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# High School Curriculum and University Admission Requirements: A Critical Linkage

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A Report for the Intersegmental Task Force on Assembly Concurrent Resolution 73

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# *Executive Summary*

The adoption of new CSU admission requirements closely parallels other state-level action over the last few years calling for a more coherent pattern of academic course work in California high schools. Cumulatively, these multiple forces have produced significant pressures on high schools to increase academic offerings and to meet the new standards. Although the proposed changes were generated from an array of sources, they are remarkably consistent and send a set of reasonably clear signals to schools. The pressure for change combined with a substantial influx of state dollars has resulted in marked improvement on several dimensions. Numbers of academic course sections offered and enrollments in academic courses generally as well as in college preparatory courses show overall increases. They reflect the fact that, for the most part, districts have responded to the cumulative effect of increased graduation requirements, higher expectations, and more rigorous admission requirements.

Accommodating change of such magnitude is a difficult task for a system already burdened by other demands. Recognizing the difficulty schools face in responding to these changes in a relatively short time, CSU adopted what appears to be a reasonable phase-in period and is closely monitoring the impact of new requirements with a concomitant, explicit commitment to alter the implementation schedule if new information warrants.

Growth in the rates of classes offered and course enrollments are positive indicators that schools are moving to meet the increased expectations of the four-year segments and other pressures, but these growth rates reveal little about the quality of the courses offered, nor do they generate information about whether the promulgation of higher standards will increase dropout rates and enlarge the number of students failing to receive diplomas, nor do they answer the question regarding whether these growth rates will be able to be sustained over time, nor whether all high schools will ultimately be able to offer adequate numbers of courses of sufficient quality to ensure college preparatory opportunities for all those who want and need them. There are other more specific problems that deserve continued concern and increased attention:

- Despite improvement, black and Hispanic students are still underrepresented in advanced course enrollments and in completing the course patterns necessary for admission to the public four-year segments.

- There is a substantial disparity among schools in academic course offerings and an even greater disparity among schools in the percentage of a-f completers. Schools with relatively low completion rates tend to have higher than average enrollment of historically underrepresented students, have lower socioeconomic status as measured by parental income, and have higher percentages of AFDC-eligible and limited-English-proficient students.

- Visual and performing arts courses of collegiate preparatory level appear to be a major problem both in terms of course sections offered and in enrollment. Combining this information with what is already known about low completion rates of this requirement among past CSU freshmen applicants, highlights a problem area which will require attention.

- California will face major problems in providing adequate teaching staff both in terms of quantity and quality, particularly in science and mathematics, even though new information on potential increases in supply is positive.

- Inservice training for high school teachers on matters relating to curriculum is virtually nonexistent, and in those cases where it is offered, is inadequate.

- Other segments of education will be affected by the new CSU graduation requirements. It is not clear that all the implications of these changes have been fully explored.

Twelve recommendations covering dimensions such as financial and human resources, special programs, organizational framework, and dissemination are discussed beginning on page 29.

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# *Policy Analysis for California Education*

Policy Analysis for California Education, PACE, is a university-based research center focusing on issues of state educational policy and practice. PACE is located in the Schools of Education at the University of California, Berkeley and Stanford University. It is funded by the William and Flora Hewlett Foundation and directed jointly by James W. Guthrie and Michael W. Kirst. PACE operates satellite centers in Sacramento and Southern California. These are directed by Gerald C. Hayward (Sacramento) and Allan R. Odden (University of Southern California).

PACE efforts center on five tasks: (1) collecting and distributing objective information about the conditions of education in California, (2) analyzing state educational policy issues and the policy environment, (3) evaluating school reforms and state educational practices, (4) providing technical support to policy makers, and (5) facilitating discussion of educational issues.

The PACE research agenda is developed in consultation with public officials and staff. In this way, PACE endeavors to address policy issues of immediate concern and to fill the short-term needs of decision makers for information and analysis.

PACE publications include Policy Papers, which report research findings, the Policy Forum, which presents views of notable individuals; and Update, an annotated list of all PACE papers completed and in progress.

# *Introduction*

Assembly Concurrent Resolution 73 resulted in part from legislative concern about the impact of recent changes in the California State University's (CSU) admission requirements. These new requirements, when fully phased in, will more closely parallel entrance requirements of the University of California (UC). The legislative directive, however, went beyond new CSU admission requirements to encompass the general availability of appropriate high school curricular offerings and faculty adequacy for preparing California's young people for higher education. The resolution specifically called for recommended actions to ensure access to higher education, especially for underrepresented minority students. Other legislative concerns, including the examination of alternative admission criteria, are beyond the scope of this study.

ACR 73 directed the Superintendent of Public Instruction, in cooperation with the Regents of the University of California and the Trustees of the California State University, to convene a Task Force on College Preparation to examine issues and to make recommendations to the California Postsecondary Education Commission, the Commission on the Review of the Master Plan for Higher Education, and the Joint Legislative Committee on the Master Plan. The Superintendent of Public Instruction contracted with Policy Analysis for California Education (PACE) to work with the task force in preparing this report.

California's education system is diverse and complex. Its segments--elementary and secondary schools, community colleges, and four-year higher education institutions--are remarkably and inextricably interrelated. Consequently, actions of a single segment have large and sometimes unanticipated consequences for other segments. In this report, for example, the following interwoven actions and implications will be explored:

1. Admission policies of the four-year segments have a major impact on high school curriculum. Historically, high schools have been attentive to changes in admission requirements of postsecondary institutions. Although it is evident that both the public four-year segments impact high school curricula, the focus of this report is the changes recently implemented by the Board of Trustees of the California State University System, because of their recency and the magnitude of the change.

2. Other significant external forces, including the University of California, State Board of Education, Superintendent of Public Instruction, general public, legislature, and governor, also impact heavily on high school curriculum. In examining the impact of CSU's actions, it is important that one not lose sight of the multitude of other factors which appear to be leading in the same direction. It is important, in other words, to view these changes within their appropriate policy context. A subsection entitled Other Forces addresses these influences.

3. The cumulative effect of these external pressures for a more academically oriented curriculum has led to the adoption of a more rigorous high school curriculum with increases in both courses offered and enrollment in these courses. The section entitled High School Curricular Changes examines these impacts over time from a variety of sources and examines changes in offerings and enrollments in academic courses, with a special focus on those courses now acceptable for admission to UC and those soon to be required for CSU.

4. Although the pattern of curricular change is positive, it is not uniform. Underrepresented minority groups, while showing some progress in enrollment patterns in academic courses, are still substantially behind their white and Asian counterparts. In addition, schools with large percentages of low-income and minority youth, on average, offer substantially fewer courses which meet the new requirements. The section on Advanced Course Enrollment by Ethnicity examines this troublesome phenomenon.

5. Admission requirement changes also influence parts of the education system other than high schools. A section entitled Other Impacts looks at potential implications for CSU, UC, community colleges, elementary and junior high schools, and teacher supply and demand.

6. Sections entitled Conclusions and Recommendations summarize major findings and recommend actions to ensure access to higher education for high school graduates.

In order to understand fully the implications of these changes in admission requirements it is important to understand the policy itself. The next section is devoted to examining CSU's new admission policy.

## California State University Admission Requirements

From 1965 through 1983, the California State University admission requirements for first-time freshmen did not include specific high school course requirements. Students were eligible for admission if they possessed a high school diploma and had a sufficiently high score on CSU's Eligibility Index, a weighted combination of high school grade point average (GPA) and score on either the Scholastic Aptitude Test (total score) or the American College Test (composite score). The eligibility index was monitored and adjusted periodically. Students with GPAs above a specified level were eligible for admission irrespective of their scores on the standardized test. The intent of these requirements was to create a pool of eligible students equal to the top one-third of the high school graduating class, consistent with the Master Plan's directive that CSU serve the top one-third of California public high school graduates.

