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ABSTRACT

In 1985, the California legislature directed the California Postsecondary Education Commission to study the attrition rate of students in engineering education in order to learn if ethnic minority and women students had a higher drop-out rate than all engineering students and, if so, to determine the reasons for their high attrition. In that resolution, the Legislature also directed the Commission to assess the impact of the Minority Engineering Program in reducing the attrition of minority students in engineering education. This report responds to that resolution by providing information about the attrition rate of women and ethnic minority engineering students and about the impact of the Minority Engineering Program. The study includes discussions of continuation and graduation rates, differing tracking rates by institution and campus, and discussions of the background, effectiveness, characteristics, significant components, and recommendations of the Minority Engineering Program. Appendices include the text of Senate Concurrent Resolution No. 16 (1985), and 25 supplemental tables. (CW)

Summary

This report responds to Senate Concurrent Resolution 16 (1985, Bill Greene), which directed the California Postsecondary Education Commission to (1) study the attrition rate of students in engineering education in order to determine if ethnic minority and women students have a higher drop-out rate than all engineering students and (2) assess the impact of the Minority Engineering Program in reducing the attrition rate of minority students in engineering education.

In Part One of the report on pages 3-8, the Commission analyzes by sex and ethnicity the continuation and graduation rates of students majoring in engineering at the University of California and the California State University. In Part Two on pages 9-16, it then examines the success of the Minority Engineering Program.

In brief, the Commission concludes that (1) women continue in and graduate from the University's and State University's engineering programs at approximately the same rate as men; (2) Mexican-American, Black, and other Hispanic students continue in and graduate from these programs at a lower rate than white students, while Asian and Filipino students continue in and graduate at a higher rate; (3) participants in the Minority Engineering Program continue in engineering at a higher rate than non-participants; and (4) three crucial elements of the program are community building among students, academic support through mathematics and science workshops, and professional and personal support through participation in student organizations, summer jobs, internships, and career awareness activities.

On pages 15 and 16, the Commission offers two recommendations: (1) "beginning in the 1988-89 Budget Act, the Minority Engineering Program should be a line item in the budgets of both the University of California and the California State University, and thereby involve both systems in the effort to secure funds for the maintenance and possible expansion of the program," and (2) "prior to January 1, 1990, the Legislature should request a comprehensive evaluation of the Minority Engineering Program, to assess the progress of each participating campus in implementing all of the program's components and document its full impact in increasing the graduation rate of ethnic minority students."

The Commission adopted this report on December 15, 1986, on recommendation of its Policy Evaluation Committee. Additional copies of the report may be obtained from the Publications Office of the Commission. Further information about the report may be obtained from Bruce D. Hamlett of the Commission staff at (916) 322-8010 or from Suzanne Ness, the public information officer of the Commission, at (916) 322-0145.

RETENTION OF STUDENTS IN ENGINEERING

A Report to the Legislature in Response to Senate Concurrent Resolution 16 (1985)

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION
Third Floor • 1020 Twelfth Street • Sacramento, California 95814

COMMISSION REPORT 86-33
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ON THE COVER: Students in the Minority Engineering Program at the School of Engineering and Computer Science, California State University, Northridge.

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Introduction

THROUGH Senate Concurrent Resolution 16 of 1985 (Bill Greene), the Legislature directed the California Postsecondary Education Commission to study the attrition rate of students in engineering education in order to learn if ethnic minority and women students have a higher drop-out rate than all engineering students and, if so, to determine the reasons for their high attrition. In that resolution, which is reproduced in Appendix A, the Legislature also directed the Commission to assess the impact of the Minority Engineering Program in reducing the attrition of minority students in engineering education.

This report responds to Senate Concurrent Resolution 16 by providing information first about the attrition rate of women and ethnic minority engineering students, and then about the impact of the Minority Engineering Program.

Limits of the report

The University of California and the California State University have provided extensive assistance to the Commission in compiling the data necessary for this report, with the University, in particular, providing extensive data about the academic performance of engineering students. In addition, the systemwide office for MESA (Mathematics, Engineering, Science Achievement), which administers the Minority Engineering Program and maintains a thorough data base about program participants, shared these data with Commission staff.

Despite this extensive data support, four limitations are inherent on the types of analyses and conclusions that can be presented in this report:

1. The data provided to the Commission for this report from the the University, the State University, and MESA are not comparable, and thus comparisons cannot be made between the University and State University regarding student retention or attrition. For example, the information provided by the University permits tracking students from their enrollment in engineering to their completion of a degree either in engineering or another field, but that provided by the State University does not differentiate between engineering enrollees who graduate in engineering and those who change their majors and graduate in another field.
2. Senate Concurrent Resolution 16 requested the Commission to "assess the impact of differing levels of academic preparation and secondary school education on academic success by ethnic minority and women students in engineering education." Data to answer this question would have to be gathered through a detailed and costly analysis of the secondary school education of engineering students. Lacking funds for such a study, the Commission has not addressed this question in this report.
3. The statewide Minority Engineering Program was initiated in Fall 1982, and it has not been in operation long enough for students who enter the program as freshmen to complete a baccalaureate degree. Consequently, no conclusions can be presented about the impact of the program in improving the graduation rate of minority students in engineering. However, analyses have been made on the continuation rate of these students in engineering after two or three years of study.
4. In response to the request of the Legislature to analyze the academic progress of underrepresented ethnic students in engineering education, the Commission provides information on the following pages about all major ethnic groups of students, but it gives emphasis to only three underrepresented groups -- Black, Mexican-American, and other Hispanic (those Hispanic students with a background other than Mexico).

Definitions

In order to respond to Senate Concurrent Resolution 16, the Commission uses three terms frequently in this report -- *continuation rate, graduation rate, and*

tracking rate. These terms have the following meaning:

1. *Continuation rate* refers to the number of students who are still enrolled in engineering at a specified institution and who have not graduated, withdrawn from the institution, or changed majors while remaining at the institution. This rate is determined by dividing this number by the total number of students who initially enrolled in engineering.
2. *Graduation rate* refers to the number of students who graduated with a baccalaureate degree in engineering from the institution where they originally enrolled. It is determined by dividing this number by the total number of students who initially enrolled in engineering.
3. *Tracking rate* refers to the number of students who have either graduated with a degree in engineering or are still enrolled in an engineering program. It is calculated by adding the continuation and graduation rates.

Questions answered in the report

The report answers four questions asked in Senate Concurrent Resolution 16:

1. Do women continue in and graduate from engineering programs at a lower rate than men?
2. Do ethnic minority students continue in and graduate from engineering programs at a lower rate than white students?
3. Do participants in the Minority Engineering Program continue in engineering programs at a higher rate than students who are not receiving its services?
4. If students in the Minority Engineering Program do continue at a higher rate, what components of the program are particularly successful?

The Commission answers the first two questions in Part One of the report on pages 3-7 and the last two in Part Two on pages 9-12.

1 *Graduation and Continuation Rates in Engineering*

NINETEEN public university campuses in California offer baccalaureate degree programs in engineering -- 13 State University campuses and six University of California campuses. In Fall 1984, these campuses enrolled 31,398 undergraduates in their engineering programs, and in the 1984-85 academic year they awarded 5,391 baccalaureate degrees in engineering. Approximately 16 percent of the engineering students in the public universities are female, 22 percent at the University of California and 14 percent at the State University. Among ethnic groups, approximately 8 percent of the engineering students are Hispanic and approximately 3 percent are Black, with their enrollment levels relatively equal in the University of California and the State University.

Display 1 below presents information on degrees awarded by these 19 campuses to all students, to women, and to Black and Hispanic students. As can be seen, the four largest of the 19 programs are offered at the University of California, Berkeley; California Polytechnic State University, San Luis Obispo; California State University, Long Beach; and California State Polytechnic University, Pomona. Among all 19 campuses, Humboldt State University awarded women a larger proportion (30 percent) of its engineering degrees than any other, while the Los Angeles and Northridge campuses of the State University awarded the largest proportion (13 percent) to Hispanic and Black students.

Efforts to increase the numbers of women and ethnic minority students who complete engineering programs began at least a decade ago, following publication of *Minorities in Engineering: A Blueprint for Action* in 1974 by the Alfred P. Sloan Foundation. As a result of that report, the National Academy of Engineering assumed leadership in convening engineers, educators, and corporate leaders to increase minority representation in the engineering profession. The Academy adopted the goal of achieving a tenfold increase in minority engineering graduates within a decade and established the Committee on Minorities in Engineering to promote this goal. The operations of the Committee were funded by some 30 major cor-

DISPLAY 1 Baccalaureate Degrees Awarded in Engineering by California's Public Universities, 1984-85

Total Number of Degrees Awarded		Number of Degrees Awarded to Black and Hispanic Students		Proportion of Degrees Awarded to Black and Hispanic Students		Number of Degrees Awarded to Women		Proportion of Degrees Awarded to Women	
UC Berkeley	573	CSU Long Beach	38	CSU Los Angeles	13.2%	UC Berkeley	132	CSU Humboldt	30.3%
CSU San Luis Obispo	553	CSU Pomona	34	CSU Northridge	12.9	CSU Long Beach	82	UC Davis	25.0
CSU Long Beach	516	UC Berkeley	30	CSU Long Beach	7.4	UC Davis	78	UC Berkeley	23.0
CSU Pomona	492	CSU Northridge	27	CSU San Francisco	7.2	UC Los Angeles	71	UC Los Angeles	22.5
CSU San Diego	324	CSU San Luis Obispo	26	CSU Fresno	7.0	CSU San Luis Obispo	65	UC Irvine	19.8
CSU San Jose	317	CSU Los Angeles	24	CSU Pomona	6.9	CSU San Jose	58	UC San Diego	19.5
UC Los Angeles	315	CSU San Diego	17	UC Davis	5.4	UC San Diego	52	CSU San Jose	18.3
UC Davis	312	UC Davis	17	UC Los Angeles	5.4	UC Santa Barbara	47	CSU Northridge	16.7
UC Santa Barbara	283	UC Los Angeles	17	CSU San Diego	5.2	CSU Pomona	41	UC Santa Barbara	16.6
UC San Diego	266	CSU Fresno	15	UC Berkeley	5.2	CSU San Diego	38	CSU Long Beach	15.9
CSU Sacramento	251	UC Santa Barbara	13	CSU San Luis Obispo	4.7	CSU Northridge	35	CSU Fullerton	14.7
CSU Fresno	213	CSU San Jose	11	UC Santa Barbara	4.6	CSU Sacramento	33	CSU Sacramento	13.1
CSU Northridge	209	CSU Sacramento	9	CSU Chico	4.6	UC Irvine	32	CSU San Luis Obispo	11.8
CSU Los Angeles	182	CSU San Francisco	7	CSU Fullerton	3.7	CSU Fullerton	24	CSU San Diego	11.7
CSU Fullerton	163	UC San Diego	7	CSU Sacramento	3.6	CSU Fresno	19	CSU San Francisco	11.3
UC Irvine	162	CSU Chico	6	CSU San Jose	3.5	CSU Los Angeles	18	CSU Los Angeles	9.9
CSU Chico	130	CSU Fullerton	6	UC Irvine	3.1	CSU San Francisco	11	CSU Fresno	8.9
CSU San Francisco	97	UC Irvine	5	CSU Humboldt	3.0	CSU Humboldt	10	CSU Pomona	8.3
CSU Humboldt	33	CSU Humboldt	1	UC San Diego	2.6	CSU Chico	8	CSU Chico	6.2

Source: California Postsecondary Education Commission.

porations working through the National Advisory Council on Minorities in Engineering.

Parallel with this effort, the Engineer's Council for Professional Development, which accredits engineering programs, established both the Minority Engineering Education Effort ("ME^3") and the Minority Introduction to Engineering. The purpose of both programs was to identify and motivate ethnic minority high school students to consider the engineering profession. An additional nationwide effort initiated in the 1970s was the formation of the National Fund for Minority Engineering Students in order to provide scholarship support.

The national minority engineering effort was well established by the late '70s, when the several individual efforts were consolidated into one entity, the National Action Council for Minorities in Engineering, based in New York City. During the 1980s, this Council has assumed national leadership in initiating and supporting efforts at many universities throughout the country.

In California, efforts to increase the number of ethnic minorities and women completing engineering programs were initiated in the 1970s through the establishment of three programs:

1. Mathematics, Engineering, Science Achievement (MESA), which was initiated in 1970 with 25 students at Oakland Technical High School The primary goal of MESA, which has expanded to a statewide operation with a combination of State and private funding, is to increase the number of high school graduates from underrepresented minority groups with the needed information and academic preparation in mathematics, sciences, and English to pursue a university education in a mathematics-based field.

2. The Minority Engineering Program, which began at the California State University, Northridge in 1973. In 1982, State funding was provided through the MESA organization to implement the program on 14 other university campuses, with the goal of increasing the number of underrepresented ethnic minority students who complete baccalaureate programs in engineering. (Part Two of this report evaluates the success of this program.)

3. EQUALS, which was launched in 1977 at the Lawrence Hall of Science of the University of California, Berkeley, and which offers workshops for elementary and secondary school teachers as well as prospective teachers that aim to help them increase the number of young women and minority students who participate in mathematics and computer science education. With the help of funds from the State, the Carnegie Corporation of New York, and the National Science Foundation, EQUALS has expanded to include 15 additional sites -- five of them in California -- and has served over 10,000 teachers in California and 6,000 in 34 other states.

Continuation and graduation rates of women

Available data indicate that women continue in and graduate from engineering programs at approximately the same rate as men at both the University of California and the California State University.

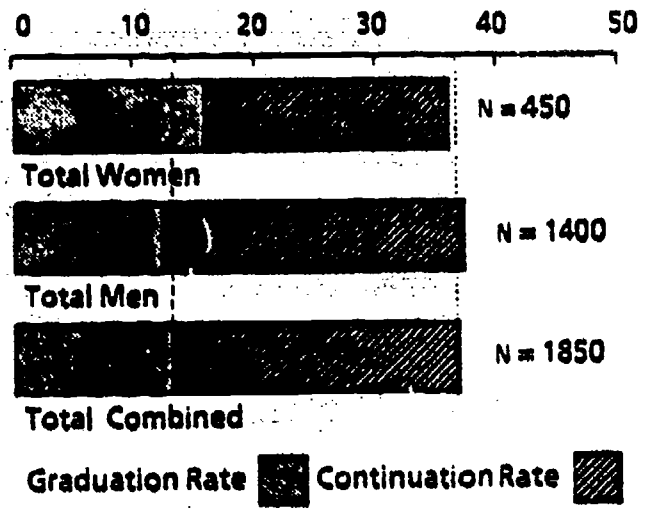
University of California

Freshman entrants: Among freshmen entering the University of California as regular admissions engineering majors in Fall 1981, approximately 37 percent had either completed a baccalaureate degree in engineering or were still enrolled as engineering majors after four years of study. Thirty-five percent had withdrawn from the University, and 27 percent had changed majors while continuing their enrollment. As is shown in Display 2 at the top of the opposite page, these graduation, continuation, and withdrawal rates are approximately the same for men and women, with a slightly larger proportion of women graduating after four years, and a slightly larger proportion of men not graduating but continuing their enrollment as engineering majors. (Table 1 in Appendix B contains detailed additional data on these rates by ethnic group.)

Similar conclusions can be made about freshmen who entered the University as special-action admits in Fall 1981, and about freshmen entering in Fall 1982 and Fall 1983, as Display 3 on page 3 and Tables 2-6 in Appendix B show.

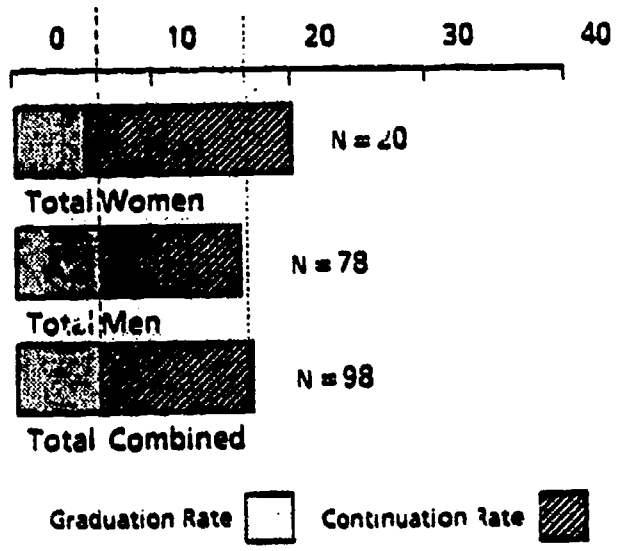
Transfer students: Among transfer students majoring in engineering who entered the University as juniors in Fall 1981, approximately 51 percent had either completed a baccalaureate degree in engineering or were still enrolled as engineering majors after four years. Forty-two percent had withdrawn from the University, and 7 percent had changed majors

DISPLAY 2 Four-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Sex



Source: California Postsecondary Education Commission.

