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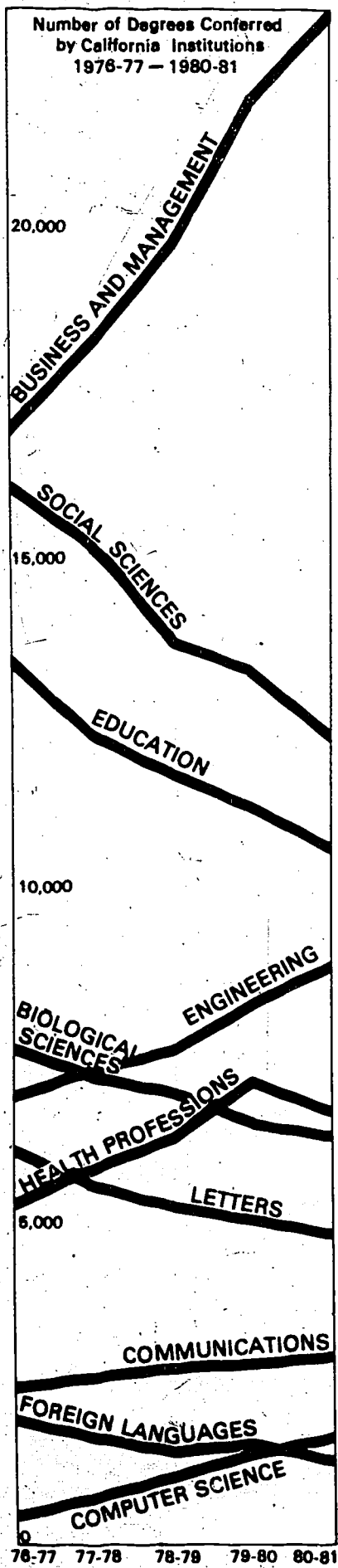
ABSTRACT

Enrollments for undergraduate and graduate majors in California are examined and compared to national trends. Information is provided on changes in degrees awarded by field of study in the nation from 1960-1961 to 1979-1980 and in California from 1976-1977 through 1980-1981. Using data from the Higher Education General Information Survey, changes are reported in student interest as reflected in percentage changes among general fields of study and market shares of each of these fields. Attention is also directed to: absolute numbers of degrees awarded and percentage changes in specific disciplines within the University of California and California State University campuses; and changes in the interests of men and women, ethnic minorities, and foreign students. Changes in degrees are compared to changes in enrollments among major fields and the implications of the changes for institutional planning are considered. The effects of these changes in student demand on departmental, institutional, and segmental planning and management are also discussed. Appendices provide detailed information on changes in student degree patterns by discipline, sex, ethnicity, and segment. (Author/SW)



MAJOR GAINS AND LOSSES

Recent Shifts in Popularity of Academic Disciplines as Fields of Concentration

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

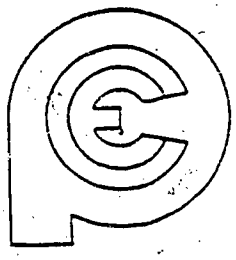
The California Postsecondary Education Commission was created by the Legislature and the Governor in 1974 as the successor to the California Coordinating Council for Higher Education in order to coordinate and plan for education in California beyond high school. As a state agency, the Commission is responsible for assuring that the State's resources for postsecondary education are utilized effectively and efficiently; for promoting diversity, innovation, and responsiveness to the needs of students and society; and for advising the Legislature and the Governor on statewide educational policy and funding.

The Commission consists of 15 members. Nine represent the general public, with three each appointed by the Speaker of the Assembly, the Senate Rules Committee, and the Governor. The other six represent the major educational systems of the State.

The Commission holds regular public meetings throughout the year at which it takes action on staff studies and adopts positions on legislative proposals affecting postsecondary education. Further information about the Commission, its meetings, its staff, and its other publications may be obtained from the Commission offices at 1020 Twelfth Street, Sacramento, California 95814; telephone (916) 445-7933.

MAJOR GAINS AND LOSSES

Recent Shifts in Popularity of Academic Disciplines as Fields of Concentration



CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

1020 Twelfth Street, Sacramento, California 95814

Commission Report 83-25

Adopted June 20, 1983

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INTRODUCTION

During the past several years, enrollment shifts have been increasingly evident as college students throughout the country have moved out of programs in the humanities and social sciences into programs in business, computer science, and engineering. The magnitude of these shifts in California has not been generally recognized, however. The Commission's data collection and analysis system now allows the Commission to document annually the number of undergraduate and graduate majors enrolled in each degree program on every University of California and California State University campus as well as the number of degrees awarded in each program not only on these campuses but by California's independent institutions as well. Assembled in this manner, the information would be an invaluable tool for curriculum planning and programmatic decisions under any circumstances; but during a period of dramatic shifts and fiscal stringency, it is an even more essential instrument for program planning and review. Moreover, beyond its implications for academic planning, it provides an excellent clue to values and goals in society as a whole. It suggests the kinds of careers to which students aspire, the knowledge and skills most in demand, and the varieties of specialized training that colleges and universities are being urged to provide.

The relationship of program planning and review to the goal of excellence and quality makes this concern an item of high priority on the Commission's planning agenda as outlined in The Challenges Ahead (1981), the Commission's five-year plan for 1982-1987. This report provides an additional perspective for those concerned with excellence and quality and thus may contribute to the achievement of that goal.

SCOPE OF THE REPORT

The first chapter of the report describes changes in degrees awarded by field of study in the nation at large from 1960-61 to 1979-80--the most recent year for which national data are available. Chapter Two then reports similar changes in California's four-year institutions from 1976-77 through 1980-81. Using information provided by the segments through the annual Higher Education General Information Survey (HEGIS) program, it documents changes in student interest as reflected in percentage changes among general fields of study and "market shares," of each of these fields. Chapter Three examines absolute numbers of degrees awarded and percentage changes in specific disciplines within the University and the State University. Chapter Four examines changes in men's and women's interests and highlights the dramatic increase of women in hitherto male-dominated specialities. Chapters Five and Six report similar data for ethnic minority and foreign students. Chapter Seven compares changes in degrees with changes in enrollments among major fields and draws implications from the changes for institutional planning. Chapter Eight discusses the effects of these changes in student demand on departmental, institutional, and segmental planning and management. Finally, the appendices, the primary source of information used throughout

the report, provide detailed descriptions of changes in student degree patterns by discipline, sex, ethnicity, and segment.

Because of the tendency of students to switch from one major to another during college, and even during their last two years, enrollment figures by major field are less reliable than numbers of degrees conferred in measuring or predicting changes in student academic interests and demand. Of all possible measures of student preference, degrees awarded are clearly the most accurate and reliable, since they represent final choices in verifiable numbers. Most of the statistics in this report, therefore, are based on degrees already awarded. Only in Chapter Seven, which attempts to identify trends that are likely to continue, are enrollments by major field introduced.

POSSIBLE FUTURE REPORTS

A summary report based on hundreds of pages of quantitative information can call attention to only some of the broader trends and developments reflected in the voluminous statistics. It cannot hope to account for all the shifts within the same general field (bachelor's degrees in applied mathematics increased 95 percent, for example, while those in general mathematics declined 20 percent); or explain why in some fields undergraduate enrollment shows a healthy increase while graduate enrollment is plummeting (or vice versa); or analyze the ratio of enrollments to degrees awarded in all fields; or identify those enrollment patterns which result from institutional policy rather than student choice.

With information currently in computer files, these and a variety of other topics could be investigated in detail. It would be possible, for example, to propose measures of program vitality, to examine enrollment patterns in relation to the sizes and locations of campuses, and to analyze more thoroughly than is attempted in this report shifts in enrollment according to age, sex, and minority status.

The present report does not intend to be highly analytical. It attempts to document--with numerous tables and graphs--some recent curricular developments that are interesting and significant. Subsequent reports can be expected to analyze more carefully certain aspects of the information on enrollments and degrees awarded that may have been slighted here.

HIGHLIGHTS OF THE REPORT

National Trends from 1960-61 to 1979-80

- Among undergraduates, business and management has overtaken education as the most popular major in the country, and now accounts for one fifth of all bachelor's degrees awarded nationally.
- The number of bachelor's degrees awarded in history, library science, mathematics, and sociology declined by over 50 percent in the last 10 years.
- The field of letters--including the disciplines of English, comparative literature, classics, linguistics, and philosophy--suffered a 55 percent loss in the same period.
- The greatest percentage growth in bachelor's degrees over the past decade occurred in computer science (up 367%), public affairs and services (up 295%), and health professions (up 153%).
- At the doctoral level, one of every four doctorates awarded in the United States in 1980 was in education--up from one in five in 1971.
- Conversely, the number of doctorates declined appreciably in engineering, foreign languages, letters, mathematics, physical sciences, and social sciences

California Trends from 1976-77 to 1980-81

- In California during the past five years, majors in a few subjects have increased dramatically while those in most others have declined.
- The greatest percentage gains at the bachelor's level have occurred in computer science (up 114%), business administration (42%), engineering (59%), and communications (29%).
- The number of bachelor's degrees almost tripled in electrical/electronic engineering and nearly doubled in all other engineering fields.
- The greatest losses have occurred in the disciplines of the social sciences (23%), foreign languages (24%), and public affairs (24%).
- In the University of California and the California State University combined, bachelor's degrees in anthropology are down 41 percent; in Afro-American studies, 40 percent; in sociology, 38 percent; and in history, 34 percent. In the State University, the number of master's degrees in sociology and history has declined at an even greater rate.
- Twenty-four percent of the bachelor's degrees awarded by the State University in 1981 were in business and management, compared to only 5 percent at the University.

- At the graduate level, the number of engineering degrees awarded has decreased during the past five years. Although graduate degrees in computer sciences went up more than 70 percent, the numbers remain modest.

- California institutions now award more master's degrees in business and management than in education, with the two fields combined accounting for 43 percent of all master's degrees.

Trends Among Men and Women Nationally and in California

- Degrees earned by women at all levels increased during the past decade both nationally and in California.

- Nationally, by 1979-80, women were earning 49 percent of bachelor's degrees, and in California, women reached this percentage by 1980-81.

- Nationally, the percentage of bachelor's degrees earned by women in business and management rose from 8 percent to 33 percent between 1970-71 and 1979-80; in computer sciences, from 14 percent to 30 percent; and in biological sciences, from 29 percent to 42 percent. Similar gains for women in these fields are evident in California.

- At the doctoral and first professional levels, women increased their share of degrees awarded nationally from 14 percent in 1970-71 to 30 percent in 1979-80. The percentages were virtually identical in California.

- Women's share of doctorates in education more than doubled during the 1970s nationally, amounting to 44 percent by 1979-80. In California, by 1980-81 women were receiving 49 percent of these doctorates.

- Nationally, only 262 women received law degrees in 1960-61, but 10,754 women earned such degrees in 1979-80. At the University of California, (including Hastings College of Law) 36 percent of all law degrees awarded in 1981 went to women.

- The percentage of women in California entering the high-demand disciplines (computer science, business and management, engineering, and communications) is increasing more rapidly than that of men.

Trends Among Minority Student and Foreign Students in California

- Few fields of study have proven resistant to the changing interests of the student population; degrees awarded to minorities and foreign students point to increased participation of these groups as well as women in programs in which they have traditionally been underrepresented. Exceptions include engineering (92% Asian and White, 90+% male), home economics (91+% Asian and White, 95+% female), and agriculture (87% white).

The three most popular undergraduate fields for minority students, accounting for 42 percent of all their bachelor's degrees in 1980-81, were business and management, social sciences, and engineering. (For non-minority students, these three fields accounted for 39 percent of their bachelor's degrees.)

In 1981, foreign language and public affairs programs graduated the highest percentage of minority students at the baccalaureate level: approximately one of every five bachelor's degrees in these fields were awarded to these students.

Minority graduates (both including and excluding Asian students) in California registered larger percentage increases in bachelor's degrees among the high-growth fields than did the general student population.

Master's degrees awarded to minority students increased by 16 percent between 1976-77 and 1980-81, compared to a 1.3 percent decline for all students.

The percentage of doctorates awarded to all minority students increased by 33 percent, compared to 14 percent for all students, however, when Asian students are excluded from the minority group, the percentage of doctorates awarded dropped by 3 percent over the 1976-77 - 1980-81 period.

Among foreign (non-resident alien) students, their number of bachelor's degrees increased by 94 percent; and their master's degrees increased by 28 percent while their doctorates declined by nearly 5 percent.

In 1980-81, 5 percent of the bachelor's degrees, 12 percent of the master's degrees, and 12 percent of the doctorates awarded in California went to foreign students. Of the bachelor's degrees awarded to foreign students, the State University awarded 50 percent, independent institutions awarded 34 percent, and the University of California only 10 percent.

In 1980-81, foreign students received approximately one out of every five bachelor's degrees, one out of every three master's degrees, and four out of every ten doctorates awarded in engineering in California.

ONE

NATIONAL TRENDS SINCE 1960-61

Trends in program popularity nationally over the past twenty years provide background for reviewing the changes during the past five years in California. This portion of the report notes trends at the baccalaureate and doctoral levels and compares trends among women with those among men. Information on first professional degrees appears in Appendix A.

BACHELOR'S DEGREES

Changes since 1960-61 in the number of bachelor's degrees awarded nationally in the 20 general fields of study listed in Table 1 reveal pronounced shifts in the popularity of these disciplinary areas. As this table shows, the number of bachelor's degrees more than doubled between 1960-61 and 1970-71 but then increased only 10 percent between 1970-71 and 1979-80. The peak year was 1973-74 when 945,776 students earned baccalaureate degrees. Since then, the number of these degrees awarded has dropped by some 16,000, with the number awarded by public institutions declining from 651,544 to 624,084, while contrary to some predictions, the number granted by independent colleges and universities increasing from 294,232 to 305,333 in 1980 (National Center for Education Statistics, 1982, p. 15).

As Table 1 shows, all 20 categories of discipline increased their number of degrees during the 1960s, most by more than 50 percent but only 13 of the 20 grew during the '70s and two of the others--library science and mathematics --declined by more than 50 percent. Only two fields--biological sciences and fine arts--maintained a relatively consistent share of the total during the entire twenty-year period. Most others experienced large increases or decreases, and these trends seem to have accelerated during the past five years.

The categories exhibiting the greatest gains and losses nationally during these decades are for the most part the same as those changing the most in California during the past five years. The most growth nationally occurred in business and management, which now easily surpasses education as the field in which more bachelor's degrees are awarded than any other. In fact, education's share of baccalaureates dropped in about the same proportion as that of business and management increased. (Education doctorates, however, continued to increase both in number and proportion, jumping from 16 percent of all doctorates in 1960-61 to more than 24 percent in 1979-80.)

TABLE 1 Bachelor's Degrees Awarded in the United States by General Field of Study, 1960-61, 1970-71, and 1979-80

Field of Study	1960-61 Number	1960-61 Percent of Total	1970-71 Number	1970-71 Percent of Total	19879-80 Number	19879-80 Percent of Total
Agriculture and Natural Resources	5,634	1.5	12,672	1.5	11,802	2.5
Architecture and Environmental Design	412	0.1	5,570	0.7	9,130	1.0
Biological Sciences	16,101	4.4	35,743	4.3	46,370	5.0
Business and Management	48,545	13.2	113,532	13.5	183,741	19.8
Communications	-	-	10,324	1.2	16,927	2.9
Computer Science	-	-	2,388	0.3	11,154	1.2
Education	92,368	25.3	176,614	21.0	118,169	12.7
Engineering	34,527	9.5	50,046	5.9	68,893	7.4
Fine and Applied Arts	12,898	3.5	30,394	3.6	40,892	4.4
Foreign Languages	6,524	1.8	19,945	2.4	11,133	1.2
Health Professions	11,478	3.1	25,190	3.0	63,607	6.8
Home Economics	4,338	1.2	10,825	1.3	17,856	1.9
Letters*	32,022	8.8	73,079	8.7	40,566	4.3
Library Science	439	0.1	1,013	0.1	398	0.04
Mathematics	13,127	3.6	24,801	3.0	11,378	1.2
Physical Sciences	15,500	4.2	21,412	2.5	23,410	2.5
Psychology	8,524	2.3	37,880	4.5	41,962	4.5
Public Affairs and Services**	-	-	9,918	1.1	39,190	4.2
Social Sciences	53,004	14.5	155,236	18.5	103,519	11.1
Miscellaneous	10,096	2.7	30,864	3.7	55.389	6.0
TOTAL	365,337		839,730		929,417	

* Includes English, philosophy, comparative literature, linguistics, and religion.

**Included with social sciences in 1960-61.

Sources: U.S. Office of Education, 1963; National Center for Education Statistics, 1982.

Engineering presents a pattern opposite to education, with a doubling of bachelor's degrees over 20 years and a decline during the 1970s in the number of Ph.Ds. In percentage terms, both computer science and communications have enjoyed a surging growth during the '70s (having not yet been identified as separate categories of degree programs) although the number of degrees in these fields is still proportionally small. Another field showing considerable increases has been public affairs and services, although this trend may presently be reversing itself since a large part of the increase was due to the popularity during the 1970s of programs in social work and public administration.

The field of letters--including among others the disciplines of English, comparative literature, classics, linguistics, and philosophy--has suffered one of the greatest percentage losses since 1961--51 percent. The even greater percentage decline of mathematics results partly from computer science receiving independent status, having originated as options within mathematics. Also losing ground during the last decade--after having increased significantly during the 1960s, unlike letters--were the social sciences. This curricular area includes several common undergraduate majors, not all of which fared equally. Anthropology, history, and sociology, for example, suffered losses of more than 50 percent between 1971 and 1980, while undergraduate degrees in economics grew in number.

DOCTORAL DEGREES

The number of doctorates awarded nationally, not counting first professional degrees, increased from 10,575 in 1960-61 to 32,107 in 1970-71. Since the peak year of 1972-73, when 33,756 doctorates were awarded, the number has declined slightly and remained in the vicinity of 32,000 for the past five years. In view of the median time lapse between baccalaureate to doctorate, it is likely that enough students are still in the academic pipeline for this figure to remain relatively stable for at least a few more years.

As noted earlier, some subjects differ markedly in enrollment and degree trends at the undergraduate and graduate levels. Because doctoral programs emphasize research and the creation of new knowledge, changing patterns of enrollment at this level are especially important. Table 2 shows the number of doctoral degrees awarded and the percentage of the total in each of the 20 discipline categories for the years 1960-61, 1970-71, and 1979-80.

Education, as we have seen, is one field in which the number of undergraduate degrees declined drastically, while its share of doctoral degrees was growing to an impressive 24.5 percent of the total in 1979-80, more than twice as many as any of the 19 other fields. Some of this growth is probably due to the expansion of off-campus doctoral programs being offered by nontraditional institutions. The second highest number of doctorates in 1979-80 were in the biological sciences (now frequently labeled life sciences) which have maintained a consistent 11 percent of the total since 1962-63.

TABLE 2 Doctorates Awarded in the United States by General Field of Study, 1960-61, 1970-71, 1979-80

Field of Study	1960-61 Number	1960-61 Percent of Total	1970-71 Number	1970-71 Percent of Total	1979-80 Number	1979-80 Percent of Total
Agriculture and Natural Resources	450	4.2	1,065	2.3	991	3.1
Architecture and Environmental Design	3	0.0	36	0.1	79	0.2
Biological Sciences	1,193	11.2	3,645	11.4	3,636	11.1
Business and Management	1,[illegible]	1.6	807	2.5	792	2.4
Communications	-	-	145	0.5	182	0.6
Computer Science	-	-	128	0.4	240	0.7
Education	1,743	16.5	6,403	19.9	7,941	24.3
Engineering	943	8.9	3,638	11.3	2,502	7.7
Fine and Applied Arts	303	2.9	621	1.9	655	2.0
Foreign Languages	263	2.5	781	2.4	549	1.7
Health Professions	133	1.3	459	1.4	771	2.3
Home Economics	36	0.3	121	0.4	191	0.6
Letters*	792	7.5	2,408	7.4	1,874	5.7
Library Science	14	0.1	39	0.1	73	0.2
Mathematics	344	3.3	1,199	3.7	724	2.2
Physical Sciences	1,911	18.2	4,390	13.7	3,089	9.5
Psychology	567	5.4	1,782	5.6	2,786	8.5
Public Affairs and Services**	-	-	188	0.6	411	1.3
Social Sciences	1,355	12.8	3,659	11.4	3,219	9.9
Miscellaneous	379	3.6	1,265	4.0	2,475	7.6
TOTAL	10,575		32,107		32,615	

*Includes English, philosophy, comparative literature, linguistics, and religion.

**Included with social sciences in 1960-61.

Sources: U.S. Office of Education, 1963; National Center for Education Statistics, 1982.

During the past decade, the number of doctorates has fallen off in the fields of engineering, mathematics, physical sciences, social sciences, and letters. The decline in engineering has been well publicized, while that in the physical sciences has not. Nevertheless, many students in the fields of chemistry, physics, and geology, as in engineering, apparently feel that the attractions of immediate employment outweigh the benefits of pursuing the doctorate. The losses in mathematics during the last ten years are not entirely accounted for by the shift into computer sciences, just as those in the social sciences over the past 20 years are not fully explained by the separation of public affairs and services. Decreases in the number of doctorates in letters and social sciences have been less dramatic than in the number of bachelor's and master's degrees in these fields, possibly reflecting the fact that large numbers of doctoral students who began their graduate programs in the 1970s are just now completing them. (The median completion time from baccalaureate to doctorate is 11 years in history, 10.9 years in English, and 10 years in sociology. The longest time lapse of 13.5 years is in education; the shortest is 6.0 years in chemistry. See National Research Council, 1982, pp. 32-33.)

Doctorates in business and management, even though tripling in number since 1961, have increased only .8 percent of the total, to 2.4 percent. Despite the booming popularity of bachelor's and master's programs in business administration, few indications exist of any significant increase in student demand for doctorates in business.

DEGREES AWARDED TO WOMEN

In examining trends in academic degrees awarded nationally during the past 20 years, nothing stands out as conspicuously as the enormous increase in the number of degrees earned by women. The gains are apparent in almost every field at all degree levels especially since 1971. Tables 3 and 4 as well as the tables in Appendix A show the number and percent change in degrees awarded to women in the 20 major disciplinary categories discussed above since 1971.

By 1980, for the first time in history, the number of bachelor's degrees earned by women almost equalled that earned by men (Table 3). Women increased their share of degrees to 49 percent overall and in all of the discipline categories--except for three: education, home economics, and letters--in which they maintained their overwhelming majority (74, 96, and 59 percent, respectively) despite a percentage decline. In several fields, women's advances during the ten-year period were striking--up from 4 percent to 30 percent, for example, in agriculture and natural resources; from 8 percent to 33 percent in business and management, from 14 percent to 30 percent in computer science, from less than 1 percent to 10 percent in engineering, and in the biological or life sciences, from 29 percent to 42 percent. Gains in other subjects, while not quite as dramatic statistically, were in other respects equally significant. In 1980, women earned 76 percent of the bachelor's degrees awarded in foreign languages; 42 percent of those in mathematics; and 63 percent of those in both psychology and fine and applied arts.

TABLE 3 Bachelor's Degrees Awarded in the United States by General Field of Study, in Total and to Women, 1970-71 and 1979-80

Field of Study	1970-71 Number Awarded	1970-71 Number Awarded to Women	1970-71 Percent Awarded to Women	1979-80 Number Awarded	1979-80 Number Awarded to Women	1979-80 Percent Awarded to Women
Agriculture and Natural Resources	12,671	536	4.2	22,802	6,757	29.6
Architecture and Environmental Design	5,570	664	11.9	9.132	2,536	27.8
Biological Sciences	35,743	10,410	29.1	46,370	19,542	42.1
Business and Management	113,542	9,172	8.1	183,741	60,908	33.2
Communications	10,324	3,665	35.5	26,927	14,200	52.7
Computer and Information Science	2,388	324	13.6	11,154	3,372	30.2
Education	176,614	131,520	74.5	118,169	87,247	73.8
Engineering	44,898	358	0.8	58,402	5,915	10.1
Fine and Applied Arts	30,394	18,138	59.7	40,892	25,827	63.2
Foreign Languages	19,945	14,870	74.6	11,133	8,402	75.5
Health Sciences	22,634	17,246	76.2	57,864	47,369	81.9
Home Economics	10,825	10,652	98.4	17,856	17,213	96.4
Letters	72,079	44,538	61.0	40,566	24,067	59.3
Library Science	1,013	932	92.0	398	378	95.0
Mathematics	24,301	9,432	38.0	11,378	4,816	42.3
Physical Science	21,412	2,953	13.8	23,410	5,546	23.7
Psychology	37,880	16,851	44.5	41,962	26,543	63.3
Public Affairs and Services	9,918	4,515	45.5	39,190	21,144	54.0
Social Sciences	155,236	57,146	36.8	103,519	45,085	43.6
Miscellaneous	30,864	10,214	33.0	55,389	28,939	52.2
TOTAL	839,730	364,136	43.4	929,417	455,806	49.0

Source: National Center for Education Statistics, 1982.