In 1981, the CSU Trustees, concerned that many students were coming to the university ill-prepared for college-level work, added specific course requirements in English (4 years) and mathematics (2 years). These revisions were first effective for students entering CSU in the fall of 1984. In addition, in November 1984 the Trustees directed the Chancellor to develop recommendations concerning additional courses which should be required for entrance. In response to that directive, the Chancellor, aided by the California State University Admission Advisory Council (with representatives from the faculty, administration, and students) submitted a report to the Trustees. That report led to the adoption in November 1985 of a resolution requiring a comprehensive course pattern of college preparatory subjects to become effective for first-time freshmen applicants commencing in the fall of 1988. The resolution stated:

> Resolved, That the comprehensive pattern of college preparatory subject requirements shall include four years of English, three years of mathematics, one year of social studies (U.S. history and government), one year of laboratory science, two years of foreign language, one year in the visual and performing arts, and three years of electives from specified fields of study...

The Trustees subsequently adopted the following comprehensive pattern of college preparatory subjects as an element of admission requirements. These additional requirements were to be effective fall 1988 for all regular admittees:

- 4 years of English (presently required)
- 3 years of mathematics (2 years presently required)
- 1 year of U.S. history or U.S. history and government
- 1 year of laboratory science
- 2 years of foreign language (or competency)
- 1 year in the visual and performing arts
- 3 years of approved electives

Conditional Admissions

Also included as a part of the resolution was the following general language regarding possible "conditional admissions provisions":

> Resolved, That the Chancellor may authorize conditional admission provisions for applicants otherwise admissible but who are deficient in one or more units of required subjects.

In May 1986, the Chancellor presented an information item to the Trustees further describing conditional admission as a form of regular admission separate and distinct from admission by special action:

> Applicants otherwise admissible and admitted "on condition" will be required to meet specified conditions after enrollment, such conditions to include completing specific requirements early in their careers at CSU, most likely within the first year of baccalaureate study. Providing for conditional admission will phase in the additional subjects during the initial stages only. Eventually, CSU expects the provision will no longer be necessary. The Chancellor will therefore establish limits on the number of subjects that can be missing. Decisions on the limits will follow further study of the applicant population resulting from monitoring the impact of the requirements on that population.

The Trustees reiterated their directive that the Chancellor shall further:

> ... make every effort to avoid undue hardship during the phasing in of these requirements and shall determine satisfactory completion of the requirements and may grant exceptions for preparation determined by the Chancellor to be equivalent. Similarly, the CSU will continue to evaluate the availability of curricular offerings in the secondary schools as that availability pertains to the admission requirements and the particulars of conditional admission.

As a result of this directive, and based on recommendations developed by the Admissions Advisory Council and upon further review, the Chancellor adopted the following conditional admission policy:

| | |
|---|---|
| Fall 1988 | At least 10 of the required 15 units, among which are included at least 6 of the 7 units in English and mathematics. |
| Fall 1989 | At least 12 of the required 15 units, among which are included at least 6 of the 7 units in English and mathematics. |
| Fall 1990 | At least 14 of the required 15 units, among which are included at least 6 of the 7 units in English and mathematics. |
| Fall 1991 | At least 14 of the required 15 units, among which are included at least 6 of the 7 units in English and mathematics. |
| Fall 1992 | Full implementation. |

Removing Conditions

In notifying students of admission to the university, CSU will specify on the admission document whether the student is to be admitted as a conditional admit. The letter of admission will designate which deficiencies apply and will describe precisely what the student must do to remove them. Students will be encouraged to make up the missing subjects early in their baccalaureate studies. Baccalaureate-level degree courses completed to satisfy conditions of admission count toward all applicable bachelor's degree objectives. For example, a student not completing the requirement in visual and performing arts may enroll in an art course at CSU and remove the deficit as well as gain credit toward the

baccalaureate degree. To the extent that this occurs, the student's time-to-degree would not be lengthened.

Continued Conditional Admission

Beyond the phase-in period, CSU will continue to have a restricted conditional admission policy "providing for applicants to be considered for admission who fail to have the required pattern of courses, but who give indications of being highly qualified otherwise." CSU lists among examples of such conditions, "a graduate of a high school that did not offer a required course or courses, or an English-as-a-second-language student who, because of language difficulties, may not have completed the English sequence."

Special Action

CSU has made clear that the conditional admission process is separate and distinct from the special action admission policies already in place in the system and that special action policies will be continued. This is an important policy in that two-thirds of 1985 black freshmen were special admits, as were 45 percent of Hispanic freshmen.

Monitoring

The Chancellor of CSU has also adopted a comprehensive and ambitious monitoring plan to evaluate "... trends in the number of collegiate preparatory subjects taken by public high school students in California as well as changes in other variables related to admission to the CSU." The trends to be studied include:

> ...changes in the percent taking each component of the 1988 CSU comprehensive subject requirements, changes in the distribution of high school grades, changes in the distributions of admission test scores and changes in the distributions of test scores used for remedial placement. The monitoring plan will also measure the benefits that are expected to ensue from the the introduction of the subject requirements including improved performance and persistence in the CSU and a reduction in the need for remediation.

## Context

It would be a mistake and a serious oversimplification to look at changes in CSU entrance requirements in isolation, especially in terms of their impact on high school curriculum. Although actions by the Trustees of the California State University and, particularly, actions of the Regents of the University of California have historically played a significant role in determining the content of high school curriculum, they do not operate in isolation. Few would argue that the role of the four-year segments is less than critical. However, curricular changes must be viewed in an appropriate context, and there are other major forces which impact upon high school curricular offerings.

Numerous studies on curricular change, both in California and nationally, have been undertaken in the last decade. Although many of the studies attempted to attribute cause for curricular changes in high schools, there is no consensus on the primary impetus of change. A national study of school board members published in 1985 maintains that school boards are responsible for curricular changes; school board members reported that the major impetus for change came from the local level, not the state. Other studies have linked local curricular changes with other, nonschool related phenomena. It is clear, for example, that in California, Proposition 13 played a significant role in the curricular retrenchment which followed. Still other studies point to legislative initiative as the precursor for local high school curricular changes. The minimum competency testing program in California, for example, has been found to have been an important catalyst for change (Grossman, et al. 1985).

### Other Forces

Irrespective of the difficulty in establishing a precise cause-effect relationship between state-level actions and local high school curricular changes, it is clear that external forces do play a significant role in determining the typical high school curriculum. A number of such forces are clearly at work in altering local course offerings, for example:

1. Substantial infusions of state dollars over the last three years, primarily due to the passage of significant school finance/reform legislation, have enabled districts to restore a large number of courses that were eliminated during the immediate post-Propositon 13 era. More specifically, districts were given bonuses to lengthen their school day (many schools were forced by financial exigencies to a five-period day; now the vast majority are able to offer at least six periods). In addition, counseling services, which were severely curtailed by Proposition 13 and other fiscal shortfalls, have been improved by implementation of the tenth grade counseling bonus, in which nearly all high schools now participate.

2. Senate Bill 813 also increased high school graduation requirements to:

   - 3 years of English
   - 2 years of mathematics

- 2 years of science
- 3 years of social science
- 1 year of foreign language or fine arts
- 2 years of physical education (previously required)

3. The State Department of Education, under Senate Bill 813, established a three-phase accountability program for the state's public high schools in order to raise standards and expectations for students, teachers, and schools. A specific goal was to increase the number of students academically prepared for college. Phase one involved setting state goals for improvement on specified "quality indicators." Phase two involved preparing individual performance reports for each high school and district, and comparing the schools' and districts' performance with state goals. Phase three involved encouraging each local school and district to develop their own local accountability reports with appropriate goals.

4. The State Board of Education adopted model high school graduation standards which challenge local school districts:

> ... to raise their sights and to recognize what is necessary to achieve excellence in education. If they meet the Board's challenge, local districts will be involved in the development of their own high school graduation requirements, and local communities will participate in the comparison of local standards to those of the model. Only such participation can result in the necessary commitment for effective reform.

