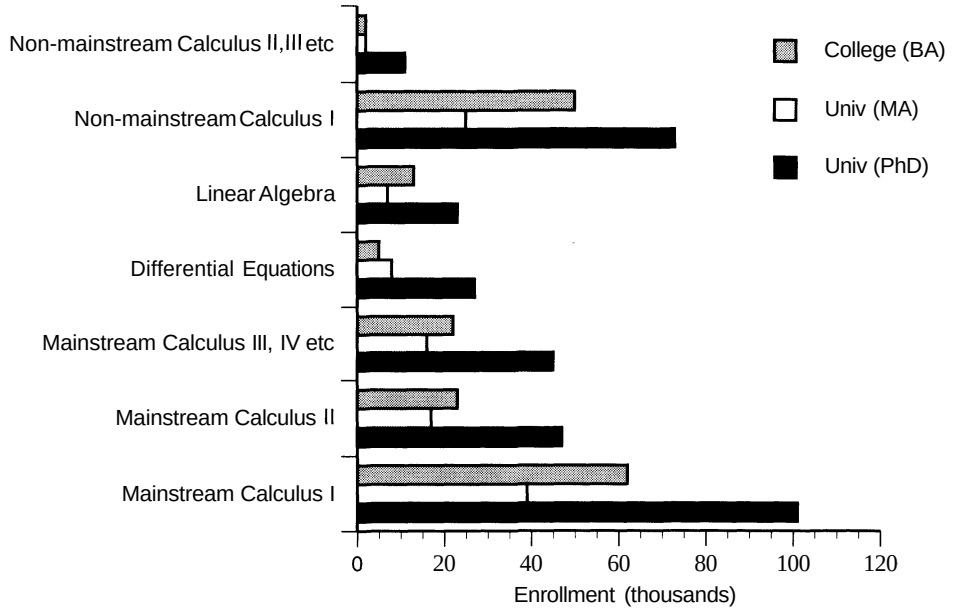

FIGURE C.1.1 Enrollment in some Calculus level courses in four-year college and university Departments of Mathematics by type of school: Fall 1990.

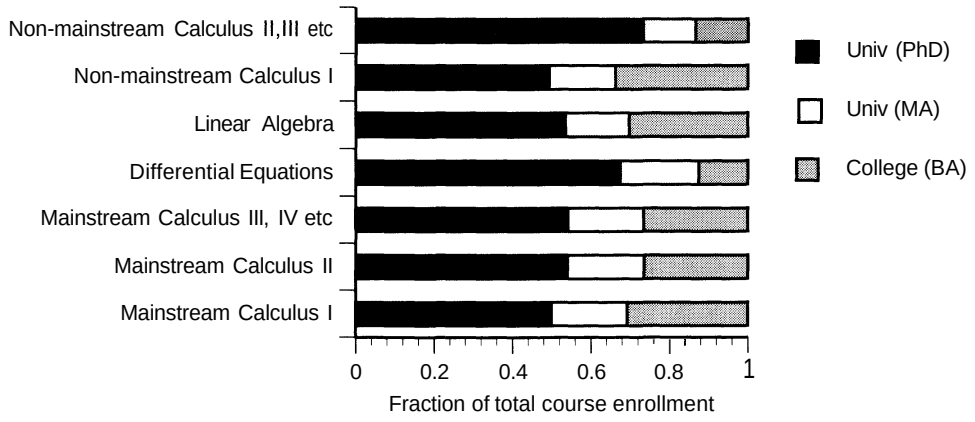

FIGURE C.1.2 Fraction of enrollment in some Calculus level courses in four-year college and university Departments of Mathematics by type of school: Fall 1990.