TABLE 4 Doctorates Awarded in the United States by General Field of Study, in Total and to Women, 1970-71 and 1979-80

Field of Study	1970-71 Number Awarded	1970-71 Number Awarded to Women	1970-71 Percent Awarded to Women	1979-80 Number Awarded	1979-80 Number Awarded to Women	1979-80 Percent Awarded to Women
Agriculture and Natural Resources	552	31	5.6	991	112	11.3
Architecture and Environmental Design	36	3	8.3	79	13	16.5
Biological Sciences	3,645	595	16.3	3,636	946	26.0
Business and Management	807	23	2.9	792	115	14.5
Communications	145	19	13.1	182	70	38.5
Computer and Information Science	128	3	2.3	240	27	11.2
Education	6,403	1,358	21.2	7,941	3,522	44.4
Engineering	3,637	23	0.6	2,502	95	3.8
Fine and Applied Arts	621	138	22.2	655	242	36.9
Foreign Languages	781	297	38.0	549	315	57.4
Health Sciences	449	75	16.7	763	346	45.3
Home Economics	121	73	60.3	191	145	75.9
Letters	2,408	564	23.4	1,874	767	41.0
Library Science	39	11	28.2	73	38	52.1
Mathematics	1,199	93	7.8	724	100	13.8
Physical Science	4,390	246	5.6	3,089	384	12.4
Psychology	1,782	427	24.0	2,768	1,166	42.1
Public Affairs and Services	188	45	23.9	411	142	34.5
Social Sciences	3,659	507	13.9	3,219	872	27.1
Miscellaneous	1,265	46	3.6	2,475	255	10.3
TOTAL	32,107	4,577	14.3	32,615	9,672	29.7

Source: National Center for Education Statistics, 1982.

A similar trend occurred at the doctoral level. Of the total number of doctorates in all fields awarded in 1980, women earned 30 percent, compared to only 14 percent in 1971. Roughly 5,100 more women earned doctoral degrees in 1980 than ten years earlier, while 4,600 fewer men were awarded the degree. Over the decade, women increased their share of the total in every major disciplinary area (Table 4). In education, in contrast to the baccalaureate level, women's share of doctorates more than doubled, increasing to 44 percent of the number awarded. In foreign languages and letters, their share reached 57 and 41 percent of the totals, respectively. While their number in engineering, mathematics, and the physical sciences remained low, their share of the total in these fields was up notably.

Gains in the number of first professional degrees earned by women were especially impressive (Appendix A), particularly during the decade of the '70s. Even though women are still not close to earning the same number of degrees as men in any of the professional fields, in 1980-81 they received more than a third of those awarded in pharmacy and nearly a third in veterinary medicine and law. The trends are even more pronounced, of course, over a 20-year period. In 1961, less than 3 percent of all first professional degrees went to women; 20 years later, more than 25 percent did, and the advances were noteworthy in every professional field. The field of law provides particularly convincing evidence of the general trend. In 1961, only 262 women earned the Bachelor of Law; whereas in 1980, 10,754 did so. The same exponential increases were registered in medicine, dentistry, veterinary medicine, theology, and, in fact, in all specialized professional categories.

These statistics, along with those for degrees awarded at other levels, present forceful testimony to the changing attitudes toward the role of women in the professions and in all occupational fields, and they suggest that opportunities increasingly exist for women to prepare themselves for careers in any field.

TWO

CALIFORNIA TRENDS SINCE 1976-77

Over the past five years, the four-year colleges and universities in California have awarded more than 410,000 baccalaureate, 150,000 master's, and 20,000 doctorate degrees. During this time, the number of bachelor's and master's degrees they have conferred has remained virtually constant, although the number of both awarded by public institutions has declined while increasing in the independent institutions--a pattern similar to that nationally over the past decade. In contrast, during these five years, the number of doctorates awarded has increased by 14 percent--up 6 percent at the University of California and 22 percent at independent institutions.

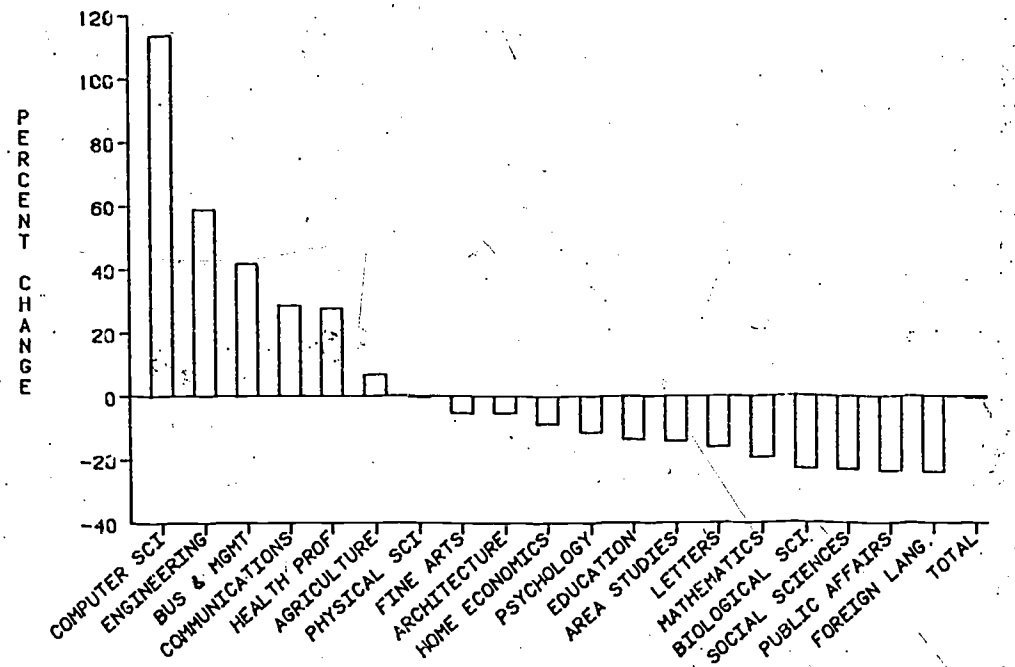
These five-year totals by themselves do not suggest extensive changes in student enrollment and degree patterns, but a closer look at the numbers of degrees awarded by discipline discloses many turbulent trends under the surface.

INCREASES AND DECREASES BY FIELD OF STUDY

Figure 1 on page 16 and Appendix B on pages 65-70 show the shifting nature of undergraduate interests by depicting the percentage change in the number of bachelor's degrees awarded in 19 subject areas over this half decade. They demonstrate that a substantial shift toward high-technology and business administration majors has taken place in California as in the nation at large, accomplished in a large measure at the expense of the humanities, social sciences, and other liberal arts programs. As Figure 1 indicates, twice as many fields experienced decreases in the number of bachelor's degrees awarded as enjoyed increases. Within the six programs showing increases, the high-technology programs of computer science and engineering clearly predominated, and the other four--business and management, communications, health professions, and agriculture--all are increasingly technological in orientation. Among the 13 programs losing ground, five among the worst hit were those in the standard liberal arts and sciences: letters, mathematics, biological sciences, social sciences, and foreign languages.

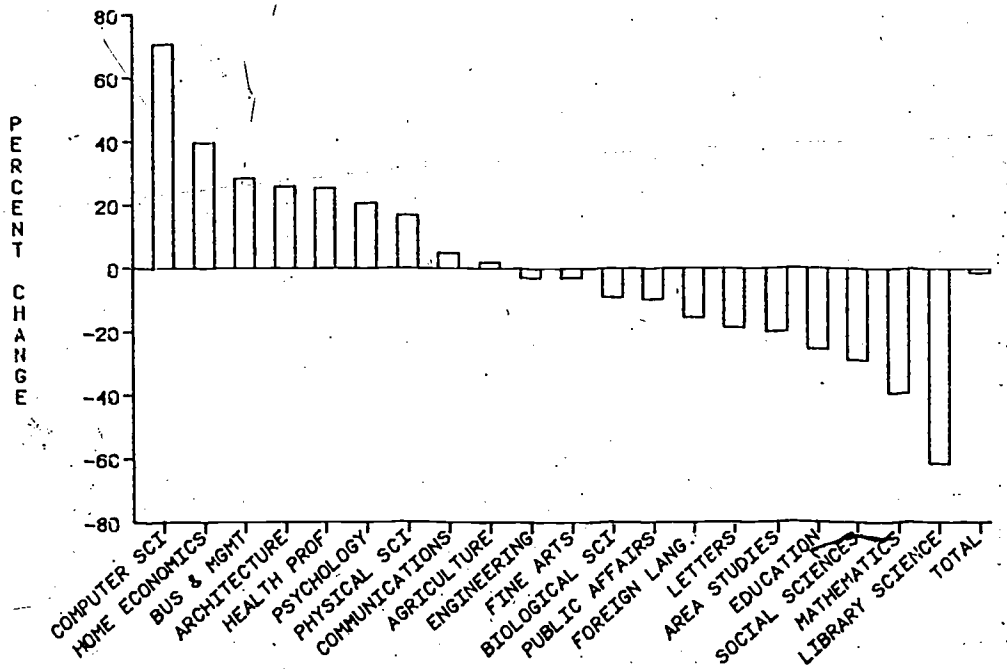
At the master's level, Figure 2 and Appendix B show that gains were distributed over a wider range of fields--nine rather than six--but these nine were still outnumbered by the other 11 that absorbed losses. Notably, engineering, which registered a strong increase at the baccalaureate level, declined slightly at the master's level. (The Commission's recent report, Engineering and Computer Science Education in California Public Higher Education discusses this topic at length.) Conversely, the number of degrees

FIGURE 1 Percentage Change in Bachelor's Degrees Awarded by General Field of Study, All California Institutions, 1976-77 Through 1980-81



Source: Appendix B.

FIGURE 2 Percentage Change in Master's Degrees Awarded by General Field of Study, All California Institutions, 1976-77 Through 1980-81



Source: Appendix B.

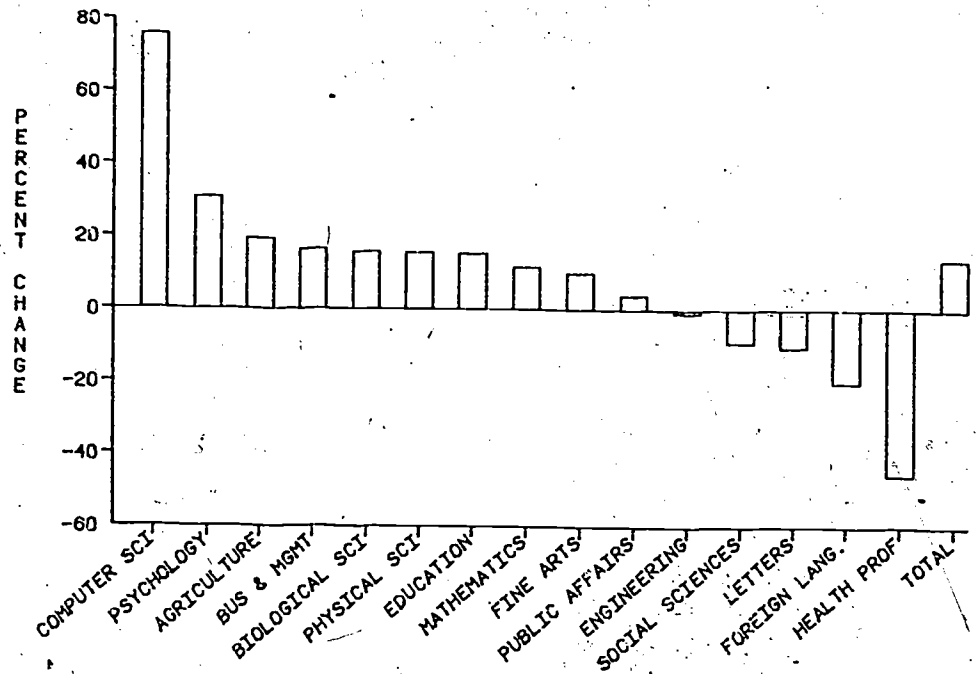
awarded in psychology and the physical sciences increased at the master's level while declining at the baccalaureate level. As with bachelor's degrees, because the total number of master's degrees did not increase noticeably, the disciplines that grew over the five-year period did so at the expense in numbers of students of those that declined.

Figure 3 below and Appendix C on pages 71-74 provide similar information about doctorates. As mentioned above, unlike the two other degree levels, the number of doctorates awarded in California increased over the five-year period. Furthermore, ten disciplines showed net gains in their number of doctorates, while only five experienced losses. Yet like the bachelor's and master's degree changes, the discipline experiencing the largest percentage increase--albeit with a modest base--was computer science. With this exception, doctoral gains were rather evenly distributed among the ten disciplines that increased, while losses tended to be concentrated in foreign languages and the health professions.

CHANGES IN "MARKET SHARE"

Table 5 illustrates these trends somewhat differently by listing for each of the five years and for all three degree levels the number of degrees awarded in each field, together with each field's "market share"--that is, the

FIGURE 3 Percentage Change in Doctorate Degrees Awarded by General Field of Study, All California Institutions, 1976-77 Through 1980-81



Source: Appendix C.

TABLE 5 *Number and Percent of Degrees Conferred by General Field of Study, All California Institutions, 1976-77 Through 1980-81, Indicating "Market Share" of Each Field*

	1976-77		1977-78		1978-79		1979-80		1980-81		Net Change in Market Share
	Number	Market Share	Number	Market Share	Number	Market Share	Number	Market Share	Number	Market Share	
Agriculture											
Bachelors	1,908	2.3	2,174	2.7	2,194	2.7	2,222	2.7	2,040	2.5	+0.2
Masters	304	1.0	305	1.0	329	1.0	308	1.0	313	1.0	-
Doctorate	41	1.1	43	1.1	30	0.8	42	1.1	49	1.1	-
Architecture											
Bachelors	876	1.1	854	1.0	814	1.0	762	0.9	819	1.0	-0.1
Masters	327	1.0	309	1.0	298	0.9	344	1.1	410	1.3	+0.2
Doctorate	13	0.3	15	0.4	20	0.5	21	0.6	13	0.3	-
Area Studies											
Bachelors	356	0.4	350	0.4	313	0.4	320	0.4	305	0.4	-
Masters	123	0.4	103	0.3	113	0.4	101	0.3	94	0.3	-0.1
Doctorate	8	0.2	12	0.3	10	0.3	7	0.1	10	0.2	-
Biological Science											
Bachelors	6,483	7.9	6,025	7.4	5,823	7.2	5,215	6.3	4,995	6.1	-1.8
Masters	677	2.2	699	2.3	719	2.3	712	2.3	619	2.0	-
Doctorate	443	11.5	450	11.0	412	11.0	485	13.0	513	12.2	+0.7
Bus & Mgmt											
Bachelors	11,463	13.8	12,209	15.0	13,467	16.6	14,875	18.1	16,261	19.8	+6.0
Masters	5,470	17.4	5,879	19.0	6,189	19.7	6,971	22.4	7,013	22.8	+4.6
Doctorate	103	2.7	125	3.1	83	2.2	101	2.7	120	2.8	+0.1
Communications											
Bachelors	2,131	2.6	2,157	2.6	2,414	3.0	2,525	3.1	2,738	3.3	+0.7
Masters	204	0.6	229	0.7	216	0.7	249	0.8	214	0.7	-
Doctorate	18	0.5	21	0.5	24	0.6	22	0.6	7	0.1	-0.4
Computer Science											
Bachelors	493	0.6	501	0.6	635	0.8	857	1.0	1,054	1.3	+0.7
Masters	329	1.0	363	1.2	358	1.1	504	1.6	562	1.8	+1.2
Doctorate	37	1.0	35	0.9	34	0.9	50	1.3	65	1.6	+0.6
Education											
Bachelors	4,245	5.1	4,193	5.1	3,794	4.7	3,823	4.7	3,666	4.5	-0.6
Masters	8,778	27.9	7,649	24.8	8,416	26.8	6,947	22.3	6,520	21.2	-2.0
Doctorate	464	12.1	504	12.3	469	12.5	466	12.5	535	12.8	+0.7
Engineering											
Bachelors	3,859	4.7	4,232	5.2	4,730	5.8	5,325	6.5	6,057	7.4	+2.7
Masters	2,495	7.9	2,445	7.9	2,370	7.5	2,458	7.9	2,437	7.9	-
Doctorate	461	12.0	440	10.8	399	10.7	421	11.3	457	10.9	-1.1
Fine Arts											
Bachelors	5,993	7.3	5,690	7.0	5,449	6.7	5,244	6.4	5,674	6.9	-0.4
Masters	1,234	3.9	1,226	4.0	1,182	3.8	1,279	4.1	1,204	3.9	-
Doctorate	69	1.8	87	2.1	62	1.7		1.7	76	1.8	-
Foreign Lang.											
Bachelors	1,505	1.8	1,447	1.8	1,251	1.5	1,225	1.5	1,142	1.4	-0.4
Masters	360	1.1	339	1.1	254	0.8	300	1.0	286	0.9	-0.3
Doctorate	84	2.2	62	1.5	56	1.5	78	2.1	67	1.6	-0.6
Health Prof.											
Bachelors	3,564	4.3	3,990	4.9	4,445	5.5	5,175	6.3	4,553	5.5	+1.2
Masters	1,545	4.9	1,661	5.4	1,744	5.6	1,839	5.9	1,938	6.3	+1.0
Doctorate	140	3.6	106	2.6	98	2.6	105	2.8	76	1.8	-1.8

TABLE 5 (continued)

	1976-77		1977-78		1978-79		1979-80		1980-81		
	Number	Market Share	Number	Market Share	Number	Market Share	Number	Market Share	Number	Market Share	Net Change in Market Share
Home Economics											
Bachelors	1,456	1.8	1,468	1.8	1,321	1.6	1,159	1.4	1,328	1.6	-0.2
Masters	136	0.4	155	0.5	126	0.4	127	0.4	190	0.6	+0.3
Doctorate	4	0.1	6	0.1	0	0.0	0	0.0	65	1.6	+0.5
Int'disp St.											
Bachelors	6,273	7.6	6,844	8.4	5,950	7.3	5,524	6.7	5,400	6.6	-1.0
Masters	1,130	3.6	1,161	3.8	1,851	5.9	1,610	5.2	1,697	5.5	+1.7
Doctorate	71	1.8	99	2.4	484	12.9	212	5.7	86	2.1	+0.3
Letters											
Bachelors	4,734	5.7	4,349	5.3	4,180	5.2	4,039	4.9	3,973	4.8	-0.9
Masters	1,050	3.3	1,042	3.4	964	3.1	977	3.1	886	2.9	-0.5
Doctorate	212	5.5	190	4.6	136	3.6	185	4.9	190	4.6	-0.9
Lib Sciences											
Masters	589	1.9	565	1.8	364	1.2	354	1.1	226	0.7	-1.0
Doctorate	7	0.2	11	0.3	4	0.1	6	0.2	8	0.2	-
Math											
Bachelors	1,179	1.4	1,037	1.3	1,013	1.2	966	1.2	952	1.2	-0.2
Masters	370	1.2	321	1.0	339	1.1	279	0.9	242	0.8	-0.3
Doctorate	94	2.4	89	2.2	101	2.7	101	2.7	105	2.5	-0.1
Physical Sciences											
Bachelors	1,856	2.2	1,934	2.4	1,871	2.3	2,070	2.5	1,846	2.2	-
Masters	501	1.6	597	1.9	588	1.9	580	1.9	592	1.9	+0.5
Doctorate	424	11.0	434	10.6	385	10.3	457	12.2	490	11.7	+0.7
Psych											
Bachelors	5,741	7.0	5,405	6.6	5,239	6.5	5,361	6.5	5,079	6.2	-0.8
Masters	1,397	4.4	1,336	4.3	1,386	4.4	1,418	4.5	1,688	5.5	+1.4
Doctorate	577	15.0	551	13.5	485	13.0	450	12.0	755	18.1	+3.1
Pub. Aff.											
Bachelors	4,326	5.2	3,789	4.6	4,030	5.0	3,650	4.5	3,299	4.0	-1.2
Masters	2,550	8.1	2,410	7.8	2,306	7.3	2,358	7.6	2,300	7.5	-0.7
Doctorate	50	1.3	58	1.4	46	1.2	49	1.3	52	1.2	-0.1
Social Sciences											
Bachelors	13,829	16.8	12,751	15.6	11,972	14.8	11,488	14.0	10,671	13.0	-3.8
Masters	1,809	5.8	2,041	6.6	1,304	4.2	1,403	4.5	1,316	4.3	-1.5
Doctorate	475	12.3	488	11.9	386	10.3	414	11.1	432	10.3	-2.0
Total											
Bachelors	82,493	100.0	81,638	100.0	81,111	100.0	82,020	100.0	82,128	100.0	-
Masters	31,430	100.0	30,878	100.0	31,416	100.0	31,181	100.0	30,784	100.0	-
Doctorate	3,848	100.0	4,084	100.0	3,739	100.0	3,740	100.0	4,175	100.0	-

Source: Analytic Studies, California Postsecondary Education Commission.

percentage that its number of degrees constituted of the total number for that year. In 1979, the market shares in California were generally consistent with comparable national figures, with the following exceptions:

- At both the baccalaureate and doctoral level, the share of degrees awarded in psychology in California was much larger than that at the national level (approximately 6.5 and 12.0 percent, respectively, compared to 4.5 and 8.5 percent nationally).
- At the doctoral level, education commands nearly twice as large a market share of degrees awarded at the national level (24.3%) than it does in California (approximately 12.5 percent).
- And engineering doctorates constitute a larger percentage of California's degree awards (approximately 11.3 percent) than they do at the national level (approximately 7.7 percent).

The final column of Table 5 shows that most disciplines' share of degree awards remained relatively stable over the 1976-77 - 1980-81 period but that some disciplines experienced dramatic changes. Among the more notable, the social sciences declined at all three degree levels and, in doing so, posted the greatest overall loss of market share. Education experienced the single greatest loss in market share at any single degree level by declining a full 6 percentage points at the master's level; and like the social sciences, it suffered losses in its share of degrees awarded at all three levels. Losses in letters, interdisciplinary studies, and foreign languages were less severe, but they were also general across all levels.

On the positive side, business and management clearly established the best record for growth in total share of degrees awarded. Its market share jumped by 6.0 percentage points at the bachelor's, 4.6 at the master's, and 0.1 at the doctoral level. Computer science also recorded substantial percentage increases in the number of degrees awarded at all levels, but unlike business and management it still represents a relatively small share of the total market.

Finally, some disciplines--among them, engineering, health professions, and the physical sciences--increased their market share at one degree level while declining at others.

THREE

DISCIPLINARY GAINS AND LOSSES AT THE UNIVERSITY AND STATE UNIVERSITY

To indicate the general direction of student program choices, it is enough to compare trends among broad disciplinary categories such as those described thus far. But within some of these categories, the extent of shifts in student choices becomes fully apparent only when the specific degree programs of individual academic departments or disciplines are compared. This section thus examines those specific disciplines at the University of California and the California State University that have gained or lost the most in terms of graduates within the several general fields of study discussed in earlier pages.