The State Board of Education's recommendations include:

- 4 years of English
- 2 years of science (a year each of physical and life science)
- 3 years of mathematics (including algebra and geometry)
- 3 years of social sciences, including:
  - 1 year of world civilizations
  - 1 year of U.S. history
  - 1 semester of government
  - 1 semester of economics
- 2 years of the same foreign language
- 1 year of visual and performing arts
- 1 year of computer studies

5. State legislation (ACR 14, 1983) urged the State Board of Education to require each school district governing board to compare its existing graduation requirements and curriculum standards with the model standards developed by the State Board of Education.

6. Senate Bill 1213 added a semester of economics to existing high school graduation requirements.

7. Academic Senates of the three segments of public higher education jointly adopted and have widely disseminated their *Statement on Competencies in English and Mathematics Expected of Entering Freshmen* (Academic Senates 1984), intended to assist students in preparing for college, their parents and counselors in advising and course selection, and high school teachers and administrators in planning curriculum.

8. The University of California's entrance requirements have long been viewed as a primary "driver" of high school curriculum. Because the required course sequence has six components, labeled a-f, the high school courses are commonly referred to as "a-f courses." The current University of California a-f requirements include:

- 4 years of English
- 3 years of mathematics
- 1 year of laboratory science
- 1 year of U.S. history or U.S. history and government
- 2 years of the same foreign language
- 4 years of approved electives

9. In computing grade point averages, the University of California and many prestigious private colleges and universities now award extra weight for honors and advanced placement classes in order to encourage students to take more difficult courses.

In sum, a wide variety of forces external to the high school have combined, in an unprecedented manner, to create a cumulative and significant pressure for change in high school curriculum. Although proposed changes have been generated from an array of sources, the called-for changes are remarkably consistent and send reasonably clear signals to schools (Figure 1). Change of such magnitude does not come easily, however, and will undoubtedly require long-term, sustained effort to implement. The next section examines initial high school responses to these pressures for change.

## Figure 1

**Graduation Requirements Established by SB 813 and Recommended by the State Board of Education, Admission Requirements CSU and UC**

| Subject | SB 813 | State Board of Education | CSU Required 1988 | UC Required 1986 |
|---|---|---|---|---|
| English | 3 | 4 | 4 | 4 |
| Mathematics | 2 | 3 | 3 | 3 |
| Algebra | | (1) | | |
| Geometry | | (1) | | |
| Science | 2 | 2 | 1[d] | 1[d] |
| Physical | (1) | (1) | | |
| Life | (1) | (1) | | |
| Social Studies | 3 | 3 | 1[e] | 1[e] |
| World Civ. | (1) | (1) | | |
| U.S. History | (1) | (1) | (1) | (1) |
| Ethics | | (.5) | | |
| American Gov. | (1)[a] | | (1) | (1) |
| Economics | | (.5) | | |
| Foreign Language | 1[b] | 2[c] | 2[c] | 2[c] |
| Fine Arts | 1[b] | 1 | 1[f] | |
| Computer Studies | | .5 | | |
| Physical Education | 2 | | | |
| Electives | | | 3 | 4 |

[a]Including civics and economics
[b]One year foreign language or fine arts
[c]Must be in same language
[d]Lab required
[e]U.S. History/Government
[f]Visual and performing arts

SOURCE: California Postsecondary Education Commission, and California State Department of Education.

# *High School Curricular Changes*

There are a variety of ways one can examine curricular change. Each of several approaches is important in order to get the full flavor of the magnitude of change over time. Directly responsive to the question regarding the general availability of courses required for admission, this section examine changes in course sections offered. If adequate numbers of course sections are not offered, California high school students will not have access to the two public university systems or many independent colleges and universities. Although it is beyond the scope of this study to determine what an adequate number of course section offerings would be for each high school in the state, one can examine recent trends in course offerings, particularly as they apply to the kinds of academic courses acceptable by CSU.

It is equally important to examine course enrollment trends. Little good is served by offering new course sections if students do not opt to take them. It is particularly important to examine trends and patterns in course enrollment in the specific a-f pattern now required for admission to UC since these requirements so closely parallel the new CSU admission criteria. This section also compares data on a-f course completers. This data, collected by the State Department of Education for the first time this year, will provide an important benchmark for examining future trends.

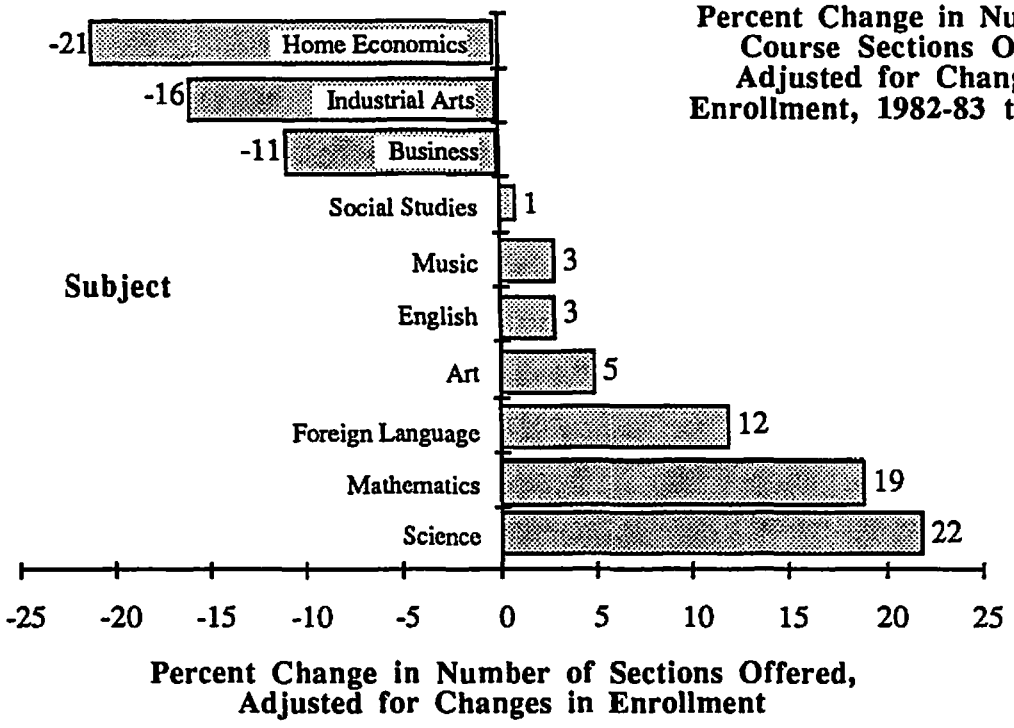
Finally, and of critical importance to the future of this state, will be to examine course patterns by ethnicity. California would be ill-served by any policy that provides for anything less than full equal educational opportunity for its historically underrepresented students.

## Class Sections

All the activities cited thus far have created pressures on school districts to implement changes in high school courses aimed at meeting state curricular standards. Schools have begun to respond. In *Conditions of Education in California, 1985* (Guthrie, et al. 1985) PACE reported significant increases in numbers of class sections in social studies, music, English, art, foreign language, mathematics, and science in the two-year period 1982-83 to 1984-85 (Figure 2). Of special note was the spectacular increase in advanced placement offerings (58%). These changes, reported fully in *Curricular Change in California Comprehensive High Schools* (Grossman, et al. 1985), were based on a sample of 20 public comprehensive California high schools . Although the sample is not random and is skewed slightly in the direction of more academically-oriented students, PACE did find important curricular changes across academic subject matter areas for the two-year period in question, and these findings were generally consistent with CBEDS (California Basic

**FIGURE 2**

**Percent Change in Number of Course Sections Offered, Adjusted for Changes in Enrollment, 1982-83 to 1984-85**




SOURCE: Pam Grossman and Michael W. Kirst, et al., *Study of Curricular Change in California Comprehensive High Schools: 1982-83 to 1984-85* (Berkeley, CA: Policy Analysis for California Education, PACE, July 1985).