DISPLAY 3 Four-Year Tracking Rates of Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Sex



Source: California Postsecondary Education Commission.

while continuing their enrollment. These graduation, continuation, and withdrawal rates are approximately the same for men and women, with a slightly larger proportion of women graduating after four years and a slightly larger proportion of men withdrawing from the institution. (Table 7 in Appendix B contains detailed additional data on these rates by ethnic group.)

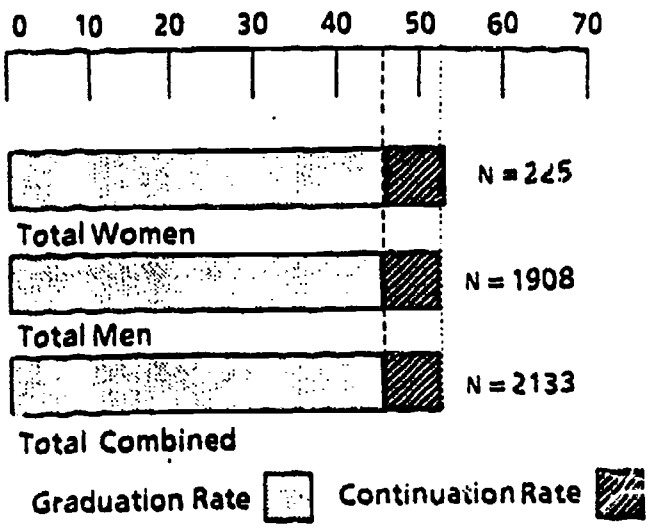
The California State University

Women majoring in engineering in the State University also appear to have graduation and retention records comparable to that of men both among freshman entrants and transfer students.

Freshman entrants: Among all freshman engineering majors entering the State University in Fall 1978 as regular admission students, 45 percent had graduated and 7 percent were still enrolled after seven years of study, with virtually no difference between men's and women's rates, as Display 4 at the top of the next column and Table 8 in Appendix B show. (Available data from the State University do not indicate the proportion of these graduates who received their degrees in engineering.)

Transfer students: Among engineering majors transferring into the State University in Fall 1978, 54 percent had graduated after seven years of study -- although not necessarily in engineering; and 4 percent were still enrolled. While women graduated at a slightly lower rate than men (51 percent to 54 percent), a slightly larger proportion of them were still enrolled (6 percent to 4 percent), as Table 9 in Appendix B shows. Available data for engineering majors entering the State University in Fall 1981, 1982, and 1983 that also appear in Appendix B support the same conclusion.

DISPLAY 4 Seven-Year Tracking Rates for Fall 1978 Freshmen Majoring in Engineering at the California State University, by Sex



Note: These rates include students who changed majors from engineering.

Source: California Postsecondary Education Commission.

Continuation and graduation of ethnic minority students

Considerable variation exists in the rate in which students from various ethnic groups complete baccalaureate programs in engineering. Generally, Asian and Filipino students graduate from and continue in engineering programs at a higher rate than other students, and Black and Hispanic students graduate and continue at a lower rate. This generalization is based on data for students entering the University of California in Fall 1981 and the California State University in Fall 1978. (Since the Minority Engineering Program was not begun until Fall 1982, these data do not reflect its impact.)

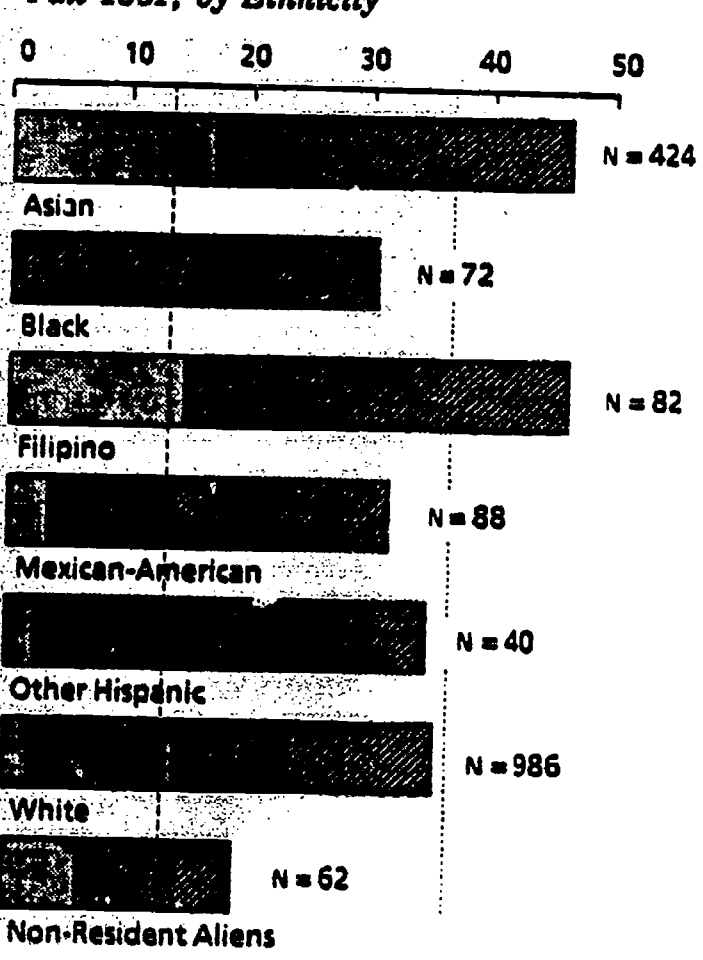
University of California

Among engineering students entering the University as regular admits in Fall 1981, 13 percent graduated with baccalaureate degrees in engineering after four years of study. Asian, Filipino, and white students all graduated at a higher rate -- 17 percent, 15 percent, and 14 percent, respectively, as Display 5 shows. In contrast, none of the Black engineering majors and only 3 percent of the Mexican-American and other Hispanic students had graduated.

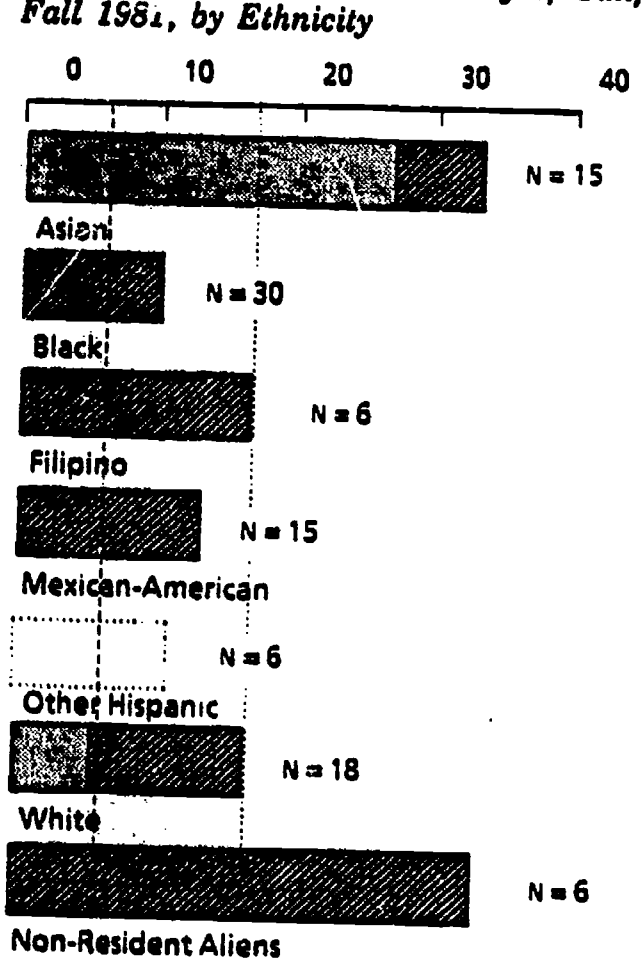
Four years after entering, 37 percent of all Fall 1981 regular admission freshmen had either graduated or were still enrolled in engineering. Asian and Filipino students were being tracked at higher rates -- 47 and 46 percent, respectively -- than Black and Hispanic students, at 31 and 32 percent, respectively. The proportion who entered the University in Fall 1981 but withdrew within four years was close to 35 percent for all ethnic groups except Black students, who withdrew at a 49 percent rate.

Among special-action admission engineering students entering the University in Fall 1981, 6 percent graduated after four years of study, and 11 percent were still enrolled in engineering programs (Display

DISPLAY 5 Four-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Ethnicity



DISPLAY 6 Four-Year Tracking Rates of Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Ethnicity



Source: California Postsecondary Education Commission.

6). Graduation and continuation rates were lower for special-action admits than for regular admits, but the variation by ethnic group among special-action admits was similar to that described above for regular admits.

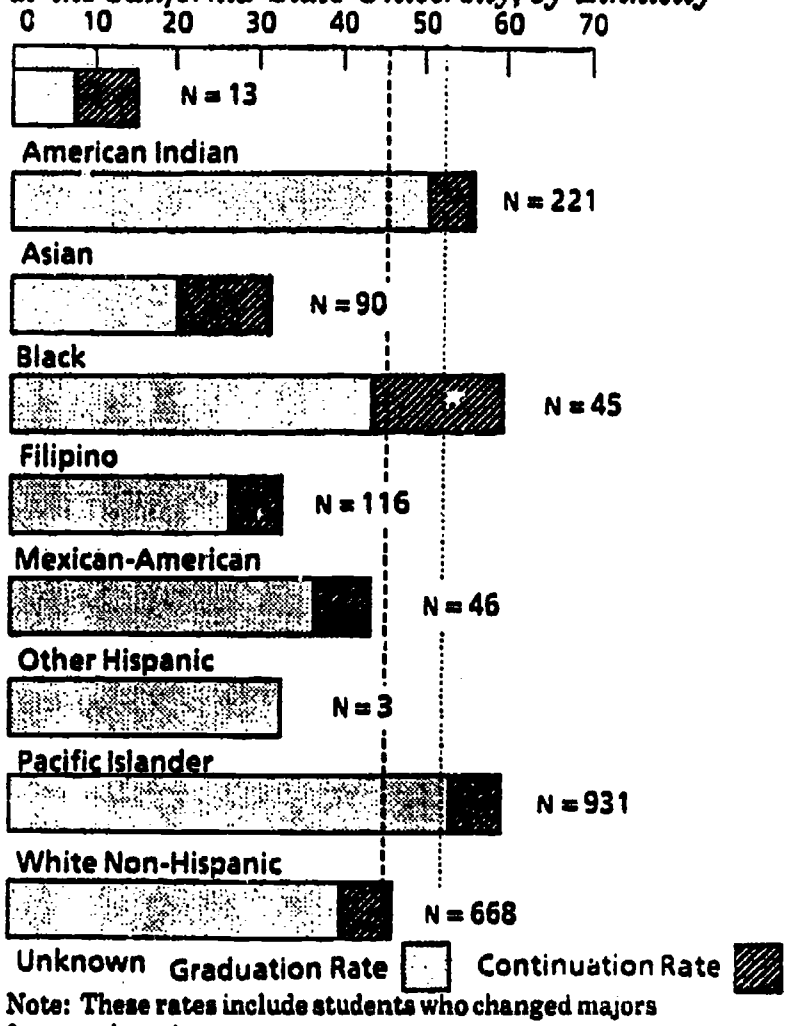
The California State University

Freshman entrants: A similar pattern exists for engineering students who entered the California State University as freshmen in Fall 1978, with Black and Hispanic students demonstrating low graduation and continuation rates, compared with that of white, Filipino, and Asian students. As Display 7 shows, approximately 52 percent of all freshman engineering majors entering the State University had either graduated or were still enrolled after seven years of study. White and Filipino students maintained a higher tracking rate (60 percent), but Black and Mexican-American students maintained a considerably lower rate (32 and 33 percent, respectively). In addition, Mexican-American students graduated at a lower rate than other Hispanic students (27 percent compared to 37 percent).

Among engineering students entering the State University as freshmen in Fall 1981, a similar pattern exists in their continuation and graduation rates. As Table 10 in Appendix B indicates, approximately 62 percent had either graduated or were still enrolled after four years of study. Asian, Pacific Islander, Filipino, and white students maintained a higher tracking rate than the average of nearly 62 percent, while Black students maintained a substantially lower rate of 34 percent.

Transfer students: Transfer students entering the State University as engineering majors do not demonstrate as large a variation in tracking rate among the various ethnic groups as do freshmen students, as Table 11 in Appendix B demonstrates. Among those transferring into the State University in Fall 1981, for example, 62 percent were still enrolled after four years, but Black and Mexican-American students had only slightly lower tracking rates -- 59 and 56 percent, respectively, while those of white and Asian students were slightly higher -- 65 and 62 percent, respectively.

DISPLAY 7 Seven-Year Tracking Rates for Fall 1978 Freshmen Majoring in Engineering at the California State University, by Ethnicity



Note: These rates include students who changed majors from engineering.

Source: California Postsecondary Education Commission.

Differing tracking rates by institution of origin

Substantial variation exists in the tracking rate of engineering students at the University of California, depending on which type of institution the students attended previously, as Tables 12 and 13 in Appendix B show. Students enrolling directly after graduation from public or private high school who constitute nearly 70 percent of the total, have a substantially higher retention rate in engineering than do transfers from Community Colleges, State University campuses, or other University of California campuses, who make up about 16, 2, and 4 percent, respectively. Mexican-American and Black students enter the University's engineering programs directly from high school at a higher rate than white students but from Community College transfer programs at a lower rate.

Differing tracking rates by campus

Considerable variation exists in the tracking rate of engineering students among the six University of

California campuses and 13 State University campuses that offer engineering degrees.

University of California: The Davis and Los Angeles campuses of the six University campuses, have the highest continuation and graduation rates. For example, among freshmen entering the University in Fall 1982, approximately 71 percent of the students at Los Angeles and 64 percent of the students at Davis had either graduated or were still enrolled after three years of study (Table 14, in Appendix B). Similarly, among transfer students entering the University in Fall 1981, approximately 85 percent of the students at Davis and 83 percent at Los Angeles had either graduated or were still enrolled in engineering after four years of study (Table 15 in Appendix B).

California State University: Within the State University, the Chico and San Luis Obispo campuses had the highest tracking rates of all 13 among Fall 1981 freshmen (Table 16 in Appendix B) while Chico, Fresno, Sacramento, and San Jose have the highest rates among transfer students (Table 17). For example, among transfer students entering in Fall, approximately 73 percent of those at Chico and 72 percent of those at Sacramento had either graduated or were still enrolled at the institution after four years of study. As of 1981, eight of the 13 campuses enrolled more of their engineering majors as transfer students, rather than as first-time freshmen. (The five exceptions to this generalization were Fresno, Northridge, Pomona, San Francisco, and San Luis Obispo.)

The number of Hispanic and Black engineering students enrolling at many of the smaller State University campuses is not large enough to permit useful comparisons of campus retention rates by ethnicity, although Tables 16 and 17 contain data on these rates.

2 Impact of the Minority Engineering Program

Background on the program

In 1973, Ray Landis, an engineering professor at the California State University, Northridge, initiated the Minority Engineering Program, working with 23 students. The program expanded on that campus in the following seven years and served almost 400 students in Fall 1980. The success of the program led to the allocation of State funding to expand it to these 14 university campuses beginning in Fall 1982:

California Polytechnic State University, San Luis Obispo
California State University, Fresno
California State University, Long Beach
California State University, Los Angeles
California State University, Northridge
California State Polytechnic University, Pomona
California State University, Sacramento
San Diego State University
San Jose State University
University of California, Berkeley
University of California, Davis
University of California, Los Angeles
University of California, Santa Barbara
University of Southern California

In Fall 1983, the program was expanded to California State University, Fullerton, and in Fall 1986, to the Chico and San Francisco campuses. In the latter year, the program at the University of Southern California was eliminated.

On each of the 16 campuses, the Minority Engineering Program is housed in and administered by the school of engineering where a full-time staff director reports to the dean of engineering or another tenured faculty member. Engineering faculty members are involved directly in working with students as academic advisors, mentors, and counselors.

Each campus program is expected to have 12 components, concentrated on freshmen and sophomores:

1. Recruitment, to build a strong applicant pool for the engineering program.
2. Assistance in securing financial aid and scholarships.
3. Admissions assistance, to ensure that new students are admitted speedily and efficiently.
4. Matriculation activities, including financial aid budgeting, housing, diagnostic testing, academic advising, registration, and orientation.
5. Freshman orientation through a formal orientation course, preferably for academic credit, focusing on motivation, career awareness, group dynamics, a thorough orientation to the university, and the development of a strong sense of group cohesiveness.
6. Academic advising and registration, to ensure that students take the proper courses and credit load, have the best available teachers, and enroll in the same sections of classes as much as possible.
7. Academic support, including study skills training and pre-freshman mathematics and science courses as appropriate.
8. Tutoring in all lower-division mathematics, science, and engineering courses.
9. A student study center, providing a place for students to study in groups and for tutoring.
10. Membership and participation in student organizations, such as the National Society of Black Engineers, the Society of Hispanic Professional Engineers, and the American Indian Science of Engineering Society.
11. Personal counseling regarding non-academic factors that might interfere with academic work.
12. Assistance in finding students' summer jobs in engineering-related employment, which helps to provide financial support, increased motivation, and enhanced awareness of engineering as a career.