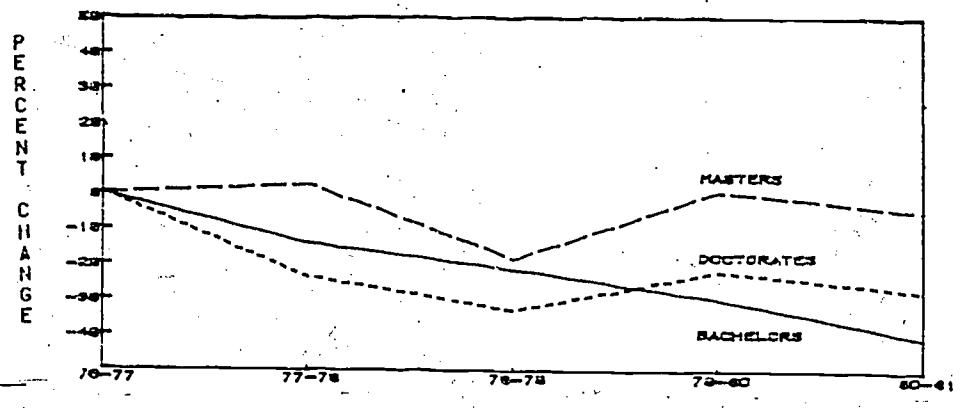
SOCIAL SCIENCE DISCIPLINES

During the last five years, losses in the number of baccalaureate degrees awarded by the University and the State University in certain social science fields are startling. Figures 4 through 7 display changes in four such disciplines at the bachelor's, master's, and doctoral levels and appendix D on pages 75-78 illustrate several more. Thus, between 1976-77 and 1980-81, bachelor's degrees in anthropology declined by 40.8 percent (Figure 4); in history, by 34.2 percent (Figure 5); and in sociology, by 37.8 percent (Figure 6). Although not shown, the corresponding figure for Afro-American studies was 40.4 percent. And despite the fact that the number of bachelor's degrees in economics awarded by the University increased slightly during the five-year period, those at the State University dropped more than 20 percent, leading to the overall decline depicted in Figure 7.

In general, the percentage drop in baccalaureates among the social science disciplines has been more severe in the State University than in the University. The pattern is much the same at the graduate level, where the decline in social science master's degrees at the State University is particularly striking. There, only criminology, geography, and Mexican-American studies showed modest increases over the five years, while sociology dropped 65 percent, and history declined by 45 percent. Even in economics and political science--fields in which the number of master's and doctoral degrees awarded by the University of California increased--the number of master's degrees awarded by the State University was down.

Numbers of juniors and seniors majoring in the social sciences over these years suggest that the movement of students out of the social sciences as evidenced by degrees awarded is not abating. Some signs of firming are occurring at the graduate level in some disciplines within the University (anthropology, economics, political science, and sociology), but upperclass majors in these same subjects are eroding badly, as are both upperclass and graduate enrollments in most social science disciplines at the State University where declines of 40 percent to 50 percent are not uncommon.

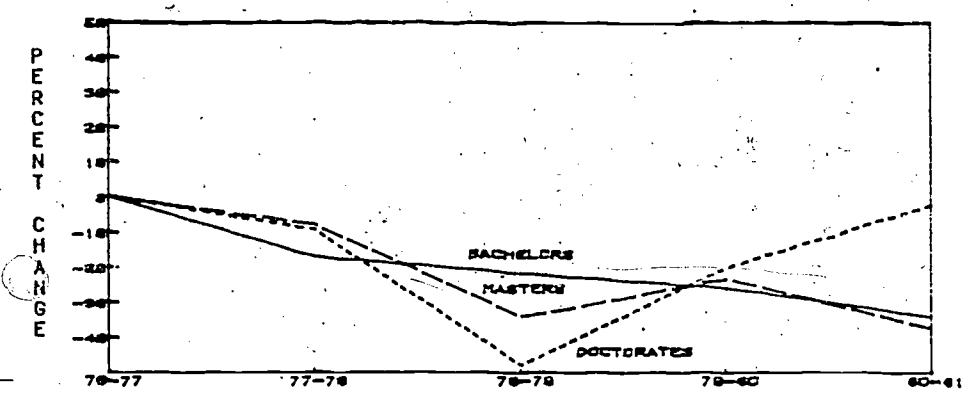
FIGURE 4 Degrees Conferred in Anthropology, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	903	775	710	635	534
Master's	125	128	102	126	119
Doctorates	54	41	36	42	39

Source: Analytic Studies, California Postsecondary Education Commission.

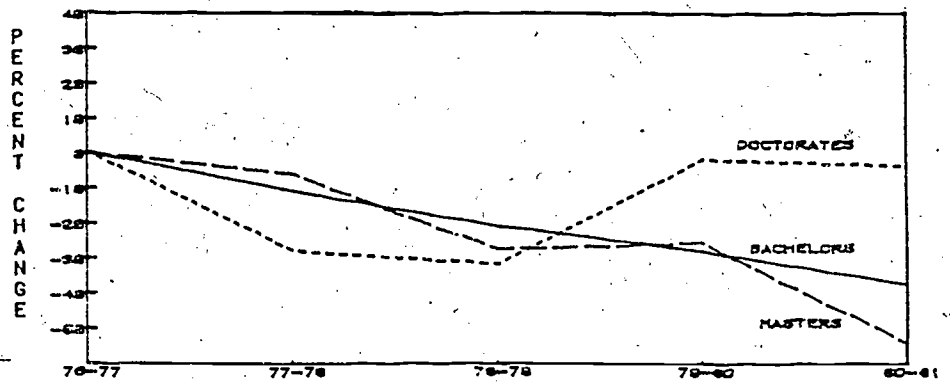
FIGURE 5 Degrees Conferred in History, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	2,035	1,682	1,589	1,504	1,339
Master's	274	252	180	210	171
Doctorates	83	75	43	66	81

Source: Analytic Studies, California Postsecondary Education Commission.

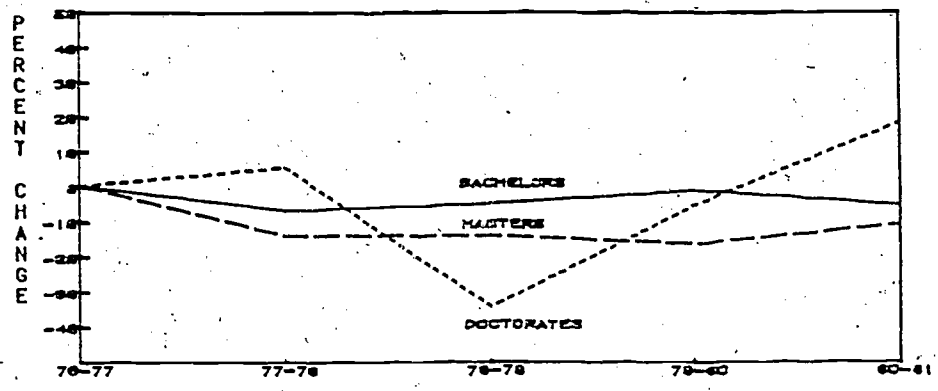
FIGURE 6 Degrees Conferred in Sociology, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	2,148	1,916	1,701	1,545	1,343
Master's	149	140	108	111	68
Doctorates	50	36	34	49	48

Source: Analytic Studies, California Postsecondary Education Commission.

FIGURE 7 Degrees Conferred in Economics, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	1,513	1,413	1,440	1,498	1,431
Master's	176	151	151	147	157
Doctorates	55	58	36	52	65

Source: Analytic Studies, California Postsecondary Education Commission.

LETTERS

The category of letters includes several subjects which have been traditional mainstays of the humanities curriculum. For several decades, the most popular major among these subjects has been English, the undergraduate program on most campuses consisting of a combination of courses in English and American language and literature. The English major has never provided a direct route to employment, except perhaps for students interested in teaching in secondary schools, but has served instead to provide a liberal education for those preparing for careers in law, advertising, journalism, and a range of other occupations.

The 1,732 bachelor's degrees in English awarded in 1981 by the University and State University might still be impressive were it not for the steady decrease amounting to nearly 20 percent over the five years that figure represents (Figure 8). That the number of graduate degrees in English is also declining is not surprising in view of the publicity given to the over-supply of Ph.D.s in the field. The recent public interest in improving writing skills may result in a slight increase in English department enrollments, but there are very few other indications that the downtrend in the number of English majors will soon reverse itself.

Nor are the signs favorable for comparative literature, a field suffering some of the most drastic losses in undergraduate majors. The number of graduate degrees has actually held steady even though the totals at both graduate and undergraduate levels remain modest.

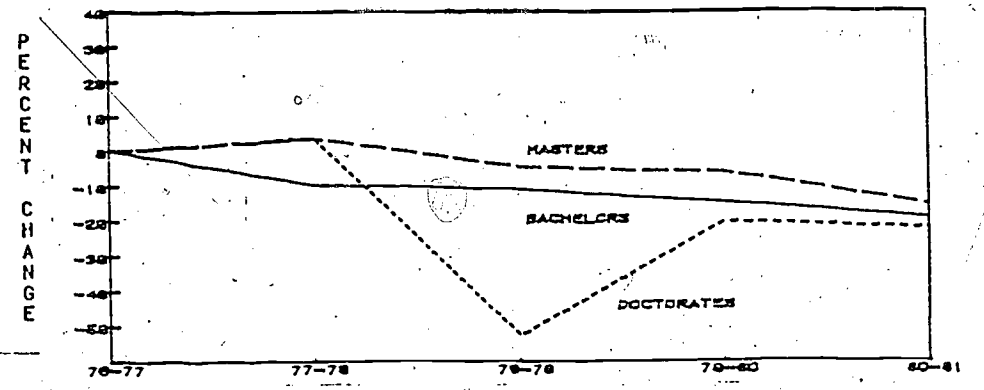
Philosophy also serves largely as a liberal arts program for a dwindling number of undergraduate students (Figure 9). While the relatively small number of doctorates in philosophy has held firm, the number of master's degrees has been reduced by half during the last five years. With few opportunities for teaching philosophy in the secondary schools, the occupational utility of the master's degree in philosophy is perhaps even more limited than master's degrees in other humanistic disciplines.

Classics has the distinction of being the discipline most often cited as an example of a field of study which must be maintained to preserve the wholeness of the curriculum, no matter what the enrollment. Certainly, if student demand at all three degree levels were the only criterion, one campus would be more than able to accommodate all classics majors in the State.

ENGINEERING SPECIALITIES

Trends in enrollments and degrees earned in engineering were analyzed in the Commission's 1982 report, "Engineering and Computer Science Education in California Public Higher Education." The numbers of degrees awarded in engineering, one of the fields showing the largest gains at the undergraduate level, are repeated here to provide a measure for comparison with fields of study experiencing equally sizable losses.

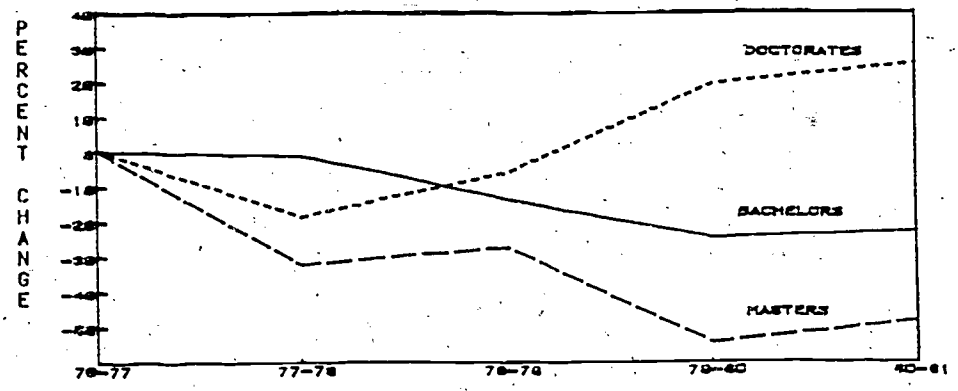
FIGURE 8 Degrees Conferred in General English, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	2,143	1,934	1,906	1,823	1,732
Master's	426	441	406	399	360
Doctorates	54	56	26	43	42

Source: Analytic Studies, California Postsecondary Education Commission.

FIGURE 9 Degrees Conferred in Philosophy, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	351	347	303	265	271
Master's	62	42	45	28	32
Doctorates	16	13	15	19	20

Source: Analytic Studies, California Postsecondary Education Commission.

The number of bachelor's degrees in all fields of engineering increased markedly between 1977 and 1981, almost tripling in electrical/electronic engineering (Figure 10) and nearly doubling in all other fields (Figures 11-13).

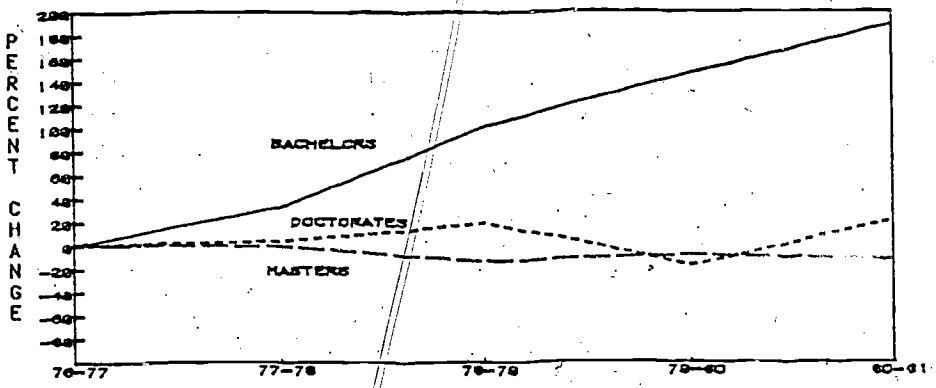
At the same time, there was very little, if any, growth in degree production at the graduate level. The number of master's degrees actually declined except in the combined miscellaneous category, while the number of doctoral degrees remained essentially level, showing some yearly fluctuations but no discernible trends. The absence of growth in graduate degrees and enrollments is a cause for concern because of what that portends for the future supply of faculty and the increasing vitality of the research effort in the various fields of engineering.

As noted in the "Engineering and Computer Science Education" report, a number of engineering programs in both the University and the State University have been declared "impacted," meaning that enrollments are near capacity and that students must meet special conditions before they can be admitted. Curricular planning in the engineering sciences is complicated by a number of factors. Not only is it necessary, as in any field, to predict the extent and duration of student and societal demand for each of the specialized areas of study, but the limited availability of faculty and the need for the most recent of sophisticated equipment make engineering perhaps the most difficult of all fields to plan for at the present time. There are growing indications of an interest on the part of industrial management in involving itself more directly in the process of engineering education. Such an involvement, properly regulated, may ease some of the pressures many campuses are currently experiencing in their efforts to determine and serve the public interest in this curricular area.

OTHER DISCIPLINES UNDERGOING MAJOR CHANGES

In addition to the specific programs discussed in the preceding pages, others scattered throughout the curriculum have also experienced drastic changes in the numbers of degrees awarded during the last five years. During any similar period there will naturally be fluctuations in the numbers of those earning degrees in any field of study. But the magnitude of the changes in the individual degree programs listed below suggest an abnormal volatility and further demonstrate the difficulties of curriculum management in the current climate. Table 6 on page 29 lists fields in which increases or decreases of at least 20 percent in the number of degrees awarded during the last five years have occurred. (Included here are only those programs in which at least 100 degrees at the bachelor's level, 50 at the master's level, or 25 at the doctoral level were awarded in either 1977 or 1981. Other smaller fields are illustrated in Appendix D on pp. 75-78.)

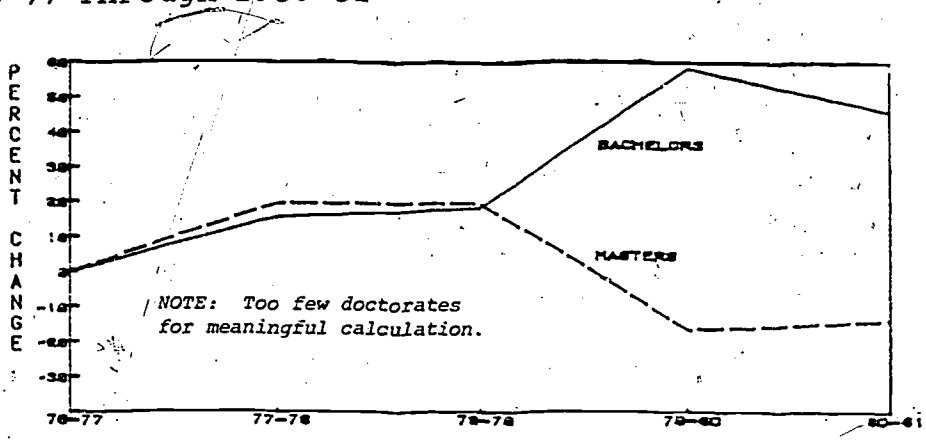
FIGURE 10 *Degrees Conferred in Electrical, Electronics, and Communications Engineering, University of California and California State University, 1976-77 Through 1980-81*



Type and Number					
Bachelor's	406	540	819	1,004	1,176
Master's	266	261	226	242	231
Doctorates	38	39	45	31	46

Source: Analytic Studies, California Postsecondary Education Commission.

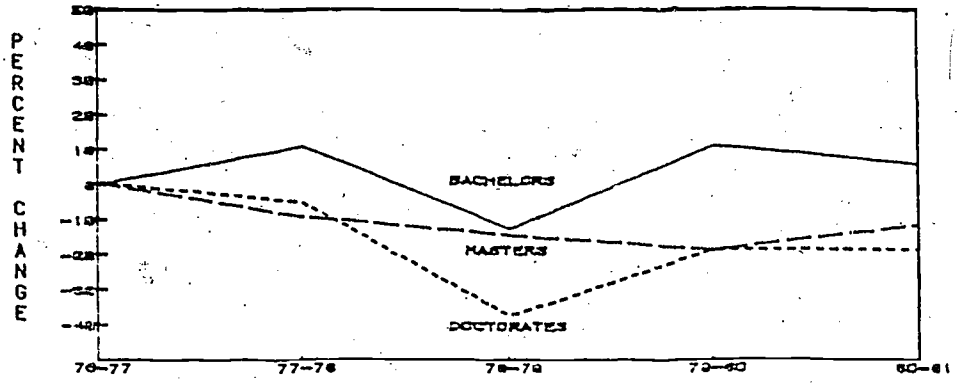
FIGURE 11 *Degrees Conferred in Chemical Engineering, University of California and California State University, 1976-77 Through 1980-81*



Type and Number					
Bachelor's	193	223	228	305	281
Master's	36	43	43	30	31
Doctorates	13	10	12	12	15

Source: Analytic Studies, California Postsecondary Education Commission.

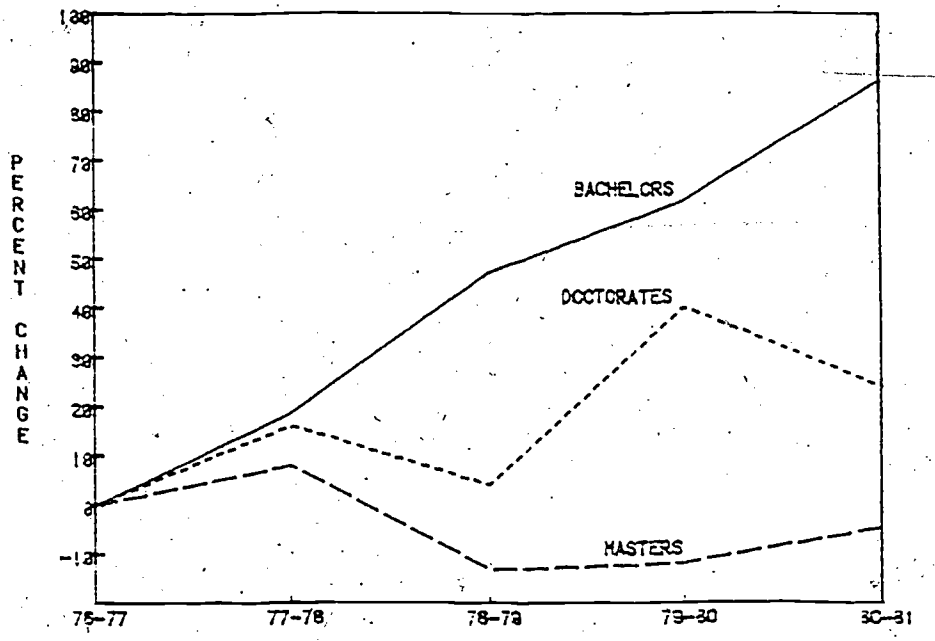
FIGURE 12 Degrees Conferred in Civil, Construction, and Transportation Engineering, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	618	684	539	685	652
Master's	311	281	265	252	274
Doctorates	37	35	23	30	30

Source: Analytic Studies, California Postsecondary Education Commission.

FIGURE 13 Degrees Conferred in Mechanical Engineering, University of California and California State University, 1976-77 Through 1980-81



Type and Number					
Bachelor's	379	449	558	613	707
Master's	151	163	131	133	144
Doctorates	25	29	26	35	31

Source: Analytic Studies, California Postsecondary Education Commission.

Table 6 Additional Fields in Which the Number of Degrees Between 1977 and 1981 Has Increased or Decreased 20 Percent or More

Subject	1977	1981	Percent Change
Bachelor's Degrees			
Agricultural Business	148	255	+ 72.3
Landscape Architecture	75	129	+ 72.0
Architecture	253	399	+ 57.7
Geology	276	363	+ 31.5
Applied Design	175	229	+ 30.8
Food Science and Technology	85	107	+ 25.8
Speech Pathology	407	496	+ 21.8
Spanish	569	431	- 24.2
Law Enforcement and Corrections	1,266	918	- 27.4
Parks and Recreation Management	948	670	- 29.3
German	138	94	- 31.8
American Studies	116	78	- 33.6
General Biology	3,003	1,986	- 33.8
Botany	121	77	- 36.8
Zoology	437	262	- 40.0
City Planning	135	49	- 63.7
Cinematography	127	31	- 75.5
Bacteriology	160	19	- 88.1
Master's Degrees			
Speech Pathology and Audiology	177	294	+ 66.1
Physics	93	140	+ 50.5
Geology	48	64	+ 33.3
Architecture	129	166	+ 28.6
Social Work and Helping Services	502	613	+ 22.1
Public Health	369	448	+ 21.4
Parks and Recreation Management	71	54	- 23.9
French	66	47	- 28.7
Medical Laboratory Technology	110	87	- 28.9
Doctoral Degrees			
Microbiology	17	29	+ 52.9
Physics	56	76	+ 35.7
Entomology	21	28	+ 33.3
Chemistry	119	151	+ 26.8
Physiology	28	17	- 39.2
Oceanography	25	15	- 40.0

*Includes only those programs awarding at least the following number of degrees in either year: bachelors, 100; master's, 50; doctoral, 25.

Source: California Postsecondary Education Commission.

FOUR

DEGREE CHOICES OF MEN AND WOMEN

While the total number of bachelor's and master's degrees awarded in California remained virtually constant over the 1976-77 to 1980-81 period (Table 7), substantial changes took place in the number of men and women receiving degrees and, in some instances, the disciplines in which they were obtained (Table 8).

In reviewing these changes, the reader should be aware that approximately 8 percent of the University of California's degree awards in 1980-81 were reported without gender declarations (e.g., the sex of the degree recipient was not reported). Trend and market share figures appearing in this chapter were developed with the assumption that the "sex unknown" degree recipients were distributed uniformly throughout the University's 1980-81 graduating class and that gender-based computations could be developed using only those degree recipients for which gender was known.

BACHELOR'S DEGREES

At the baccalaureate level, the number of degrees awarded to women increased a full 8 percent while the number of degrees awarded to men declined by more than 10 percent. The ratio of bachelor's degrees awarded to women and men was 56:44 percent favoring men in 1976-77. By the end of the 1980-81 academic year this ratio had neared parity (51:49%). In the 1976-77 academic year the three fields with the greatest numbers of bachelor's degree awards to men were, in order of their popularity, business and management, the social sciences, and engineering. In the 1980-81 academic year the same three disciplines retained their top positions for men, even though engineering recorded a 45 percent increase in the number of bachelor's degrees awarded during the five-year interval; and social sciences, a 33 percent decline. The period also witnessed a "centralizing" effect with regard to the fields of study selected by men. Whereas these three disciplines accounted for 44 percent of the bachelor's degrees awarded to men in 1976-77, the same three disciplines represented more than half (50.6%) of the degrees awarded to men in 1981.

