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AUTHOR Treisman, Philip Uri
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ABSTRACT

The University of California at Berkeley has developed a Mathematics Workshop the purpose of which is to improve serious deficiencies in minority students' mathematics and study skills. Now in its second year, the workshop has five functions: (1) building a community of minority freshmen that is academically-oriented and a source of peer support; (2) providing minority students with an extensive orientation to the university and with ongoing academic advising; (3) advocating the interests of minority students and monitoring their academic progress and adjustment to the environment; (4) providing minority freshmen with ongoing supplementary instruction in order to develop independent learners; and (5) linking high school-level and undergraduate-level affirmative action efforts. The Mathematics Workshop has improved the math grades of minority students and their persistence in both math classes and the general university program. (DC)

IMPROVING THE PERFORMANCE OF MINORITY STUDENTS IN COLLEGE-LEVEL MATHEMATICS

by Philip Uri Treisman

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IMPROVING THE PERFORMANCE OF MINORITY STUDENTS IN COLLEGE-LEVEL MATHEMATICS

Minority Students at Berkeley

The Professional Development Program at the University of California at Berkeley found that large numbers of previously successful minority students were being eliminated in Berkeley's two-year sequence of freshman-sophomore-level mathematics courses, a prerequisite not only for engineering and the sciences, but also for an increasing number of other fields. Many minority students enter Berkeley with serious deficiencies in mathematics and study skills. Because of low academic standards in their high schools, they chronically overestimate their understanding of course material, and so they prepare insufficiently for their classes and fail to make timely use of available academic support services. Moreover, the students do not use study time effectively.

The insularity of these minority students further hinders their academic success. The informal study groups common among majority students enable students both to "check out" their understanding of college and class requirements and to normalize their attitudes and behavior. Without such a community of peers, the minority student faces alone the formidable demands of the freshman year.

U.C. Berkeley provides counseling, faculty advising, and remedial tutoring, but many minority students misunderstand the role and purpose of these services. Minority students take as directives what faculty advisors intend as advice, thus decreasing these advisors' value to the student. Similarly, because many minority students believe that the Counseling Center is a college version of their high school counseling office, they rarely seek its help. Many minority students associate remediation with non-academically oriented students and discipline problems. These misconceptions, coupled with the inexperience of many faculty and staff members in working with minority students, often result in a disappointing experience for minority students who seek help.

The Intervention Strategy: the Mathematics Workshop

With support from the Fund for the Improvement of Postsecondary Education, we developed a strategy to improve these students' performance and persistence. The resulting Mathematics Workshop has five functions:

(1) *Building a community of minority freshmen that is academically oriented and a source of peer support.*

In the Mathematics Workshop, students are immersed in highly structured, intensive group activities. Study groups are formed before classes start, giving students time to get acquainted and to learn how to work together before they are beset by the pressures of the academic term. Workshop staff members teach participants a variety of skills, from how to utilize the institutional "system," to an understanding of specific concepts under study in a course.

(2) *Providing minority students with an extensive orientation to the University, and with ongoing academic advising.*

During his/her first week on campus, each student is interviewed in depth and given an appropriate mathematics screening test. Students are told how their academic preparation compares with that of their classmates (minority and non-minority), and what will be expected of them in courses. Each student is helped to design an appropriate academic plan for his/her freshman year and is intro-

duced to a sophomore student who will monitor his/her progress and serve as a "buddy."

(3) *Monitoring of students' academic progress and their adjustment to the University environment, and advocating students' collective and individual interests.*

The Mathematics Workshop staff follows closely workshop students' progress and performance in their classes, including their homework and test scores, their understanding of important mathematical concepts, etc. Monitoring is thus closely tied to the workshop's orientation, advising, and instructional activities.

(4) *Providing minority freshmen with ongoing supplementary instruction* in reading the technical language in which mathematics tests are written, writing assignments in standard mathematical language and form, and assessing their understanding of mathematical concepts and problems.

An important feature of Mathematics Workshop instruction is its non-remedial emphasis, made possible by carefully placing students in courses for which they have adequate prerequisites. When an individual student needs remediation, the workshop staff arranges for individual study sessions, often with one of the regular campus units available for such service. The ultimate aim is to develop independent learners who can function effectively beyond their sophomore year.

(5) *Linking high school-level and undergraduate-level affirmative action efforts.*

Graduates of comparable high-school-level programs, serving as workshop participants, peer teachers, and advisors, are becoming the core of an effective minority academic community on the Berkeley campus. Conversely, the workshop students are enriching the high school programs substantially by serving in them as informal tutors and advisors.

Results

The Mathematics Workshop, now in its second year of operation, appears to be meeting its goals. Black workshop students consistently out-perform their non-workshop counterparts in mathematics. The average mathematics grade of the 42 first-term workshop students was B-; the average grade of their non-workshop counterparts was D-. Almost half of the non-workshop minority students failed to complete mathematics courses; by contrast, every workshop student completed his/her mathematics class. In the spring, 1979 term, the workshop students out-performed their classmates in every section of every mathematics class in which they were enrolled.

The workshop has also effected minority retention. First-year attrition at Berkeley has averaged 16 percent among all freshmen, and 30 percent among minorities. In contrast, none of the 60 students who participated in the Mathematics Workshop in 1978-79 had left Berkeley by the end of that academic year. All but five of these students completed their second year at Berkeley. Over 50 percent of the fall, 1977 Black freshman class had left the University by the end of their second year of study.

The Berkeley strategy can be effective on other predominantly white campuses as well. One feature of the Berkeley program is of primary importance for all affirmative action programs: congruence between the aims of the program and the character of the institution within which it operates. Too often, talented, motivated minority students come to college hoping to be challenged and to excel, but find instead that they are expected merely to get by. Services that focus only on the lowest levels of academic achievement cannot effectively support minority students in academic environments that respect only its highest levels.

Philip Uri Treisman
Director; Mathematics Workshop

For further information, contact the author at U.C. Berkeley, Professional Development Program, Berkeley, CA 94720.

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