Educational Data System) data collected for the state as a whole. In addition, PACE found that schools in the sample with a lower parent education index (a proxy for socioeconomic status used by the State Department of Education) showed the greatest gains in the number of academic courses, particularly in science and mathematics.

The most recent data (1984-85 to 1985-86) from CBEDS also display growth across the academic curriculum, suggesting that districts are still moving to meet the more rigorous standards (Guthrie, et al. 1986). Comparing 1984 with 1985 (Figure 3) and correcting for enrollment growth, each academic departmental area (except music) shows continued improvement in the number of classes offered. English (+0.6%), social science (+1.1%), and art (+1.4%) show modest growth; mathematics (+3.4%) and foreign languages (+4.7%) show moderate growth; drama (+13.0%) and science (+13.3%) display significant increases. Only music declined slightly (-0.4%).

Within these general categories, growth patterns differ. Within *English*, comprehensive English offered in grades 9-12 (+5.3%), literature (+2.2%), and advanced composition (+1.5%) displayed increases greater than English as a whole, continuing the progress begun in 1983-84. Advanced Placement English declined slightly (-1.3%), which is not unexpected given its remarkable growth of the last two years.

The most significant finding in *foreign language* is the growth in advanced (beyond the first two years) foreign language classes. These classes increased by 18.1 percent in a single year, with the largest increase occurring in Spanish (+22.4%).

*Science* also experienced spectacular growth in chemistry (+20.6%), advanced chemistry (+17.9%), and the physical science, earth science, and life science courses (+29.5%), the latter changes representing an obvious response to increased graduation requirements.

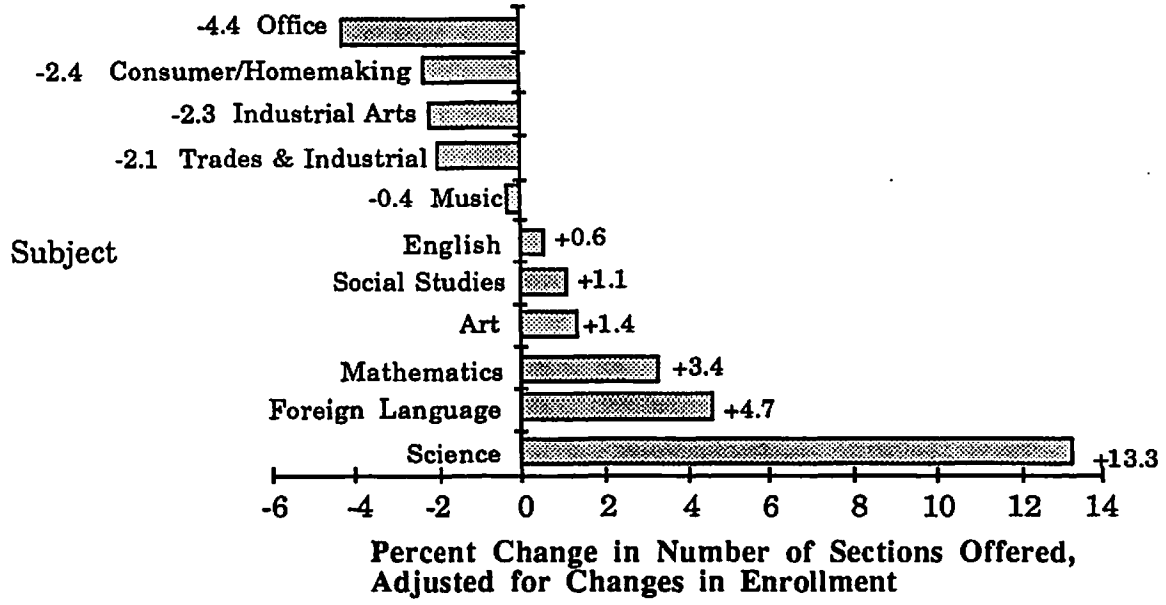
In the *social sciences*, economics displayed the most dramatic growth (+24%), generated at least partially by SB 1213 which added a semester of economics to the graduation requirement list.

In *mathematics*, the largest increases occurred in courses beyond beginning algebra (i.e., geometry, trigonometry, calculus, etc.). The combined rate of increase for all mathematics courses above beginning algebra totalled 10.7 percent. As was the case in prior years, courses relating to computers continued to enjoy substantial increases.

Class offerings in the *visual and performing arts* deserve special attention because this admission requirement is distinctive to the California State University. These courses normally fall within the categories of art, dance, music, and theater/drama. CSU has made it clear that it intends to accept courses in the visual and performing arts that are now on

**FIGURE 3**

**Percent Change in Number of Course Sections Offered, Adjusted for Changes in Enrollment, 1984-85 to 1985-86**




SOURCE: PACE analysis of California Basic Educational Data System (CBEDS) data.

approved lists of "Courses to Meet Requirements for Admission to the University of California." In addition, CSU will accept courses beyond those so designated and has disseminated lists of examples of courses deemed acceptable. Although it is not possible to adequately assess the acceptability of each course, it is possible to get a flavor of changing patterns by examining CBEDS data on course offerings in classes listed by CSU as *examples* of acceptable courses.

- *Art* course offerings in ceramics (-7%) and painting (-11%) are down substantially. Courses in drawing (+2%) are up marginally, while courses in basic art (+7%) and art history (+30%) are growing significantly. It is not clear that all courses defined as basic art will be acceptable for admission purposes.

- *Dance* courses are increasing (+14%), but because CBEDS does not distinguish among dance courses, it is impossible to assess college admission applicability.

- *Music* course offerings in the largest enrollment areas: band (-4%), Orchestra (-3%), and Chorus (-1%) all experienced declines.

- *Drama* (+13%) and *Theater* (+7%) courses experienced increases but represent a very small population.

The number of course sections offered in academic areas of the curriculum have continued to display marked improvement for at least the last three years. They reflect the fact that, on most dimensions, districts have responded to the cumulative effect of increased graduation requirements, higher expectations, stricter standards, and more rigorous admission requirements by adding class sections in academic courses. Visual and performing arts class section offerings, however, especially in the larger enrollment classes most likely to be acceptable to CSU, are running counter to the general trend.

## Enrollment Changes

As might be expected, course enrollment changes from 1984-85 to 1985-86, again controlling for enrollment growth, tended to mirror changes in the number of class sections offered.

### General Changes

- *English* : comprehensive English class enrollments (+4%), literature (+1%), and advanced composition classes (+2%) displayed small increases while enrollment in advanced placement English classes declined slightly (-3%).

- *Foreign Language* : large enrollment increases were noted in advanced (beyond the first two years) foreign language classes (+18%). Enrollment in Advanced Spanish increased 23 percent.

- *Science* : spectacular growth in chemistry enrollment (+19%), substantial growth in advanced chemistry (+11%), physics (+7%), and advanced physics (+4%), with no growth in biology and a slight growth in advanced biology (+1%) all were noted.

- *Social Science* : economics enrollments increased 25 percent.

- *Mathematics* : the combined rate of increase in enrollment for all mathematics courses above beginning algebra totaled 10 percent.

- *Visual and Performing Arts* : combining programs in art, music, dance, and theater, a cumulative enrollment decline was evident. But, again, any generalizations about which courses will be acceptable for admission purposes is premature. It is safe to infer that this area, more so than other required courses, shows enrollment trends that are less than optimistic.

a-f Enrollment Changes

Of special relevance to admission to the four-year segments is the number of students enrolled in courses meeting the a-f requirements for the University of California. PACE analyzed school-by-school data compiled by the Research and Information Technology Unit of the State Department of Education which compared the 1984-85 and 1985-86 reported enrollment in courses certified to meet the University of California's a-f requirements. Because the California State University admission requirements are now so similar to the admission standards established by UC, it is reasonable to assume that one could get a fairly accurate picture of enrollment patterns for *both* segments by utilizing change data for a-f courses. The State Department of Education reports that total enrollments in these courses increased from 38.2 percent to 43.6 percent from 1984-85 to 1985-86, a 14.1 percent increase (California State Department of Education 1986).

a-f Completers

This year for the first time, the State Department of Education collected, as part of CBEDS data, the percentage of graduates for each high school who completed a-f course requirements. Like all first year data requests, the response rate is less than perfect, and there are clearly some data gaps and anomalies. However, given these caveats, the State Department of Education reports that of those students who graduated in 1984, 27.5 percent completed all a-f requirements (California State Department of Education 1986).