The resource guide to the program, *Handbook on Improving the Retention and Graduation of Minorities in Engineering* (Landis, 1985) argues that the "successful minority engineering program creates an environment, a subculture within the engineering school, that mitigates negative circumstances . . . and helps students to fulfill their social needs within their academic environment . . . . Within the MEP community, students develop relationships with others who share common goals and similar workloads. When one's friends are all studying, studying becomes the order of the day" (p. 11).

Approximately 15 percent of the students in the Minority Engineering Program have participated in the Mathematics, Science, Engineering Achievement (MESA) program while enrolled in secondary schools.

Effectiveness of the program

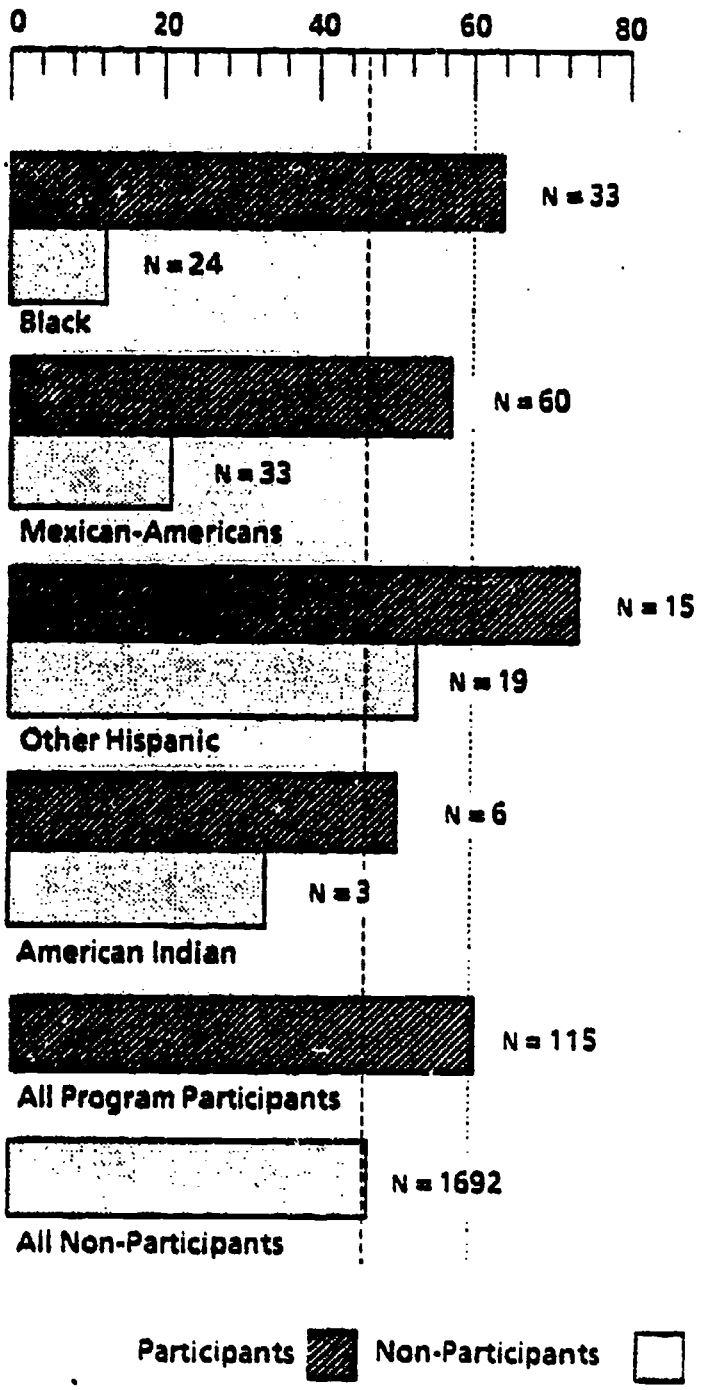
An analysis of data on the impact of the program indicates that its participants continue in engineering at a higher rate than non-participants. This conclusion is based on the following evidence:

University of California

Before-and-after comparisons: An analysis of the continuation rates for all freshmen entering the University as engineering majors in either Fall 1981, Fall 1982, or Fall 1983 indicates that on the average 70 percent were still enrolled in engineering after two years of study (Table 18 in Appendix B), but the participants in the Minority Engineering Program who entered the University in Fall 1982 and Fall 1983 continued at a slightly higher rate -- 73.5 percent. Moreover, each of the four ethnic groups targeted by the program increased their rates substantially after its establishment. For example, only 51 percent of the Mexican-American students and 59 percent of the Black students who entered the University in Fall 1981 prior to the establishment of the program were still enrolled after two years, compared to 65 and 70 percent of those who participated in the program during its first two years.

1982 cohort comparisons: Forty-seven percent of all freshmen entering the University in Fall 1982 and majoring in engineering were still enrolled in engineering after three years of study, in contrast to 60

DISPLAY 8 Three-Year Continuation Rate of Fall 1982 Ethnic Minority Freshmen Majoring in Engineering at the University of California, by Participation in the Minority Engineering Program



Note: None of the students had graduated within three years.

Source: California Postsecondary Education Commission.

percent of all program participants (Display 8 at the right and Table 19 in Appendix B). Among the major ethnic groups, 64 percent of the Black student participants in the program continued in engineering, compared with only 13 percent of Black non-participants. Among Mexican-American students, 57 percent of the participants continued, compared to 21 percent of non-participants. Among other Hispanic students, 73 percent of the participants continued, compared to 53 percent of the non-participants.

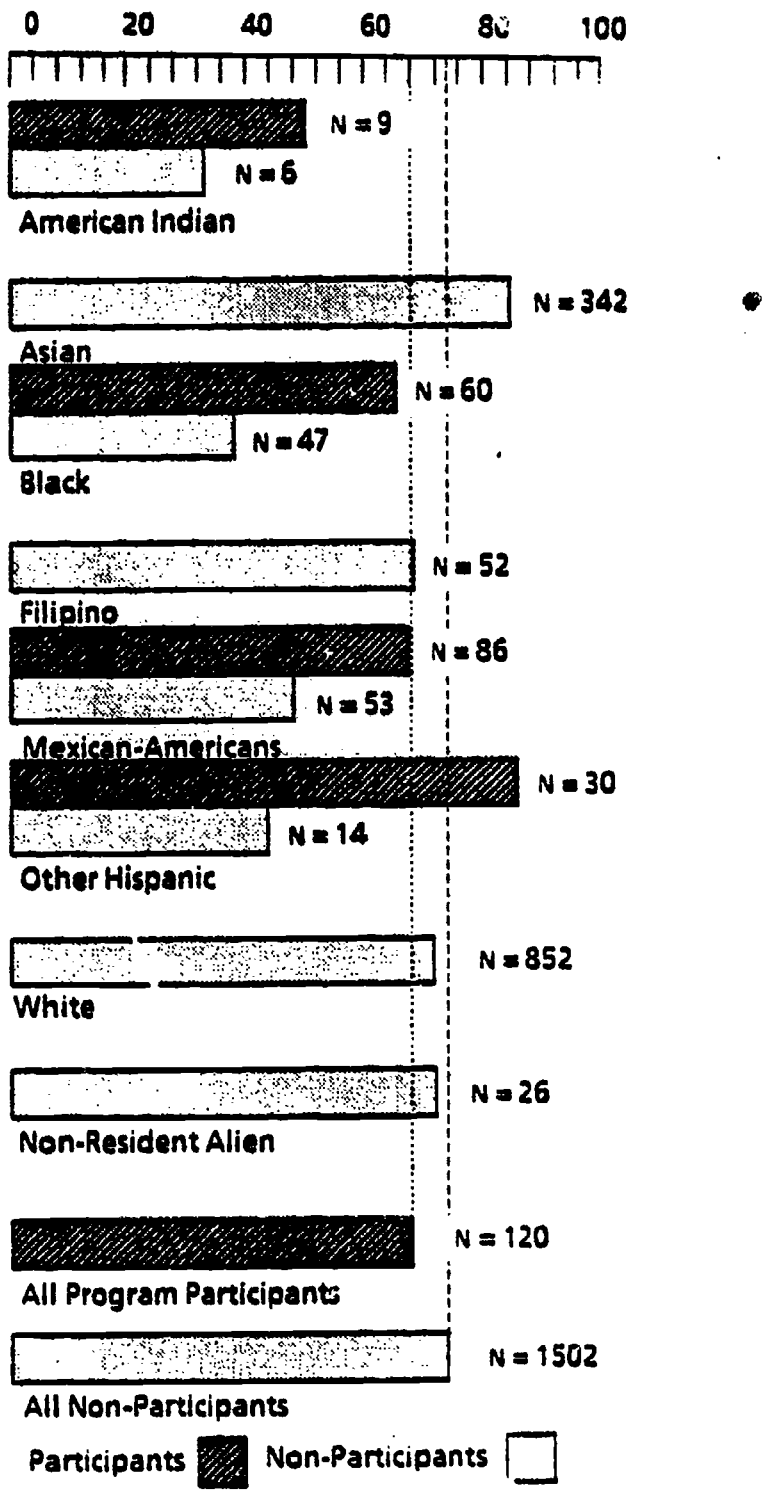
Each of the three ethnic groups targeted by the program -- Black, Mexican-American, and other Hispanic -- continued at a higher rate than all other ethnic groups, except Asian students who had a 63 percent continuation rate.

Among the 98 freshmen entering the University through special-action admissions in Fall 1982 and majoring in engineering, 33 percent of the participants were still enrolled in engineering after three years of study, compared with 30 percent of the non-participants (Table 20 in Appendix B). Among the 30 Black students who began their engineering studies through special-action admissions, 17 participated in the program. Thirty-five percent of these participants were still enrolled in engineering after three years of study, while all 13 of the Black non-participants had discontinued their studies in engineering.

Campus-by-campus comparisons show the same differences: Program participants demonstrated at least the same or higher continuation rates as all engineering students on three of the four campuses (Table 21 in Appendix B). For example, on the Santa Barbara campus, 56 percent of the participants were still enrolled in engineering after three years of study, compared to 49 percent for all engineering majors. Only on the Berkeley campus did the participants have a lower continuation rate than all engineering students (50 percent compared with 58 percent). For each ethnic group on each of the four campuses, the continuation rate of participants was higher than that for non-participants.

1983 cohort comparisons: Among freshmen entering the University in Fall 1983 and majoring in engineering, 73 percent of all of the students were still enrolled in engineering after two years of study. Program participants were continuing at a comparable but slightly lower rate -- 68 percent (Display 9 on this page). Among the various ethnic groups, 68

DISPLAY 9 Two-Year Continuation Rate of Fall 1983 Ethnic Minority Freshmen Majoring in Engineering at the University of California, by Participation in the Minority Engineering Program



Note: None of the students had graduated within three years.

Source: California Postsecondary Education Commission.

percent of the Mexican-American participants were still enrolled, compared with 48 percent of the Mexican-American non-participants. Sixty-six percent of the Black participants were still enrolled in engineering, compared with 38 percent of the non-participants.

The California State University

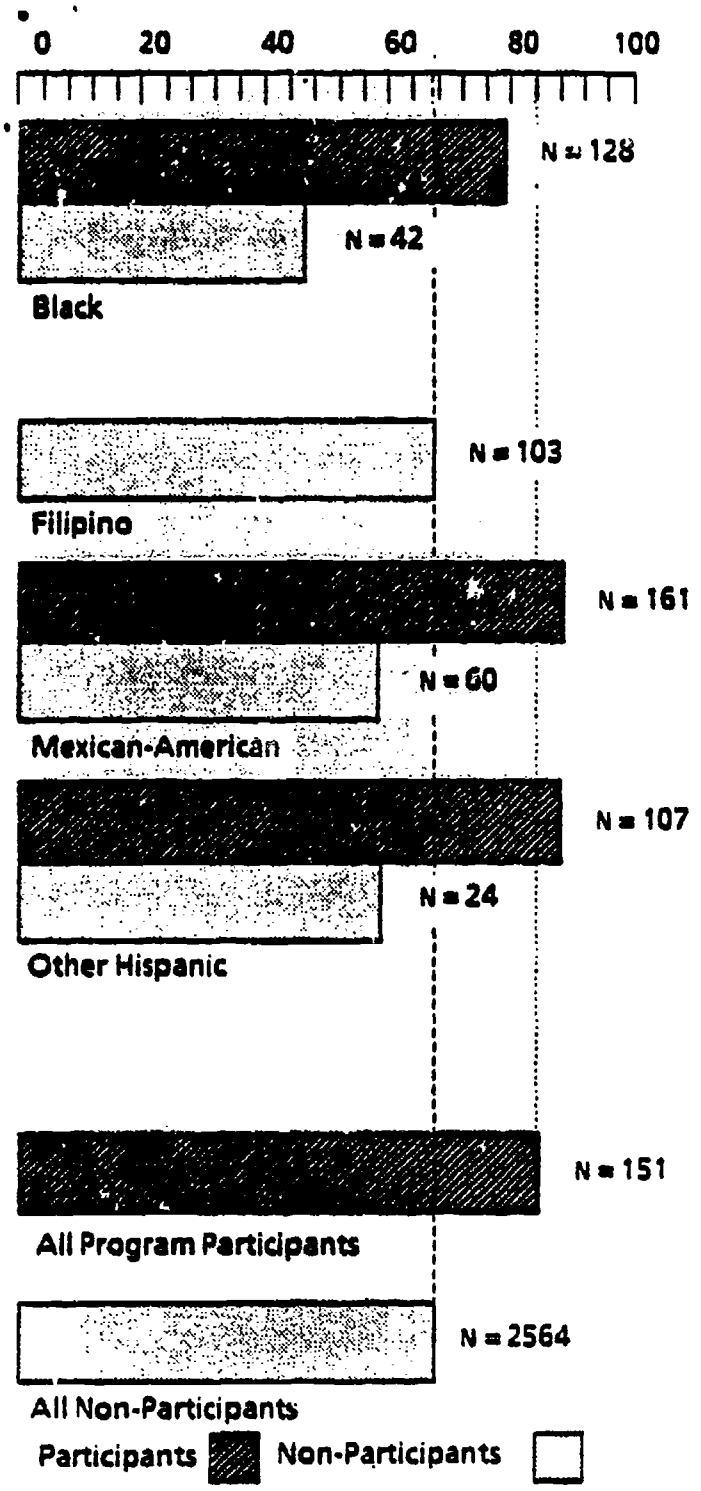
Freshman entrants: Among freshmen entering the State University in Fall 1982 and majoring in engineering, 67 percent were still enrolled three years later -- but not necessarily in engineering. In contrast, 84 percent of all participants were still enrolled (Display 10 and Table 22 in Appendix B). Among the various ethnic groups, 88 percent of the Mexican-American student participants were still enrolled, compared with 41 percent of the non-participants. Seventy-nine percent of the Black participants were still enrolled, compared with 30 percent of the non-participants.

On each campus of the State University in Fall 1982, program participants demonstrated a higher continuation rate than that of all engineering students (Table 23 in Appendix B). For example, on the Northridge campus, 78 percent of the participants were still enrolled after three years of study, compared to 68 percent for all engineering majors. For each ethnic group, the continuation rate of participants was higher than that for non-participants. This same fact is accurate for all of the ten State University campuses with a Minority Engineering Program.

Transfer students: Among all transfer students entering the State University in Fall 1982 and majoring in engineering, 65 percent had either graduated or were still enrolled three years later, although not necessarily in engineering, compared to 70 percent of program participants (Table 24 in Appendix B). Among the various ethnic groups, 76 percent of Mexican-American participants were still enrolled, compared to 53 percent of non-participants, and 79 percent of Black participants were still enrolled, compared with 37 percent of non-participants.

Among these Fall 1982 transfer students, program participants demonstrated a higher continuation rate on six campuses than all engineering students and a lower rate on three -- Fresno, Northridge, and San Luis Obispo (Table 25 in Appendix B). The Pomona campus had 21 transfer students participat-

DISPLAY 10 Three-Year Continuation Rate of Fall 1982 Ethnic Minority Freshmen Majoring in Engineering at the California State University, by Participation in the Minority Engineering Program



Note: None of the students had graduated within three years.