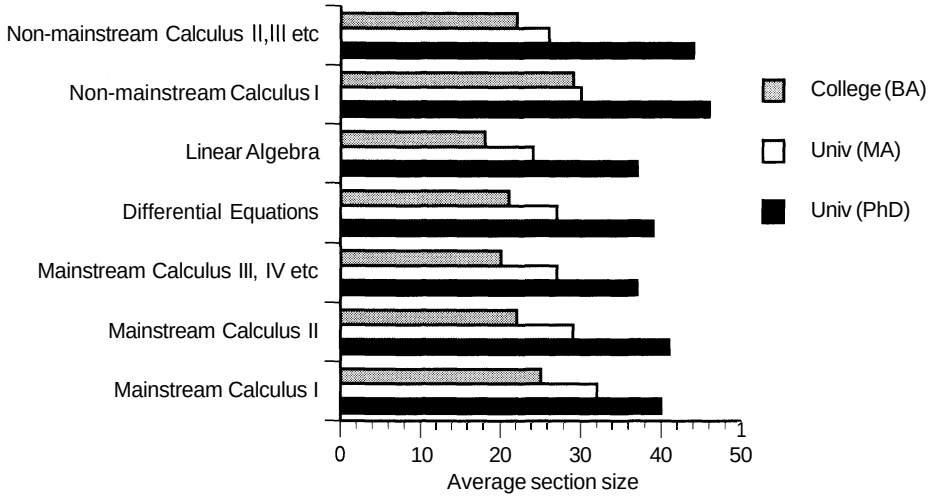

FIGURE C.1.3 Average section size in some Calculus level courses in four-year college and university Departments of Mathematics by type of school: Fall 1990.

TABLE C.1 Enrollment in discrete mathematics, introduction to mathematical logic, and other calculus-level courses are not presented in this table but are included in Tables S.2, E.1, E.2, and E.3 under calculus-level courses, as well as in the specific course enrollments presented in Appendix I.

TABLE C.2 Instructional formats for mainstream and non-mainstream Calculus I in four-year college and university Departments of Mathematics; percent of total sections in each format by type of school: Fall 1990.

	Mainstream Calculus I				Non-mainstream Calculus I			
	Univ (PhD)	Univ (MA)	College (BA)	ALL Math Depts	Univ (PhD)	Univ (MA)	College (BA)	ALL Math Depts
Number of sections	2544	1214	2512	6270	1568	835	1747	4150
Class size								
Less than 40	59%	88%	92%	78%	66%	88%	94%	81%
40 to 80	8%	9%	7%	8%	13%	12%	0%	9%
Greater than 80, no quiz sects	0%	1%	1%	1%	5%	0%	6%	4%
Greater than 80, quiz sects	32%	0%	0%	12%	16%	0%	0%	6%
Other	1%	2%	0%	1%	0%	0%	0%	0%

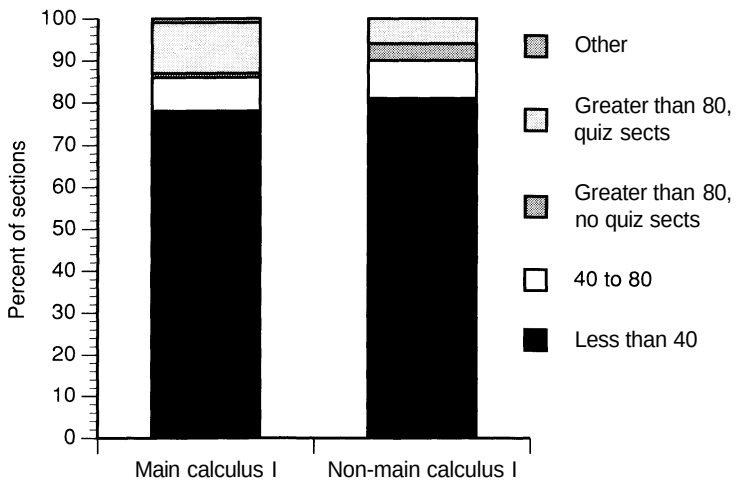

Figure C.2.1 Percent of sections using each instructional format for mainstream and non-mainstream Calculus I in four-year college and university Departments of Mathematics: Fall 1990.

TABLE C.2 Because of the different breakdown of institutions as compared to previous studies, it is not always possible to make comparisons with past survey data. In particular, the corresponding 1985 data were presented in a more summary fashion making comparisons impossible. Because of a much higher average section size, enrollment in large lecture with quizzes at the PhD universities is surely more than half their total calculus course enrollment.

TABLE C.3 Number of sections (percent in parentheses) of Mainstream Calculus I and II requiring extra features in four-year college and university Departments of Mathematics by type of school: Fall 1990.