Since this is the first time this information has been collected, previous year comparisons are not possible.

PACE analyzed this data by school and found striking variation among high schools in the percentages of their students who completed the required courses. Sixty-seven percent of schools reporting show completion rates of 30 percent or less, and only about seven percent of the schools report a rate of a-f completers exceeding 50 percent of their high school graduates.

**a-f Completion Rate***

| Rate of Completion | Number of High Schools |
|---|---|
| < 10 | 76 |
| 11-20 | 216 |
| 21-30 | 201 |
| 31-40 | 117 |
| 41-50 | 70 |
| 51-60 | 19 |
| 61-70 | 14 |
| 71-80 | 1 |
| 81 + | 7 |

* Percent of high school graduates completing a-f requirements.

Schools which tended to have smaller percentages of a-f completers can be characterized as having lower parent education indexes, higher percentages of AFDC eligibles, and higher percentages of blacks and Hispanics. Just as in the California Postsecondary Education Commission 1983 eligibility study, schools with low completion rates could be found in both urban and rural settings.

To gain some additional insights on the impact of socioeconomic status on the number of a-f completers, PACE looked at the percent of a-f completers in the 25 largest California school districts (comprising approximately 34 percent of the state's total enrollment). Using the reported parent education index, PACE discovered substantial differences between schools' completion rates. Schools which ranked in the top quartile on parent education had a completion rate of 38 percent, substantially higher than the state average of 28 percent and a rate almost double that of schools in the bottom quartile which had an average rate of only 19 percent.

In sum, low income, black, and Hispanic students lag substantially behind their counterparts in a-f enrollment and a-f completion rates. Schools these students attend for the most part can be characterized as offering fewer opportunities to this growing segment of the population.

## Quality Indicators

The State Department of Education uses a variety of data sources to compile information reported for each high school in California. These so-called "quality indicators" give additional information regarding courses and course-taking patterns which are useful in assessing change over time. The following quality indicators have a bearing on course enrollments.

### California Assessment Program Test Data

When grade 12 students took the CAP test in December of 1985 they were asked to state how many years of courses they will have completed by the time they graduate. Seniors were specifically asked about courses in mathematics, English, history/social science, foreign language, and fine arts. Although this is merely an indication of the patterns of courses taken and does not reflect whether the courses taken would meet the new requirements, it does reflect the general pattern of students taking more academically oriented courses. Results for the three years 1983-84 through 1985-86 are displayed below (California State Department of Education 1986).

| Courses | 1983-84 | 1984-85 | 1985-86 | Difference | % Change |
|---|---|---|---|---|---|
| Mathematics | | | | | |
| 3 or more years | 67% | 74% | 78% | 11 | 16% |
| English | | | | | |
| 4 or more years | 73 | 86 | 88 | 15 | 21 |
| Science | | | | | |
| 3 or more years | 33 | 36 | 40 | 7 | 21 |
| Foreign Language | | | | | |
| 3 or more years | 22 | 22 | 26 | 4 | 18 |
| Fine Arts | | | | | |
| 1 year art/ music/dance | 65 | 67 | 70 | 5 | 8 |

### California Basic Educational Data System Data

*a. Advanced Course Enrollment.* Each October, principals and teachers in every public school in California respond to specific questions related to their school, school staff, and enrollments. Included in this report are questions related to courses and course-taking patterns of their student bodies. This information is particularly important for purposes of monitoring course-taking patterns over time. Specific CBEDS data relevant to this study are listed below.

| Courses | 1983-84 | 1984-85 | 1985-86 | Difference | % Change |
|---|---|---|---|---|---|
| Advanced Math. | | | | | |
| *Courses above Alg.I* | 28% | 32% | 33% | + 5 | +18% |
| Science | | | | | |
| *Chemistry* | 25 | 31 | 37 | +12 | +48 |
| *Physics* | 10 | 12 | 14 | + 4 | +40 |
| *Adv. Sci.* | NA | NA | 49 | NA | NA |
| UC Requirements | | | | | |
| *a-f enrollments* | NA | NA | 44 | NA | NA |
| *a-f completions* | NA | NA | 28 | NA | NA |

The trends appear to be toward more enrollment in academic subjects.

*b. Advanced Course Enrollment by Ethnicity.* Blacks and Hispanics, however, are still underrepresented in these courses and in completing the courses necessary for admission to the public four-year segments . The 1983 California Postsecondary Education Commission high school eligibility study, for example, found that only 10.1 percent of blacks and 15 percent of Hispanics were eligible to enter the California State University as regularly admitted students directly out of high school compared to 33.5 per cent of whites and 49 percent of Asians. Recent 1985-86 data on advanced course enrollment by ethnicity do not portray a significantly different landscape.

The State Department of Education also reports enrollments in specific courses by ethnicity, which reflects ethnic differences in enrollment patterns.

| Ethnicity | Adv. Math. | Physics | Chemistry |
|---|---|---|---|
| All Students | 13.2% | 14.8% | 39.2% |
| White | 13.9 | 15.2 | 40.6 |
| Black | 6.1 | 7.6 | 29.8 |
| Hispanic | 6.0 | 6.4 | 25.3 |
| Asian/Filipino | 33.4 | 35.2 | 67.5 |
| Pacific Islander | 13.9 | 15.1 | 32.4 |
| American Indian | 6.4 | 7.2 | 20.2 |

Note: Advanced mathematics represents the statewide rate of enrollment per 100 juniors and seniors. Also, the definition of advanced mathematics in this display is not the same as the preceding chart. In this chart advanced mathematics is defined as any third or fourth year advanced mathematics course. The values for chemistry and physics are the statewide enrollment per 100 seniors.

Comparison of this data for the last two years by subject provides a more developed picture (California State Department of Education 1986):

**Advanced Mathematics**
**Change from 1984-85 to 1985-86**

| Ethnicity | 84-85 | 85-86 | Difference | % Change |
|---|---|---|---|---|
| All | 13.9% | 13.2% | -0.7 | -5.0% |
| White | 14.8 | 13.9 | -0.9 | -6.1 |
| Black | 6.8 | 6.1 | -0.7 | -10.3 |
| Hispanic | 5.7 | 6.0 | +0.3 | +5.3 |
| Asian/Fil. | 31.7 | 33.4 | +1.7 | +5.4 |
| Amer. Ind. | 7.6 | 6.4 | -1.2 | -15.8 |

**Physics**
**Change from 1984-85 to 1985-86**

| Ethnicity | 84-85 | 85-86 | Difference | % Change |
|---|---|---|---|---|
| All | 13.5% | 14.8% | +1.3 | +9.6% |
| White | 14.2 | 15.2 | +1.0 | +7.0 |
| Black | 6.6 | 7.6 | +1.0 | +15.2 |
| Hispanic | 5.8 | 6.4 | +0.6 | +10.3 |
| Asian/Fil. | 30.4 | 35.2 | +4.8 | +15.8 |
| Amer. Ind. | 10.8 | 7.2 | -3.6 | -33.3 |

**Chemistry**
**Change from 1984-85 to 1985-86**

| Ethnicity | 84-85 | 85-86 | Difference | % Change |
|---|---|---|---|---|
| All | 32.3% | 39.2% | +6.9 | +21.4% |
| White | 34.6 | 40.6 | +6.0 | +17.3 |
| Black | 21.7 | 29.8 | +8.1 | +37.3 |
| Hispanic | 17.4 | 25.3 | +7.9 | +45.4 |
| Asian/Fil. | 57.0 | 67.5 | +10.5 | +18.4 |
| Amer. Ind. | 19.2 | 20.2 | +1.0 | +5.2 |

Not only is the percentage of Asians/Filipinos enrolled in these courses substantially higher than each of the other ethnic groups, but the rate of increase is also substantially higher in mathematics and physics. Only in chemistry did the percentage of black and Hispanic enrollees increase at a rate greater than whites and Asians. While black and Hispanic enrollment percentages grew in physics, the rate of growth was in each case less than that of Asians. In advanced mathematics, percentages of blacks were down and Hispanics were up as percentages declined overall. Obviously, the substantial gap between black and Hispanic participation in these advanced classes did not close appreciably. Combining enrollments in both physics and chemistry--since either is presumably applicable for CSU purposes--presents a more optimistic picture, with growth rates among blacks and Hispanics exceeding the overall growth rate, but large disparities still remain.