In 1977, women selected the social sciences, interdisciplinary studies, and fine arts as their three most preferred fields of study. These three disciplines accounted for 36 percent of the total number of bachelor's degrees awarded to women in this year. By the end of the 1980-81 academic year, the top three fields had shifted to business and management, the social sciences, and health, respectively (interdisciplinary studies virtually tied with health). The movement of women into business programs has been dramatic during the past five years, with bachelor's degrees awarded to women increas-

Table 7 Percentage Change in the Number of Degrees Awarded to Men and Women in California, 1976-77 Through 1980-81

Discipline	Bachelor's Degrees			Master's Degrees			Doctoral Degrees*
	Men	Women	Total	Men	Women	Total	Total
Agriculture	-12.0	+43.1	+ 6.9	-25.5	+40.0	+ 2.0	+19.5
Architecture	-17.2	+11.5	- 5.4	- 9.5	+107.8	+25.8	0.0
Area Studies	-17.6	-23.1	-14.3	-37.9	-14.0	-20.0	**
Biological Science	-35.7	- 8.6	-23.0	-20.0	-12.0	- 9.2	+15.8
Business and Management	+16.5	+120.2	+41.8	+12.7	+110.5	+28.4	+16.5
Communications	- 1.6	+69.8	+28.5	-13.0	+26.0	+ 4.9	**
Computer Science	+95.8	+110.0	+113.8	+67.0	+76.8	+70.8	+75.7
Education	-24.8	- 2.9	+73.6	-40.7	-14.9	-25.6	+15.3
Engineering	+45.6	+195.5	+58.9	- 9.4	+55.1	- 2.9	- 0.9
Fine Arts	- 5.0	- 8.7	- 5.3	-10.9	- 0.9	- 2.9	+10.1
Foreign Languages	-33.2	-23.1	-24.1	-20.7	-14.7	-15.6	-20.2
Health	0.0	+35.3	+27.7	+ 8.8	+28.2	+25.4	-45.7
Home Economics	+59.1	-12.3	- 8.8	**	+36.1	+39.7	**
Letters	-23.6	-14.6	-16.1	- 3.0	-16.2	-18.4	-10.4
Mathematics	-23.7	-14.5	-19.3	-41.5	-44.0	-39.2	+11.4
Physical Science	- 8.7	+23.8	- 0.5	+ 7.3	+44.0	-39.2	+11.4
Psychology	-28.3	- 3.1	-11.5	- 7.8	+36.3	+20.7	+30.8
Public Affairs	-42.0	+ 0.6	-23.7	+28.0	+28.2	- 9.8	+ 4.0
Social Sciences	-32.0	-14.4	-23.1	-29.7	-31.5	-28.9	- 9.1
Interdisciplinary Studies	-25.8	-10.8	-13.6	+49.1	+ 0.5	-50.4	+23.9
TOTAL	-10.4	+ 8.0	- 0.6	- 8.1	+ 5.0	- 1.3	+14.0

* Percentage changes in the number of Ph.D.s awarded to men and women are not provided because data from the University of California for 1980-81 are inaccurate, precluding percentage computations.

**Numbers too small to permit percentage computations.

Source: Analytic Studies, California Postsecondary Education Commission.

Table 8 Market Shares of Degrees Awarded to Men and Women in California, 1976-77 and 1980-81

Discipline	Bachelor's 1976-77	Bachelor's 1980-81	Master's 1976-77	Master's 1980-81	Doctoral 1976-77	Doctoral 1980-81
Agriculture	73:27	60:36	85:15	75:25	90:10	**
Architecture	73:27	64:32	80:20	64:36	**	**
Area Studies	37:63	38:62	50:50	42:58	**	**
Biological Science	64:36	56:44	68:32	66:34	78:22	71:29
Business and Management	76:24	62:38	85:15	75:25	90:10	89:11
Communications	59:41	45:55	64:36	55:45	**	**
Computer Science	78:22	72:28	83:17	82:18	95:5	96:4
Education	50:50	44:56	37:63	29:71	65:35	51:49
Engineering	95:5	90:10	94:6	91:9	99:1	97:3
Fine Arts	43:57	43:57	52:48	50:50	55:45	64:36
Foreign Languages	26:74	24:76	37:63	35:65	46:54	40:60
Health	22:78	17:83	31:69	28:76	79:21	40:60
Home Economics	3:97	5:95	10:90	11:89	**	**
Letters	42:58	39:61	38:62	41:59	64:36	60:40
Library Science	**	**	5:95	5:95	**	**
Mathematics	65:35	63:38	73:27	45:55	88:12	90:10
Physical Science	81:19	76:24	85:15	81:19	92:8	85:15
Psychology	42:58	35:65	52:48	42:58	67:33	56:44
Public Affairs	58:42	45:55	68:32	54:46	76:24	61:39
Social Sciences	59:41	53:47	64:36	64:36	79:21	77:23
Interdisciplinary Studies	33:67	29:71	82:18	87:13	66:34	59:41
TOTAL	56:44	51:49	60:40	58:42	78:22	71:29

* In 1980-81, U.C. failed to report approximately 8 percent of its degrees conferred by sex. Ratios were developed on the basis of those degrees for which sex was known.

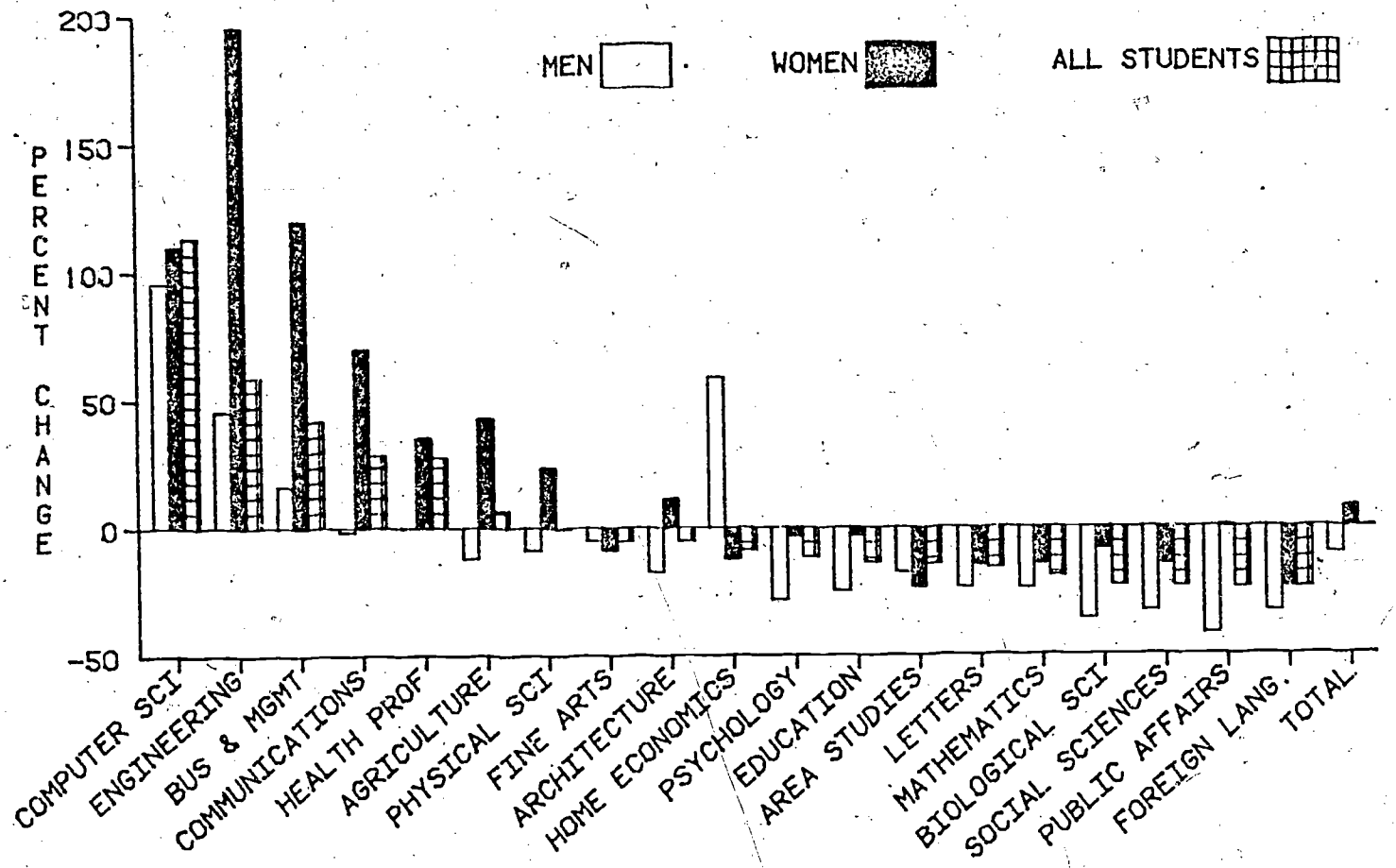
**Numbers too small to permit percentage computations.

Source: Analytic Studies, California Postsecondary Education Commission.

ing by approximately 120 percent. The centralizing effect of degree awards into the top three disciplines noted earlier for men was not as apparent for women. In the 1980-81 academic year, the top three disciplines accounted for 37 percent of the total number of bachelor's degrees awarded, a 1 percentage point increase over the period.

Figure 14 presents the percentage change in bachelor's degrees awarded to men, women, and statewide by discipline between 1976-77 and 1980-81. As this figure illustrates, women generally recorded greater percentage increases than men in the number of bachelor's degrees awarded in the "growth" fields and lesser percentage decreases in those fields experiencing losses over the five years studied. In some measure these changes are due to the increase in the total number of bachelor's degrees awarded to women; however, the overriding trend that emerges from these data is that women are moving into the high-demand disciplines more rapidly (on a percentage basis) than men, and are leaving the low-demand fields such as social sciences and public affairs more slowly than their male counterparts.

FIGURE 14 Percentage Change in Bachelor's Degrees Awarded to Men, Women, and All Students in All California Institutions Between 1976-77 and 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

The two disciplines experiencing the most rapid expansion for men, as measured by the percentage increase in degrees awarded were computer science and engineering, respectively. For women, three disciplines more than doubled their degree productivity over the 1977-1981 time frame: engineering, business and management, and computer science. While these percentage gains appear impressive at face value, the ratio of degrees awarded to women vs. men (Table 8) in these most popular fields rose only slightly in business and remained virtually constant in engineering and computer science between 1976-77 and 1980-81. The field with the lowest percentage of bachelor's degrees awarded to women in 1981 was engineering (approximately 10%), while the highest was home economics (95%).

MASTER'S DEGREES

A number of trends are notable at the master's level between 1976-77 and 1980-81:

First, the number of master's degrees awarded to women increased by 5 percent (628 degrees), while the number for men decreased by more than 8 percent (-1,520) during this period. This increase in the number of master's degrees awarded to women during the five-year period lowered the ratio of degrees awarded to men and women from 60:40 percent in 1976-77 to 58:42 percent in 1980-81.

The percentage changes for all master's degrees awarded between 1976-77 and 1980-81 were roughly the same for men and women as at the baccalaureate level (+8.0% and 10.4%, respectively). The three most popular disciplines for women (education, health, and business and management) were identical in both the 1976-77 and 1980-81 academic years. The same phenomenon held for men with the greatest number of degrees being in business and management, engineering, and education.

The increased centralization of degrees awarded in fewer and fewer fields of study described earlier for men at the baccalaureate level did not take place for either men or women at the master's level. In 1980-81, the three most popular disciplines for men at the master's level accounted for approximately 53 percent of the total number of degrees awarded, while the three disciplines favored most by women during the same year accounted for nearly 58 percent of the total.

The largest percentage increase in the number of master's degrees awarded to men occurred in computer science (67%), while business and management (110%) recorded the largest percentage increase for women and computer science placed second.

Finally, the three disciplines with the largest proportion of women in 1980-81 were library science (95%), home economics (89%), and health (76%). Those with the smallest representation were physical sciences (19%), interdisciplinary studies (13%), and engineering (10%).

DOCTORAL DEGREES

Between 1976-77 and 1980-81, the number of doctorate degrees awarded to men decreased by nearly 10 percent. The greatest percentage decreases occurred in health and foreign languages. The only discipline recording more than a 10 percent increase among men was computer science, 54.3 percent. The three most popular fields among men in 1976-77 and 1980-81 were engineering, the physical sciences, and psychology. These three fields turned out approximately 40 percent of the doctorates awarded to men in 1977 and roughly 43 percent in 1981.

Women recorded substantial increases in both the number and percentage of doctoral degrees awarded in psychology and education. Their largest decrease occurred in foreign languages and the social sciences.

The overall ratio of doctoral degrees awarded to men and women changed from 78:22 percent in 1976-77 to 71:29 percent in 1980-81. The three fields with the largest proportion of men to women in 1980-81 were engineering (97%), computer science (96%), and mathematics (90%). The fields with the lowest percentage representation of men were foreign languages (40%), and health (40%).

FIVE

DEGREE CHOICES OF MINORITY STUDENTS

Accuracy in reporting changes in degree award patterns in terms of student ethnicity is complicated by the laws and regulations governing the collection of these data (Appendix E contains an expanded treatment of the difficulties attendant to the collection and use of student ethnicity.) That information that can be gleaned from student ethnicity data must be developed by employing assumptions about student characteristics and reporting the data accordingly. Unfortunately, many of the assumptions used in this report are largely untested and the conclusions reported in this chapter must therefore be considered tentative pending their validation.

Three terms are used throughout this chapter to describe different portions of the student population. The first, "Students Who Declared Their Ethnicity" (SWDTE), is a five-element subset of the eight categories used by colleges and universities to report student ethnicity. Under federal and state statute, student ethnicity declarations are collected in the following categories:

1. Black Non-Hispanic
2. Hispanic
3. Asian (includes Pacific Islander and Filipino)
4. Native American
5. White
6. Other (not covered under categories 1-5)
7. Students Who Declined to State Their Ethnic Origin
8. Non-Resident Alien

All of these categories (and particularly the non-resident alien category) are mutually exclusive; students reported in one category may not appear in another. The SWDTE population is defined as those U.S. residents who specifically declared their ethnic origin. To develop SWDTE data from the eight categories described above, the "non-resident alien", "other", and "declined to state" categories are discarded and only those students in ethnic categories 1-5 are used in computations of ethnic representation. Such a methodology assumes that the distribution of students by ethnicity in the "declined to state" and "other" categories is the same (or approximately the same) as for those U.S. resident students who specifically declare their ethnic origin. Further, SWDTE data acknowledges that the ethnic distribution of non-resident aliens is not known and assumes, for the purpose of this report, that their ethnicity declarations are of little interest in terms of reporting degrees awarded to California's student population.

Two other terms, "minorities" and "selected minorities", are used throughout this chapter; both are subsets of the SWDTE population. "Minorities" is defined as that group of SWDTE students who declared their ethnicity in categories 1-4 (all non-white students). "Selected minorities," a subset of "minorities," includes only those students who reported their ethnicity as

Black, Hispanic, or Native American. It is used in this chapter to describe changes in student demand that have taken place within that subset of the student population that has traditionally been underserved in California's postsecondary educational systems. The term is useful in analyzing differences in student enrollment and degree award patterns by ethnic groupings and, in so doing, to take into account the fact that Asian students as a group exhibit many of the enrollment and degree award patterns generally attributed to White students. The phenomenon of differential enrollment patterns for different ethnic groupings is particularly significant in high technology programs, mathematics, and the physical sciences, where white and Asian students have traditionally exhibited similar enrollment and degree award rates.

BACHELOR'S DEGREES

The top three disciplines in terms of numbers of baccalaureate degrees awarded to graduates in the "minorities" category in the 1976-77 academic year were the social sciences, business and management, and biological sciences. These three disciplines accounted for slightly more than 43 percent of the total number of baccalaureate degrees awarded to minorities in that year. In 1980-81 the three most popular fields for minorities shifted slightly to business and management, the social sciences, and engineering. The proportion of degrees awarded in the three most popular disciplines remained virtually unchanged in the 1980-81 academic year. The three accounted for 41 percent of the total number of bachelor's degrees awarded to minorities in that year. As Table 9 indicates, the disciplines in which bachelor's degree recipients in the "minorities" category represented the greatest proportion of the graduating class in 1976-77 were foreign languages (27%) and area studies (25%). In 1980-81 the two disciplines with the greatest proportion of graduates in this category were foreign languages (31%) and public affairs (31%).

Overall, students in the "minorities" category recorded a 10.6 percent increase in the number of bachelor's degrees awarded over the 1976-77 through 1980-81 period. The disciplines recording the largest percentage gain in the number of bachelor's degrees (Table 10) were computer science (122%) and engineering (108%). Those showing the greatest decreases were area studies (-38%) and social sciences (-28%).

Considering only those students classified in the "selected minorities" category (Blacks, Hispanics, and Native Americans), bachelor's degrees awarded over the 1977-1981 period increased a modest one percent. For these graduates in 1976-77, the top three fields in the number of bachelor's degrees awarded were the social sciences, business and management, and interdisciplinary studies, respectively. In 1980-81, the three most popular fields remained the same, but business and management replaced social sciences in the top position. In both academic years, these three disciplines accounted for approximately 43 percent of the total number of bachelor's degrees awarded to students in this classification. The disciplines with the highest percentage representation of these selected minorities in 1976-77

Table 9 Market Share of Degrees Awarded to Minorities and Selected Minorities Expressed as a Percent of Those Students Who Declared Their Ethnicity, All California Institutions, 1976-77 and 1980-81

Discipline	Bachelor's Degrees				Master's Degrees			
	Minorities		Selected Minorities		Minorities		Selected Minorities	
	1976-77	1980-81	1976-77	1980-81	1976-77	1980-81	1976-77	1980-81
Agriculture	9.3%	12.3%	4.6%	9.3%	8.6%	10.1%	2.9%	6.8%
Architecture	18.7	21.5	8.4	9.7	21.3	19.3	11.7	10.6
Area Studies	25.3	19.7	13.4	12.3	11.0	16.7	4.4	11.7
Biological Science	19.4	24.6	6.7	9.4	11.4	11.9	4.3	2.8
Business and Management	18.6	21.8	9.2	11.0	13.1	21.2	7.3	14.6
Communications	15.1	16.0	11.3	11.4	9.2	13.9	8.5	9.5
Computer Science	22.2	26.4	12.3	18.5	11.6	18.2	3.8	8.4
Education	19.7	20.6	13.9	13.9	21.1	21.2	16.6	15.8
Engineering	20.2	28.3	6.3	8.0	20.2	21.6	6.0	5.7
Fine Arts	13.3	16.0	9.3	9.3	9.9	10.6	6.0	6.4
Foreign Languages	27.4	31.3	23.1	23.4	20.7	22.7	13.6	17.6
Health	21.0	21.5	11.0	11.2	15.9	16.4	9.5	9.2
Home Economics	18.3	16.7	8.7	8.9	17.2	18.0	8.1	8.7
Letters	13.8	12.5	10.4	8.6	8.5	10.6	6.1	6.2
Mathematics	20.1	23.5	7.6	5.7	12.9	16.2	5.0	5.1
Physical Sciences	11.2	17.3	4.5	6.4	7.3	12.1	2.3	3.7
Psychology	17.5	21.7	12.1	14.1	11.6	9.6	8.4	7.5
Public Affairs	20.1	30.7	15.8	23.5	18.8	21.4	14.8	15.9
Social Sciences	21.0	19.9	16.0	14.4	15.0	17.5	11.4	13.4
Interdisciplinary Studies	17.5	20.4	12.8	14.7	11.2	11.0	6.4	9.4
TOTAL	18.1	21.0	11.2	11.9	16.1	18.5	10.7	12.2

Source: Analytic Studies, California Postsecondary Education Commission.

Table 10 Percentage Change in the Number of Degrees Awarded to "Minorities," "Selected Minorities," Students who Declared Their Ethnicity (SWDTE), and all Graduates, All California Institutions; 1976-77 and 1980-81

Discipline	Bachelor's				Master's			
	All Minorities	Selected Minorities	SWDTE Total	All Graduates	All Minorities	Selected Minorities	SWDTE Total	All Graduates
Agriculture	+29.4	+98.7	-20.4	+ 6.9	**	**	-14.9	+ 2.0
Architecture	+14.5	+15.3	0.6	- 5.4	- 3.9	- 3.6	- 0.2	+25.8
Area Studies	-38.3	-27.9	-20.1	-14.3	**	**	-34.1	-20.0
Biological Science	- 3.1	+ 7.3	-23.8	-23.0	-11.3	-45.0	-15.3	- 7.2
Business and Management	+68.9	+71.9	+43.7	+41.8	+116.8	+168.6	+33.9	+28.4
Communications	+40.5	+32.8	+32.7	+28.5	**	**	+21.5	+ 4.9
Computer Science	+122.2	+180.0	+86.8	+113.8	+164.3	**	+68.5	+70.8
Education	-14.6	-18.5	-18.7	-13.6	-21.4	-25.7	-22.2	-25.6
Engineering	+108.1	+88.1	+48.4	+58.9	- 3.4	-13.6	-10.0	- 2.9
Fine Arts	- 4.6	-20.7	-21.1	- 5.3	- 9.6	-10.5	- 5.4	- 2.9
Foreign Languages	-13.4	-23.1	-24.1	-24.1	- 9.1	+ 6.9	-17.4	-15.6
Health	+25.6	+23.9	+23.1	+27.7	+32.5	+24.6	+28.6	+25.4
Home Economics	-13.9	- 3.5	- 5.7	- 8.8	**	**	+51.5	+39.7
Letters	-20.4	-27.8	-12.3	-16.1	0.0	-18.2	-19.6	-18.4
Library Science					-66.7	-61.7	-64.6	-61.6
Mathematics	-10.8	-42.9	-23.8	-19.3	-38.7	**	-51.2	-39.2
Physical Science	+48.0	+37.7	- 4.2	- 0.5	+68.0	**	+ 1.2	+16.8
Psychology	+ 5.6	- 0.5	-14.8	-11.5	+16.2	+24.7	+40.4	+20.7
Public Affairs	+ 9.1	+ 9.5	-26.2	-23.7	+ 5.5	- 0.3	- 7.0	- 9.8
Social Sciences	-28.1	-31.6	-24.0	-23.1	-22.9	-22.6	-33.9	-28.9
Interdisciplinary Studies	- 7.0	- 8.6	-20.4	-13.6	+59.6	+140.3	+62.6	+50.4
TOTAL	+10.6	+ 1.0	- 4.5	- 0.6	+15.6	+16.7	+ 1.5	- 1.3

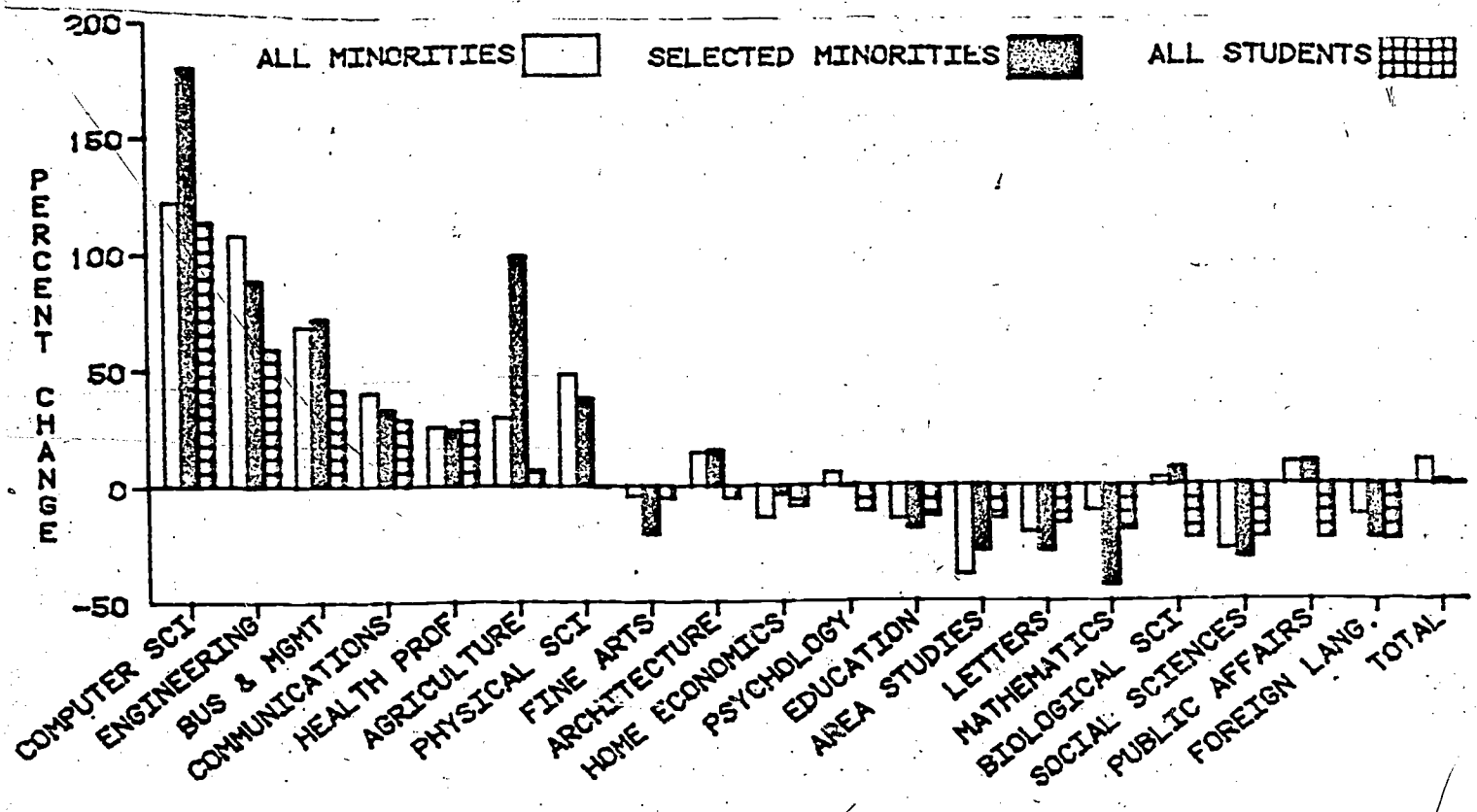
**Numbers too small to permit percentage computations.