Source: California Postsecondary Education Commission.

ing in the Minority Engineering Program -- the largest number of any campus; and 67 percent of them had either graduated or were still enrolled in the institution after three years of study, compared to 62 percent of all transfer students.

Characteristics of program participants

The following generalizations can be made about the participants in the Minority Engineering Program during the first four years of its operation:

1. Seventy-three percent have been men, and 27 percent have been women.
2. The largest ethnic group served by the program has been Mexican-American, constituting approximately 52 percent of all participants. Thirty-four percent of the participants have been Black, 10 percent other Hispanic, and 3 percent American Indian.
3. For a majority of the participants, neither of their parents have attended college, and for 35 percent of the participants their parents have not graduated from high school. For approximately 26 percent of the participants, at least one parent has only an eighth-grade education or less.
4. Approximately 15 percent of participants have participated in the Mathematics, Science, Engineering Achievement (MESA) program while enrolled in secondary school.
5. The mean high school grade-point average of the participants was 3.26, reaching its highest level of 3.32 among Fall 1985 entrants. Considerable variation in mean high school grade-point average exists among campuses, with participants at UCLA having the highest in the University (at 3.70), and those at the Long Beach, Pomona, and San Luis Obispo campuses having the highest in the State University (at 3.15), with California State University, Los Angeles having the lowest of all campuses (2.98).
6. The mean Scholastic Aptitude Test (SAT) score for participants has been 956, with 433 in the verbal test and 523 in mathematics. American Indian participants have had the highest mean score at 1043, while Black participants have had the lowest at 939. Participants entering the Berkeley and Los Angeles campuses have had the highest mean SAT score, at 1122 and 1076 respectively, and California State University, Los Angeles, has served participants with the lowest mean score at 824.
7. Most participants have completed four years of high school mathematics. For example, 87 percent have completed algebra II, and 75 percent have completed trigonometry, but only half have completed pre-calculus and only 26 percent have completed calculus. The programs at UCLA and Northridge serve the largest proportion of participants in their respective segments who have advanced mathematics preparation, with 78 percent and 50 percent, respectively, having completed pre-calculus in high school.
8. Approximately 71 percent of the participants have completed a high school chemistry course; 55 percent have completed a high school course in physics; and over half have also completed four years of English, with the mean for all participants being 3.6 years of English.
9. The mean undergraduate grade-point average for the 377 participants who have graduated with baccalaureate degrees in engineering has been 2.7, and 23 percent of them had a grade-point average of 3.0 or above.

Significant components of the program

Recent studies of minority student retention in engineering programs have identified a set of factors that cause high attrition ("Retention of Minority Students in Engineering," and Penick and Morning):

- inadequate preparation in mathematics and the physical sciences;
- inadequate motivation toward engineering as a career;
- inadequate financial resources;
- lack of self-confidence;
- ethnic isolation within the program and the institution;
- excessive expenditure of time for social and non-academic student activities;
- poor teaching and faculty insensitivity to minority students; and
- inadequate student support services in counseling, tutoring, and academic advising.

Three crucial elements of the Minority Engineering Program that help overcome these causes of high attrition appear to be (1) a sense of community, (2) academic support, and (3) professional and personal support.

Sense of community

Historically, when only one or two Mexican-American or Black students were enrolled in a mathematics or engineering course, they were forced to separate their academic life from their social life: Their ethnic isolation meant that they had no classmates with whom to study or share information, and they tended to socialize with friends not in the academic community who often had a negative influence on their academic work.

Several components of the Minority Engineering Program are designed to weld the participants into a community of scholars who provide each other positive peer support while helping to reduce ethnic isolation and alienation: a freshman orientation course for all participants; the clustering of program participants in the same mathematics and engineering courses during their freshman and sophomore years; and the operation of a student study center.

- The freshman orientation course, which is particularly well developed at Northridge, focuses on career awareness and motivation, group dynamics, study skills development, and an orientation to the institution. By the end of the course, students are expected to know one another and share an attitude of mutual support.

- The clustering of participants in the same classes is inexpensive to implement but has major benefits, as students more easily establish study groups and friendships based on similar academic interests.

- The student study center provides a place for students to study in groups, facilitates student-to-student communication, and guarantees a location where students can find other students with similar academic concerns and problems. On many of the campuses, this study center is open 24 hours a day, and student utilization is high on all of the campuses.

Academic support

Traditional components of all retention programs are tutoring, study skills training, and academic advising to improve course selection. The Minority Engineering Program includes these components, as well as mathematics and science workshops or "shadow" courses designed to provide students with additional exposure to course materials and the benefits of group study.

The model for the mathematics and science workshops was developed by Professor Uri Treisman in the Professional Development Program at the University of California, Berkeley. The philosophy of the workshops is that minority students can learn mathematics and science more effectively by studying together with their peers, under the guidance of a skilled teacher. A group of students, all enrolled in the same course, meet regularly throughout the term, working together on homework assignments, reviewing class activities, and preparing for tests. This group activity both helps the students succeed academically and prepares them for subsequent employment in engineering, where cooperative work skills are essential (Treisman, 1985).

Professional and personal support

Several components of the program seek to enhance the students' professional and career development through participation in student organizations, summer jobs, internships, and career awareness activities. For example, participants are expected to participate in student organizations affiliated with professional societies such as the National Society of Black Engineers, the Society of Hispanic Professional Engineers, and the American Indian Science and Engineering Society. Such organizations provide students with opportunities to develop communication and interpersonal skills, participate in field trips and conferences, interact with their peers in social situations directly related to their academic interests, and gain personal self-confidence through membership in a professional society.

The Minority Engineering Program is also unique from most other State-funded retention programs in at least three ways -- (1) its disciplinary base, (2) itsemphasis on student-to-student interaction, and (3) its approach to recruitment.

Disciplinary base

The program is based in a specific discipline rather than providing institution-wide services. Students share a common curriculum which is relatively well structured over a four-year period. Faculty members are directly involved as academic advisers, and the program is viewed as part of the engineering department. As a consequence, faculty members frequently contribute their time and energy to its operation as well as assist in gaining support from private industry.

Emphasis on student-to-student interaction

The program emphasizes student-to-student relationships organized around a common academic activity, seeking to develop among students the ability and self-confidence to work together to resolve problems, improve their understanding of course material, and overcome the institutional barriers that traditionally inhibit the retention of minority students in engineering. In contrast, most other state funded retention programs emphasize student-to-staff relationships, with professional staff providing most of the counseling, tutoring, and advising.

Specialized recruitment

Students are recruited into the program through several strategies, including direct contact by program staff with high school mathematics and science instructors, who frequently identify talented minority students and assist in encouraging them to attend a particular institution and study engineering. In addition, program participants frequently visit high schools as representatives of their professional society and encourage other minority students to consider the opportunities for university study in engineering.

Conclusions and recommendations

Available data demonstrate that the Minority Engineering Program is increasing the retention rate of ethnic minority students in engineering, but several problems must be resolved if the program is going to continue its success in the coming years.

- Not all campuses are at the same level in implementing the program. Some are only now beginning to develop a freshman orientation course and mathematics and science workshops, despite the essential importance of these components.
- Most campuses do not pay the salary of the project director through institutional funds, despite the acceptance of the program as an integral part of the engineering department and some campuses have experienced instability in staffing, with one campus having four different program directors in the four years of its operation.
- The number of participants on each campus is increasing, as a larger proportion of minority students choose to participate in it. Currently, approximately 65 percent of the eligible ethnic minority students participate on each of the campuses. In addition, three public campuses with engineering programs do not operate a Minority Engineering Program -- Humboldt State University and the University of California at Irvine and San Diego. Success of the existing program warrants its expansion to all public universities and its availability to all interested minority students in engineering.

However, the existing structure for funding the program is faulty. The administrative office of the program is housed with the MESA (Mathematics, Engineering, Science Achievement) program at the Lawrence Hall of Science of the University of California, Berkeley, and the University Office of the President is responsible for submitting budget requests for both programs. However, of the 16 campuses with Minority Engineering Programs, only one-fourth are part of the University, while three-fourths belong to the State University. As a result, there is an incongruity between the segment responsible for preparing budget proposals -- the University of California -- and the segment with the most campuses in the program -- the California State University.

The Commission therefore recommends that, beginning in the 1988-89 Budget Act, the Minority Engineering Program should be a line item in the budgets of both the University of California and the California State University, and thereby involve both systems in the effort to secure funds for the maintenance and possible expansion of the program.

Finally, although the program has demonstrated success after three years of operation, its first participants who entered as first-time freshmen have not yet graduated. Accordingly, further monitoring and evaluation of the program is desirable, in order to verify continued improvements in campus-level administration and the ultimate success of the program in increasing graduation rates.

The Commission therefore recommends that, prior to January 1, 1990, the Legislature should request a second comprehensive evaluation of the Minority Engineering Program, to assess the progress of each participating campus in implementing all of the program's components and document its full impact in increasing the graduation rate of ethnic minority students.

Appendix A
Senate Concurrent Resolution No 16 (1985)

Senate Concurrent Resolution No. 16—Relative to engineering education.

LEGISLATIVE COUNSEL'S DIGEST

SCR 16, B. Greene. Engineering education.

This measure would request the California Postsecondary Education Commission to conduct a study of the attrition rate of students in engineering education, to determine if ethnic minority and women students have a higher attrition rate than all engineering students, and, if so, to determine the causes of this higher attrition rate and develop recommended solutions to increase the retention rate for minority and women students in engineering programs, as specified.

WHEREAS, There are many successful programs that are being conducted to increase the number of minority high school students who enroll in engineering education programs; and

WHEREAS, Few minority students in engineering education complete the engineering requirements in postsecondary education and receive their degrees in engineering; and

WHEREAS, Congress has passed Public Law 98-377 which contains "Title II of the Education For Economic Security Act of 1984," and this legislation appropriates significant funding for the states, including California, to conduct a needs assessment of the challenges faced by underrepresented groups entering and remaining in science and math related education career paths, including the qualification of teachers; and

WHEREAS, Some researchers have estimated that the attrition rate of minority students in engineering education is in excess of 90 percent from some school districts; now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That the California Postsecondary Education Commission is requested to

conduct a study of the attrition rate of students in engineering education, to determine if ethnic minority and women students have a higher attrition rate than all engineering students, and, if so, to determine the causes of this higher attrition rate and develop recommended solutions to increase the retention rate for minority and women students in engineering programs; and be it further

Resolved, That the California State University and the University of California, in cooperation with the California Postsecondary Education Commission, shall identify the types of data necessary to determine the attrition rate for engineering students; and be it further

Resolved, That the California State University and the University of California are requested to collect these data and provide them to the California Postsecondary Education Commission prior to April 1, 1986; and be it further

Resolved, That the California Postsecondary Education Commission assess the impact of the Minority Engineering Program in improving the retention rate of minority students in engineering education and identify those components of the program which have been particularly successful; and be it further

Resolved, That the California Postsecondary Education Commission, in conducting the study, assess the impact of differing levels of academic preparation and secondary school education on academic success by ethnic minority and women students in engineering education; and be it further

Resolved, That the California Postsecondary Education Commission is requested to cooperate with other agencies and groups to assist in this research and develop recommendations; and be it further

Resolved, That the California Postsecondary Education Commission complete the study prior to December 1, 1986, and that the results be transmitted to the Senate and Assembly Education Committees, the Assembly Committee on Economic Development and New Technologies, the Joint Committee on Science and Technology, and to the Mathematics Engineering

Science Achievement and Minority Engineering Program offices located in the Lawrence Hall of Science at the University of California at Berkeley; and be it further

Resolved, That the data derived from the "needs assessment" required in Public Law 98-377 and conducted in California schools be included in the report developed in conjunction with this resolution; and be it further

Resolved, That the Secretary of the Senate transmit a copy of this resolution to the California Postsecondary Education Commission.

O

Appendix B
Supplemental Tables

TABLE 1 Four-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Ethnicity and Sex

Ethnic Group & Sex	Number Enrolled Fall 1981	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	450	158	129	92	20.44	71	15.78	36.22
Male	1400	494	377	353	25.21	173	12.36	37.57
Total	1850	652	506	445	24.05	244	13.19	37.24
Asian								
Female	110	36	21	24	21.82	29	26.36	48.18
Male	314	116	53	101	32.17	43	13.69	45.86
Total	424	152	74	125	29.48	72	16.98	46.46
Black								
Female	42	22	9	11	26.19	0	.00	26.19
Male	30	13	6	11	36.67	0	.00	36.67
Total	72	35	15	22	30.56	0	.00	30.56
Filipino								
Female	20	7	3	7	35.00	3	15.00	50.00
Male	62	19	15	19	30.65	9	14.52	45.17
Total	82	26	18	26	31.71	12	14.63	46.34
Mexican-American								
Female	19	7	5	7	36.84	0	.00	36.84
Male	69	27	21	18	26.09	3	4.35	30.44
Total	88	34	26	25	28.41	3	3.41	31.82
Other Hispanic								
Female	9	1	3	5	55.56	0	.00	55.56
Male	31	12	10	8	25.81	1	3.23	29.04
Total	40	13	13	13	32.50	1	2.50	35.00
White								
Female	220	71	75	38	17.27	36	16.36	33.64
Male	766	252	236	172	22.45	105	13.71	36.16
Total	986	323	311	210	21.30	141	14.30	35.60
Non-resident aliens								
Female	10	4	6	0	.00	0	.00	.00
Male	52	20	19	8	15.38	4	7.69	23.07
Total	62	24	25	8	12.90	4	6.45	19.35

TABLE 2 *Four-Year Tracking Rates of Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1981, by Ethnicity and Sex*

Ethnic Group & Sex	Number Enrolled Fall 1981	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	20	7	9	3	15.00	1	5.00	20.00
Male	78	44	21	8	10.26	5	6.41	16.67
Total	98	51	30	11	11.22	6	6.12	17.34
Asian								
Female	2	1	0	0	.00	1	50.00	50.00
Male	13	8	1	1	6.69	3	23.08	29.77
Total	15	9	1	1	6.67	4	26.67	33.34
Black								
Female	13	5	6	2	15.38	0	.00	15.38
Male	17	11	5	1	5.88	0	.00	5.88
Total	30	16	11	3	10.00	0	.00	10.00
Filipino								
Female	0	0	0	0	N/A	0	.00	N/A
Male	6	3	2	1	16.67	0	.00	16.67
Total	6	3	2	1	16.67	0	.00	16.67
Mexican-American								
Female	1	1	0	0	.00	0	.00	.00
Male	14	7	5	2	14.29	0	.00	14.29
Total	15	8	5	2	13.33	0	.00	13.33
Other Hispanic								
Female	0	0	0	0	.00	0	.00	N/A
Male	6	6	0	0	.00	0	.00	.00
Total	6	6	0	0	.00	0	.00	.00
White								
Female	3	0	3	0	.00	0	.00	.00
Male	15	7	5	2	13.33	1	6.67	20.00
Total	18	7	8	2	11.11	1	5.56	16.67
Non-Resident Aliens								
Female	1	0	0	1	100.00	0	.00	100.00
Male	5	1	3	1	20.00	0	.00	20.00
Total	6	1	3	2	33.33	0	.00	33.33

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 3 *Three-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the University of California, Fall 1982, by Ethnicity and Sex*

Ethnic Group & Sex	Number Enrolled Fall 1982	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	455	88	164	203	44.62	0	.00	44.62
Male	1,353	276	424	648	47.89	5	.37	48.26
Total	1,808	364	588	851	47.07	5	.28	47.35
Asian								
Female	126	21	27	78	61.90	0	.00	61.90
Male	290	43	61	183	63.10	3	1.03	64.13
Total	416	64	88	261	62.74	3	.72	63.46
Black								
Female	24	6	9	9	37.50	0	.00	37.50
Male	33	11	7	15	45.45	0	.00	45.45
Total	57	17	16	24	42.11	0	.00	42.11
Filipino								
Female	16	5	5	6	37.50	0	.00	37.50
Male	54	12	16	26	48.15	0	.00	48.15
Total	70	17	21	32	45.71	0	.00	45.71
Mexican-American								
Female	27	7	10	10	37.03	0	.00	37.03
Male	66	25	10	31	46.97	0	.00	46.97
Total	93	32	20	41	44.09	0	.00	44.09
Other Hispanic								
Female	13	2	2	9	69.23	0	.00	69.23
Male	21	7	2	12	57.14	0	.00	57.14
Total	34	9	4	21	61.76	0	.00	61.76
White								
Female	216	43	88	85	39.35	0	.00	39.35
Male	805	165	286	352	43.73	2	.25	43.98
Total	1,021	208	374	437	42.80	2	.20	43.00
Non-Resident Aliens								
Female	14	1	12	1	7.14	0	.00	7.14
Male	38	7	24	7	18.42	0	.00	18.42
Total	52	8	36	8	15.38	0	.00	15.38