**Combined Physics and Chemistry Change from 1984-85 to 1985-86***

| Ethnicity | 84-85 | 85-86 | Difference | % Change |
|---|---|---|---|---|
| All | 45.8% | 54.0% | +8.2 | +17.9% |
| White | 48.8 | 55.8 | +7.0 | +14.3 |
| Black | 28.3 | 37.4 | +9.1 | +32.2 |
| Hispanic | 23.2 | 31.7 | +8.5 | +36.6 |
| Asian/Fil. | 87.4 | 102.7 | +15.3 | +17.5 |
| Amer. Ind. | 30.0 | 27.4 | -2.6 | -8.7 |

* Since some students take both physics and chemistry, some students are double counted, which accounts for the fact that the Asian/Filipino rate exceeds 100 percent.

In sum, the general record of impressive gains in both academic course offerings and enrollments, and the findings that in some areas of the curriculum, blacks and Hispanics appear to be enrolling in higher numbers, should not mask the fact that many schools still have a long distance to travel if they are to assist their students in gaining access to higher education.

The impact of these changes is not limited to high schools. The next section explores implications of recent changes on other segments of education.

# *Other Impacts*

Actions by any segment often have impacts beyond those most directly observable. Actions by any segment often have impacts beyond those most directly observable. Changes in CSU entrance requirements are no exception. This section examines implications of the new requirements on CSU, UC, community colleges, teacher supply and demand, and junior high and elementary schools.

## Impact on CSU Eligibility Pool

The California State University eligibility index now utilizes a combination of grades (GPA) and test scores (SAT or ACT). Students with GPAs above 3.1 are admissible irrespective of their scores on the standardized tests. Students falling below 2.0 are not admissible as regular admits. Students falling between 2.0 and 3.1 are admissible providing they receive acceptable scores inversely related to the GPA (e.g., a student with a lower GPA requires a higher test score and vice versa). Most significantly, CSU now differs from UC in that courses acceptable for computing GPA include *all* courses taken after the freshman year, except military science and physical science. UC requires that GPA be computed *only* for a-f approved courses.

As CSU moves to full implementation of the new requirements, a key policy question must be addressed: does CSU plan to stay with its current policy or begin to count only those courses applicable for the a-f requirements? In either case, the implications deserve serious attention. Assuming that the Master Plan top one-third eligibility requirement is sacrosanct, that the Master Plan review Commission will not recommend a substantial alteration to that figure, and that CSU, for obvious reasons, will not wish to require less than a 2.0 GPA, the test score portion of the eligibility index will need to undergo continual and perhaps substantial revision to keep the size of the eligibility pool at a reasonable level. Even under current CSU policy, a-f courses will naturally make up a larger and larger proportion of the total high school curriculum, and, when fully phased-in, could approach 70 to 80 percent of the total curriculum (150 units of the 200 to 225 units now normally required for graduation minus classes in physical education and military science).

One has to believe that inclusion of a-f courses as a substantial portion of the total load will have a significant impact on grade point averages. It is at least theoretically possible that, irrespective of test scores, there will not be enough students in the eligibility pool to meet the top one-third requirement who have completed the required courses with GPAs above 2.0. The prospect worsens if CSU were to adopt the current UC practice of counting only grades earned in a-f courses. On the other hand, Scholastic Aptitude Test (SAT) scores for graduating seniors have improved since their 1982 nadir, and

significantly more high school seniors are now taking the examination (44% in 1985) than in earlier years (California State Department of Education 1986). These increases, if continued, may offset lower grade point averages. In any event, constant, careful monitoring will be necessary.

Two different data sources are available and useful here. First, the CPEC High School Eligibility Study (CPEC 1985) reported that among 1983 public high school graduates, 28.4 percent had completed a-f pattern courses for eligibility for admission to UC with no more than two missing courses. Of these students, 46 percent or 13.2 percent of the public high school graduates qualified for the University. Unfortunately, the CPEC data are not disaggregated in such a way as to determine the percentage of students who had completed 10 of the 15 required courses, but one can assume that the percentage is now greater because the required units are less in the initial stages of implementation. CBEDS reports that 27.5 percent of all graduating seniors had completed *all* the requirements and that virtually all of CSU's applicants in 1985 who were otherwise eligible would have met the minimum requirements for conditional admission had the 1988 (10 of 15 courses) requirements been in place.

Second, a study completed by CSU on 1986 fall freshman applicants reported that if CSU had the 1988 course pattern (at least 10 of the 15 courses) in place in 1986 that 97.4 percent of all applicants with qualifiable indexes (GPA and SAT or ACT) would have qualified. The range by ethnic group is quite small, 95.3 percent for blacks to 97.8 percent for whites. Based upon the growth in academic course availability and increased academic course enrollment that has taken place, CSU concludes that the percent will be even higher in 1988 than in 1986. Visual and performing arts was by far the curricular area where the smallest percentage of students had fulfilled the requirement, with only 39.7 percent reporting they had completed one year or more (Vandament 1986).

CSU also reports that 9 of 10 otherwise eligible freshman applicants in 1986 would have successfully completed 12 of the 15 required courses. While very few 1986 freshman applicants (less than 1 in 10) would have successfully completed all 15 of the requirements, CSU reports that a substantial portion of those students were short because their transcripts did not yet include their final semester English course at the time of submission. In addition, not completing the visual and performing arts requirement alone would have eliminated 6 of 10 1986 applicants.

As a consequence of earlier CSU studies on the potential impact of the requirements on the pool of students eligible for admission, CSU adopted a four-year phase-in program (see page 4) and has made a commitment to carefully review the impact on students and to alter the phase-in period if warranted. Again, constant, careful monitoring will be necessary.

## Impact on Teacher Supply and Demand

Another critical consideration, emphasizing the pervasive influence of any segmental change in entrance requirements, is the potential impact on teacher supply and demand. A recent PACE report on this subject regarding California public high schools reported "major shortages ... in several subject areas including mathematics, English, and science" (Cagampang, et al. 1986). Requiring additional advanced course work in these subject matter areas may exacerbate an already pressing human resource problem. Projecting the extent of the teacher supply and demand problem is extremely complex, but some things are known.

On the positive side of the equation, we know that high school enrollments (assuming no dramatic improvement in the high school dropout rate) will decline until 1990-91, at which time it will begin to increase. In addition, it appears that increased job availability, higher beginning salaries, and increased public attention to teaching as a satisfying profession have begun to impact the supply of potential teachers.

First, there is a fairly large pool of credentialed mathematics and science teachers in high schools who are currently teaching outside their major fields. There is at least some room for reassigning these teachers to classes in which they are most appropriately trained. It should be noted here that credentialed mathematics teachers who teach outside their major fields tend to teach courses in science. The same is true in reverse for science teachers. Second, enrollment in teacher credentialing programs is up sharply and is expected by schools of education to continue to increase. This trend is especially evident in the areas of science and mathematics where enrollments have doubled and tripled respectively over the last four years. Third, out-of-state applicants for California teaching credentials are up significantly. Fourth, prospective teachers who have been out of college at least two years have generated the most rapid growth of any discrete pool of potential teachers. The numbers of individuals from this group who have taken CBEST has almost tripled since 1983-84. This group, both in California and from elsewhere, is a significant possible source of future teachers. Finally, the number of California undergraduate takers of CBEST is growing rapidly, increasing 50 percent since 1983-84 (Cagampang, forthcoming).