Source: Analytic Studies, California Postsecondary Education Commission.

were foreign languages (23%), public affairs (16%), and social sciences (16%). By 1980-81 the disciplines with the greatest proportion level had shifted to public affairs (24%), foreign languages (23%), and computer science 19%). Disciplines with the lowest representation by 1980-81 were mathematics and the physical sciences (both 6%), and engineering (8%).

One of the most interesting trends at the baccalaureate level for both "minorities" and "selected minorities" has been the rate of change of degree awards by discipline. As Figure 15 notes, degree recipients in these categories recorded larger percentage increases in the "growth" fields of computer science, engineering, business and management, and communications than did the overall SWDTE population. This condition proved particularly noteworthy in computer science and business and management, where "selected

FIGURE 15 Percentage Change in Bachelor's Degrees Awarded to All Minority, Selected Minority, and All Students Between 1976-77 and 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

minorities" graduates recorded higher percentage increases in baccalaureate awards than did either the overall "minorities" category (that is, "selected minorities" plus Asians), of the total graduating class. Some of the spectacular increases in these percentages are clearly attributable to small numbers (for example, "selected minority" graduates in computer science increased from 99 to 220 over the 1970-71 to 1980-81 period--a 122 percent jump), but the consistency of the increases in bachelor's degrees awarded to "minorities" and "selected minorities" in the growth disciplines suggest that other factors such as improved secondary school counseling, expanded collegiate level outreach programs, and increased awareness among minority students of the linkage between the growth fields and job opportunities may have influenced their selection of majors.

MASTER'S DEGREES

Both "minorities" and "selected minorities" recorded impressive increases in both the number and percentage of master's degrees awarded over the 1976-77 through 1980-81 time frame. Master's degree recipients in the "minorities" category posted a 15.6 percent increase (591 degrees), while those in the "selected minorities" category noted a 16.7 percent (420 degrees) rise. These impressive percentage gains did not, however, translate into substantial increases in the overall representation of "minorities" and "selected minorities" in the total graduating class. Between the 1976-77 and 1980-81 academic years, the percentage of master's degrees awarded to "minorities" increased from 16 to 18 percent of the statewide SWDTE total, while "selected minorities" degree recipients rose only from 11 to 12 percent.

Among "selected minorities" students at the master's level, the most popular fields in both the 1976-77 and 1980-81 academic years were education, business and management, and public affairs. While business and management experienced an overall 169 percent jump, and education a 26 percent decline in the number of master's degrees awarded to "selected minorities" over this period, there was little shifting of graduates among these three most popular disciplines. The three represented 63 percent of the total number of master's degrees awarded to graduates in the "minorities" category in 1976-77, and 62 percent in 1980-81. The highest concentration of both "minority" degree recipients (measured in terms of their proportions of their graduating classes) occurred in the fields of education, architecture, and foreign languages during the 1976-77 academic year. In this year "minorities" accounted for 21 percent of the total number of master's degrees awarded in these three fields. By the 1980-81 academic year, a number of fields virtually tied for the highest proportion of "minorities." In this year, foreign languages, engineering, public affairs, education, and business and management all tied at the 21-22 percent range for "minorities".

In 1976-77, "selected minorities" accounted for 17 percent of the total number of master's degrees awarded in education. In 1980-81, education also claimed the highest proportion of "selected minorities" (16%).

The disciplines with the lowest representation of master's degree recipients classified as "minorities" between 1977 and 1981 included agriculture

(9-10%), letters (9-10%), and the physical sciences (7-12%). For "selected minorities", agriculture (3-7%), biological sciences (3-4%), and the physical sciences (2-4%) posted the lowest proportions of master's graduates.

DOCTORAL DEGREES

Doctoral degree recipients classified as "minorities" and "selected minorities" fared differently over the five-year period. While the percentage of doctorates awarded statewide increased by 14 percent, degrees awarded to "minorities," with of course a smaller base, rose 33 percent (94 degrees). Doctorates awarded to graduates in the "selected minorities" category, however, dropped by nearly 3 percent. Graduates in the "minorities" category rose from 7 to 8 percent of the total graduating class over the 1977-1981 period while "selected minorities" held a steady 5 percent of the total number of doctorates granted in both years.

The relatively small number of degree recipients at the doctorate level precluded the development of detailed figures describing the distribution of "minorities" and "selected minorities" graduates by discipline, etc. The data do reveal, however, that graduates in the "minorities" category are generally concentrated in education, psychology, and the social sciences, and that graduates in engineering increased by 80 percent (20 degrees) over the 1977-1981 period.

SIX

DEGREE CHOICES OF FOREIGN STUDENTS

Chapter Five contained a lengthy description of the assumptions employed in developing statistics to describe the graduation patterns and rates of minority students. While the same eight categories of graduate ethnicity are used to isolate foreign students from others, different assumptions have been used in reporting their activities. First, students who declared their ethnicity in one of five SWDTE categories are assumed to be U.S. residents (e.g., either United States citizens or non-citizens residing in the U.S. as permanent residents). Second, students reported in the "non-resident alien" category are classified under the term "foreign students." Finally, students reported in the "other" or "declined to state" categories are, for the purpose of this chapter's discussion, assumed to be U.S. residents.

Clearly, the assumptions used to differentiate foreign students from U.S. residents are somewhat arbitrary and based more upon enlightened hunch than empirical evidence. To the extent these assumptions are inaccurate, they probably understate the number of foreign student graduates over the 1977-1981 period. However, as the discussion of student ethnicity data in Appendix F points out, the self-reported nature of these data permit no more reliability in the notion that students who reported their status as "non-resident aliens" are actually foreign students than students who reported their ethnicity in the "white" or "Hispanic" categories are indeed U.S. residents. While the assumptions used in this chapter to isolate foreign students from the total graduate population probably result in the most accurate method of reporting trends in foreign student graduation rates and patterns, the actual degree of accuracy, while assumed high, is not known.

BACHELOR'S DEGREES

Foreign student graduates at the baccalaureate level in California increased substantially in both the percentage and number of degrees they received. Statewide, the number of bachelor's degrees awarded to foreign students jumped by nearly 94 percent (2,038 degrees) over the 1977-1981 period. When considered in relation to the State's overall baccalaureate degree production, foreign students increased their share of the total from 3 percent in 1976-77 to 5 percent in 1980-81 (Table 11). In only one discipline category, foreign languages, did the number of foreign student graduates decline over this period (Figure 16). All other disciplines recorded increases ranging from a low 3.6 percent in the biological sciences to highs well above 100 percent for agriculture, communications, computer science, education, engineering, the fine arts, physical sciences, public affairs, and interdisciplinary studies (Table 12). The number of foreign graduates receiving bachelor's degrees doubled in 9 of the 19 disciplines examined over

Table 11 Market Share of Degrees Awarded to Foreign Students Expressed as a Percent of the Total Graduating Class, 1976-77 and 1980-81

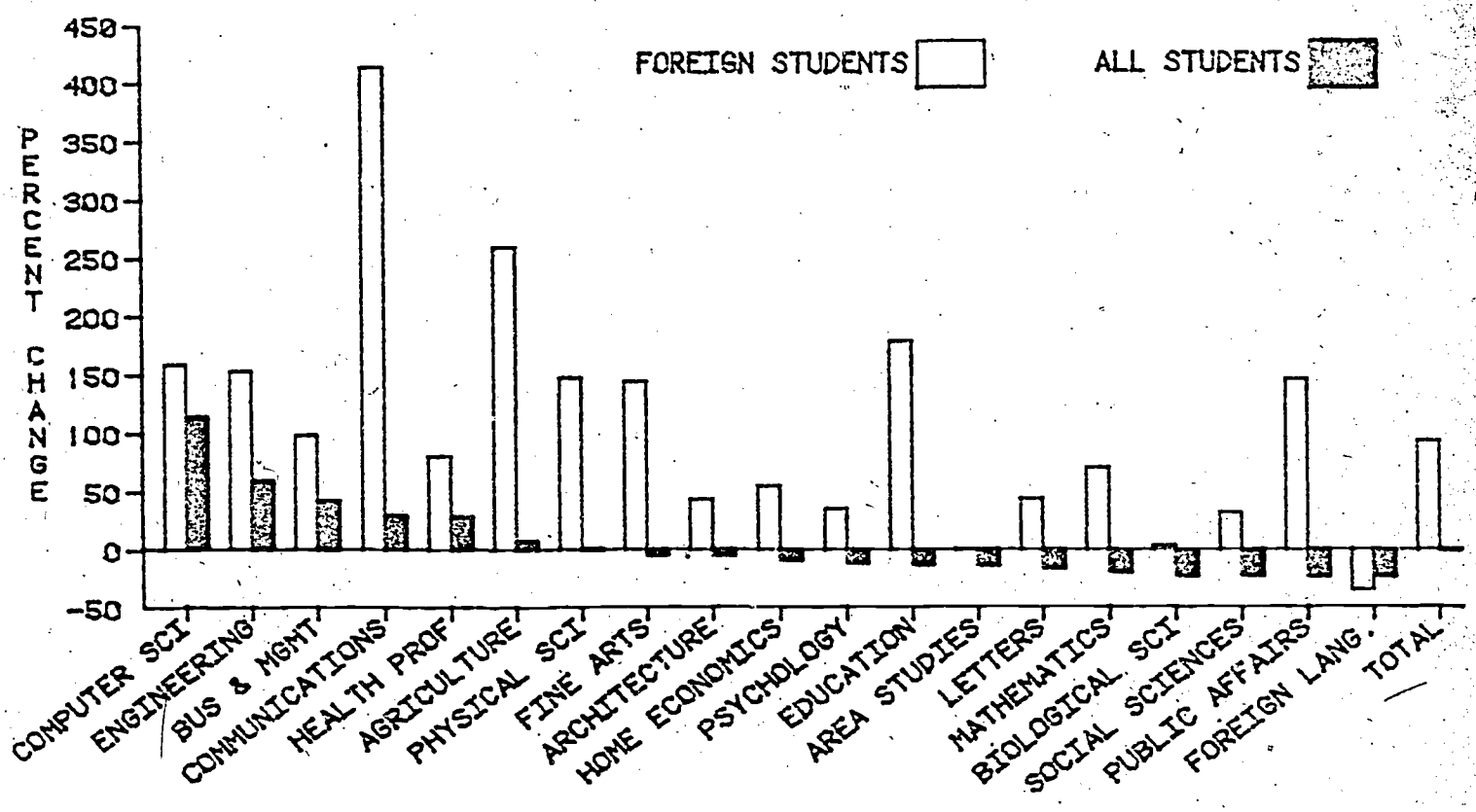
Discipline	Bachelor's		Master's		Doctoral	
	1976-77	1980-81	1976-77	1980-81	1976-77	1980-81
Agriculture	1.6%	5.3%	29.3%	26.5%	36.6%	24.5%
Architecture	4.3	6.5	13.8	22.0	**	**
Area Studies	1.7	3.6	6.1	15.2	**	**
Biological Science	2.6	3.4	10.5	11.0	**	**
Business and Management	4.8	6.7	13.3	12.8	12.9	4.9
Communications	1.0	3.9	11.3	16.4	**	**
Computer Science	6.9	8.3	19.5	22.1	21.6	24.6
Education	1.2	4.0	1.9	5.5	8.2	9.2
Engineering	11.6	18.5	32.0	36.3	44.9	37.6
Fine Arts	1.5	3.9	5.4	10.4	4.3	7.9
Foreign Languages	4.3	3.7	10.6	17.6	8.3	4.5
Health	1.3	1.8	5.6	4.0	3.6	5.3
Home Economics	1.5	2.6	4.4	7.4	**	**
Letters	1.4	2.5	5.0	10.0	8.5	8.4
Library Science	**	**	2.0	7.1	**	**
Mathematics	3.5	7.4	17.5	26.0	22.3	26.7
Physical Science	2.6	6.4	12.3	17.9	15.1	9.8
Psychology	1.5	2.3	2.5	4.4	3.3	6.4
Public Affairs	0.9	2.8	3.3	7.0	8.0	7.7
Social Sciences	1.7	2.9	11.5	20.4	13.5	14.6
Interdisciplinary Studies	0.7	2.0	2.7	3.8	8.5	4.5
TOTAL	2.6%	5.1%	9.1%	11.8%	14.8%	12.3%

**Numbers too small to permit percentage computations.

Source: Analytic Studies, California Postsecondary Education Commission.

the 1976-77 - 1980-81 span. The pattern of foreign student baccalaureate awards differed somewhat from U.S. residents during this period. Like their U.S. resident counterparts, foreign students directed much of their interest toward high technology and business-related fields. In the 1976-77 academic year, engineering and business and management (the two most popular disciplines) accounted for 45 percent of the total number of bachelor's degrees awarded to foreign students. By 1980-81 the popularity of these two disciplines had risen to 52 percent of the total. Unlike U.S. residents, however, foreign graduates did not exhibit a keen interest in computer science. While over the five years studied, bachelor's degrees awarded to foreign students in this discipline increased by over 150 percent, the number rose by only 54 degrees. Foreign students also differed in that they increased the number of baccalaureate degrees they received in eight fields that suffered overall declines. Education (+179%), the fine arts (+144%), and interdisciplinary studies (+130%) are the three fields in which this phenomenon is most evident.

FIGURE 16 Percentage Change in Bachelor's Degrees Awarded to Foreign Students and All Students Between 1976-77 and 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

Table 12 The Percentage Change in Degrees Awarded to Foreign Students and U.S. Residents, By Discipline, 1976-77 Through 1980-81

Discipline	Bachelor's		Master's		Doctoral	
	Foreign	Residents	Foreign	Residents	Foreign	Residents
Agriculture	+260.0%	+ 2.9%	- 7.9%	+ 6.1	**	**
Architecture	+ 43.2	- 7.6	+100.0	+ 13.9	**	**
Area Studies	**	- 16.0	+100.0	- 27.8	**	**
Biological Science	+ 3.6	- 23.7	- 4.4	- 9.8	- 56.1	+ 26.4
Business and Management	+ 98.2	+ 39.0	+ 23.6	+ 29.1	0.0	+ 21.3
Communications	+414.3	+ 24.6	+ 52.2	- 1.1	**	**
Computer Science	+158.8	+110.5	+ 93.8	+ 65.3	**	**
Education	+179.3	- 16.1	+113.3	- 28.3	+ 29.0	+ 14.1
Engineering	+153.9	+ 46.5	+ 10.2	- 9.1	- 16.9	+ 12.2
Fine Arts	+144.4	- 7.6	+ 87.9	- 8.1	**	**
Foreign Languages	- 35.4	- 23.6	+ 40.6	- 22.2	**	**
Health	+ 80.4	+ 27.1	- 9.3	+ 27.5	**	**
Home Economics	+ 54.6	- 9.8	**	+ 35.4	**	**
Letters	+ 44.1	- 17.0	+ 65.3	- 22.8	**	**
Library Science			**	- 63.6	**	**
Mathematics	+ 70.7	- 22.5	- 6.8	- 46.0	+ 23.3	+ 5.5
Physical Sciences	+147.9	- 4.5	+ 69.0	+ 9.5	- 25.0	+ 22.8
Psychology	+ 35.2	- 12.3	+117.7	+ 18.2	+152.6	- 95.2
Public Affairs	+147.4	- 25.2	+ 91.7	- 13.3		
Social Sciences	+ 32.1	- 24.1	+ 25.4	- 36.0	- 1.6	- 10.2
Interdisciplinary Studies	+130.4	- 14.7	+113.3	+ 48.6	+ 30.3	+ 18.4
TOTAL	+ 93.5%	- 3.2%	+ 28.2%	- 4.2%	- 4.8%	+ 17.3%

**Numbers too small to permit percentage computations.

Source: Analytic Studies, California Postsecondary Education Commission.

By a wide margin, engineering proved to be the discipline at the baccalaureate level in which foreign students represented their greatest percentage of the statewide graduating class. In 1976-77 foreign students accounted for 12 percent of the bachelor's degrees awarded in engineering in California. By 1980-81 this percentage had increased to 19 percent of the total--nearly one out of every five bachelor's degrees awarded in engineering. Figure 15 presents a summary of the percentage changes in bachelor's degrees awarded to foreign students by discipline compared to statewide averages.

MASTER'S DEGREES

Foreign student graduates at the master's level differed from both their counterparts at the baccalaureate level and from all other master's degree recipients between 1977 and 1981. First, proportionately more foreign students received graduate degrees than bachelor's degrees. Over the five-year period, the ratio of bachelor's to master's degrees awarded to California residents remained virtually constant at 2.84:1, favoring bachelor's degrees. Foreign graduates exhibited a marked difference, however; their ratio of bachelor's to master's degrees rose from 0.77:1 in 1976-77 to 0.87:1 in 1980-81, both figures favoring master's degrees. Second, foreign graduates tended to concentrate their master's level studies more heavily in business and management, and engineering than did U.S. residents. In the 1976-77 and 1980-81 academic years, 22 percent and 28 percent of the master's degrees awarded to U.S. residents were in the fields of business and management, and engineering. In these same two years, master's degrees awarded to foreign students in business and management, and engineering averaged 53 percent and 48 percent, respectively. As might be expected, engineering proved to be the discipline in which foreign students recorded the highest percentage of total master's degrees awarded. In 1976-77, 32 percent (one out of three) of the master's degrees awarded in engineering by California colleges and universities was awarded to a foreign student. This percentage increased to 36 percent of the total by the end of the 1980-81 academic year.

Unlike at the baccalaureate level, foreign graduates recorded both positive and negative changes in the percentage of master's degrees awarded. While a number of disciplines posted 100 percent plus increases in master's degrees awarded to foreign students (education and psychology are the most notable instances), four disciplines awarded fewer. Included in this group were agriculture, biological sciences, health, and mathematics. Surprisingly, the engineering and business and management fields experienced only moderate increases in the number of master's degrees awarded--10 percent for engineering, and 24 percent for business and management. In comparison, master's degrees awarded to U.S. residents dropped by 9 percent in engineering while degree awards in business and management rose by 28 percent.

DOCTORAL DEGREES

The number of doctoral degrees awarded to foreign students declined by nearly 5 percent over the 1977-1981 period. Losses in foreign student graduates were experienced in the biological sciences (-56%), the physical sciences (-25%), and, perhaps surprisingly, engineering (-17%). Increases in the number of doctoral degrees awarded occurred in education (29%) and mathematics (33%). In considering these percentage changes, however, the "smallness" of the numbers clearly plays a significant effect and, therefore, the magnitude of the trends may be misstated. As with the master's degree, engineering proved to be the most popular field of study at the doctoral level. Thirty-six percent of the doctoral degrees awarded to foreign students in 1976-77 were in engineering. In the 1980-81 academic year this percentage had dropped slightly to 31 percent.

From a State-level viewpoint, 45 percent of all of the Ph.D.s in engineering awarded in California in the 1976-77 academic year went to foreign students. Even though the number of U.S. residents receiving doctoral degrees in engineering declined somewhat over this period, the proportion of Ph.D.s awarded to foreign students dropped to 38 percent by the 1980-81 academic year.

SEVEN

MAJOR CHOICES OF UPPER DIVISION AND GRADUATE STUDENTS

One of the assumptions underlying this report is that a five-year record of degrees conferred in all fields of study is useful as an indication of trends in student interests. Nonetheless, statistics regarding conferred degrees, no matter how recently they were conferred, reflect student choices in the past. For obvious reasons, academic planning must be even more concerned with the program choices of students currently enrolled.

So far, this report has focused on degrees awarded because they are more reliable than enrollment figures in reporting students' final choices. This chapter, however, examines trends in enrollments among fields of study at the University of California and the California State University for the past five years. By counting only upper division students majoring in each field, it reduces to some extent the fluctuations caused by students switching majors. At the graduate level, of course, moving from one major field to another is much less common than at the undergraduate level, and graduate majors therefore provide more solid evidence of trends in career choices than upper division majors. In both cases, upper division and graduate majors point to a continuation into the immediate future of the trends in degree output identified earlier in this report.

UPPER DIVISION STUDENTS

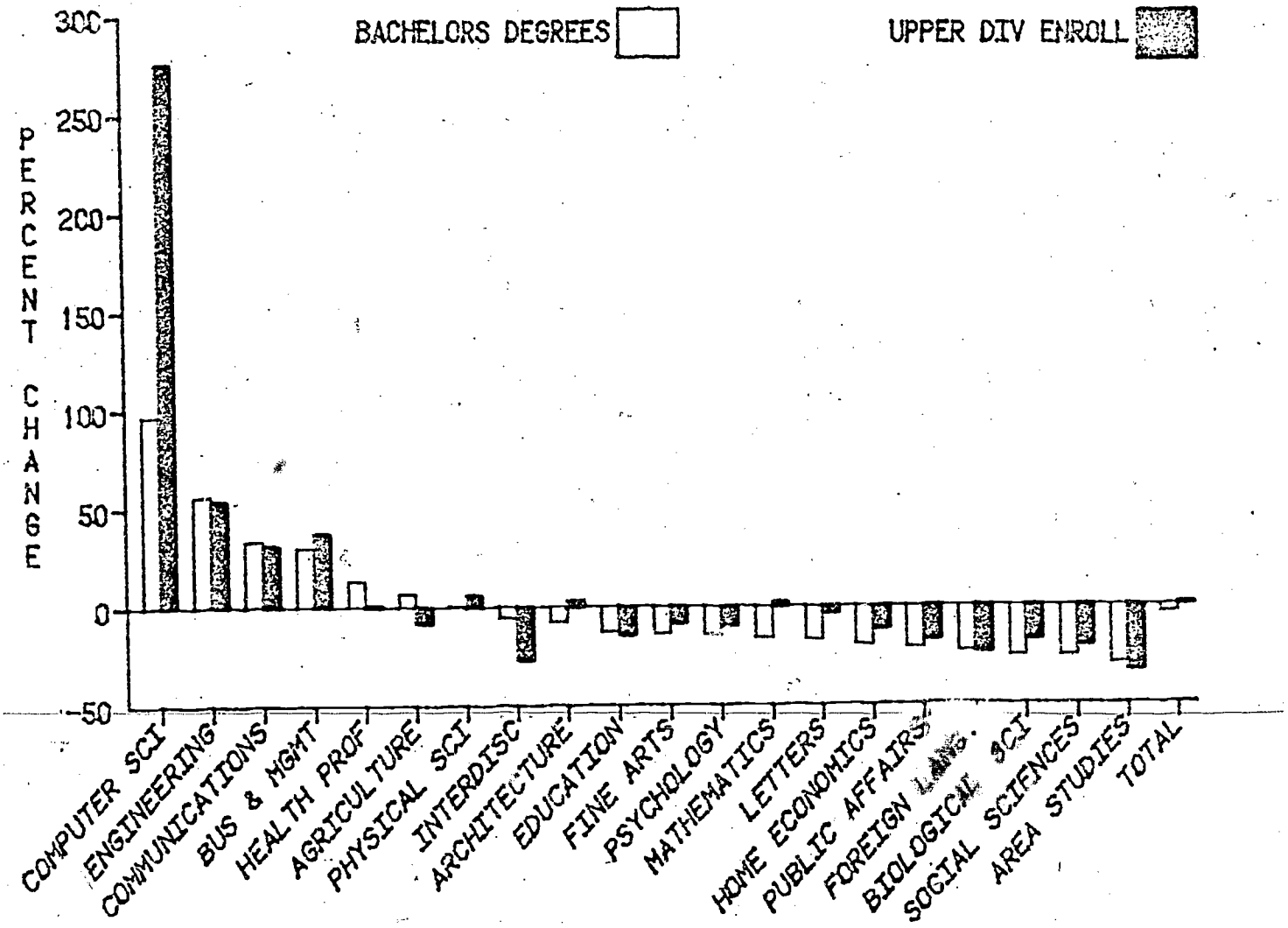
Figure 17 shows that the fields with the greatest percentage gains in the number of bachelor's degrees awarded during the last five years are, with few exceptions, the same fields with significant increases in current enrollment. In fact, there is a striking correspondence between changes in enrollment and degrees granted in all the discipline categories suggesting, of course, that declining fields will continue to decline and gaining fields will continue to gain. The exceptions are in architecture and mathematics, fields in which degrees granted have declined during the past five years but enrollments have increased slightly; and in agriculture, in which the number of degrees increased but overall enrollments are falling off.