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 4 *Three-Year Tracking Rates of Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1982, by Ethnicity and Sex*

Ethnic Group & Sex	Number Enrolled Fall 1982	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	19	4	9	6	31.58	0	.00	31.58
Male	79	32	23	24	30.38	0	.00	30.38
Total	98	36	32	30	30.61	0	.00	30.61
Asian								
Female	5	0	2	3	30.77	0	.00	30.77
Male	17	4	3	10	58.82	0	.00	52.22
Total	22	4	5	13	59.09	0	.00	59.09
Black								
Female	6	3	2	1	16.67	0	.00	16.67
Male	24	12	7	5	20.83	0	.00	20.83
Total	30	15	9	6	20.00	0	.00	20.00
Filipino								
Female	3	1	2	0	.00	0	.00	.00
Male	2	1	1	0	.00	0	.00	.00
Total	5	2	3	0	.00	0	.00	.00
Mexican-American								
Female	1	0	0	1	100.00	0	.00	100.00
Male	10	5	3	2	20.00	0	.00	20.00
Total	11	5	3	3	27.27	0	.00	27.77
Other Hispanic								
Female	1	0	1	0	.00	0	.00	.00
Male	3	2	0	1	33.33	0	.00	33.33
Total	4	2	1	1	25.00	0	.00	25.00
White								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	13	6	3	4	30.77	0	.00	30.77
Total	13	6	3	4	30.77	0	.00	30.77
Non-Resident Aliens								
Female	3	0	2	1	33.33	0	.00	33.33
Male	9	2	6	1	11.11	0	.00	11.11
Total	12	2	8	2	16.67	0	.00	16.67

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 5 *Two-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the University of California, Fall 1983, by Ethnicity and Sex*

Ethnic Group & Sex	Number Enrolled Fall 1983	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	337	51	58	228	67.66	0	.00	67.66
Male	1,165	163	138	864	74.16	0	.00	74.16
Total	1,502	214	196	1,092	72.70	0	.00	72.70
Asian								
Female	82	4	9	69	84.15	0	.00	84.15
Male	260	24	16	220	84.62	0	.00	84.62
Total	342	28	25	289	84.50	0	.00	84.50
Black								
Female	27	9	3	15	55.56	0	.00	55.56
Male	33	7	5	21	63.64	0	.00	63.64
Total	60	16	8	36	60.00	0	.00	60.00
Filipino								
Female	24	8	1	15	62.50	0	.00	62.50
Male	28	5	3	20	71.43	0	.00	71.43
Total	52	13	4	35	67.31	0	.00	67.31
Mexican-American								
Female	27	6	7	14	51.85	0	.00	51.85
Male	59	14	7	38	64.41	0	.00	64.41
Total	86	20	14	52	60.47	0	.00	60.47
Other Hispanic								
Female	8	2	0	6	75.00	0	.00	75.00
Male	22	7	2	13	59.09	0	.00	59.09
Total	30	9	2	19	63.33	0	.00	63.33
White								
Female	150	20	34	96	64.00	0	.00	64.00
Male	702	98	90	514	73.22	0	.00	73.22
Total	852	118	124	610	71.60	0	.00	71.60
Non-Resident Aliens								
Female	6	1	0	5	83.33	0	.00	83.33
Male	20	2	4	14	70.00	0	.00	70.00
Total	26	3	4	19	73.08	0	.00	73.08

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 6 *Two-Year Tracking Rates of Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1983, by Ethnicity and Sex*

Ethnic Group & Sex	Number Enrolled Fall 1983	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	11	5	2	4	36.36	0	.00	36.36
Male	38	13	6	19	50.00	0	.00	50.00
Total	49	18	8	23	46.94	0	.00	46.94
Asian								
Female	1	0	0	1	100.00	0	.00	100.00
Male	13	3	3	7	53.85	0	.00	53.85
Total	14	3	3	8	57.14	0	.00	57.14
Black								
Female	1	1	0	0	.00	0	.00	.00
Male	8	5	0	3	37.50	0	.00	37.50
Total	9	6	0	3	33.33	0	.00	33.33
Filipino								
Female	1	1	0	0	.00	0	.00	.00
Male	0	0	0	0	N/A	0	N/A	N/A
Total	1	1	0	0	.00	0	.00	.00
Mexican-American								
Female	3	2	0	1	33.33	0	.00	33.33
Male	4	2	0	2	50.00	0	.00	50.00
Total	7	4	0	3	42.86	0	.00	42.86
Other Hispanic								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	1	0	0	1	100.00	0	.00	100.00
Total	1	0	0	1	100.00	0	.00	100.00
White								
Female	2	0	1	1	50.00	0	.00	50.00
Male	9	3	2	4	44.44	0	.00	44.44
Total	11	3	3	5	45.45	0	.00	45.45
Non-Resident Aliens								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	2	0	0	2	100.00	0	.00	100.00
Total	2	0	0	2	100.00	0	.00	100.00

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 7 *Four-Year Tracking Rates of Regular-Admission Junior Transfers Majoring in Engineering at the University of California Fall 1981, by Ethnicity*

Ethnic Group & Sex	Number Enrolled Fall 1981	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups								
Female	72	29	5	1	1.39	37	51.39	52.78
Male	379	159	26	4	1.06	190	50.13	51.19
Total	451	188	31	5	1.11	227	50.33	51.44
Asian								
Female	16	7	1	0	.00	8	50.00	50.00
Male	72	31	1	0	.00	40	55.56	55.56
Total	88	38	2	0	.00	48	54.55	54.55
Black								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	4	2	1	0	.00	1	25.00	25.00
Total	4	2	1	0	.00	1	25.00	25.00
Filipino								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	5	1	0	0	.00	4	80.00	80.00
Total	5	1	0	0	.00	4	80.00	80.00
Mexican-American								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	14	6	0	0	.00	8	57.14	57.14
Total	14	6	0	0	.00	8	57.14	57.14
Other Hispanic								
Female	0	0	0	0	N/A	0	N/A	N/A
Male	6	2	1	1	16.67	2	33.33	50.00
Total	6	2	1	1	16.67	2	33.33	50.00
White								
Female	44	19	0	1	2.27	24	54.55	56.82
Male	181	71	19	0	.00	91	50.28	50.28
Total	225	90	19	1	.44	115	51.11	51.55
Non-Resident Aliens								
Female	8	3	3	0	.00	2	25.00	25.00
Male	69	34	2	1	1.45	32	46.38	47.83
Total	77	37	5	1	1.30	34	44.16	45.46

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 8 *Seven-Year Tracking Rates for Fall 1978 Freshman Majoring in Engineering at the California State University*

Ethnic Group & Sex (Systemwide)	Number Enrolled Fall 1978	Number Continuing In the Institution	Continuation Rate	Number Graduating	Graduation Rate	Tracking Rate
All Ethnic Groups						
Female	225	16	7.1	103	45.8	52.9
Male	1,908	123	6.5	866	45.4	51.8
Total	2,133	139	6.5	969	45.4	51.9
American Indian	13	1	7.7	1	7.7	15.4
Asian	221	13	5.9	112	50.7	56.6
Black	90	10	11.1	18	20.0	31.1
Filipino	45	7	15.6	20	44.4	60.0
Mexican-American	116	7	6.0	31	26.7	32.8
Other Hispanic	46	3	6.5	17	37.0	43.5
Pacific Islander	3	0	0	1	33.3	33.3
White, Non-Hispanic	931	58	6.2	501	53.8	60.0
Unknown	668	40	6.0	268	40.1	46.1

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 9 *Seven-Year Tracking Rates for Fall 1978 Transfer Students Majoring in Engineering at the California State University*

Ethnic Group & Sex (Systemwide)	Number Enrolled Fall 1978	Number Continuing In the Institution	Continuation Rate	Number Graduating	Graduation Rate	Tracking Rate
All Ethnic Groups						
Female	254	16	6.3	129	50.8	57.1
Male	2,659	108	4.1	1,445	54.3	58.4
Total	2,913	124	4.3	1,574	54.0	58.3
American Indian	20	1	5.0	5	25.0	30.0
Asian	217	6	2.8	148	68.2	71.0
Black	59	6	10.2	16	27.1	37.3
Filipino	24	1	4.2	9	37.5	41.7
Mexican-American	84	7	8.3	45	53.6	61.9
Other Hispanic	43	5	11.6	16	37.2	48.8
Pacific Islander	19	0	0	14	73.7	73.7
White, Non-Hispanic	1,103	41	3.7	661	59.9	63.6
Unknown	1,344	57	4.2	660	49.1	53.3

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 10 *Four-Year Tracking Rates of Regular-Admission Freshmen Majoring in Engineering at the California State University, Fall 1981, by Ethnicity*

Ethnic Group	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups	2569	1463	56.9	123	4.8	61.7
American Indian	62	31	50.0	1	1.6	51.6
Asian	342	207	60.5	20	5.8	66.4
Black	139	46	33.1	1	.7	33.8
Filipino	105	68	64.8	0	.0	64.8
Mexican-American	159	77	48.4	4	2.5	50.9
Other Hispanic	63	32	50.8	2	3.2	54.0
Pacific Islander	28	13	46.4	8	28.6	75.0
White	1402	847	60.4	62	4.4	64.8

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 11 *Four-Year Tracking Rates for Fall 1981 Transfer Students Majoring in Engineering at the California State University*

Ethnic Group	Number Transferred Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Ethnic Groups	2949	622	21.1	1203	40.8	61.9
American Indian	88	12	13.6	35	39.8	53.4
Asian	466	93	20.0	198	42.5	62.4
Black	63	25	39.7	12	19.0	58.7
Filipino	55	12	21.8	22	40.0	61.8
Mexican-American	102	28	27.5	29	28.4	55.9
Other Hispanic	86	24	27.9	24	27.9	55.8
Pacific Islander	31	4	12.9	10	32.3	45.2
White	1455	318	21.9	632	43.4	65.3

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 12 *Four-Year Tracking Rates of Fall 1981 Students Majoring in Engineering at the University of California, by Institution of Origin and Ethnicity*

	All Groups	American Indian	Asian	Black	Filipino	Mexican American	Other Hispanic	White	Non-Resident Alien
Total Number Enrolled	2,817	8	602	126	103	139	62	1,413	213
State University Transfers									
Number	68	..	8	1	3	2	3	38	9
Percent of Total	2.41%	..	1.33%	.79%	2.91%	1.44%	4.84%	2.69%	4.23%
Percent Who Changed Major	10.42%	..	0.00%	100.00%	0.00%	0.00%	33.33%	7.89%	0.00%
Tracking Rate	1.47	..	0.00	0.00	0.00	0.72	0.00	0.00	0.00
Community College Transfers									
Number	458	2	95	9	5	15	8	237	60
Percent of Total	16.26%	25.00%	15.78%	7.14%	4.85%	10.79%	12.90%	16.77%	28.17%
Percent Who Changed Major	8.30%	0.00%	4.21%	11.11%	0.00%	0.00%	0.00%	10.97%	8.33%
Tracking Rate	1.09	0.00	0.00	0.00	0.97	.00	0.00	.21	0.00
Inter-Campus Transfers									
Number	105	..	26	3	1	4	2	43	16
Percent of Total	3.73%	..	4.32%	2.38%	0.97%	2.88%	3.23%	3.04%	7.51%
Percent Who Changed Major	8.57%	..	3.85%	0.00%	100.00%	0.00%	0.00%	11.63%	12.50%
Tracking Rate	1.90	..	0.00	0.00	0.00	0.00	50.00	0.00	0.00
Public High School Graduates									
Number	1,615	4	411	81	68	88	35	810	43
Percent of Total	57.33%	50.00%	68.57%	64.29%	66.02%	63.31%	56.45%	57.32%	20.19%
Percent Who Changed Major	26.44%	25.00%	16.30%	24.69%	23.53%	29.55%	28.57%	30.12%	53.49%
Tracking Rate	23.96	50.00	28.71	24.69	30 88	25.00	28.57	20.86	20.93
Private High School Graduates									
Number	221	..	13	18	16	13	11	128	7
Percent of Total	7.85%	..	2.16%	14.29%	15.53%	9.35%	17.74%	9.06%	3.29%
Percent Who Changed Majors	33.03%	..	30.77%	27.78%	12.50%	38.46%	36.36%	37.50%	14.29%
Tracking Rate	21.27	..	15.38	22.22	31.25	23.08	27.27	22.66	.00

Note: "Percent Who Changed Major" indicates the percentage of
"Tracking Rate" indicates the percentage

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 13 *Three-Year Tracking Rates of Fall 1982 Students Majoring in Engineering at the University of California, by Institution of Origin and Ethnicity*

	All Groups	American Indian	Asian	Black	Filipino	Mexican American	Other Hispanic	White	Non-Resident Alien
Total Number Enrolled	2,543	10	601	98	82	119	45	1,371	130
State University Transfers									
Number	48	--	9	1	--	--	--	27	4
Percent of Total	1.89%	--	1.50%	1.02%	--	--	--	1.97%	3.08%
Percent Who Changed Major	28.00%	--	22.22%	0.00%	--	--	--	18.52%	25.00%
Tracking Rate	10.42	--	11.11	.00	--	--	--	14.81	.00
Community College Transfers									
Number	394	1	106	6	4	9	5	209	37
Percent of Total	15.49%	10.00%	17.64%	6.12%	4.88%	7.56%	11.11%	15.24%	28.46%
Percent Who Changed Major	13.71%	0.00%	0.94%	0.00%	0.00%	22.22%	0.00%	17.70%	32.43%
Tracking Rate	6.85	.00	28.30	33.33	.00	.00	.00	5.50	6.67
Inter-Campus Transfers									
Number	91	--	26	--	--	2	--	49	7
Percent of Total	3.58%	--	4.33%	--	--	1.68%	--	3.57%	5.38%
Percent Who Changed Major	5.49%	--	0.00	--	--	50.00%	--	6.12%	14.29%
Tracking Rate	7.69	--	15.38	--	--	0.00	--	6.25	0.00
Public High School Graduates									
Number	1,560	8	406	65	59	84	24	825	43
Percent of Total	61.34%	80.00%	67.55%	66.33%	71.95%	70.59%	53.33%	60.18%	33.08%
Percent Who Changed Major	30.64%	25.00%	19.46%	21.54%	38.98%	25.00%	16.67%	33.33%	79.07%
Tracking Rate	48.14	50.00	63.79	36.92	42.59	42.86	50.00	44.85	9.30
Private High School Graduates									
Number	225	--	16	16	12	20	11	138	6
Percent of Total	8.85%	--	2.66%	16.33%	14.63%	16.81%	24.44%	10.07%	4.62%
Percent Who Changed Majors	41.33%	--	25.00%	37.50%	8.33%	10.00%	9.09%	51.45%	83.33%
Tracking Rate	39.11	--	50.00	37.50	58.33	45.00	72.73	34.78	.00

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 14 *Three-Year Continuation and Progress Rates of Freshmen Majoring in Engineering at the University of California, Fall 1982, by Campus and Ethnicity*