These positive indicators, of course, do not tell the full story. There are other indications that the supply of qualified teachers will be a major problem for California policy makers in the next few years. First, it is clear that the new requirements will generate demand for additional teachers, especially in areas where the new requirements have shown the greatest increases. Because the new admission requirements are in those areas of the curriculum that are the most demanding, and include many advanced courses, teachers must also be appreciably more knowledgeable about subject matter and more

skilled in imparting that knowledge to a less able group of students. It is of little use to increase student requirements and expectations if the teaching faculty cannot provide high-quality instruction.

This new demand for quality is compounded by the fact that a large number of instructors currently teaching high school classes in science and mathematics are not appropriately credentialed. When one looks at first-issuance credentials, the category representing new teachers entering the profession, the proportion of emergency credentials is substantial. For example, in 1984-85, one out of every four high school teachers entering the workforce for the first time entered equipped with an emergency credential (Guthrie, et al. 1986). Just to bring the current teaching force up to meet minimal requirements will be a difficult task. Compounding the problem is that there are geographic areas of the state where state averages mask the severity of the shortage, especially in such counties as San Diego, Los Angeles, and Orange.

In sum, although the indicators send a somewhat mixed message about the precise extent of the problem, it is clear that California will require larger numbers of better prepared teachers to meet the challenges of the future. This will require dramatic, new strategies to encourage a larger pool of better qualified teachers to enter and stay in the profession. This has great implications for the major provider of teacher training in California: the California State University.

In fall 1986, CSU implemented strengthened admission requirements for its teacher preparation programs. These placed increased emphasis on preparation in the subjects to be taught. Students accepted into teacher preparation programs on all CSU campuses must have a grade point average that places them in the upper one-half of their class of students majoring in similar subjects on campus. Prior to admission to student teaching, the department in which the candidate has majored must certify that he or she has sufficient mastery of the subject(s) to be taught to become an effective teacher.

Just as improvements are needed in the quantity and quality of new teachers, so too are improvements needed in the knowledge and skill base of those already teaching. Given the changes in academic standards, the sharp increase in external pressures to improve high school curriculum, and the adoption of new state frameworks in many subject matter areas, it is depressing to note that schools are not adequately providing opportunities for teachers to update and improve their subject matter knowledge. A recent PACE poll found that only 34 percent of teachers responding had any subject matter inservice training in the last year. Of those who did receive such training, 72 percent reported that the training lasted less than one week. Clearly, the almost total absence of sustained subject matter inservice training in light of all the curricular changes which have recently occurred will not suffice if the quality of the high school program is even approximately to meet the new demands of California's increasingly diverse student body.

## Impact on the University of California

A possible, and possibly significant, impact may be that if more students successfully complete the a-f requirements, they may opt to apply for the University of California rather than CSU, thus increasing the demand on limited spaces available at UC. It certainly is within the realm of reason that increasing the completers of a-f requirements will increase the number of applicants to the University of California. The converse is also possible: it may be that as CSU increases its standards for admission and hence becomes more selective, it may become a more attractive option for students in the upper one-eighth of their graduating classes. It is clearly too early to answer these speculative questions, but they do suggest areas for additional research and should be placed high on the state's research agenda.

## Impact on Community Colleges

It is highly likely that new CSU admissions requirements will also have an effect on community college enrollment. To the extent that higher education-bound high school graduates are not able to meet the new CSU requirements, they will seek admittance to community colleges. To the extent that high schools have difficulty in offering the full array of courses for the expanded pool of students requiring them, community colleges increasingly will be called upon to enter into consortial arrangements with feeder high schools to increase the educational opportunitites for high school students. While it is clear that most community colleges would welcome additional high school graduates, and that many already are engaged in consortial arrangements with local high schools, the statutory limitation on enrollment growth in community colleges (limited to the growth in adult population in the district) may restrict their ability to respond to the increased demand. There is also likely to be a substantial impact on the community college curriculum as community colleges will be held accountable for better preparation of their potential transfer population in order that transfer students will be able to compete with a better prepared group of students who enrolled as freshmen at CSU.

## Impact on Junior High and Elementary Schools

Admission requirement changes tend to push down through the system, ultimately affecting every level. If students are required to take a more rigorous high school course of study, it is important that they receive adequate introductions to those courses in their early school experience. The quantity and quality of elementary and junior high school programs

in English, mathematics, science, and foreign languages will have a significant bearing on the quantity and quality of subsequent experiences of the students in these fields. California is beginning to gather information on the quantity dimension. For the first time in 1985-86, the State Department of Education collected information on the amount of time spent on mathematics, science, and foreign languages in grades 2, 4, 6, and 8. This will serve as an important baseline for monitoring future progress.

Although highly speculative, at least one other fallout of the new admission requirements deserves some attention. Often, especially in unified school districts, high school teaching vacancies are first filled from junior high school personnel, at least partially because of clauses included in collective bargaining agreements. Although the quality of these teachers is unknown, if those selected are the better ones, negative consequences on the quality of the junior high program may result. It is also possible that junior high school teachers, as a whole, may be less well prepared in advanced subject matter areas than their high school counterparts. To the extent that districts hire junior high teachers who are less subject matter oriented to instruct in the new proliferation of advanced subjects, students will be ill served.

In sum, changes in CSU admission policies, or, for that matter, changes in important policies by any other segment, have significant effects on other segments and often permeate throughout California's entire educational system.

# *Conclusions*

The adoption of new CSU admission requirements closely parallels other state-level action over the last few years calling for a more coherent pattern of academic course work in California high schools. Cumulatively, these multiple forces have produced significant pressures on high schools to increase academic offerings and to meet the new standards. Although the proposed changes were generated from an array of sources, they are remarkably consistent and send a set of reasonably clear signals to schools. The pressure for change combined with a substantial influx of state dollars has resulted in marked improvement on several dimensions. Numbers of academic course sections offered and enrollments in academic courses generally as well as in college preparatory courses show overall increases. They reflect the fact that, for the most part, districts have responded to the cumulative effect of increased graduation requirements, higher expectations, and more rigorous admission requirements.

Accommodating change of such magnitude is a difficult task for a system already burdened by other demands. Recognizing the difficulty schools face in responding to these changes in a relatively short time, CSU adopted what appears to be a reasonable phase-in period and is closely monitoring the impact of new requirements with a concomitant, explicit commitment to alter the implementation schedule if new information warrants.

Growth in the rates of classes offered and course enrollments are positive indicators that schools are moving to meet the increased expectations of the four-year segments and other pressures, but these growth rates reveal little about the quality of the courses offered, nor do they generate information about whether the promulgation of higher standards will increase dropout rates and enlarge the number of students failing to receive diplomas, nor do they answer the question regarding whether these growth rates will be able to be sustained over time, nor whether all high schools will ultimately be able to offer adequate numbers of courses of sufficient quality to ensure college preparatory opportunities for all those who want and need them. There are other more specific problems that deserve continued concern and increased attention:

- Despite improvement, black and Hispanic students are still underrepresented in advanced course enrollments and in completing the course patterns necessary for admission to the public four-year segments.

- There is a substantial disparity among schools in academic course offerings and an even greater disparity among schools in the percentage of a-f completers. Schools with relatively low completion rates tend to have higher than average enrollment of historically underrepresented students, have lower socioeconomic status as measured by parental income, and have higher percentages of AFDC-eligible and limited-English-proficient students.