	Mainstream Calculus I				Mainstream Calculus II			
	Univ (PhD)	Univ (MA)	College (BA)	TOTAL	Univ (PhD)	Univ (MA)	College (BA)	TOTAL
Number of sections	2544	1217	2512	6273	1146	596	1068	2810
Number of sections using:								
Graphics calculator	66 (3%)	37 (3%)	59 (2%)	162 (3%)	31 (3%)	8 (1%)	22 (2%)	61 (2%)
Computer	130 (5%)	99 (8%)	360 (14%)	589 (9%)	37 (3%)	40 (7%)	106 (10%)	183 (7%)
Group projects	37 (1%)	27 (2%)	128 (5%)	192 (3%)	15 (1%)	7 (1%)	35 (3%)	57 (2%)
Writing component	57 (2%)	29 (2%)	519 (21%)	605 (10%)	18 (2%)	3 (1%)	243 (23%)	264 (9%)

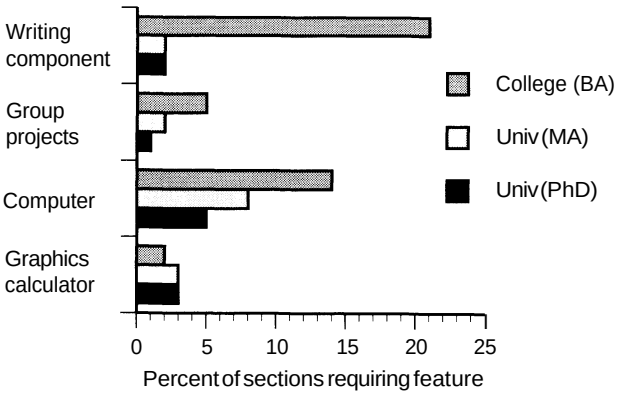

FIGURE C.3.1 Percent of sections of Mainstream Calculus I requiring extra features in four-year college and university Departments of Mathematics by type of school: Fall 1990.

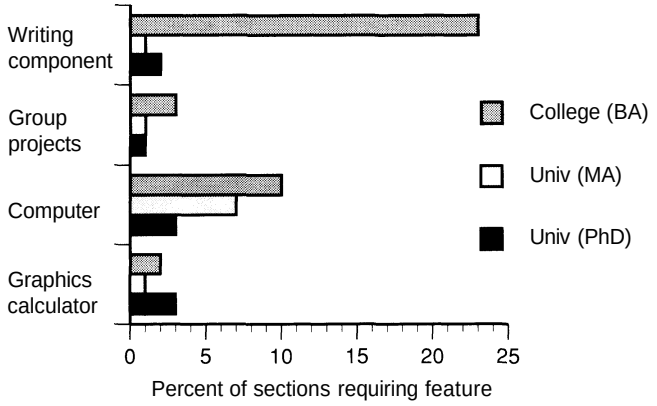

FIGURE C.3.2 Percent of sections of Mainstream Calculus II requiring extra features in four-year college and university Departments of Mathematics by type of school: Fall 1990.

TABLE C.3 Except for the writing component and computer assignments at four-year colleges, all other features were required in no more than 8% of sections.

TABLE C.4 Instructional formats for Elementary Statistics in four-year college and university Departments of Mathematics and Statistics; percent of total sections in each format by type of school: Fall 1990.

	Statistics Departments				Mathematics Departments			
	Univ (PhD)	Univ (MA)	College (BA)	ALL Stat Depts	Univ (PhD)	Univ (MA)	College (BA)	ALL Math Oepts
Number of sections	293	65	7	364	286	818	1497	2601
Class size								
Less than 40	18%	86%	100%	32%	45%	82%	85%	80%
40 to 80	19%	14%	0%	18%	27%	16%	12%	15%
Greater than 80, no quiz sects	10%	0%	0%	8%	8%	2%	3%	3%
Greater than 80, quiz sects	51%	0%	0%	40%	20%	0%	0%	2%
Other	2%	0%	0%	2%	0%	0%	0%	0%

TABLE C.4 This table is new and so comparisons to previous surveys cannot be made. Of course, Tables C.2, C.4, and C.5 give comparisons on the various instructional formats used for introductory courses in the three departments.