Campus	Number First-Time Freshmen in Engineering	Proportion of All Students	Number Who Withdrew	Number Who Changed Majors	Graduated Number	Graduated Rate	Continuation Number	Continuation Rate	Proportion of Continuing Students Achieving Senior Status
Berkeley									
All Ethnic Groups	464	100.00	126	70	0	.0	268	57.8	n/a
Asian	136	29.3	24	19	0	.0	93	68.4	50.4
Black	20	4.3	9	1	0	.0	10	50.0	8.3
Filipino	14	3.0	5	1	0	.0	8	57.1	54.6
Mexican-American	20	4.3	8	3	0	.0	9	45.0	16.7
Other Hispanic	8	1.7	1	0	0	.0	7	87.5	42.9
Non-Resident Alien	7	1.5	2	0	0	.0	5	71.4	n/a
White	245	52.8	74	46	0	.0	125	51.0	42.3
Davis									
All Ethnic Groups	213	100.00	47	29	0	0.0	137	64.3	n/a
Asian	40	18.8	10	6	0	0.0	24	60.0	60.7
Black	11	5.2	2	3	0	0.0	6	54.5	10.0
Filipino	9	4.2	3	1	0	.0	5	55.6	0.0
Mexican-American	25	11.7	9	1	0	0.0	15	60.0	13.3
Other Hispanic	9	4.2	3	0	0	.0	6	66.7	83.3
Non-Resident Alien	4	1.9	0	0	0	.0	4	100.0	n/a
White	108	50.7	17	15	0	0.0	0.76	70.4	57.1
Irvine									
All Ethnic Groups	169	100.00	39	45	2	1.2	83	49.1	n/a
Asian	57	33.7	8	15	1	1.8	33	57.9	73.2
Black	1	0.6	1	0	0	.0	0	.0	.0
Filipino	5	3.0	1	0	0	.0	4	80.0	100.00
Mexican-American	4	2.4	2	0	0	.0	2	50.0	66.7
Other Hispanic	4	2.4	2	0	0	.0	2	50.0	100.0
Non-Resident Alien	4	2.4	1	1	0	--	2	50.0	n/a
White	84	49.7	23	25	1	1.2	35	41.7	65.0
Los Angeles									
All Ethnic Groups	299	100.00	52	35	1	0.3	211	70.6	n/a
Asian	111	37.1	12	6	1	0.9	92	82.9	50.0
Black	13	4.3	4	5	0	.0	4	30.8	16.7
Filipino	20	6.7	5	2	0	.0	13	65.0	23.1
Mexican-American	9	3.0	3	0	0	.0	6	66.7	0.0
Other Hispanic	6	2.0	2	0	0	0	4	66.7	20.0
Non-resident Alien	1	0.3	0	0	0	.0	1	100.0	n/a
White	129	43.1	24	19	0	0	86	66.7	40.0
San Diego									
All Ethnic Groups	351	100.00							
Asian	37	10.5							
Black	6	1.7							
Filipino	18	5.1		Data for UC, San Diego are not available					
Mexican-American	14	4.0							
Other Hispanic	3	0.9							
Non-resident Alien	38	10.8							
White	222	63.2							
Santa Barbara									
All Ethnic Groups	312	100.00	67	91	2	0.6	152	48.7	n/a
Asian	35	11.2	4	11	1	2.9	19	54.3	72.0
Black	6	1.9	1	1	0	.0	4	66.7	40.0
Filipino	4	1.3	2	0	0	.0	2	50.0	0.0
Mexican-American	21	6.7	8	4	0	.0	9	42.9	30.0
Other Hispanic	4	1.3	1	1	0	.0	2	50.0	0.0
Non-resident Alien	2	0.6	1	1	0	.0	0	0.0	n/a
White	233	74.7	50	67	1	0.4	115	49.4	56.6

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 15 *Four-Year Tracking Rates of Fall 1981 University of California Transfer Students Majoring in Engineering, by Campus and Ethnicity*

Campus	Number Enrolled Fall 1981	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Berkeley								
All Ethnic Groups	291	262	15	4	1.37	10	3.44	4.81
Asian	75	70	2	0	.0	3	4.00	4.00
Black	15	15	0	0	.0	0	.0	.0
Filipino	4	3	1	0	.0	0	.0	.0
Mexican-American	13	12	0	0	.0	1	7.69	7.69
Other Hispanic	5	5	0	0	.0	0	.0	.0
Non-Resident Alien	40	37	1	0	.0	2	5.00	5.00
White	122	106	9	3	2.46	4	3.28	5.74
Davis								
All Ethnic Groups	80	11	1	5	6.25	63	78.75	85.00
Asian	16	1	0	0	.0	15	93.75	93.75
Black	3	1	0	0	.0	2	66.67	66.67
Filipino	5	1	0	2	40.00	2	40.00	80.00
Mexican-American	8	4	1	1	12.50	2	25.00	37.50
Other Hispanic	1	1	0	0	.0	2	100.00	100.00
Non-Resident Alien	2	0	0	0	.0	2	100.00	100.00
White	41	3	0	2	4.88	36	87.80	92.68
Irvine								
All Ethnic Groups	101	29	3	0	.0	69	68.32	68.32
Asian	20	4	1	0	.0	15	75.00	75.00
Black	1	0	1	0	.0	0	.0	.0
Filipino	1	0	0	0	.0	1	100.00	100.00
Mexican-American	3	1	0	0	.0	2	66.67	66.67
Other Hispanic	3	1	1	0	.0	1	33.33	33.33
Non-Resident Alien	28	10	0	0	.0	18	64.29	64.29
White	33	7	0	0	.0	26	78.79	78.79
Los Angeles								
All Ethnic Groups	90	11	4	5	5.55	70	77.78	83.33
Asian	28	3	1	1	3.57	23	82.14	85.71
Black	1	0	0	0	.0	1	100.00	100.00
Filipino	..	..	..	..	..	..	..	..
Mexican-American	5	0	0	1	20.00	4	80.00	100.00
Other Hispanic	2	0	0	1	50.00	1	50.00	100.00
Non-Resident Alien	14	3	0	0	.0	11	78.57	78.57
White	37	5	2	2	5.41	28	75.68	81.09
San Diego								
All Ethnic Groups	185	63	44	6	3.24	72	38.92	42.16
Asian	9	1	3	0	.0	5	55.56	55.56
Black	3	1	2	0	.0	0	.0	.0
Filipino	3	2	1	0	.0	0	.0	.0
Mexican-American	3	3	0	0	.0	0	.0	.0
Other Hispanic	4	3	1	0	.0	0	.0	.0
Non-Resident Alien	60	16	13	3	5.00	28	46.67	51.67
White	88	32	23	1	1.14	32	36.36	37.50
Santa Barbara								
All Ethnic Groups	122	34	15	2	1.64	71	58.20	59.84
Asian	15	4	2	9	60.00	0	.0	60.00
Black	1	1	0	0	.0	0	.0	.0
Filipino	2	0	0	0	.0	2	100.00	100.00
Mexican-American	4	0	2	0	.0	2	50.00	50.00
Other Hispanic	1	1	0	0	.0	0	.0	.0
Non-Resident Alien	1	0	0	0	.0	1	100.00	100.00
White	88	24	11	3	3.41	50	56.82	60.23

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 16 *Four-Year Tracking Rates of Freshmen Majoring in Engineering Fall 1981, at the California State University by Campus and Ethnicity*

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Chico						
All Ethnic Groups	94	54	57.4	16	17.0	74.5
American Indian	--	--	--	--	--	--
Asian	2	1	50.0	0	.0	50.0
Black	2	1	50.0	0	.0	50.0
Filipino	--	--	--	--	--	--
Mexican-American	4	4	100.0	0	.0	100.0
Other Hispanic	--	--	--	--	--	--
Pacific Islander	15	5	33.3	8	53.3	86.7
White	62	40	64.5	2	3.2	67.7
Fresno						
All Ethnic Groups	135	75	55.6	10	7.4	63.0
American Indian	4	1	25.0	0	.0	25.0
Asian	16	10	62.5	1	6.3	68.8
Black	4	1	25.0	0	.0	25.0
Filipino	6	4	66.7	0	.0	66.7
Mexican-American	9	3	33.3	1	11.1	44.4
Other Hispanic	2	1	50.0	1	50.0	100.0
Pacific Islander	--	--	--	--	--	--
White	58	41	70.7	44	5.2	75.9
Fullerton						
All Ethnic Groups	123	65	52.8	5	4.1	56.9
American Indian	14	7	50.0	0	.0	50.0
Asian	25	13	52.0	1	4.0	56.0
Black	4	1	25.0	0	.0	25.0
Filipino	1	0	.0	0	.0	.0
Mexican-American	5	4	80.0	0	.0	80.0
Other Hispanic	7	3	42.9	0	.0	42.9
Pacific Islander	1	1	100.0	0	.0	100.0
White	60	31	51.7	4	6.7	58.3
Humboldt						
All Ethnic Groups	17	10	58.8	0	.0	58.8
American Indian	--	--	--	--	--	--
Asian	--	--	--	-	--	--
Black	--	--	--	--	--	--
Filipino	1	1	100.0	0	.0	100.0
Mexican-American	--	--	--	--	--	--
Other Hispanic	1	1	100.0	0	.0	100.0
Pacific Islander	--	--	--	--	--	--
White	15	8	53.3	0	.0	53.3
Long Beach						
All Ethnic Groups	271	162	59.8	10	3.7	63.5
American Indian	8	6	75.0	0	.0	75.0
Asian	65	45	69.2	2	3.1	72.3
Black	15	5	33.3	0	.0	33.3
Filipino	14	11	78.6	0	.0	78.6
Mexican-American	29	15	51.7	0	.0	51.7
Other Hispanic	8	4	50.0	0	.0	50.0
Pacific Islander	5	3	60.0	0	.0	60.0
White	109	63	57.8	6	5.5	63.3
Los Angeles						
All Ethnic Groups	42	20	47.6	3	7.1	54.8
American Indian	--	--	--	--	--	--
Asian	13	6	46.2	2	15.4	61.5
Black	3	2	66.7	0	.0	66.7
Filipino	2	2	100.0	0	.0	100.0
Mexican-American	11	5	45.5	0	.0	45.5
Other Hispanic	3	0	.0	0	.0	.0
Pacific Islander	--	--	--	--	--	--
White	4	1	25.0	1	25.0	50.0

(Continued)

TABLE 16 (continued)

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Northridge						
All Ethnic Groups	207	114	55.1	4	1.9	57.0
American Indian	5	4	80.0	0	.0	80.0
Asian	26	14	53.8	0	.0	53.8
Black	40	12	30.0	0	.0	30.0
Filipino	7	6	85.7	0	.0	85.7
Mexican-American	19	10	52.6	0	.0	52.6
Other Hispanic	12	9	75.0	0	.0	75.0
Pacific Islander	..	..	..	..	..	..
White	88	54	61.4	3	3.4	64.8
Pomona						
All Ethnic Groups	459	232	50.5	31	6.8	57.3
American Indian	4	0	.0	1	25.0	25.0
Asian	40	23	57.5	6	15.0	72.5
Black	9	4	44.4	0	.0	44.4
Filipino	12	9	75.0	0	.0	75.0
Mexican-American	27	8	29.6	2	7.4	37.0
Other Hispanic	7	2	28.6	1	14.3	42.9
Pacific Islander	..	..	..	..	..	..
White	255	126	49.4	13	5.1	54.5
Sacramento						
All Ethnic Groups	109	63	57.8	3	2.8	60.6
American Indian	4	2	50.0	0	.0	50.0
Asian	11	4	36.4	1	9.1	45.5
Black	10	4	40.0	0	.0	40.0
Filipino	4	3	75.0	0	.0	75.0
Mexican-American	7	6	85.7	0	.0	85.7
Other Hispanic	2	2	100.0	0	.0	100.0
Pacific Islander	..	..	..	..	..	..
White	68	42	61.8	1	1.5	63.2
San Diego						
All Ethnic Groups	278	144	51.8	7	2.5	54.3
American Indian	9	3	33.3	0	.0	33.3
Asian	30	15	50.0	2	6.7	56.7
Black	17	4	23.5	0	.0	23.5
Filipino	16	7	43.8	0	.0	43.8
Mexican-American	14	7	50.0	0	.0	50.0
Other Hispanic	5	1	20.0	0	.0	20.0
Pacific Islander	2	1	50.0	0	.0	50.0
White	177	105	59.3	5	2.8	62.1
San Francisco						
All Ethnic Groups	77	41	53.2	3	3.9	57.1
American Indian	1	0	.0	0	.0	.0
Asian	15	7	46.7	1	6.7	53.3
Black	3	0	.0	0	.0	.0
Filipino	10	6	60.0	0	.0	60.0
Mexican-American	4	1	25.0	0	.0	25.0
Other Hispanic	1	0	.0	0	.0	.0
Pacific Islander	1	0	.0	0	.0	.0
White	9	6	66.7	1	11.1	77.8
San Jose						
All Ethnic Groups	294	174	59.2	16	5.4	64.6
American Indian	10	5	50.0	0	.0	50.0
Asian	58	45	77.6	1	1.7	79.3
Black	21	9	42.9	1	4.8	47.6
Filipino	19	11	57.9	0	.0	57.9
Mexican-American	11	3	27.3	1	9.1	36.4
Other Hispanic	8	3	37.5	0	.0	37.5
Pacific Islander	3	2	66.7	0	.0	66.7
White	145	90	62.1	11	7.6	69.7

(Continued)

TABLE 16 (continued)

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
San Luis Obsipo						
All Ethnic Groups	463	309	66.7	15	3.2	70.0
American Indian	3	3	100.0	0	.0	100.0
Asian	41	24	58.5	3	7.3	65.9
Black	11	3	27.3	0	.0	27.3
Filipino	13	8	61.5	0	.0	61.5
Mexican-American	19	11	57.9	0	.0	57.9
Other Hispanic	7	6	85.7	0	.0	85.7
Pacific Islander	1	1	100.0	0	.0	100.0
White	352	240	68.2	12	3.4	71.6

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 17 *Four-Year Tracking Rates of Transfer Students Majoring in Engineering Fall 1981, California State University by Campus and Ethnicity*

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Chico						
All Ethnic Groups	148	40	27.0	68	45.9	73.0
American Indian	4	0	.0	3	75.0	75.0
Asian	6	0	.0	3	50.0	50.0
Black	1	0	.0	0	.0	.0
Filipino	--	--	--	--	--	--
Mexican-American	4	1	25.0	3	75.0	100.0
Other Hispanic	1	0	.0	1	100.0	100.0
Pacific Islander	5	0	.0	2	40.0	40.0
White	108	35	32.4	51	47.2	79.6
Fresno						
All Ethnic Groups	125	26	20.8	60	48.0	68.8
American Indian	1	0	0.0	1	100.0	100.0
Asian	9	1	11.1	3	33.3	44.4
Black	3	0	.0	2	66.7	66.7
Filipino	--	--	--	--	--	--
Mexican-American	8	4	50.0	1	12.5	62.5
Other Hispanic	4	1	25.0	0	.0	25.0
Pacific Islander	--	--	--	--	--	--
White	77	18	23.4	42	54.5	77.9
Fullerton						
All Ethnic Groups	147	37	25.2	44	29.9	55.1
American Indian	9	1	11.1	2	22.2	33.3
Asian	57	15	26.3	20	35.1	61.4
Black	1	0	.0	1	100.0	100.0
Filipino	2	0	.0	0	.0	.0
Mexican-American	6	2	33.3	2	33.3	66.7
Other Hispanic	5	2	40.0	1	20.0	60.0
Pacific Islander	1	1	100.0	0	.0	100.0
White	54	12	22.2	16	29.6	51.9
Humbolt						
All Ethnic Groups	47	20	42.6	8	17.0	59.6
American Indian	1	0	.0	1	100.0	100.0
Asian	1	0	.0	0	.0	.0
Black	--	--	--	--	--	--
Filipino	2	2	100.0	0	.0	100.0
Mexican-American	--	--	--	--	--	--
Other Hispanic	3	1	33.3	0	.0	33.3
Pacific Islander	--	--	--	--	--	--
White	34	15	44.1	6	17.6	61.8
Long Beach						
All Ethnic Groups	454	109	24.0	151	33.3	57.3
American Indian	13	2	15.4	5	38.5	53.8
Asian	127	29	22.8	43	33.9	56.7
Black	15	8	53.3	1	6.7	60.0
Filipino	13	4	30.8	4	30.8	61.5
Mexican-American	11	1	9.1	3	27.3	36.4
Other Hispanic	21	5	23.8	9	42.9	66.7
Pacific Islander	20	2	10.0	5	25.0	35.0
White	175	48	27.4	57	32.6	60.0
Los Angeles						
All Ethnic Groups	105	21	20.0	25	23.8	43.8
American Indian	--	--	--	--	--	--
Asian	12	2	16.7	3	25.0	41.7
Black	7	1	14.3	0	.0	14.3
Filipino	1	0	.0	1	100.0	100.0
Mexican-American	8	3	37.5	3	37.5	75.0
Other Hispanic	2	1	50.0	0	.0	50.0
Pacific Islander	--	--	--	--	--	--
White	16	4	25.0	2	12.5	37.5

(Continued)

TABLE 17 (continued)