Figure 17, therefore, holds out little prospect of an early return to patterns of distribution as they used to be. It illustrates vividly the characteristic tendency of enrollment patterns during the past five years: a steady drain of majors from a majority of disciplines toward a heavy concentration in a few.

GRADUATE STUDENTS

At the graduate level in the State University, a graphic display of trends in enrollment of majors beside degrees awarded since 1977 (Figure 18) presents an even gloomier picture for a majority of academic departments. In

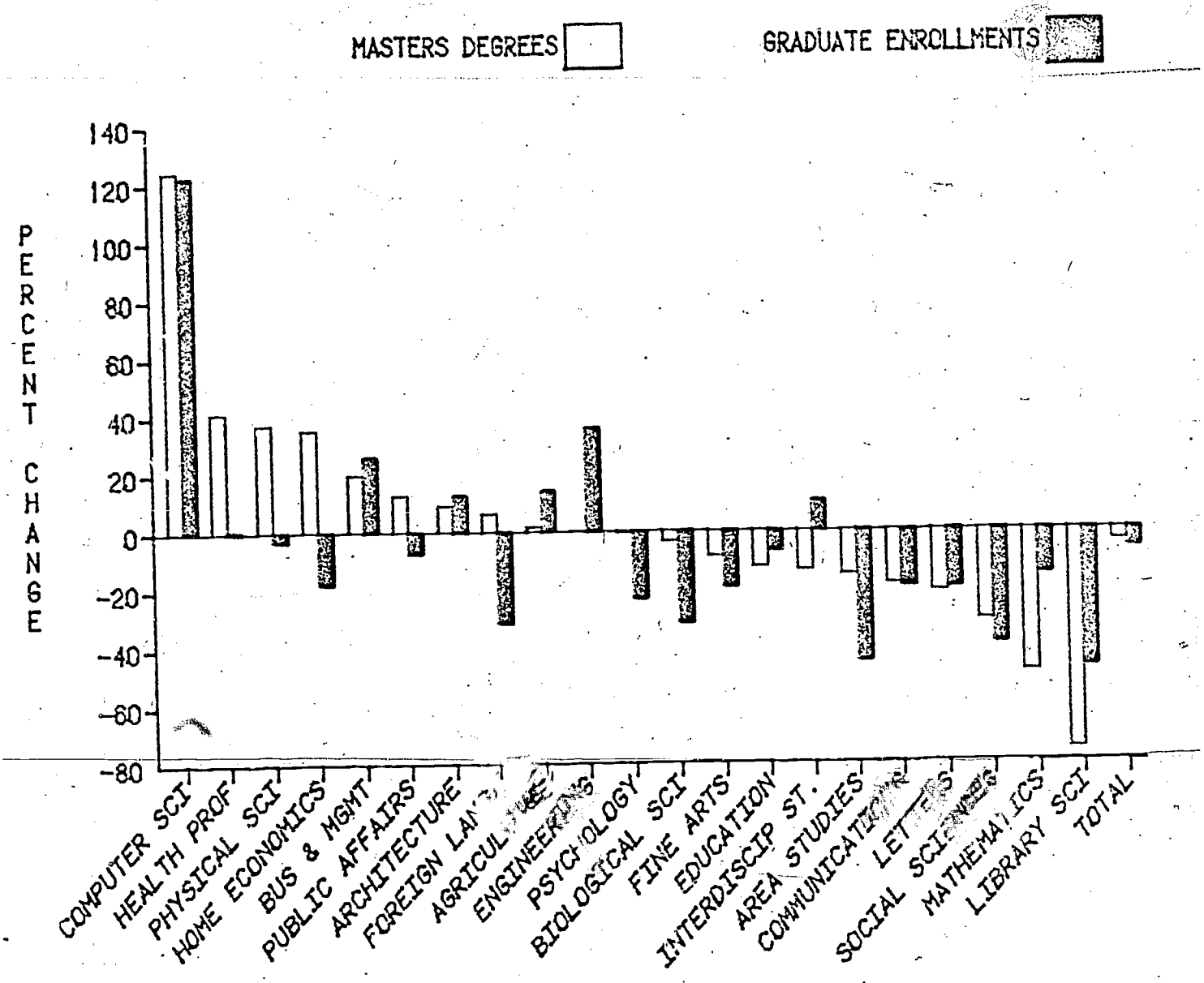
FIGURE 17 Percentage Changes in Upper Division Majors and Bachelor's Degrees Awarded in General Fields of Study, University of California and California State University, 1976-77 Through 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

addition to the nine discipline areas in which both enrollments and degrees have declined, five more--health professions, physical sciences, home economics, public affairs and services, and foreign languages--show falling enrollments despite an increase in degrees. Furthermore, the decline in enrollments in many fields is accelerating, as indicated by the extent to which percentage losses in enrollments exceed the decline in degrees awarded.

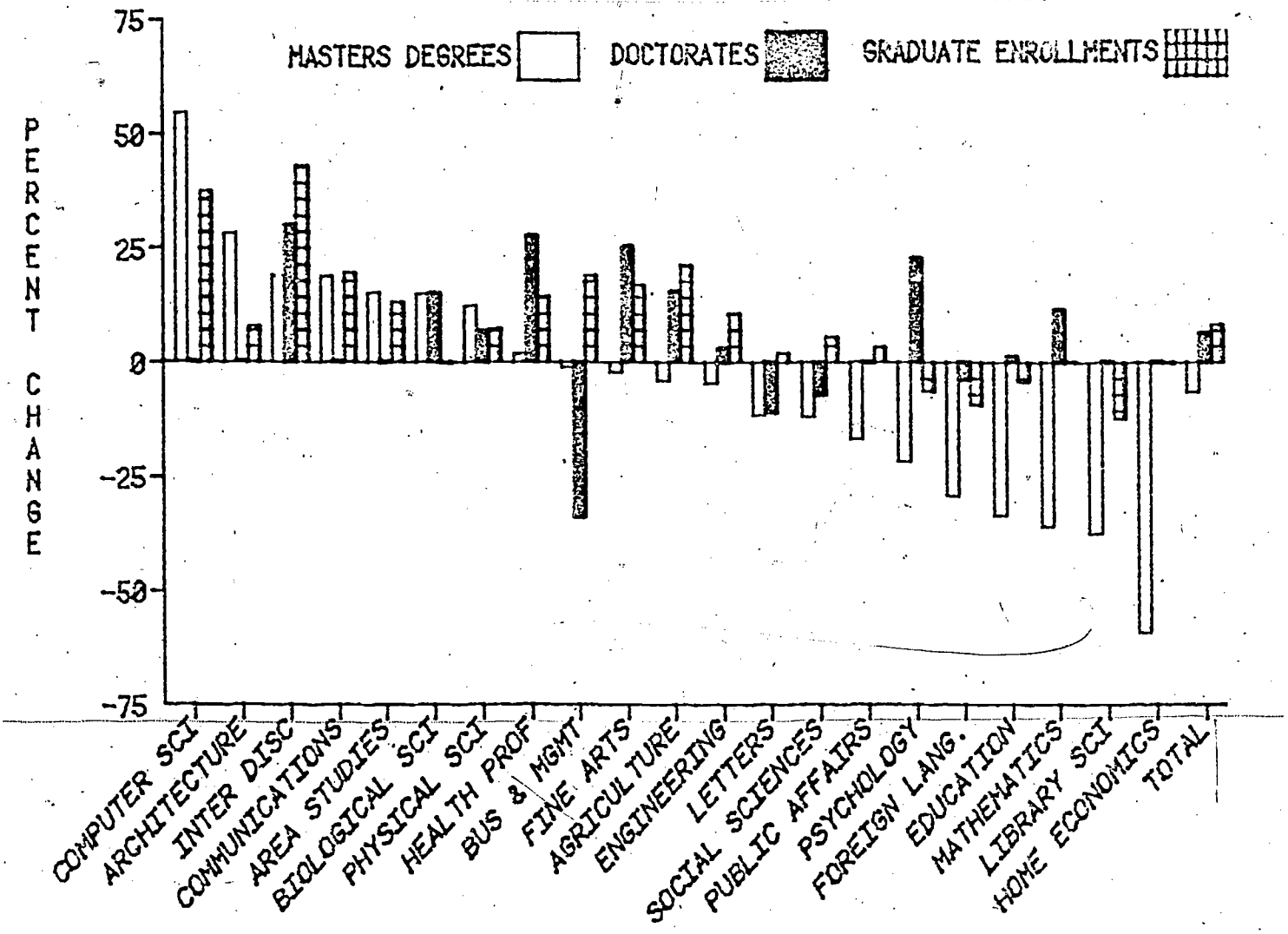
FIGURE 18 Percentage Changes in Graduate Majors and Master's Degrees Awarded, California State University, 1976-77 Through 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

In the University of California, graduate enrollments in a majority of departments have shown a healthy resistance to the downward trend evident in the State University. As Figure 19 shows, only four areas--education, psychology, foreign languages, and library sciences--have lost enrollment to an appreciable extent, while most others have made significant gains. Even in letters and social sciences, in which graduate degrees declined between 1976-77 and 1980-81, graduate enrollment was up. The top three or four enrollment-growth fields are the same as those which have been identified throughout this report, with the addition here of agriculture.

FIGURE 19 Percentage Changes in Graduate Enrollments and Master's and Doctoral Degrees Awarded, University of California, 1976-77 Through 1980-81



Source: Analytic Studies, California Postsecondary Education Commission.

Changes in graduate enrollments in the University have been moderate, considerably less volatile than those in the State University. One possible reason is that students at the doctoral level remain in the pipeline longer, and each year's enrollment totals are bolstered by those who may have completed all but the dissertation some years ago. Another explanation may have to do with the changing value attached to the master's degree as an academic award. As graduate enrollments are reported by the University, it is not possible to determine how many students are in doctoral programs and how many are seeking only a master's degree. In a number of traditional academic disciplines, anyone who enrolls as a graduate student is assumed to be enrolling in a doctoral program, the master's degree being offered, if at all, to those who later decide or are encouraged not to continue. In a few fields, of course--among them architecture, performing arts, and business and management--the master's degree remains to all intents and purposes the terminal degree. But in most of the humanities and social sciences it seems to be of diminishing value, due in part perhaps to the abundant supply of Ph.D.s in these fields. Certainly, trends in enrollments in master's programs in the State University and in the number of degrees awarded in both the State University and University during the past five years suggest a changing attitude toward the degree. If in fact the master's degree in a broad range of subjects is in the process of losing its market value--a premise that admittedly requires greater documentation and analysis than is presented here--that development will have major implications for many graduate programs in the California State University.

EIGHT

ISSUES AND IMPLICATIONS

Academic planning would be vastly simplified if the duration of trends which result in disciplines gaining or losing favor as fields in which to major were possible to predict with any certainty. At the present time, it would appear that programs in business and computer science will continue indefinitely to attract increasing numbers of majors, and that the steady erosion of student majors in letters and social sciences during the last five years will continue through the next five as well. Yet simple extrapolation is unwise. Few could have predicted a decade ago that the social sciences, which enjoyed such vigorous annual growth during the 1960s, would suffer an equally precipitous decline during the late 1970s.

IMPLICATIONS OF FREE CHOICE OF MAJOR

A social and economic system which allows free choice of academic specialization and career (one of the basic rights of American democracy) assumes that the number of people trained and the number employable in a given field will over time remain in reasonable balance. It expects that college students will somehow inform themselves about the job market and be at least partially influenced in their choice of major by what seem to be occupationally promising fields. Except in certain professions which limit supply by restricting enrollment (medicine, for example) or through occasional efforts to increase supply by offering incentives such as fellowships and forgivable loans, American higher education has taken a laissez faire approach to manpower supply and demand. By and large, this free-marketplace system, vastly preferable to a bureaucratically regulated quota system, has adjusted itself to correct major imbalances. But periodically, as at present, free choice of career is in effect restricted by oversupplies in a number of fields. Current shifts in enrollment can be viewed, in part, as the self-correcting mechanism of the free marketplace in operation.

A system which allows free choice of academic major also assumes that even though certain disciplines that are regarded as essential to a comprehensive curriculum may not promise certain or lucrative career opportunities, they will continue to attract enough students to justify employing faculty. During periods of expanding enrollment, students have tended to distribute themselves throughout the major disciplines in a manner that supports this assumption. Thus, in the 1960s, all disciplines gained, if at somewhat different rates, in the enrollment of majors. Although variations occurred from year to year in the percent of biology majors, for instance, compared to those in business, French, or sociology, there were so many new students that a key measure of department chairmen's effectiveness was how many additional faculty positions they could capture for their department each year. With enrollments leveling off or declining, however, one department's

gain in the number of majors must be at the expense of another department's loss. It is this aspect of the present context that is disturbing, partly because it is foreign to the experience of most academic administrators. Only during the past five years have some departments come face to face with the prospect that their pool of majors may dry up entirely. If present trends continue, some sizable departments in both public and independent California institutions may be reduced to offering lower division general education courses as their only function. However vital this service may be, in most cases it can be performed by a fraction of the staff currently employed.

Current academic planning is complicated by the fact that disciplines suffering the greatest losses in enrollment--letters, social sciences, and foreign languages--have traditionally constituted a significant portion of the core curriculum, and degree programs in these subjects have come to be regarded as essential offerings on a comprehensive campus. At the present rate, offering a major program in some of these subjects on all public campuses may soon be impractical. The reason is not simply that of cost effectiveness when enrollments of majors fall below a minimum level. Equally important is the increasingly accepted concept of "critical mass"--the assumption that quality in degree programs depends in some measure on the direct interaction of a sufficient number of qualified participants engaged in a common pursuit. Exactly what minimum number of students and faculty constitute a critical mass may vary with circumstances, in that certain esoteric or highly specialized fields may be intellectually vital with only small numbers of students. But among core subjects in which a large number of campuses offer degree programs, those programs with substandard enrollments become increasingly difficult to justify.

Undoubtedly many students will continue to take courses in social sciences and humanities, either to satisfy breadth requirements or because of personal interest. Nevertheless, the loss of majors is having a significant impact on the workload and morale of these departments. The need for upper division classes and seminars diminishes, as does the time devoted to student advising. The loss of majors almost inevitably leads to reductions in the number of faculty positions assigned to the department, since lower division classes allow for higher student-to-faculty ratios than upper division and graduate classes. Equally important, introductory courses tend to drain the energy and enthusiasm of faculty who look to upper division or graduate seminars in order to sustain or revitalize their research interests. With an ever-growing proportion of a department's efforts devoted to these "service" courses and with little likelihood of hiring new, young faculty to whom they customarily have been assigned, the need to maintain faculty morale and preserve instructional vitality becomes an additional challenge.

INFLUENCES ON STUDENT CHOICE OF MAJOR

Student choices of major are affected by a wide range of variables including not only a talent or predilection for a given field of study (possibly influenced by an exceptional high school teacher) but also and perhaps more often by economic conditions, cultural values, and social priorities in the

environment. A number of reasons are commonly suggested for the current popularity of careers in business and technology among the current generation of college students: (1) preoccupation with financial security associated with anxiety over the job market, (2) fascination with technology, (3) diminished social consciousness, and (4) loss of interest in the life of the mind, as represented by humanistic scholarship and philosophic speculation.

If any or all of these conditions are in fact responsible for recent shifts in enrollment, how long will they prevail? Shifts in student interest over the last century have been frequently compared to swings of a pendulum, suggesting that at some point after a pronounced emphasis on practical and vocational subjects, a definite swing back to a renewed interest in liberal education has occurred. When and if such a reversal of current trends will take place is impossible to forecast, but two developments related to the job market might trigger a turnaround. First, the job market for business majors, computer specialists, and certain kinds of engineers may become saturated, just as did the market for teachers in the early 1970s. Second, because of the steady reduction in the size of the college-age population through the 1980s, the job market may open up in currently congested academic disciplines, thereby removing the stigma of joblessness from these fields. Even under these circumstances, not all disciplines would recover from their current losses, but a somewhat more even distribution of student majors among the fields of study could again be anticipated.

INSTITUTIONAL RESPONSES

In the meantime, a variety of responses are possible for campuses, institutions, and systems faced with rapid and wholesale shifts in student demand for programs. In fields of study enjoying runaway popularity, they may decide to limit enrollments. This decision, which has always been an option, may now be dictated by necessity, in that no possibility exists of enlarging facilities or expanding staff to accommodate more than a specific number of students. Or it may result from a desire to maintain a balanced curriculum. For example, a campus may determine in the interest of curricular integrity that no one program should expand beyond a certain size regardless of capacity. Such a judgment was much less difficult when overall enrollments were expanding steadily. Today, however, a campus that restricts enrollment in business administration, engineering, computer science, or communications--or that doesn't offer these programs--risks losing enrollment altogether.

Another alternative is to maintain or increase the instructional staff in expanding fields by employing part-time faculty or by establishing a salary differential for faculty in these fields. These steps are not without potential hazard to the long-range health of the institution. Part-time faculty can, of course, contribute to the effectiveness of an educational program by bringing variety and often first-hand acquaintance with the practical application of a body of knowledge to the instructional process. But a predominantly full-time faculty, committed not only to the advancement of their own disciplines but also to the strength and vitality of the curriculum as a whole, is clearly an important component of institutional quality. Increasing indefinitely the number of part-time faculty thus is

not in the best interest of students or the campus. Nor are salary differentials an easy solution. Not only is the determination of who should be eligible for a higher salary scale bound to be arbitrary (for instance, should all engineering faculty be included or only those in high-demand subspecialties; and are chemistry, physics, and geology also high-tech fields deserving of inclusion), but salary differentials are likely to have a detrimental effect on faculty morale in other fields. Furthermore, determining when to retract the differential because it is no longer warranted by the demands of the marketplace is likely to be awkward. Nevertheless, the University of California has resorted to this alternative for engineering and business administration, and the California State University seeks to do so.

Another means of coping with shifting enrollments within a no-growth context is to collect all faculty positions as they become available through attrition into a central pool for redistribution as enrollments dictate. This practice, already in effect on a number of University campuses, has the advantage of increasing the flexibility of the campus administration to direct resources where needs are greatest. Its effectiveness in resource management depends to some extent on attrition occurring in departments with falling enrollments and the maintenance of campus-wide enrollments at a sufficient level. Nevertheless, it makes possible not only reinforced staffing of existing programs as the need arises but even launching an occasional new program. While allowing chance attrition to become a primary determinant of the shape of a curriculum would be irresponsible, the accumulation of all faculty positions for possible reallocation seems a reasonable practice, especially in situations where a gradual realignment of departmental strengths is an adequate response.

Another means of ameliorating somewhat the effects of severe enrollment losses in individual departments is to explore the possibility of interdepartmental cooperation either in the form of interdisciplinary degree programs, team-taught courses, or other mutual undertakings. Such approaches are already quite common, of course, and have been implemented for reasons of pedigogical effectiveness long before economic necessity has dictated their consideration. One disappointing aspect of this expedient in the present context is that the interdisciplinary program may not have any more drawing power than the programs of the individual departments. For example, programs in comparative literature usually offered jointly by members of several foreign language departments are losing undergraduate majors more rapidly than most programs.

The most extreme response to enrollment losses is to cancel the program. There are any number of reasons why such an action is viewed as a last resort on most college campuses. The decision affects faculty, often tenured faculty, and if any savings are to be realized, these staff members must be reassigned or, more realistically, dismissed. There is always the possibility that the enrollment losses may be temporary and if the program can weather the current drought, the next swing in student interests may see it regaining favor. Or it may be a program long regarded as an essential component in a comprehensive curriculum whose loss would diminish the stature of the campus as a reputable academic institution.

For these and other reasons, only a minimal number of degree programs have been discontinued on University and State University campuses during the past five years. Even though detailed procedures for program termination are in place in both segments, there is an understandable reluctance to rush into them.

The academic process, considered by some to be unduly cautious and deliberate, cannot be measured by the same standards applied to commercial business. The success of an academic institution is not based primarily on how effectively or rapidly it gauges and responds to the shifting demands of the marketplace. One of the vital functions of the college curriculum and the instructional program it outlines has always been to order, preserve, and extend the fields of knowledge deemed essential for the progress of civilization. In this capacity, the instructional and research activities of a university cannot be content merely to reflect and respond to prevailing community values. They must often challenge, or attempt to shape, elevate, or refine those values.

It is not expected, of course, that every campus will offer instruction or conduct research in all fields of study. One obvious implication of the recent shifts in enrollment documented in this report is that especially in a multicampus system, it is no longer feasible for each campus to aspire to offer a full array of degree programs at all levels in all disciplines. Therefore, the frequent review and refinement of campus mission statements becomes increasingly important. These revisions, even though perhaps narrowing the comprehensiveness of a campus's degree programs, should prove in the long run to be salutary since a well-planned elimination of a number of programs on individual campuses will not necessarily compromise the strength of the system's academic program as a whole. In fact, pruning programs of marginal vitality may be an essential precursor to establishing centers of excellence in the various disciplines.

Unfortunately, in a time of restricted resources, the creation of centers of excellence on some campuses can be achieved only at the cost of possibly unpleasant dislocations on others. Moreover, at this stage in the evolution of the public segments, such centers are not likely to develop spontaneously. They will require careful central planning and the exercise of greater authority in curricular matters than systemwide administration in more affluent times may have wished to wield.

CONCLUSION

The issues suggested here and others implicit in the statistical tables of this report extend beyond curricular planning into all areas of academic policy. For the most part, they are matters that must be resolved by the institutions themselves. As every campus and segmental administrator knows, solutions that may have worked ten years ago are unsuited to today's context. Fixed, if not declining, resources and enrollments mean that institutions face a "zero sum" dilemma: if they respond to changes in student interests by supplying additional staff, equipment, and facilities to fields in highest demand, they must find the wherewithal for these reinforcements internally.

Yet to siphon off resources from fields with falling enrollments and transfer them to departments that are thriving is by no means a simple transaction; it is surrounded by a variety of considerations more complicated than mere economic efficiency.

The circumstances portrayed in this report suggest the need for institutions to have the greatest degree of administrative and fiscal flexibility consistent with the demands of accountability in order to make these choices. These circumstances, in turn, require that institutions be prepared to explain and justify their choices, because their responses to shifting enrollment patterns are in every way as important to the public interest as others, such as admission requirements, fee and financial aid policies, and affirmative action programs, which commonly command greater attention in the public forum.

APPENDIX A

FIRST PROFESSIONAL DEGREES

PROFESSIONAL DEGREES IN THE UNITED STATES, 1961-1980

The professional fields of Medicine (and related medical specialities), Law, and Theology shared in the general upswing in the number of degrees awarded nationally, the number in all fields except Dentistry and Pharmacy at least doubling during the past 20 years (Table 13). As a percentage of the number of bachelor's degrees awarded during the same year, however, the number of first professional degrees has actually declined slightly since 1961 (from 8% to 7.3%).

The most notable increase has been in the field of Law which awarded just over 9,500 degrees in 1961 and almost 36,000 in 1980, an increase of 275 percent. At the same time, the number of degrees in Medicine increased 113 percent and those in Dentistry only 60 percent. While there were in fact fewer advanced degrees in Pharmacy in 1980 than in 1961, bachelor's degrees in the field kept pace with the overall trend by increasing threefold (to 7,100) during the period. Optometry and Podiatry registered impressive percentage increases although the number of degrees in these specialties remains relatively small.

The most remarkable statistics of the table on First Professional Degrees are those concerning the number of degrees awarded to women in each of the professional fields, a development discussed in Chapter 3 of the report.

PROFESSIONAL DEGREES IN CALIFORNIA, 1977-1981

Professional degrees awarded in California during the past five years reflect the same tendencies. While there have been no appreciable increases in the total number of degrees in any professional field since 1977, the percentages earned by women are up in all fields.

As illustrated in Table 14, the University of California has a consistently better record than the independent colleges in the percentage of professional degrees awarded to women. (The only exception is in Optometry in 1981.) The University is also far ahead of the national percentages in every professional field, but especially in Dentistry (24% to 13%), Veterinary Medicine (47% to 33%), and Pharmacy (48% to 38%).