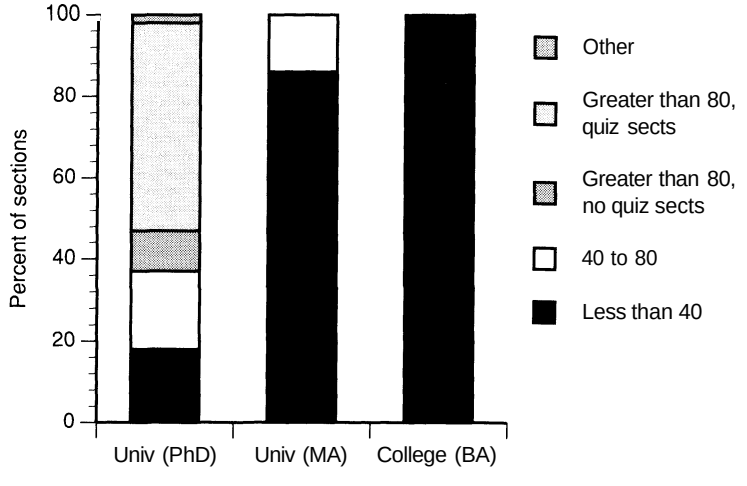

FIGURE C.4.1 Percent of sections using each instructional format for Elementary Statistics in four-year college and university Departments of Statistics by type of school: Fall 1990.

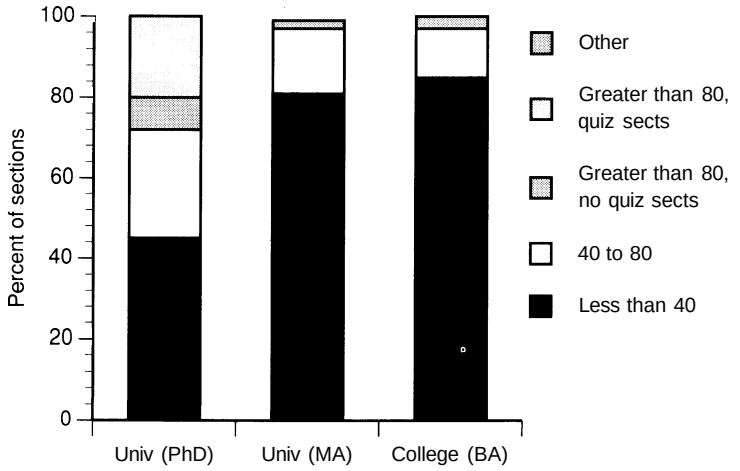

FIGURE C.4.2 Percent of sections using each instructional format for Elementary Statistics in four-year college and university Departments of Mathematics by type of school: Fall 1990.

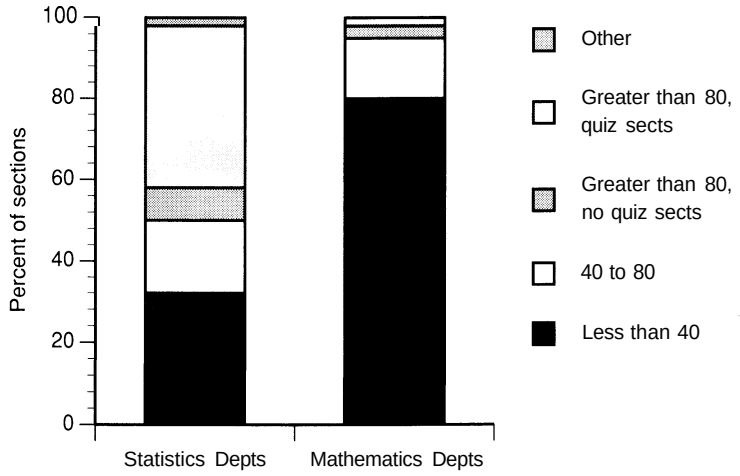

FIGURE C.4.3 Percent of sections using each instructional format for Elementary Statistics in four-year college and university Departments of Mathematics and Statistics: Fall 1990.

TABLE C.5 Instructional formats for Computer Programming I in four-year college and university Departments of Mathematics and Computer Science; percent of total sections in each format by type of school: Fall 1990.