- Visual and performing arts courses of collegiate preparatory level appear to be a major problem both in terms of course sections offered and in enrollment. Combining this information with what is already known about low completion rates of this requirement among past CSU freshmen applicants, highlights a problem area which will require attention.

- California will face major problems in providing adequate teaching staff both in terms of quantity and quality, particularly in science and mathematics, even though new information on potential increases in supply is positive.

- Inservice training for high school teachers on matters relating to curriculum is virtually nonexistent, and in those cases where it is offered, is inadequate.

- Other segments of education will be affected by the new CSU graduation requirements. It is not clear that all the implications of these changes have been fully explored.

# *Recommendations*

## Financial Resources

Absent adequate funding over the next several years, school districts will not be able to continue to improve course offerings necessary to meet the new CSU admissions requirements. If, for example, the state's revenue situation or the Gann expenditure limit substantially reduces school expenditures, a discontinuance and perhaps a reversal of the progress California schools have made in the last few years is likely.

*Recommendation 1: The state's ability to increase sections of advanced courses and their enrollments, and its ability to enlarge the pool of qualified teachers, are, to a significant degree, dependent upon the continuation of adequate financial support.*

## Human Resources

Unless schools can attract and retain highly skilled teachers, only a shell of quality exists. This may be a particular problem in advanced science and mathematics courses. In fact, several state and national studies have suggested the need for a concentrated reform effort to improve the quality of instruction. California's Commons Commission report, *Who Will Teach Our Children* (California Commission on the Teaching Profession 1985) proposes restructuring the teaching career, establishing more rigorous professional standards, redesigning schools as more productive workplaces, and recruiting capable men and women into teaching.

*Recommendation 2: Improved preservice and inservice programs are absolutely essential to enhance teaching skills. In addition, Commons Commission recommendations should be re-examined to assess which of its provisions dealing with teacher quantity and quality best address California's recognized need to improve instruction.*

## School Focus

Although it is possible that high schools will offer enough courses to create a sufficient eligibility pool for CSU, there is still tremendous variation in the distribution of those opportunities between high schools. But variation among course offerings is not nearly so great as variation among students who complete the required patterns. In response to ACR 83, the Intersegmental Policy Task Force made a series of positive recommendations

(Intersegmental Policy Task Force 1986). Of particular salience were recommendations targeting comprehensive public high schools which are predominantly minority in order to achieve the greatest momentum toward educational equity. For example, the Task Force recommended that partnerships between higher education institutions and their feeder high schools with high minority enrollment should be established in order to expand or inaugurate district-institution school improvement partnerships. Eventually all high schools that enroll predominantly minority and low-income students could be involved in such programs.

*Recommendation 3: Special intersegmental programs identifying and targeting those schools with the greatest difficulty in offering courses required for university admission will be necessary to provide equal educational opportunity for all youth.*

## Special Program Focus

A number of highly successful programs, especially in science and mathematics, are in place which are effective in greatly improving participation and persistence rates among minority students. The Achievement Council's *Excellence for Whom* (Brown and Haycock 1984) and the Report of the Intersegmental Policy Task Force on ACR 83, *Background for Expanding Education Equity* (Intersegmental Task Force 1986) identify a large number of schools and programs which have enjoyed substantial success.

*Recommendation 4: Characteristics of model programs successful in improving participation and persistence rates among minority students need to be identified and the results disseminated with the goal of expanding these programs to other schools.*

## Organizational Framework

The interactions of segmental policies argues for a more formal organizational framework than now exists to ensure that the potential effects of proposed policies on other segments be considered. Although there are an ever growing number of commendable, voluntary, intersegmental collaborative efforts, the magnitude of potential system-wide impacts generated by the unilateral actions of one segment deserves focussed attention. For this purpose, the Master Plan Review Commission is currently considering a proposal that the role of the California Postsecondary Education Commission be expanded to encompass elementary and secondary schools. Others have proposed that the Education Roundtable be formalized by interagency agreement among the current participants and that a small but ongoing staff be established whose primary responsibility is to focus on those issues with major intersegmental implications.

*Recommendation 5: Steps must be taken to more adequately and jointly assess the interactive effects of segmental policy.*

## Visual and Performing Arts

A special problem exists in high school offerings of visual and performing arts. These programs, which were practically devastated by the fallout of Proposition 13, are still not being widely offered. A public relations strategy and special programs encouraging arts in the schools would be helpful. The CSU phase-in schedule which delays full implementation of new admission requirements will lessen the impact of this shortcoming for a time.

*Recommendation 6: Special efforts should be made to increase the availability of visual and performing arts course offerings and to encourage arts in the schools. Careful monitoring of the impact of CSU's arts requirement and willingness to be flexible about which courses are applicable will be necessary, particularly in the initial stages of implementation.*

## Elementary and Junior High

Especially in subject matter areas like visual and performing arts, science, and mathematics, elementary and junior high school opportunities for students must be enhanced. New data now being collected by the State Department of Education can provide valuable information about the status of these programs and lead to the establishment of reasonable goals for improvement.

*Recommendation 7: Consistent with the recommendations of the Intersegmental Policy Task Force on Assembly Concurrent Resolution 83 (Intersegmental Task Force 1986), student advisement and counseling about postsecondary opportunities should be enhanced in elementary and junior high school years.*

## Monitoring Progress

The California State University should continue its commitment to its ambitious monitoring program over the next several years and must maintain its commitment to change the phase-in schedule if evidence so warrants. Of special importance is the need to continue to accumulate and analyze data on course-taking patterns of applicants and

enrollees with particular focus on shortages in course-taking patterns. CPEC's series of eligibility studies have become essential sources of information (CPEC 1985).

*Recommendation 8: CPEC's eligibility studies should be undertaken every two or three years, at least until there has been two or three years of experience with the impact of the new requirements after full implementation.*

## Dissemination

The California State University is engaged in a comprehensive and broadly based dissemination effort to which the system has made a significant commitment. Initial CSU initiatives on this front are impressive. CSU has utilized music video, publications, and other media to encourage youngsters to stay in school and to attend college; sent letters to 8th and 10th graders and their parents explaining the new admission requirements; worked with churches, counselors, teachers, and principals to strengthen linkages between high schools and individual CSU campuses; and undertaken numerous efforts to attract growing numbers of low-income and minority youth. The dissemination effort is critical to CSU's success, particularly as it relates to increasing motivation for potential college students and as it assists schools to impart important information about the new requirements.

*Recommendation 9: Careful monitoring of the impact of CSU's important dissemination efforts to establish a better CSU-high school information network is essential.*

## Uniform Student Identifier

The California Postsecondary Education Commission, in its March 1986 report to the legislature entitled *Feasibility Plan for a Comprehensive Student Information Study* (CPEC 1986) recommended that the state take specific steps to establish a uniform student information system which will permanently improve reporting capabilities and provide a more accurate and uniform information base for all policy analyses.

*Recommendation 10: The segments should jointly and cooperatively consider CPEC's recommendation regarding a uniform student information system.*

## Data User Consortium

Prior to full implementation of the uniform student identifier, there are ways in which data and policy analysis coordination can be significantly improved. CPEC has already begun an effort to bring together the researchers and policy analysts who deal with intersegmental issues.

*Recommendation 11: Formation of a data user consortium for the purposes of reducing duplication of effort and sharing findings with others should be pursued, especially across segments, as an important task in building an improved analytical capability.*

## Improvement of Data

There are many useful things about CBEDS and CAP data. They represent rich sources of information. However, student, teacher, and principal reporting needs to be carefully monitored. The importance of accurate reporting, since much of the data can later be disaggregated to the school level, needs to be emphasized.

*Recommendation 12: The State Department of Education should be adequately funded for purposes of validating CBEDS and CAP data. In addition, consideration should be given to mandate, as a condition of receiving some portion of future apportionments, that all districts be required to report in the prescribed format in a timely manner. By tying reporting requirements to receipt of a portion of future apportionments, the State Department of Education can avoid provisions of the law regarding payment for state mandates.*

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