Nevertheless, the number of women receiving professional degrees from California's independent institutions also increased significantly during the past five years. The increase in the percentage of degrees earned by women in independent colleges and universities was particularly impressive in Optometry (from 9% to 23%), in Law (from 21% to 33%), and in Pharmacy (from 25% to 37%).

TABLE 13 First Professional Degrees Awarded in the United States by Field of Study, in Total and to Women, 1960-61, 1970-71, and 1979-80

Field of Study	1960-61 Number	1960-61 Awarded to Women	1960-61 Percent to Women	1970-71 Number	1970-71 Awarded to Women	1970-71 Percent to Women	1979-80 Number	1979-80 Awarded to Women	1979-80 Percent to Women
Dentistry	3,289	19	0.5	3,745	42	1.1	5,258	700	13.3
Medicine	6,986	338	4.8	8,919	809	9.1	14,902	3,486	23.4
Optometry	315	4	2.0	531	13	2.4	1,085	170	15.7
Osteopathy	508	10	1.3	472	11	2.3	1,011	159	15.7
Pharmacy	794	88	11.1	-	-	-	637	239	37.5
Podiatry	121	3	2.5	240	5	2.1	580	73	12.6
Veterinary Medicine	820	16	1.9	1,252	98	7.8	1,835	602	32.8
Law	9,514	262	2.8	17,421	1,240	7.1	35,647	10,754	30.2
Theology	3,855	48	1.2	5,055	118	2.3	7,115	982	13.8
TOTAL	29,491	788	2.7	37,615	2,336	6.2	68,070	17,165	25.2

Sources: U.S. Office of Education, 1963; National Center for Education Statistics, 1982.

TABLE 14 First Professional Degrees Awarded in California by Field of Study, in Total and to Women, 1977 and 1981

Field of Study	Sex	1977 UC	1977 % Women	1977 Ind.	1977 % Women	1977 Total	1977 % Women	1981 UC	1981 % Women	1981 Ind.	1981 % Women	1981 Total	1981 % Women
Dentistry	M	131		312		443		133		322		455	
	F	39	22.9	23	6.8	62	12.2	43	24.4	28	8.0	71	13.5
	T	170		335		505		176		350		526	
Medicine	M	433		319		752		409		318		727	
	F	106	19.7	73	18.6	179	19.2	158	27.9	86	21.3	244	25.1
	T	539		392		931		567		404		971	
Optometry	M	38		77		115		48		69		117	
	F	19	33.3	7	9.0	26	18.4	11	18.6	21	23.3	32	21.4
	T	57		84		141		59		90		149	
Veterinary Medicine	M	76		-		76		45		-		45	
	F	23	23.2	-		23	23.2	40	47.0	-		40	47.0
	T	99				99		85				85	
Law*	M	827		3,502		4,329		782		2,986		3,786	
	F	416	33.4	948	21.3	1,364	24.0	486	38.3	1,464	32.8	1,950	33.9
	T	1,243		4,450		5,693		1,268		4,450		5,736	
Pharmacy	M	50		208		258		59		174		233	
	F	41	45.0	71	25.4	122	32.1	54	47.8	104	37.4	158	40.4
	T	91		279		380		113		278		391	

* UC totals include Hastings College of the Law. Independent totals include unaccredited law schools.

Source: Analytic Studies, California Postsecondary Education Commission.

APPENDIX B

Bachelor's and Master's Degrees

	Agriculture			Architecture			Area Studies			Biological Sciences			Business		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
BACHELOR'S DEGREES															
MALE															
UC	408	298		222	158		36	33		1,949	1,224		373	566	
CSU	980	925		342	260		56	31		1,352	759		5,797	6,001	
Subtotal	1,388	1,223		564	418		92	64		3,301	1,983		6,170	6,567	
IND	12	9		68	105		39	44		859	693		2,503	3,541	
Total	1,400	1,232	- 12.0	632	523	- 17.2	131	108	- 17.6	4,160	2,676	- 35.7	8,673	10,108	16.5
FEMALE															
UC	241	280		92	116		82	46		1,074	935		168	349	
CSU	267	444		63	95		79	45		765	727		1,963	3,899	
Subtotal	508	724		155	211		161	91		1,839	1,662		2,131	4,248	
IND	0	3		79	50		64	82		493	470		660	1,897	
Total	508	727	43.1	234	261	11.5	225	173	- 23.1	2,332	2,132	- 8.6	2,791	6,145	120.2
MINORITY															
UC	60	104		61	71		24	12		514	503		116	154	
CSU	79	100		48	58		33	17		247	252		1,123	1,865	
Subtotal	139	204		109	129		57	29		761	755		1,239	2,019	
IND	21	3		22	21		24	21		302	275		480	885	
Total Minority	160	207	29.4	131	150	14.5	81	50	- 38.3	1,063	1,030	3.1	1,719	2,904	68.9
Total, Selected Minority	79	157	98.7	59	68	15.3	43	31	- 27.9	368	395	7.3	853	1,466	71.9
NON-RESIDENT ALIEN															
UC	9	9		3	9		3	2		60	34		12	14	
CSU	21	101		18	16		1	4		47	81		265	590	
Subtotal	30	107		21	25		4	6		107	115		277	604	
IND	0	1		16	28		2	5		59	57		269	478	
Total	30	108	260.0	37	53	43.2	6	11		166	172	3.6	546	1,082	98.2
TOTAL BACHELOR'S															
UC	649	659		314	309		118	103		3,023	2,346		541	923	
CSU	1,247	1,369		405	355		135	76		2,108	1,486		7,760	9,900	
Subtotal	1,896	2,028		719	664		253	179		5,131	3,832		8,301	10,823	
IND	12	12		147	155		103	126		1,352	1,163		3,163	5,438	
Total	1,908	2,040	6.9	866	819	- 5.4	356	305	- 14.3	6,483	4,995	- 23.0	11,464	16,261	41.8
MASTER'S DEGREES															
MALE															
UC	148	81		169	140		14	16		216	131		635	527	
CSU	99	91		64	65		11	9		169	163		810	826	
Subtotal	247	172		233	205		25	25		385	294		1,445	1,353	
IND	12	21		29	32		33	11		66	67		3,177	3,856	
Total	259	193	- 25.5	262	237	- 9.5	58	36	- 37.9	451	361	- 20.0	4,622	5,209	12.7
FEMALE															
UC	28	34		49	100		25	22		105	88		239	293	
CSU	14	24		11	17		9	8		69	67		185	367	
Subtotal	42	58		60	117		34	30		174	155		424	660	
IND	3	5		4	16		23	19		35	29		405	1,085	
Total	45	63	40.0	64	133	107.8	57	49	- 14.0	209	184	- 12.0	829	1,745	110.5
MINORITY															
UC	6	11		41	38		2	2		32	24		110	83	
CSU	9	2		3	7		3	4		9	11		102	62	
Subtotal	15	13		44	45		5	6		41	35		212	145	
IND	0	2		7	4		5	4		12	12		325	1,019	
Total Minority	15	15		51	49	- 3.9	10	10		53	47	- 11.3	537	1,164	116.8
Total Selected Minority	5	10		28	27	- 3.6	4	7		20	11	- 45.0	299	803	168.6
NON-RESIDENT ALIEN															
UC	59	21		34	44		4	6		55	18		100	90	
CSU	24	56		3	31		0	2		3	38		54	158	
Subtotal	83	77		37	75		4	8		58	56		154	248	
IND	6	5		8	15		3	6		11	10		571	648	
Total	89	82	- 7.9	45	90	100.0	7	14	--	69	66	- 4.3	725	896	23.6
TOTAL MASTER'S															
UC	176	169		218	280		39	45		321	273		974	864	
CSU	113	115		75	82		20	17		238	230		995	1,193	
Subtotal	289	284		293	362		59	62		559	503		1,969	2,057	
IND	15	26		33	48		56	30		101	96		3,582	4,941	
Total	304	310	2.0	326	410	25.8	115	92	- 20.0	660	599	- 9.2	5,451	6,998	28.4

	Communications			Computer Science			Education			Engineering			Fine Arts		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
BACHELOR'S DEGREES															
MALE															
UC	105	112		143	201		122	45		1,135	1,606		527	329	
CSU	947	860		189	400		1,764	1,378		1,758	2,661		1,129	914	
Subtotal	952	972		332	601		1,886	1,423		2,893	4,267		1,656	1,243	
IND	307	267		51	149		234	172		720	1,138		893	1,179	
Total	1,259	1,239	- 1.6	383	750	95.8	2,120	1,595	- 24.8	3,613	5,405	45.6	2,549	2,422	- 5.0
FEMALE															
UC	85	216		48	105		211	83		106	227		987	810	
CSU	532	889		47	117		1,393	1,533		48	215		1,531	1,444	
Subtotal	617	1,105		95	222		1,604	1,616		154	442		2,518	2,254	
IND	255	376		15	63		521	447		44	143		926	889	
Total	872	1,481	69.8	110	285	110.0	2,125	2,063	- 2.9	198	585	195.5	3,444	3,143	- 8.7
MINORITY															
UC	21	36		25	86		56	13		247	500		170	125	
CSU	159	224		27	389		537	513		231	494		305	337	
Subtotal	180	260		52	475		593	526		478	994		475	462	
IND	79	104		47	45		126	88		116	242		175	158	
Total Minority	259	364	40.5	99	320	122.2	719	614	- 14.6	594	1,236	108.1	650	620	- 4.6
Total, Selected Minority	195	259	32.8	55	154	180.0	507	4.3	- 18.5	185	348	88.1	454	360	- 20.7
NON-RESIDENT ALIEN															
UC	0	3		2	14		2	0		103	170		14	9	
CSU	21	66		17	52		45	133		217	578		22	108	
Subtotal	21	69		19	66		47	133		320	748		36	117	
IND	0	39		15	22		6	15		122	374		54	103	
Total	21	108	414.3	34	88	158.8	53	148	179.2	442	1,122	153.8	90	220	144.4
TOTAL BACHELORS															
UC	190	348		191	325		333	136		1,241	1,900		1,514	1,248	
CSU	1,379	1,749		236	517		3,157	2,911		1,806	2,876		2,660	2,358	
Subtotal	1,569	2,097		427	842		3,490	3,047		3,047	4,776		4,174	3,606	
IND	562	641		66	212		755	619		764	1,281		1,819	2,068	
Total	2,131	2,738	28.5	493	1,054	113.8	4,245	3,666	73.6	3,811	6,057	58.9	5,993	5,674	- 5.3
MASTER'S DEGREES															
MALE															
UC	6	8		70	106		111	70		844	704		169	152	
CSU	54	33		45	102		1,299	829		414	403		255	209	
Subtotal	60	41		115	208		1,410	899		1,258	1,107		424	361	
IND	71	73		158	248		1,784	995		1,080	1,012		217	210	
Total	131	114	- 13.0	273	456	67.0	3,194	1,894	- 40.	2,338	2,119	- 9.4	641	571	
FEMALE															
UC	15	9		16	20		220	131		52	81		190	160	
CSU	27	33		12	26		2,263	2,421		14	25		241	244	
Subtotal	42	42		28	46		2,483	2,552		66	106		431	404	
IND	31	50		28	53		2,874	2,007		72	108		153	175	
Total	73	92	26.0	56	99	76.8	5,357	4,559	- 14.9	138	214	55.1	584	579	- 0.9
MINORITY															
UC	1	5		8	7		34	18		97	105		30	29	
CSU	2	2		4	19		524	520		70	74		41	30	
Subtotal	3	7		12	36		558	538		167	179		71	59	
IND	9	15		16	38		879	591		130	108		23	26	
Total Minority	12	22		28	74	164.3	1,437	1,129	- 21.4	297	287	- 3.4	94	85	- 9.6
Total Selected Minority	11	15		9	34	--	1,131	840	- 25.7	88	76	- 13.6	57	51	- 10.5
NON-RESIDENT ALIEN															
UC	2	0		19	33		20	28		290	275		25	32	
CSU	4	12		2	40		68	181		81	189		12	57	
Subtotal	6	12		21	73		88	209		371	464		37	89	
IND	17	23		43	51		178	145		421	409		29	35	
Total	23	35	52.2	64	124	93.8	166	354	113.3	792	873	10.2	66	124	87.9
TOTAL MASTER'S															
UC	21	25		86	133		331	220		896	856		359	351	
CSU	102	91		57	128		3,707	3,250		428	428		496	453	
Subtotal	102	91		143	261		4,038	3,470		1,324	1,284		855	804	
IND	102	123		186	301		4,858	3,002		1,152	1,120		370	385	
Total	204	214	4.9	329	562	70.8	8,696	6,472	-25.6	2,476	2,404	- 2.9	1,225	1,189	- 2.9

	Foreign Languages			Health			Home Economics			Letters			Library Science		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
BACHELOR'S DEGREES															
MALE															
UC	117	85		154	179		20	1		559	451		*	*	
CSU	188	126		366	336		18	20		876	622				
Subtotal	305	211		520	515		38	21		1,435	1,073				
IND	90	53		255	260		6	49		539	435				
Total	395	264	- 33.2	775	775	0.0	44	70	59.1	1,974	1,508	- 23.6			
FEMALE															
UC	418	317		255	356		223	69		899	698				
CSU	444	351		1,876	2,130		1,092	985		1,266	1,086				
Subtotal	862	668		2,131	2,486		1,315	1,054		2,165	1,784				
IND	248	186		658	1,287		97	184		595	572				
Total	1,110	854	- 23.1	2,789	3,773	35.3	1,412	1,238	- 12.3	2,760	2,356	- 14.6			
MINORITY															
UC	89	100		100	133		53	10		128	121				
CSU	182	141		433	444		168	163		232	167				
Subtotal	271	241		533	577		221	173		360	288				
IND	73	57		134	261		16	31		141	111				
Total Minority	344	298	- 13.4	667	838	25.6	237	204	- 13.9	501	399	- 20.4			
Total Selected Minority	290	223	- 23.1	348	437	23.9	113	109	- 3.5	378	273	- 27.8			
NON-RESIDENT ALIEN															
UC	25	9		0	2		4	0		16	14				
CSU	26	28		24	53		16	30		27	62				
Subtotal	51	37		24	55		20	30		43	76				
IND	14	5		22	28		2	4		25	22				
Total	65	42	- 35.4	46	83	80.4	22	34	54.5	68	98	44.1			
TOTAL BACHELOR'S															
UC	535	426		409	540		243	90		1,458	1,258				
CSU	632	477		2,242	2,466		1,110	1,005		2,142	1,708				
Subtotal	1,167	903		2,651	3,006		1,353	1,095		3,600	2,966				
IND	338	239		913	1,547		103	233		1,134	1,007				
Total	1,505	1,142	- 24.1	3,564	4,553	+ 27.7	1,456	1,328	- 8.8	4,734	3,973	- 16.1			
MASTER'S DEGREES															
MALE															
UC	65	40		222	181		9	1		[illegible]	75		50	32	
CSU	[illegible]	29		138	154		5	7		[illegible]	156		50	8	
Subtotal	[illegible]	69		360	335		14	8		333	231		100	40	
IND	[illegible]	19		120	187		0	12		101	93		21	9	
Total	111	88	- 20.7	480	522	8.8	122	166	+ 36.1	554	464	- 16.2	468	171	- 63.5
FEMALE															
UC	102	74		495	506		18	6		126	123		155	90	
CSU	53	53		378	575		100	135		321	267		195	52	
Subtotal	155	127		873	1,081		118	141		447	390		350	142	
IND	36	36		192	291		4	25		107	74		118	29	
Total	191	163	- 14.7	1,065	1,372	28.2	122	166	36.1	554	464	- 16.2	468	171	- 63.5
MINORITY															
UC	18	21		101	112		3	1		9	15		35	13	
CSU	17	12		56	70		14	23		26	33		18	2	
Subtotal	35	33		157	182		17	24		35	48		53	15	
IND	9	7		34	71		0	3		26	13		16	8	
Total Minority	44	40	- 9.1	191	253	32.5	17	27	--	61	61	0.0	69	23	- 66.7
Total Selected Minority	29	31	6.9	114	142	24.6	8	13	--	44	36	- 18.2	34	13	- 61.7
NON-RESIDENT ALIEN															
UC	22	20		62	38		3	0		[illegible]	26		4	7	
CSU	5	15		10	24		3	14		[illegible]	43		3	5	
Subtotal	27	35		72	62		6	14		[illegible]	69		7	12	
IND	[illegible]	10		14	16		0	0		10	12		5	4	
Total	[illegible]	45	40.6	86	78	- 9.3	6	14	--	49	81	65.3	12	16	--
TOTAL MASTER'S															
UC	167	118		717	731		27	11		244	216		205	128	
CSU	77	82		516	729		105	142		536	423		245	60	
Subtotal	244	200		1,233	1,460		132	153		780	639		450	188	
IND	58	55		312	478		4	37		208	167		139	28	
Total	302	255	- 15.6	1,545	1,938	25.4	136	190	39.7	988	806	- 18.4	589	226	- 61.6

	Mathematics			Physical Science			Psychology			Public Affairs			Social Sciences		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
BACHELOR'S DEGREES															
MALE															
UC	284	218		533	457		723	480		41	20		2,865	2,173	
CSU	303	243		603	583		1,152	771		1,847	1,119		3,502	2,003	
Subtotal	587	461		1,136	1,040		1,875	1,251		1,888	1,139		6,357	4,176	
IND	177	122		367	332		515	463		619	316		1,773	1,297	
Total	764	583	- 23.7	1,503	1,372	- 8.7	2,390	1,714	- 28.3	2,507	1,455	- 42.0	8,140	5,473	- 32.8
FEMALE															
UC	146	138		128	148		1,084	973		127	95		2,235	2,006	
CSU	178	153		137	184		1,519	1,504		1,518	1,549		2,449	1,781	
Subtotal	324	291		265	332		2,603	2,477		1,645	1,644		4,684	3,787	
IND	91	64		88	105		748	770		173	185		1,005	1,084	
Total	415	355	- 14.5	353	437	23.8	3,351	3,247	- 3.1	1,818	1,829	0.6	5,689	4,871	- 14.4
MINORITY															
UC	81	87		61	118		247	277		50	43		761	662	
CSU	81	69		67	72		396	396		537	627		1,220	720	
Subtotal	162	156		128	190		643	673		587	670		1,981	1,382	
IND	42	26		45	66		235	254		157	142		466	378	
Total Minority	204	182	- 10.8	173	256	48.0	878	927	5.6	744	812	9.1	2,447	1,760	- 28.1
Total Selected Minority	77	44	- 42.9	69	95	37.7	604	601	- 0.5	567	621	9.5	1,869	1,272	- 31.6
NON-RESIDENT ALIEN															
UC	13	19		14	13		19	13		0	1		69	58	
CSU	20	41		19	79		39	68		22	72		81	150	
Subtotal	33	60		33	92		58	81		22	73		150	208	
IND	8	10		15	27		30	38		16	21		87	105	
Total	41	70	70.7	48	119	35.2	88	119	35.2	38	94	147.4	237	313	32.1
TOTAL BACHELOR'S															
UC	430	370		661	642		1,807	1,571		168	130		5,100	4,506	
CSU	481	396		740	767		2,671	2,275		3,365	2,668		5,951	3,784	
Subtotal	911	766		1,401	1,409		4,478	3,846		3,533	2,798		11,051	8,254	
IND	268	186		455	437		1,263	1,233		792	501		2,778	2,381	
Total	1,179	952	- 19.3	1,856	1,846	- 0.5	5,741	5,079	- 11.5	4,325	3,299	- 23.7	13,829	10,635	- 23.1
MASTER'S DEGREES															
MALE															
UC	130	70		202	204		39	31		76	37		317	258	
CSU	49	32		87	115		278	209		444	373		389	248	
Subtotal	179	102		289	319		317	240		520	410		706	506	
IND	67	42		110	109		400	421		1,208	835		380	258	
Total	91	51	- 44.0	71	100	+ 40.8	661	901	+ 36.3	1,728	1,245	28.0	1,086	764	- 29.7
FEMALE															
UC	40	29		40	47		39	29		136	138		161	139	
CSU	31	9		15	25		271	237		348	521		225	175	
Subtotal	71	38		55	72		310	266		484	659		386	314	
IND	20	13		16	28		351	635		338	395		234	111	
Total	91	51	- 44.0	71	100	40.8	661	901	36.3	822	1,054	28.2	620	425	- 31.5
MINORITY															
UC	17	11		13	16		11	10		60	50		35	36	
CSU	6	5		8	11		52	57		122	170		63	40	
Subtotal	23	16		21	27		63	67		182	220		98	76	
IND	8	3		4	15		54	69		217	201		77	59	
Total Minority	31	19	- 38.7	25	42	68.0	117	136	16.2	399	421	5.5	175	135	- 22.9
Total Selected Minority	12	6	--	8	13	--	85	106	24.7	314	313	- 0.3	133	103	- 22.6
NON-RESIDENT ALIEN															
UC	36	23		22	40		10	8		3	3		60	64	
CSU	2	11		8	32		11	44		18	51		33	99	
Subtotal	38	34		30	72		21	44		21	54		93	163	
IND	21	21		28	26		13	30		63	107		104	84	
Total	59	55	- 6.8	58	98	69.0	34	74	117.6	84	161	91.7	197	247	25.4
TOTAL MASTER'S															
UC	170	109		242	272		78	61		212	176		478	421	
CSU	80	41		102	140		549	546		792	894		614	423	
Subtotal	250	150		344	412		627	607		1,004	1,070		1,092	844	
IND	87	55		126	137		751	1,056		1,546	1,230		614	369	
Total	337	205	- 39.2	470	549	16.8	1,378	1,663	20.7	2,550	2,300	- 9.8	1,706	1,213	- 28.9

	Interdisciplinary Studies			TOTAL		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change
BACHELOR'S DEGREES						
MALE						
UC	973	824		11,289	9,460	
CSU	696	510		23,765	20,522	
Subtotal	1,669	1,334		35,054	29,982	
IND	412	211		11,250	11,497	
Total	2,081	1,545	- 25.8	46,304	41,479	- 10.4
FEMALE						
UC	980	945		9,589	8,913	
CSU	2,368	2,340		19,526	21,471	
Subtotal	3,348	3,285		29,115	30,384	
IND	848	458		7,886	9,560	
Total	4,196	3,743	- 10.8	37,001	39,944	8.0
MINORITY						
UC	231	299		3,095	3,455	
CSU	401	474		6,516	7,222	
Subtotal	632	773		9,611	10,677	
IND	322	114		3,077	3,359	
Total Minority	954	887	- 7.0	12,688	14,036	10.6
Total Selected Minority	700	640	- 8.6	7,867	7,949	1.0
NON-RESIDENT ALIEN						
UC	15	23		383	413	
CSU	16	60		964	2,372	
Subtotal	31	83		1,347	2,785	
IND	15	23		833	1,433	
Total	46	106	130.4	2,180	4,218	93.5
TOTAL BACHELOR'S						
UC	1,953	1,902		20,878	19,733	
CSU	3,064	2,850		43,291	41,993	
Subtotal	5,017	4,752		64,169	61,726	
IND	1,260	669		19,136	21,057	
Total	6,277	5,421	- 13.6	83,305	82,783	- 0.6
MASTER'S DEGREES						
MALE						
UC	33	34		3,668	2,913	
CSU	73	57		4,972	4,118	
Subtotal	106	91		8,640	7,031	
IND	821	1,291		10,183	10,272	
Total	927	1,382	49.1	18,823	17,303	- 8.1
FEMALE						
UC	40	42		2,295	2,167	
CSU	46	46		4,972	5,427	
Subtotal	86	86		7,267	7,594	
IND	117	218		5,280	5,381	
Total	203	204	0.5	12,547	13,175	5.0
MINORITY						
UC	6	8		669	617	
CSU	5	6		1,154	1,250	
Subtotal	11	14		1,823	1,867	
IND	98	160		1,967	2,514	
Total Minority	109	174	59.6	3,790	4,381	15.6
Total Selected Minority	62	149	140.3	2,512	2,932	16.7
NON-RESIDENT ALIEN						
UC	1	11		863	803	
CSU	7	18		376	1,112	
Subtotal	8	29		1,239	1,915	
IND	22	35		1,610	1,738	
Total	30	64	113.3	2,849	3,653	28.2
TOTAL MASTER'S						
UC	73	87		5,963	5,569	
CSU	119	103		9,944	9,545	
Subtotal	192	190		15,907	15,114	
IND	938	1,509		15,463	15,853	
Total	1,130	1,699	50.4	31,370	30,967	- 1.3