	Computer Science Departments				Mathematics Departments			
	Univ (PhD)	Univ (MA)	College (BA)	ALL CS Depts	Univ (PhD)	Univ (MA)	College (BA)	ALL Math Depts
Number of sections	403	361	361	1125	95	372	888	1355
Class size								
Less than 40	40%	51%	87%	56%	46%	95%	97%	88%
40 to 80	25%	28%	1%	20%	26%	5%	0%	3%
Greater than 80, no quiz sects	8%	0%	0%	3%	0%	0%	3%	2%
Greater than 80, quiz sects	23%	11%	5%	14%	28%	0%	0%	7%
Other	4%	10%	7%	7%	0%	0%	0%	0

TABLE C.5 This table is new.

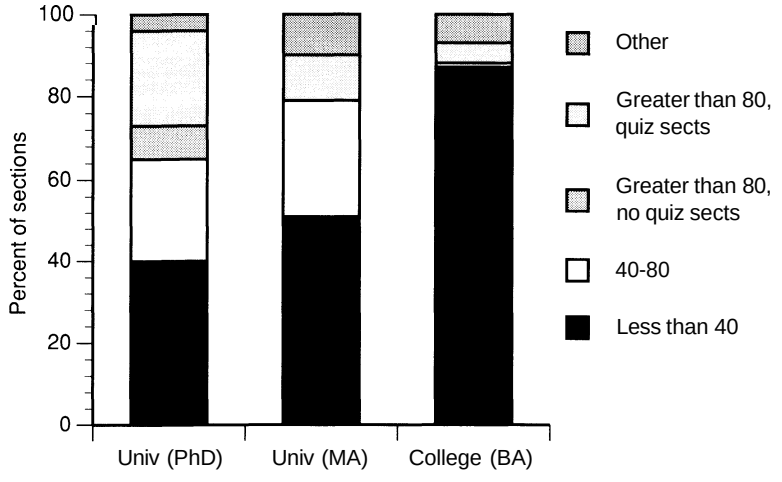

FIGURE C.5.1 Percent of sections using each instructional format for Computer Programming I in four-year college and university Departments of Computer Science by type of school: Fall 1990.

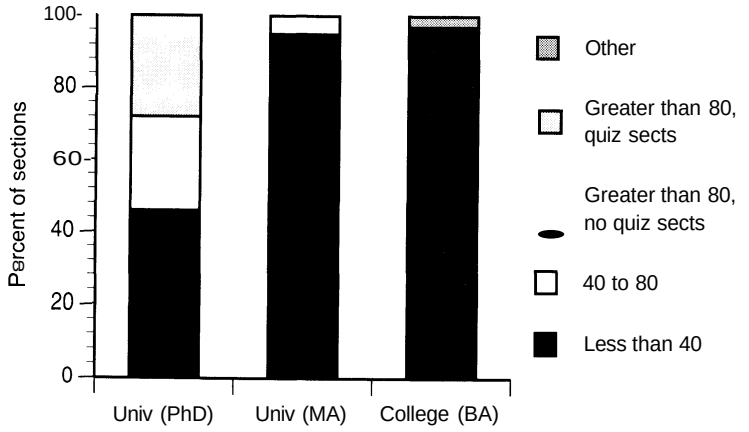

FIGURE C.5.2 Percent of sections using each instructional format for Computer Programming I in four-year college and university Departments of Mathematics by type of school: Fall 1990.

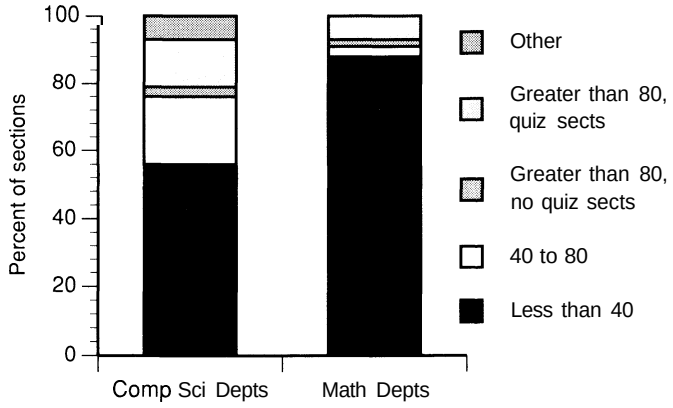

FIGURE C.5.3 Percent of sections using each instructional format for Computer Programming I in four-year college and university Departments of Mathematics and Computer Science: Fall 1990.