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Northridge						
All Ethnic Groups	101	25	24.8	41	40.6	65.3
American Indian	7	3	42.9	3	42.9	85.7
Asian	21	3	14.3	10	47.6	61.9
Black	3	2	66.7	1	33.3	100.0
Filipino	1	0	.0	1	100.0	100.0
Mexican-American	9	2	22.2	3	33.3	55.6
Other Hispanic	4	3	75.0	1	25.0	100.0
Pacific Islander	..	..	..	..	..	..
White	51	11	21.6	21	41.2	62.7
Pomona						
All Ethnic Groups	383	71	18.5	169	44.1	62.7
American Indian	2	0	.0	0	.0	.0
Asian	16	2	12.5	7	43.8	56.3
Black	3	1	33.3	0	.0	33.3
Filipino	5	0	.0	3	60.0	60.0
Mexican-American	15	4	26.7	6	40.0	66.7
Other Hispanic	5	2	40.0	1	20.0	60.0
Pacific Islander	..	..	..	..	..	..
White	81	18	22.2	35	43.2	65.4
Sacramento						
All Ethnic Groups	287	53	18.5	153	53.3	71.8
American Indian	8	1	12.5	3	37.5	50.0
Asian	32	7	21.9	17	53.1	75.0
Black	4	2	50.0	2	50.0	100.0
Filipino	5	1	20.0	1	20.0	40.0
Mexican-American	3	2	66.7	0	.0	66.7
Other Hispanic	3	0	.0	1	33.3	33.3
Pacific Islander	..	..	..	..	..	..
White	192	36	18.8	105	54.7	73.4
San Diego						
All Ethnic Groups	363	75	20.7	125	34.4	55.1
American Indian	11	1	9.1	2	18.2	27.3
Asian	44	7	15.9	20	45.5	61.4
Black	7	3	42.9	1	14.3	57.1
Filipino	10	2	20.0	3	30.0	50.0
Mexican-American	15	4	26.7	4	26.7	53.3
Other Hispanic	12	3	25.0	2	16.7	41.7
Pacific Islander	3	1	33.3	2	66.7	100.0
White	226	46	20.4	83	36.7	57.1
San Francisco						
All Ethnic Groups	73	9	12.3	29	39.7	52.1
American Indian	2	0	.0	0	.0	.0
Asian	6	2	33.3	2	33.3	66.7
Black	1	1	100.0	0	.0	100.0
Filipino	2	0	.0	0	.0	.0
Mexican-American	1	1	100.0	0	.0	100.0
Other Hispanic	2	0	.0	0	.0	.0
Pacific Islander	..	..	..	..	..	..
White	29	2	6.9	15	51.7	58.6
San Jose						
All Ethnic Groups	390	72	18.5	191	49.0	67.4
American Indian	24	3	12.5	13	54.2	66.7
Asian	101	18	17.8	51	50.5	68.3
Black	13	4	30.8	4	30.8	61.5
Filipino	14	3	21.4	9	64.3	85.7
Mexican-American	14	3	21.4	2	14.3	35.7
Other Hispanic	8	3	37.5	1	12.5	50.0
Pacific Islander	1	0	.0	1	100.0	100.0
White	181	32	17.7	97	53.6	71.3

(Continued

TABLE 17 (continued)

Campus	Number Enrolled Fall 1981	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
San Luis Obsipo						
All Ethnic Groups	326	64	19.6	139	42.6	62.3
American Indian	6	1	16.7	2	33.3	50.0
Asian	34	7	20.6	19	55.9	76.5
black	5	3	60.0	0	.0	60.0
Filipino	..	..	..	..	..	..
Mexican-American	8	1	12.5	2	25.0	37.5
Other Hispanic	16	3	18.8	7	43.8	62.5
Pacific Islander	1	0	.0	0	.0	.0
White	231	41	17.7	102	44.2	61.9

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 18 *Comparative Two-Year Continuation Rates of Freshmen Majoring in Engineering at the University of California, by Ethnicity and Participation in the Minority Engineering Program (MEP), Fall 1981 through Fall 1983*

Ethnic Group	All Groups	All MEP	American Indian All	American Indian MEP	Asian All	Black All	Black MEP	Filipino All	Mexican American All	Mexican American MEP	Other Hispanic All	Other Hispanic MEP	White All	Non-Resident Alien All
Number First-Time Freshmen Enrolled, Fall 1981	1542	--	4	--	395	69	--	68	79	--	40	--	789	27
Number Still Enrolled Fall 1983	1039	--	2	--	307	41	--	55	40	--	27	--	506	19
Continuation Rate	67.38	--	50.00	--	77.72	59.42	--	80.88	50.63	--	67.50	--	64.13	70.37
Number First-Time Freshmen Enrolled, Fall 1982	1457	114	8	6	379	51	33	52	79	60	31	15	799	14
Number Still Enrolled Fall 1984	1012	90	6	5	299	33	25	36	46	37	24	12	528	11
Continuation Rate	69.46	78.95	75.00	83.33	78.89	64.71	75.76	69.23	58.23	61.67	77.42	80.00	66.08	78.57
Number First-Time Freshmen Enrolled Fall 1983	1502	120	9	6	342	60	47	52	86	53	30	14	852	26
Number Still Enrolled Fall 1985	1092	82	4	3	289	36	31	35	52	36	19	12	610	19
Continuation Rate	72.70	68.33	44.44	50.00	84.50	60.00	65.96	67.31	60.47	67.92	63.33	85.71	71.60	73.08
Change in Number Entering, 1981 Compared to 1983	-40	--	+5		-53	-9		-16	+7		-10		+63	-1
Average two-year Continuation Rate	69.83	73.50	57.14	66.67	80.20	61.11	70.00	73.26	56.55	64.60	69.31	82.76	67.38	73.13
Change in the Continuation Rate, 1981 Compared to 1983	+2.45	--	+5.56		+6.78	+.58		-13.57	+9.84		-4.17		+7.47	+1.71

Note: Data for the University of California, San Diego campus are not included in these totals

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 19 *Three-Year Continuation Rate of Fall 1982 Ethnic Minority Freshmen Majoring in Engineering at the University of California, by Participation in the Minority Engineering Program (MEP)*

Ethnic Group	Number Enrolled Fall 1982	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Tracking Rate
Black							
MEP	33	9	3	21	63.64	0	63.64
Non-MEP	24	8	13	3	12.50	0	12.50
Filipino							
MEP	1	1	0	0	.00	0	.00
Non-MEP	69	16	21	32	46.38	0	46.38
Mexican-American							
MEP	60	19	7	34	56.67	0	56.67
Non-MEP	33	13	13	7	21.21	0	21.21
Other Hispanic							
MEP	15	4	0	11	73.33	0	73.33
Non-MEP	19	5	4	10	52.63	0	52.63
American Indian							
MEP	6	1	2	3	50.00	0	50.00
Non-MEP	3	1	1	1	33.33	0	33.33
All MEP	115	34	12	69	60.00	0	60.00
All Non-MEP (includes all ethnic groups)	1,693	330	576	782	46.19	5	46.50

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 20 *Three-Year Tracking Rates of Ethnic Minority Special-Action Admission Freshmen Majoring in Engineering at the University of California, Fall 1982, by Ethnicity and Participation in the Minority Engineering Program (MEP)*

Ethnic Group	Number Enrolled Fall 1982	Number Who Withdrew From University	Number Who Changed Majors	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Tracking Rate
Black							
MEP	17	7	4	6	35.29	0	35.29
Non-MEP	13	8	5	0	.00	0	.00
Mexican-American							
MEP	5	4	0	1	20.00	0	20.00
Non-MEP	6	1	3	2	33.33	0	33.33
Other Hispanic							
MEP	2	1	0	1	50.00	0	50.00
Non-MEP	2	1	1	0	.00	0	.00
All MEP (Special Action)	24	12	4	8	33.33	0	33.33
All Non-MEP (Special Action) (includes all ethnic groups)	74	24	28	22	29.73	0	29.73

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 21 ***Three-Year Continuation and Progress Rates of Freshmen Majoring in Engineering at the University of California, Fall 1982, by Campus, Ethnicity, and Participation in the Minority Engineering Program (MEP)***

Campus	Number First-Time Freshmen in Engineering	Number Who Withdrew 1983-85	Number Who Changed Majors 1983-85	Number Continuing in Engineering	Continuation Rate	Proportion of Continuing Students Who Achieved Junior or Senior Status
Berkeley						
All Ethnic Groups	464	126	70	268	57.76	57.11
Female	103	21	21	61	59.22	61.17
Male	361	105	49	207	57.34	56.23
MEP	36	15	3	18	50.00	44.44
Non-MEP	428	111	67	250	58.41	59.35
Asian	136	24	19	93	68.38	89.99
Black	20	9	1	10	50.00	75.00
MEP	14	6	0	8	57.14	87.50
Non-MEP	6	3	1	2	33.33	50.00
Mexican-American	20	8	3	9	45.00	75.00
MEP	17	7	3	7	41.18	70.00
Non-MEP	..	..	..	..	..	..
Other Hispanic	8	1	0	7	87.50	100.00
MEP	2	0	0	2	100.00	100.00
Non-MEP	6	1	0	5	83.33	100.00
White	245	74	46	125	51.02	78.57
Davis						
All Ethnic Groups	213	47	29	137	64.32	67.14
Female	61	14	12	35	57.38	50.82
Male	152	33	17	102	67.11	53.29
MEP	42	13	2	28	64.29	64.29
Non-MEP	171	34	27	110	64.33	
Asian	40	10	6	24	60.00	92.86
Black	11	2	3	6	54.55	80.00
MEP	9	2	1	6	66.67	77.78
Non-MEP	2	0	2	0	.0	100.00
Mexican-American	25	9	1	15	60.00	100.00
MEP	24	8	1	15	62.50	100.00
Non-MEP	1	1	0	0	.0	.0
Other Hispanic	9	3	0	6	66.67	83.33
MEP	8	3	0	5	62.50	80.00
Non-MEP	1	0	0	1	100.00	100.00
White	108	17	15	76	70.37	98.81
Irvine*						
All Ethnic Groups	169	39	45	83	49.11	50.30
Female	47	10	13	24	51.06	53.19
Male	122	29	32	59	48.36	46.72
Asian	57	8	15	33	57.89	97.56
Black	1	1	0	0	.0	.0
Mexican-American	4	2	0	2	50.00	66.67
Other Hispanic	4	2	0	2	50.00	100.00
White	84	23	25	35	41.67	95.00
Los Angeles						
All Ethnic Groups	299	52	35	211	70.57	63.88
Female	92	18	13	61	66.30	60.87
Male	207	34	22	150	72.46	65.22
MEP	21	3	3	15	71.43	61.90
Non-MEP	278	49	32	196	70.50	64.03
Asian	111	12	6	92	82.88	95.74
Black	13	4	5	4	30.77	66.67
MEP	7	1	2	4	51.14	80.00
Non-MEP	6	3	3	0	.0	.0
Mexican-American	9	3	0	6	66.67	83.33
MEP	7	1	0	6	85.71	83.33
Non-MEP	2	2	0	0	.0	.0
Other Hispanic	6	2	0	4	66.67	80.00
MEP	5	1	0	4	80.00	80.00
Non-MEP	1	1	0	0	.0	.0
White	129	24	19	86	66.67	88.00

(Continued)

TABLE 21 (continued)

Campus	Number First-time Freshmen in Engineering	Number Who Withdrew 1983-85	Number Who Changed Majors 1983-85	Number Continuing in Engineering	Continuation Rate	Proportion of Continuing Students Who Achieved Junior and Senior Status
Santa Barbara						
All Ethnic Groups	312	67	91	152	48.72	54.49
Female	61	16	23	22	36.07	39.34
Male	251	51	68	130	51.79	58.17
MEP	16	3	4	9	56.25	56.25
Non-MEP	296	64	87	143	48.31	54.39
Asian	35	4	11	19	54.29	100.00
Black	6	1	1	4	66.67	80.00
MEP	3	0	0	3	100.00	100.00
Non-MEP	3	1	1	1	33.33	50.00
Mexican-American	21	8	4	9	42.86	90.00
MEP	12	3	3	6	50.00	100.00
Non-MEP	9	5	1	3	33.33	75.00
Other Hispanic	4	1	1	2	50.00	75.00
MEP	0	0	0	0	.00	.00
Non-MEP	4	1	1	2	50.00	75.00
White	233	50	67	115	49.36	94.86

*No MEP on this campus.

Note: UC San Diego data are not available because freshmen are enrolled in a pre-engineering program for lower division work.

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 22 *Three-Year Continuation and Progress Rates of Regular-Admission Freshmen Majoring in Engineering at the California State University, Fall 1982, by Ethnicity and Participation in the Minority Engineering Program (MEP)*

Ethnic Group	Number Enrolled Fall 1982	Number Continuing in Engineering	Continuation Rate	Tracking Rate
All Groups				
All	2564	1722	67.2	67.2
MEP	151	127	84.1	84.1
American Indian				
All	10	7	70.0	70.0
Non-MEP	1	1	100.0	100.0
Asian				
All	439	339	77.2	77.2
Black				
All	128	59	46.1	46.1
MEP	42	33	78.6	78.6
Filipino				
All	103	69	67.0	67.0
Mexican-American				
All	161	94	58.4	58.4
Non-MEP	60	53	88.3	88.3
Other Hispanic				
All	107	63	58.9	58.9
Non-MEP	24	21	87.5	87.5
White				
All	1408	951	67.5	67.5

Note: None of the students graduated after three-years of study.

Source: California Postsecondary Education Commission staff analysis of University of California data.

TABLE 23 *Three-Year Tracking Rates of Freshmen Majoring in Engineering at the California State University, Fall 1982, by Ethnicity and Sex*

Institution	Number Enrolled	Number Graduated	Number Continuing in the Institution	Tracking Rate
Chico				
All Students*	75	0	50	66.7
Female	4	0	2	50.0
Male	71	0	48	67.6
Ethnic Groups (Male and Female)				
Asian	1	0	1	100.0
Black	--	--	--	--
Mexican-American	5	0	1	20.0
Other Hispanic	--	--	--	--
White	46	0	28	60.9
MEP Participants (Male and Female)	0			
Fresno				
All Students*	114	0	87	76.3
Female	11	0	9	81.8
Male	103	0	78	75.7
Ethnic Groups (Male and Female)				
Asian	9	0	9	100.0
Black	3	0	2	66.7
Mexican-American	17	0	11	64.7
Other Hispanic	6	0	6	100.0
White	75	0	57	76.0
MEP Participants (Male and Female)	12	0	10	83.3
Fullerton				
All Students*	149	0	93	62.4
Female	20	0	11	55.0
Male	129	0	82	63.6
Ethnic Groups (Male and Female)				
Asian	40	0	25	62.5
Black	3	0	0	.0
Mexican-American	8	0	7	87.5
Other Hispanic	7	0	2	28.6
White	84	0	55	65.5
MEP Participants (Male and Female)	4	0	4	100.0
Humboldt				
All Students*	15	0	9	60.0
Female	4	0	2	50.0
Male	11	0	7	63.6
Ethnic Groups (Male and Female)				
Asian	--	--	--	--
Black	--	--	--	--
Mexican-American	--	--	--	--
Other Hispanic	1	0	1	100.0
White	14	0	9	64.3
MEP Participants (Male and Female)	0			

(Continued)

TABLE 23 (continued)

Institution	Number Enrolled	Number Graduated	Number Continuing in the Institution	Tracking Rate
Long Beach				
All Students*	302	0	203	67.2
Female	60	0	34	56.7
Male	242	0	169	69.8
Ethnic Groups (Male and Female)				
Asian	68	0	57	83.8
Black	22	0	6	27.3
Mexican-American	12	0	5	41.7
Other Hispanic	22	0	14	63.6
White	137	0	93	67.9
MEP Participants (Male and Female)	9	0	9	100.0
Los Angeles				
All Students*	84	0	43	51.2
Female	18	0	10	55.6
Male	66	0	33	50.0
Ethnic Groups (Male and Female)				
Asian	31	0	22	71.0
Black	5	0	0	.0
Mexican-American	12	0	6	50.0
Other Hispanic	7	0	3	42.9
White	7	0	1	14.3
MEP Participants (Male and Female)	10	0	7	70.0
Northridge				
All Students*	230	0	156	67.8
Female	55	0	33	60.0
Male	175	0	123	70.3
Ethnic Groups (Male and Female)				
Asian	34	0	25	73.5
Black	31	0	16	51.6
Mexican-American	30	0	19	63.3
Other Hispanic	17	0	12	70.6
White	101	0	70	69.3
MEP Participants (Male and Female)	46	0	36	78.3
Pomona				
All Students*	452	0	307	67.9
Female	62	0	47	75.8
Male	390	0	260	66.7
Ethnic Groups (Male and Female)				
Asian	63	0	47	74.6
Black	16	0	10	62.5
Mexican-American	26	0	15	57.7
Other Hispanic	19	0	10	52.6
White	278	0	187	67.3
MEP Participants (Male and Female)	17	0	16	94.1

(Continued)

TABLE 23 (continued)

Institution	Number Enrolled	Number Graduated	Number Continuing in the Institution	Tracking Rate
Sacramento				
All Students*	124	0	89	71.8
Female	13	0	9	69.2
Male	111	0	80	72.1
Ethnic Groups (Male and Female)				
Asian	12	0	11	91.7
Black	2	0	1	50.0
Mexican-American	3	0	3	100.0
Other Hispan :	2	0	2	100.0
White	98	0	68	69.4
MEP Participants (Male and Female)	8	0	7	87.5
San Diego				
All Students*	321	0	174	54.2
Female	35	0	20	57.1
Male	286	0	162	56.6
Ethnic Groups (Male and Female)				
Asian	41	0	25	61.0
Black	16	0	10	62.5
Mexican-American	21	0	8	38.1
Other Hispanic	5	0	4	80.0
White	185	0	100	54.1
MEP Participants (Male and Female)	19	0	16	84.2
San Francisco				
All Students*	79	0	48	60.8
F male	19	0	14	73.7
Male	60	0	34	56.7
Ethnic Groups (Male and Female)				
Asian	21	0	17	81.0
Black	11	0	3	27.3
Mexican-American	5	0	3	60.0
Other Hispanic	1	0	1	100.0
White	20	0	10	50.0
MEP Participants (Male and Female)	1	0	1	100.0
San Jose				
All Students*	334	0	243	72.8
Female	51	0	33	64.7
Male	283	0	210	74.2
Ethnic Groups (Male and Female)				
Asian	77	0	67	87.0
Black	13	0	8	61.5
Mexican-American	9	0	7	77.8
Other Hispanic	13	0	5	38.5
White	184	0	134	72.8
MEP Participants (Male and Female)	13	0	12	92.3

(Continued)

TABLE 23 (continued)

Institution	Number Enrolled	Number Graduated	Number Continuing in the Institution	Tracking Rate
San Luis Obispo				
All Students*	285	0	212	
Female	70	0	55	[illegible]
Male	215	0	157	73.0
Ethnic Groups (Male and Female)				
Asian	42	0	33	78.6
Black	6	0	3	50.0
Mexican-American	13	0	8	61.5
Other Hispanic	7	0	4	57.1
White	179	0	139	777
MEP Participants (Male and Female)	12	0	9	75.0

*This total includes American Indian, Filipino, Pacific Islander, and Unknown categories not listed here.