APPENDIX C

Doctorate Degrees

DOCTORAL DEGREES

	Agriculture			Architecture			Area Studies			Biological Sciences			Business		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
MALE															
UC	36	16		11	2		2	3		293	216		43	[illegible]	
IND	1	4		1	1		4	2		51	62		50	83	
Total	7	20	- 45.9	12	3		6	5		344	278	- 19.2	93	98	5.4
FEMALE															
UC	2	4		1	1		1	1		79	90		4	6	
IND	2	1		0	1		1	0		20	22		6	6	
Total	4	5		1	2		2	1		99	112	13.1	10	12	
MINORITY															
UC	1	1		2	1			1		24	30		2	3	
IND								2		6	8		6	8	
Total Minority	1	1		2	1			3		30	38	26.7	8	11	
Total Selected Minority															
NON-RESIDENT ALIEN															
UC	13	10		3	0		0	0		52	20		13	5	
IND	2	2		0	0		0	0		5	5		10	18	
Total	15	12		3	0		0	0		57	25	- 56.1	23	23	0.0
TOTAL DOCTORAL															
UC	38	44		12	11		3	8		372	429		47	31	
IND	3	5		1	2		5	2		71	84		56	89	
Total	41	49	19.5	13	13		8	10		443	513	15.8	103	120	16.5

DOCTORAL DEGREES

	Communications			Computer Science			Education			Engineering			Fine Arts		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
MALE															
UC				14	30		85	47		248	201		18	20	
IND	15	5		21	24		216	211		207	194		20	15	
Total	15	5		35	54	54.3	301	258	- 14.3	455	395	- 13.2	38	35	- 7.9
FEMALE															
UC				2	1		61	71		2	9		21	8	
IND	3	2		0	1		102	176		4	5		10	12	
Total	3	2		2	2		163	247	51.5	6	14		31	20	- 35.5
MINORITY															
UC				1	3		22	12		7	30		1	1	
IND	1			1	2		32	58		8	15		1	1	
Total Minority	1			2	5		54	70	29.6	25	45	80.0	2	2	
Total Selected Minority							44	59	34.1						
NON-RESIDENT ALIEN															
UC				6	14		9	20		108	84		2	5	
IND	2	3		2	2		29	29		99	88		1	1	
Total	2	3		8	16		38	49	28.9	207	172	- 16.9	3	6	
TOTAL DOCTORAL															
UC				16	40		146	148		250	258		39	49	
IND	18	7		21	25		318	387		211	199		30	27	
Total	18	7		37	65	75.7	464	535	15.3	461	457	- 0.9	69	76	10.1

DOCTORAL DEGREES

	Foreign Languages			Health			Home Economics			Letters			Library Science		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
MALE															
UC	26	10		26	14		2			93	48		2	2	
IND	13	8		84	12		0	42		42	42		2	2	
Total	39	18	- 53.8	110	26	- 76.4	2	42		135	90	- 33.3	4	4	
FEMALE															
UC	28	20		17	30		2			52	40		1	1	
IND	17	7		13	9		0	23		25	19		2	2	
Total	45	27	- 40.0	30	39	30.0	2	23		77	59	- 23.4	3	3	
UC		3		5	5		1			5	4				
IND		3		1	2			13		4	3			1	
Total Minority	9	5		6	7		1	13		13	7			1	
Total Selected Minority															
NON-RESIDENT ALIEN															
UC	5	2		4	1		2	0		17	8		0	1	
IND	2	1		1	3		0	0		1	8		3	0	
Total	7	3		5	4		2	0		18	16		3	0	
TOTAL DOCTORAL															
UC	54	52		43	55		4			145	129		3	4	
IND	30	15		97	21		0	65		67	61		4	4	
Total	84	67	- 20.2	140	76	- 45.7	4	65		212	190	- 10.4	7	8	

DOCTORAL DEGREES

	Mathematics			Physical Science			Psychology			Public Affairs			Social Sciences		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change	76-77	80-81	Percent Change
MALE															
UC	58	58		267	222		61	40		6	1		254	134	
IND	25	26		121	154		326	367		32	24		120	106	
Total	83	84	1.2	388	376	- 3.1	387	407	4.9	38	25	- 34.2	374	240	- 35.8
FEMALE															
UC	10	6		24	41		26	41		7	7		64	39	
IND	1	3		12	25		164	281		5	9		37	31	
Total	11	9		36	66	83.3	190	322	69.5	12	16		101	70	- 30.7
MINORITY															
UC	3	8		17	13		3	8		2	2		17	21	
IND	1	3		2	14		56	47		1	4		13	4	
Total Minority	4	11		19	27		59	55	- 6.7	3	6		30	25	- 16.7
Total Selected Minority							56	44	- 21.4				24	19	- 20.8
NON-RESIDENT ALIEN															
UC	19	18		42	30		4	3		0	0		28	23	
IND	2	10		22	18		15	45		4	4		36	40	
Total	21	28	33.3	64	48	- 25.0	19	48		4	4		64	63	- 1.6
TOTAL DOCTORAL															
UC	68	76		291	311		87	107		13	19		318	295	
IND	26	29		133	179		490	648		37	33		157	137	
Total	94	105	11.7	424	490	15.6	577	755	30.8	50	52	4.0	475	432	- 9.1

DOCTORAL DEGREES

	Interdisciplinary Studies			TOTAL		
	76-77	80-81	Percent Change	76-77	80-81	Percent Change
MALE						
UC	23	14		1,569	1,093	
IND	24	30		1,486	1,668	
Total	47	44	- 6.4	3,055	2,761	- 9.6
FEMALE						
UC	10	15		414	431	
IND	14	15		449	688	
Total	24	30	25.0	863	1,119	29.7
MINORITY						
UC	2	1		133	146	
IND	1	11		151	232	
Total Minority	3	12		284	378	33.1
Total Selected Minority				214	208	- 2.8
NON-RESIDENT ALIEN						
UC	4	2		332	246	
IND	2	2		246	305	
Total	6	4		578	551	- 4.7
TOTAL DOCTORAL						
UC	33	43		1,983	2,111	
IND	38	45		1,935	2,356	
Total	71	88	23.9	3,918	4,467	14.0

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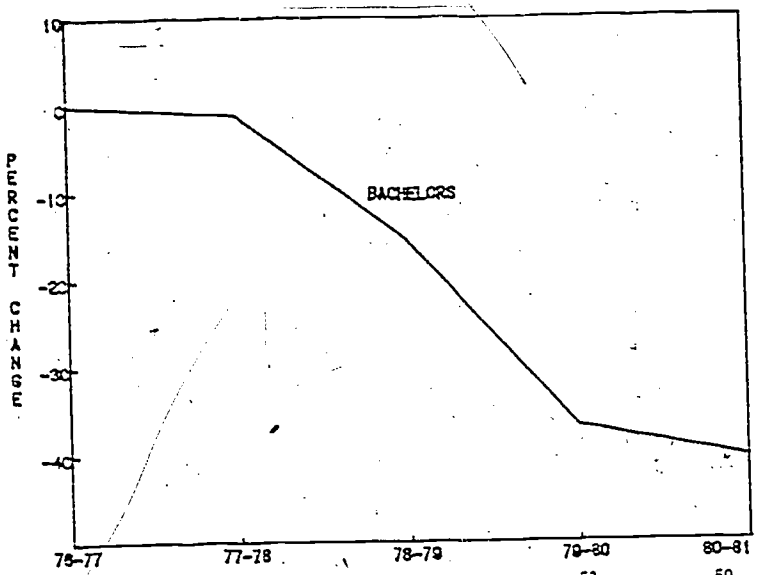
APPENDIX D

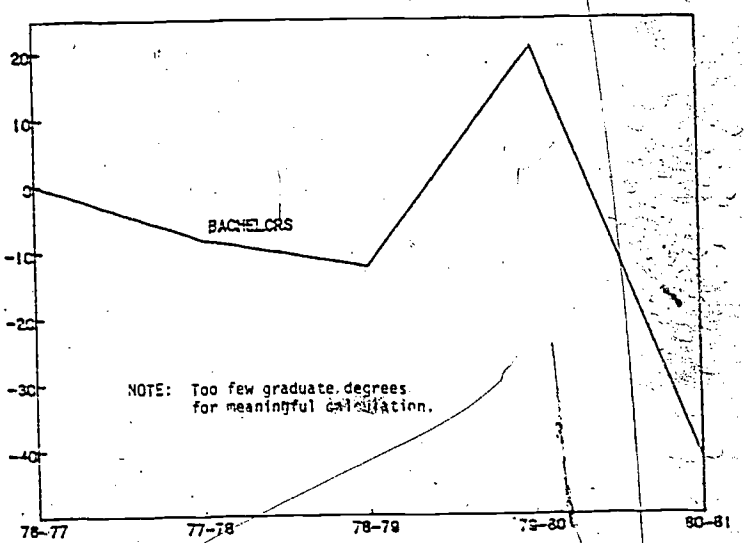
Enrollments in Selected Disciplines,
University of California and The California State University

AFRO-AMERICAN (BLACK CULTURE) STUDIES



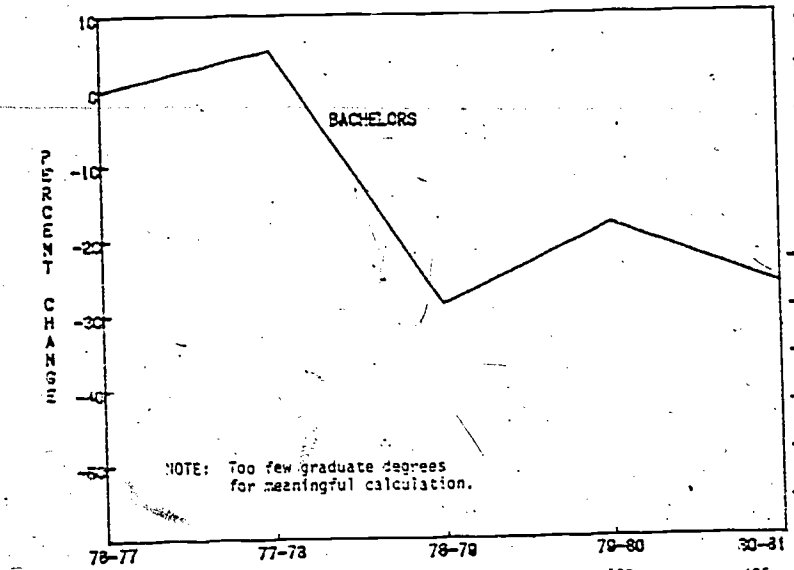
	78-77	77-78	78-79	79-80	80-81
Bachelor's	84	83	71	53	50
Master's	--	--	--	--	--
Doctorates	--	--	--	--	--

CLASSICS



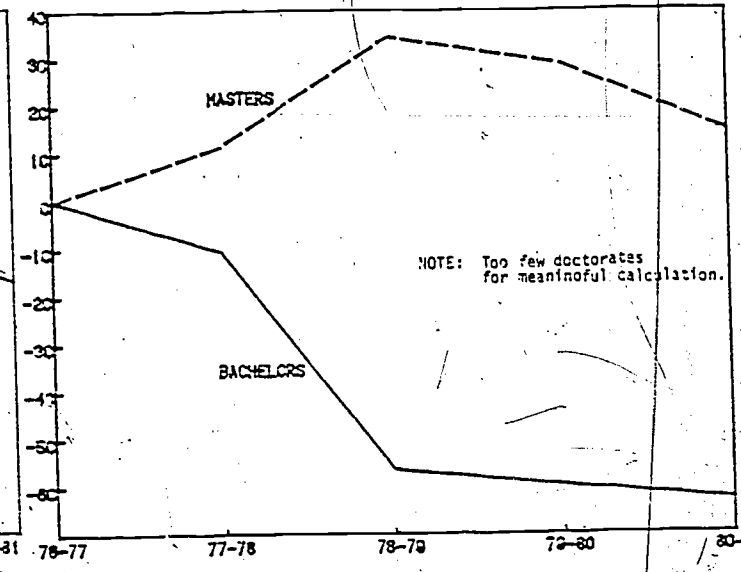
	78-77	77-78	78-79	79-80	80-81
Bachelor's	24	22	21	29	14
Master's	8	11	5	4	4
Doctorates	2	2	3	0	3

CRIMINOLOGY



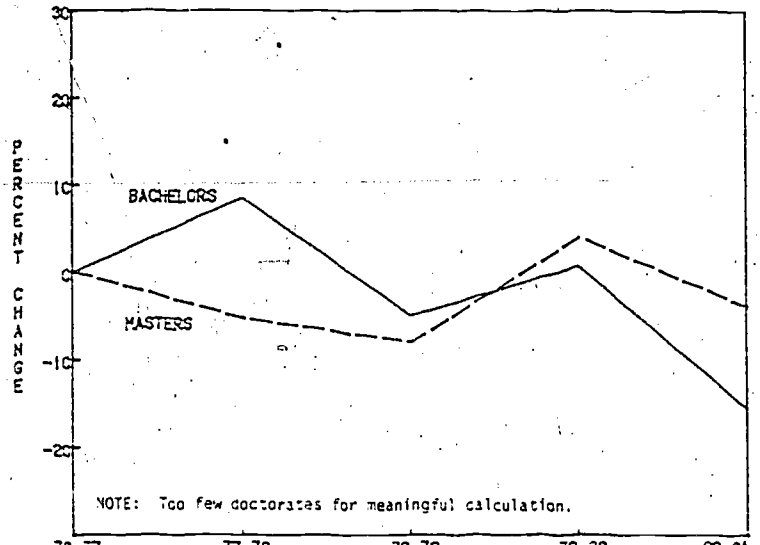
	78-77	77-78	78-79	79-80	80-81
Bachelor's	170	179	121	139	125
Master's	12	11	7	17	17
Doctorates	6	3	0	0	0

COMPARATIVE LITERATURE



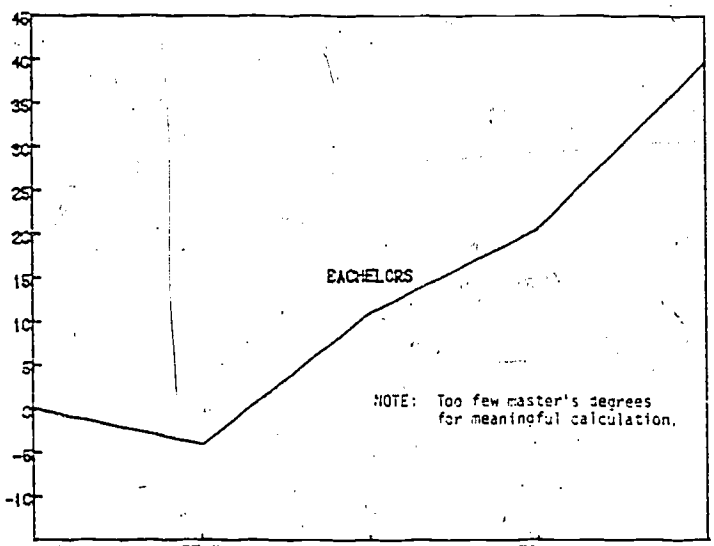
	78-77	77-78	78-79	79-80	80-81
Bachelor's	186	166	81	75	69
Master's	35	39	47	45	40
Doctorates	27	14	14	14	27

GEOGRAPHY



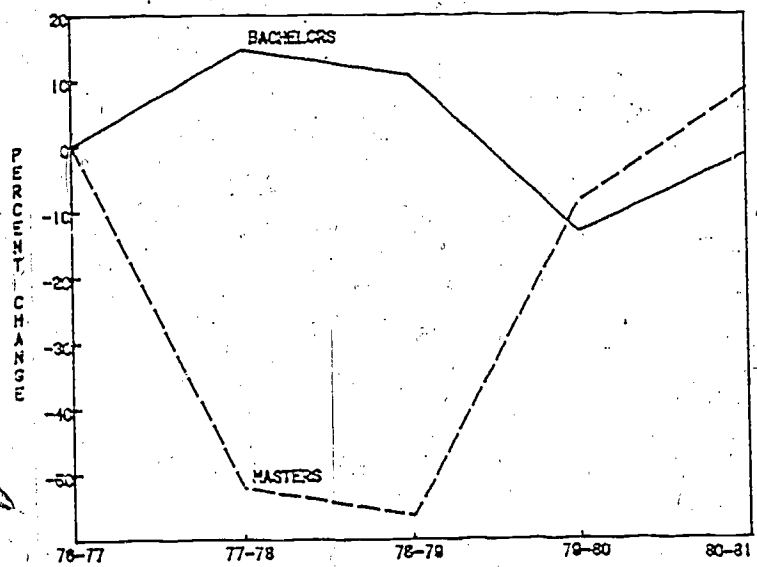
	76-77	77-78	78-79	79-80	80-81
chelor's	591	642	562	596	499
ster's	75	71	69	78	72
ctorates	18	13	10	11	9

INTERNATIONAL RELATIONS



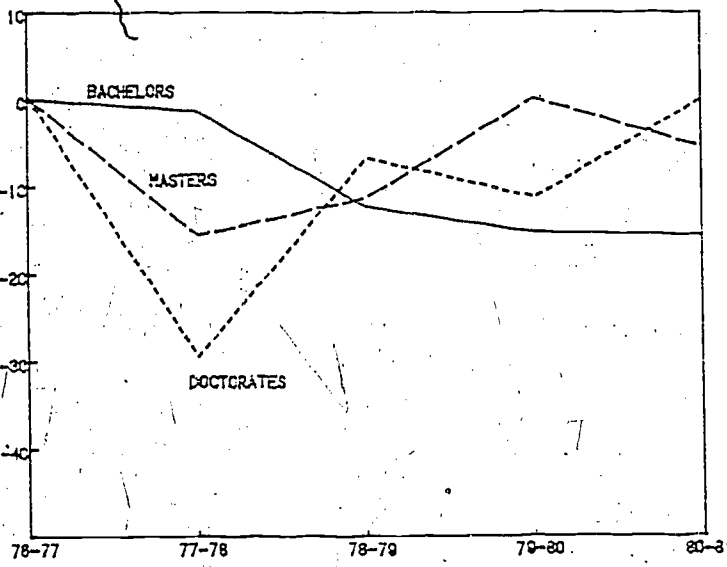
	76-77	77-78	78-79	79-80	80-81
	73	70	81	88	102
	18	20	11	10	12
	--	--	--	--	--

MEXICAN AMERICAN CULTURAL STUDIES



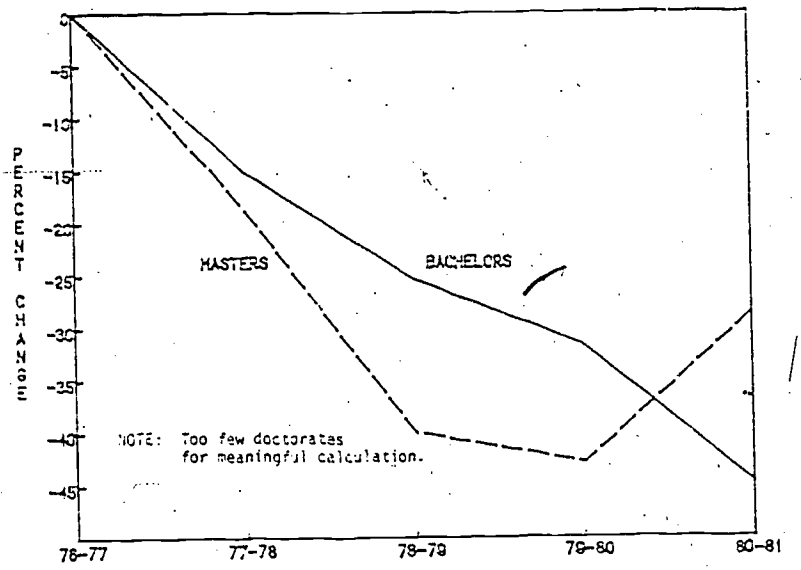
	76-77	77-78	78-79	79-80	80-81
achelor's	75	86	83	65	74
aster's	23	11	10	21	25
octorates	--	--	--	--	--

POLITICAL SCIENCE



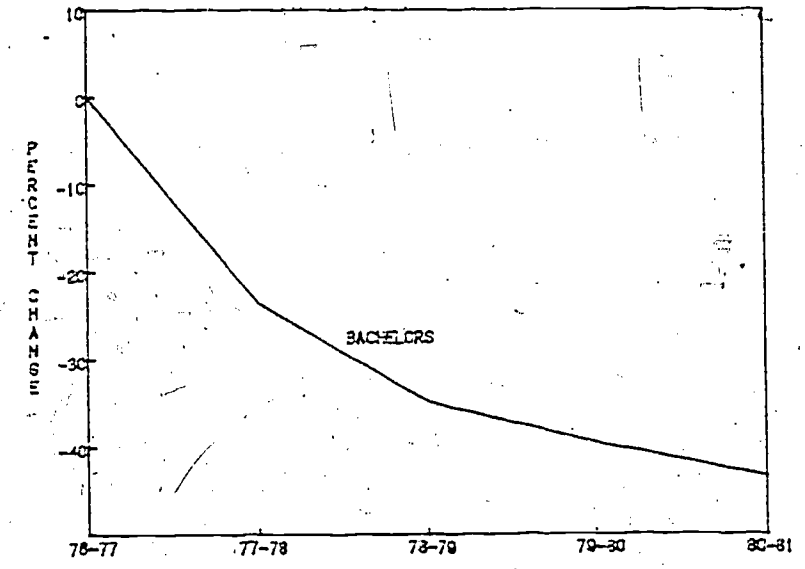
	76-77	77-78	78-79	79-80	80-81
	2,268	2,236	1,990	1,920	1,915
	160	135	142	160	151
	44	31	41	39	44

SOCIAL SCIENCES, GENERAL



	76-77	77-78	78-79	79-80	80-81
Bachelor's	941	799	702	643	519
Master's	70	67	42	40	50
Doctorates	6	9	8	9	7

URBAN STUDIES



	76-77	77-78	78-79	79-80	80-81
Bachelor's	106	81	69	64	50
Master's	--	--	--	--	--
Doctorates	--	--	--	--	--

APPENDIX E

PROBLEMS ATTENDANT TO REPORTING STUDENT ETHNICITY

Of all of the information developed, collected, and reported by a campus in the course of an academic year, student ethnicity data undoubtedly present the most difficult challenges. Problems in collecting student ethnicity fall into five basic areas:

1. Errors Inherent in the Self-Reporting Process

   By law, student ethnicity must be self-reported; that is, students must voluntarily indicate the ethnic group with which they identify. While both federal law, and administrative interpretations of it permit campus administrators limited authority to intervene in the ethnicity declaration process, campus officials are, for the most part, precluded from influencing a students' choice of their ethnic category.

2. Errors Induced by Failure to Report

   Although the federal government exhorts educational institutions to report the ethnicity of their students, campus officials have few mechanisms by which to campus officials to force recalcitrant students to declare their ethnicity. Many students, through intent or neglect, take advantage of this condition and fail to declare their ethnicity when the opportunity is afforded them.

3. Inability to Verify the Accuracy of the Information Collected

   While self-reporting has clear and obvious benefits in terms of ensuring the confidentiality of personal information, it impedes an institution's ability to verify the accuracy or appropriateness of such information. In general, student declarations of ethnicity are private matters maintained in confidential files. As such, ethnicity declarations are rarely subject to review to ensure their accuracy.

4. Changes in Reporting Categories

   Reporting categories have been modified by the federal government a number of times over the past few years and some student ethnicity designations submitted in prior years and not recollected in the interim are no longer valid. Further, some of the changes introduced by the federal government have proven difficult to interpret by both administrators and students -- a condition further complicating the problems involved in the collection of student ethnicity data.

5. Administrative Error

   Finally, many institutions solicit student ethnicty declarations as part of their first-time admission or first day of registration procedures.

From both the students' and the institution's standpoint such efforts could probably not come at a more untimely moment. At this time, many students and administrators are concerned with ensuring that students have, enrolled in the proper classes, paid the appropriate fees, received proper student financial assistance, and familiarized themselves with the local campus geography. Amidst such obvious turmoil, administrative procedures often fail, and student ethnicity declarations are either unsolicited or lost.

While it is clear that collecting and reporting accurate student ethnicity is a difficult task, most campuses do a good job of informing students of the need to know their ethnicity , and accurately recording their responses. In Fall 1981, the University of California provided ethnicity declarations for 92.5 percent of its 138,726 students. The State University system recorded the same data for 84.5 percent of its 319,566 students, and the California Community College system provided ethnicity designations for 91.6 percent of its 1,257,160 credit students. When viewed from a state level perspective, the three public segments reported ethnicity data for 90.4 percent of the 1,715,452 students enrolled this past fall.

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