Source: California Postsecondary Education Commission staff analysis of California State Univeristy data.

TABLE 24 *Three-Year Tracking Rates of Fall 1982 Transfer Students Majoring in Engineering at the California State University, by Ethnicity and Participation in the Minority Engineering Program (MEP)*

Ethnic Group	Number Enrolled Fall 1982	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
All Groups						
All	389	158	40.6	96	24.7	65.3
MEP	84	50	59.5	9	10.7	70.2
American Indian						
All	30	11	36.7	6	20.0	56.7
MEP	1	0	.0	0	.0	.0
Asian						
All	704	285	40.5	39	5.5	46.0
Black						
All	107	38	35.5	12	11.2	46.7
MEP	24	16	66.7	3	12.5	79.2
Filipino						
All	71	36	50.7	6	8.5	59.2
Mexican-American						
All	125	62	49.6	11	8.8	58.4
MEP	29	18	62.1	4	13.8	75.9
Other Hispanic						
All	123	46	37.4	15	12.2	49.6
MEP	17	8	47.1	0	.0	47.1
White						
All	1710	653	38.2	562	27.0	65.2

Source: California Postsecondary Education Commission staff analysis of California State University data.

TABLE 25 *Three-Year Tracking Rates of Fall 1982 Transfer Students Majoring in Engineering at the California State University, by Campus, Ethnicity and Participation in the Minority Engineering Program (MEP)*

Campus	Number Enrolled Fall 1982	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Chico*						
All Ethnic Groups	123	60	48.8	31	25.2	74.0
American Indian	1	0	.0	0	.0	.0
Asian	3	1	1	33.3	33.3	66.7
Black	--	--	--	--	--	--
Filipino	1	1	100.0	0	.0	100.0
Mexican-American	4	1	25.0	2	50.0	75.0
Other Hispanic	1	1	100.0	0	.0	100.0
Pacific Islander	--	--	--	--	--	--
White	89	46	51.7	20	22.5	74.2
Fresno						
All Ethnic Groups	142	60	42.3	44	31.0	73.2
American Indian	1	0	.0	0	.0	.0
Asian	15	7	46.7	4	26.7	73.3
Black	4	0	.0	1	25.0	25.0
Filipino	1	0	.0	0	.0	.0
Mexican-American	4	3	75.0	0	.0	75.0
Other Hispanic	9	5	55.6	3	33.3	88.9
Pacific Islander	--	--	--	--	--	--
White	92	35	38.0	35	38.0	76.1
MEP participants	8	5	62.5	0	.0	62.5
All Non-MEP	134	55	41.0	44	31.0	72.0
Fullerton						
All Ethnic Groups	197	73	37.1	26	13.2	50.3
American Indian	1	0	.0	0	0	0
Asian	79	25	31.6	7	8.9	40.5
Black	8	5	62.5	0	0	62.5
Filipino	1	0	.0	0	0	0
Mexican-American	3	1	33.3	0	0	33.3
Other Hispanic	6	2	33.3	0	0	33.3
Pacific Islander	2	1	50.0	1	50.0	100.0
White	80	25	31.3	15	18.8	50.0
MEP participants	2	1	50.0	0	0	50.0
Humboldt*						
All Ethnic Groups	38	15	39.5	4	10.5	50.0
American Indian	1	1	100.0	0	.0	100.0
Asian	1	0	.0	0	.0	.0
Black	--	--	--	--	--	--
Filipino	--	--	--	--	--	--
Mexican-American	--	--	--	--	--	--
Other Hispanic	--	--	--	--	--	--
Pacific Islander	--	--	--	--	--	--
White	34	14	41.2	3	8.8	50.0
Long Beach						
All Ethnic Groups	563	237	42.1	115	20.4	62.5
American Indian	7	4	57.1	2	28.6	85.7
Asian	223	106	47.5	35	15.7	63.2
Black	18	10	55.6	4	22.2	77.8
Filipino	15	11	73.3	1	6.7	80.0
Mexican-American	18	8	44.4	0	0	44.4
Other Hispanic	21	8	38.1	1	4.8	42.9
Pacific Islander	4	1	25.0	1	25.0	50.0
White	207	74	35.7	56	27.1	62.8
MEP participants	11	10	90.9	0	0	90.9
All Non-MEP	552	227	41.1	115	20.4	61.5

(Continued)

TABLE 25 (continued)

Campus	Number Enrolled Fall 1982	Number Continuing in Engineering	Continuatic Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
Los Angeles						
All Ethnic Groups	143	53	37.1	20	14.0	51.0
American Indian	1	0	0	0	0	0
Asian	40	13	32.5	8	20.0	52.5
Black	16	5	31.3	0	0	31.3
Filipino	3	2	66.7	0	0	66.7
Mexican-American	13	7	53.8	1	7.7	61.5
Other Hispanic	9	3	33.3	0	0	33.3
Pacific Islander	1	0	0	1	100.0	100.0
White	24	12	50.0	1	4.2	54.2
MEP participants	10	7	70.0	1	10.0	80.0
All Non-MEP	133	46	34.6	19	14.3	48.9
Northridge						
All Ethnic Groups	52	22	42.3	15	28.8	71.2
American Indian	..	..	..	..	..	..
Asian	15	8	53.3	2	13.3	66.7
Black	3	1	33.3	0	0	33.3
Filipino	..	..	..	..	..	..
Mexican-American	1	1	100.0	0	0	100.0
Other Hispanic	1	1	100.0	0	0	100.0
Pacific Islander	1	0	0	0	0	.0
White	28	9	32.1	13	46.4	78.6
MEP participants	6	3	50.0	0	0	50.0
All Non-MEP	46	19	41.3	15	28.8	70.1
Pomona						
All Ethnic Groups	657	239	36.4	170	25.9	62.3
American Indian	8	3	37.5	1	12.5	50.0
Asian	..	..	..	..	..	..
Black	33	17	51.5	4	12.1	63.6
Filipino	17	9	52.9	4	23.5	76.5
Mexican-American	43	19	44.2	4	9.3	53.5
Other Hispanic	34	12	35.3	2	5.9	41.2
Pacific Islander	10	6	60.0	3	30.0	90.0
White	370	136	36.8	98	26.5	63.2
MEP participants	21	9	42.9	5	23.8	66.7
All Non-MEP	636	230	36.2	165	25.9	62.1
Sacramento						
All Ethnic Groups	270	99	36.7	96	35.6	72.2
American Indian	..	..	..	..	..	..
Asian	50	15	30.0	21	42.0	72.0
Black	1	0	0	0	0	0
Filipino	2	1	50.0	0	0	50.0
Mexican-American	2	2	100.0	0	0	100.0
Other Hispanic	3	1	33.3	1	33.3	66.7
Pacific Islander	..	..	..	..	..	..
White	192	76	39.6	67	34.9	74.5
MEP participants	4	2	50.0	2	50.0	100.0
All Non-MEP	266	97	36.5	94	35.3	71.8
San Diego						
All Ethnic Groups	353	135	38.2	69	19.5	57.8
American Indian	4	2	50.0	0	0	50.0
Asian	48	17	35.4	9	18.8	54.2
Black	7	0	0	2	28.6	28.6
Filipino	14	3	21.4	1	7.1	28.6
Mexican-American	15	9	60.0	1	6.7	66.7
Other Hispanic	6	2	33.3	1	16.7	50.0
Pacific Islander	2	0	0	1	50.0	50.0
White	213	81	38.0	50	23.5	61.5
MEP participants	7	6	85.7	0	0	85.7
All Non-MEP	346	129	37.3	69	19.5	56.8

(Continued)

TABLE 25 (continued)

Campus	Number Enrolled Fall 1982	Number Continuing in Engineering	Continuation Rate	Number Who Graduated in Engineering	Graduation Rate	Tracking Rate
San Francisco*						
All Ethnic Groups	109	41	37.6	16	14.7	52.3
American Indian	1	0	.0	0	.0	.0
Asian	27	12	44.4	4	14.8	59.3
Black	7	3	42.9	0	.0	42.9
Filipino	3	0	.0	0	.0	.0
Mexican-American	2	0	.0	2	100.0	100.0
Other Hispanic	10	4	40.0	2	20.0	60.0
Pacific Islander	1	0	.0	0	.0	.0
White	34	13	38.2	5	14.7	52.9
San Jose						
All Ethnic Groups	330	133	40.3	85	25.8	66.1
American Indian	4	0	0	3	75.0	75.0
Asian	76	37	48.7	16	21.1	69.7
Black	7	4	57.1	1	14.3	71.4
Filipino	12	7	58.3	0	0	58.3
Mexican-American	8	4	50.0	0	0	50.0
Other Hispanic	11	4	36.4	2	18.2	54.5
Pacific Islander	1	1	100.0	0	0	100.0
White	184	69	37.5	55	29.9	67.4
MEP participants	4	2	50.0	1	25.0	75.0
All Non-MEP	326	131	40.2	84	25.8	66.0
San Luis Obispo						
All Ethnic Groups	267	106	39.7	0	22.5	62.2
American Indian	1	0	.0	0	0	0
Asian	30	8	26.7	9	30.0	56.7
Black	3	2	66.7	0	0	66.7
Filipino	2	1	50.0	0	0	50.0
Mexican-American	12	6	50.0	1	8.3	58.3
Other Hispanic	12	3	25.0	3	25.0	50.0
Pacific Islander	..	..	..	..	..	..
White	163	63	38.7	44	27.0	65.6
MEP participants	11	5	45.5	0	0	45.5
All non-MEP	256	101	39.5	60	22.5	62.0

*No MEP on this campus.

Source: California Postsecondary Education Commission staff analysis of California State University data.

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CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

THE California Postsecondary Education Commission is a citizen board established in 1974 by the Legislature and Governor to coordinate the efforts of California's colleges and universities and to provide independent, non-partisan policy analysis and recommendations to the Governor and Legislature.

Members of the Commission

The Commission consists of 15 members. Nine represent the general public, with three each appointed for six-year terms by the Governor, the Senate Rules Committee, and the Speaker of the Assembly. The other six represent the major segments of postsecondary education in California.

As of March 1987, the Commissioners representing the general public are:

Seth P. Brunner, Sacramento
C. Thomas Dean, Long Beach, *Chairperson*
Seymour M. Farber, M.D., San Francisco
Cruz Reynoso, Los Angeles
Lowell J. Paige, El Macero
Roger C. Pettitt, Los Angeles
Sharon N. Skog, Mountain View, *Vice Chairperson*
Thomas E. Stang, Los Angeles
Stephen P. Teale, M.D., Mokelumne Hill

Representatives of the segments are:

Yori Wada, San Francisco; representing the Regents of the University of California

Claudia H. Hampton, Los Angeles; representing the Trustees of the California State University

Arthur H. Margosian, Fresno; representing the Board of Governors of the California Community Colleges

Donald A. Henricksen, San Marino; representing California's independent colleges and universities

Harry Wugalter, Thousand Oaks; representing the Council for Private Postsecondary Educational Institutions

Angie Papadakis, Palos Verdes; representing the California State Board of Education

Functions of the Commission

The Commission is charged by the Legislature and Governor to "assure the effective utilization of public postsecondary education resources, thereby eliminating waste and unnecessary duplication, and to promote diversity, innovation, and responsiveness to student and societal needs."

To this end, the Commission conducts independent reviews of matters affecting the 2,600 institutions of postsecondary education in California, including Community Colleges, four-year colleges, universities, and professional and occupational schools.

As an advisory planning and coordinating body, the Commission does not administer or govern any institutions, nor does it approve, authorize, or accredit any of them. Instead, it cooperates with other state agencies and non-governmental groups that perform these functions, while operating as an independent board with its own staff and its own specific duties of evaluation, coordination, and planning.

Operation of the Commission

The Commission holds regular meetings throughout the year at which it debates and takes action on staff studies and takes positions on proposed legislation affecting education beyond the high school in California. By law, the Commission's meetings are open to the public. Requests to address the Commission may be made by writing the Commission in advance or by submitting a request prior to the start of a meeting.

The Commission's day-to-day work is carried out by its staff in Sacramento, under the guidance of its executive director, William H. Pickens, who is appointed by the Commission.

The Commission issues some 30 to 40 reports each year on major issues confronting California postsecondary education. Recent reports are listed on the back cover.

Further information about the Commission, its meetings, its staff, and its publications may be obtained from the Commission offices at 1020 Twelfth Street, Third Floor, Sacramento, CA 98514-3985; telephone (916) 445-7933.

RETENTION OF STUDENTS IN ENGINEERING

California Postsecondary Education Commission Report 86-33

ONE of a series of reports published by the Commission as part of its planning and coordinating responsibilities. Additional copies may be obtained without charge from the Publications Office, California Postsecondary Education Commission, Third Floor, 1020 Twelfth Street, Sacramento, California 98514-3985; telephone (916) 445-7933.

Other recent reports of the Commission include:

86-16 Purposes and Effects of Student Financial Aid: The Second of Two Background Papers on Student Financial Aids Issues and Options Prepared for the California Postsecondary Education Commission, May 1986 (May 1986)

86-17 Director's Report, May 1986: Enrollment Trends in California Higher Education, 1980-1985 (May 1986)

86-18 California Postsecondary Education Commission News, Number 1 [Inaugural issue of the Commission's periodic newsletter] (June 1986)

86-19 Analysis of the State University's Criteria for Approving Permanent Upper-Division and Graduate Off-Campus Centers: A Report to the Governor and Legislature in Response to Senate Bills 785, 1060, and 1103 (1985) (June 1986)

86-20 Annual Report on Program Review Activities 1984-85: The Tenth in a Series of Reports to the Legislature and Governor on Program Review by Commission Staff and California's Public Colleges and Universities (June 1986)

86-21 Eligibility for Institutional Participation in the Cal Grant Program: A Report to the Legislature and Governor in Response to Senate Bill 362 (Chapter 772, Statutes of 1985) (June 1986)

86-22 Transforming Data into Information: Improving Student Performance Reporting: A Staff Report to the California Postsecondary Education Commission (June 1986)

86-23 Comments from the Community: Working Papers and Testimony Before the ACR 3 Committee on Educational Opportunities and Services for Students with Disabilities in California (July 1986)

86-24 California Colleges and Universities, 1986: A Guide to Degree-Granting Institutions and to Degree and Certificate Programs (September 1986)

86-25 California College-Going Rates, 1985 Update: The Ninth in a Series of Reports on New Freshman Enrollment at California's Colleges and Universities by Recent Graduates of California High Schools (September 1986)

86-26 Supplemental Report on Academic Salaries, 1985-86: Faculty Salaries in the California Community Colleges: Selected Administrative Salaries at the University of California and the California State University (September 1986)

86-27 Special-Action Admission at California's Public Universities: Recommendations for Strengthening an Alternative Route to Success at the University of California and the California State University (September 1986)

86-28 Appropriations in the 1986-87 State Budget for the Public Segments of Higher Education; Proposition 61 and Its Potential Impact on Public Postsecondary Education: Two Reports by Staff of the California Postsecondary Education Commission. (September 1986)

86-29 Clarifying the State's Role in Guaranteeing Student Loans: A Report to the Legislature and Governor in Response to Assembly Bill 756 (Chapter 1379, Statues of 1985) (December 1986)

86-30 Conflicts in State Policies Governing Undergraduate Enrollment at California's Public Universities: An Analysis in Response to Language in the Supplemental Report of the 1985 Budget Act (December 1986)

86-31 Student Financial Aid in California: To Close the Widening Gyre (December 1986)

86-32 Effects of the Mandatory Statewide Fee on California Community College Enrollments: A Staff Report to the California Postsecondary Education Commission (December 1986)