Making Room for Diversity Makes Sense

Successful diversity programs level the playing field for women and minorities by addressing their needs and teaching undergraduates the unwritten rules of academic science

SAN FRANCISCO—As part of her doctoral studies in public health at Harvard University, Alissa Myrick spent this month collecting blood samples from malaria victims in Senegal. Using the latest molecular biology techniques, Myrick hopes to understand drug resistance in the parasite that causes the disease. But Myrick, 25, says she would not be working on the problem—or have even completed a bachelor's degree in biology—if not for a University of California (UC), Berkeley, program that targets women and underrepresented minorities in the sciences.

The Biology Scholars Program (BSP), she says, helped her cope with a sense of isolation that otherwise might have driven her out of the sciences altogether. "When you're one of three African Americans in your class," Myrick says, "it affects how you react to the class and how students and faculty react to you." And BSP is not the only program that has made great strides in helping minority undergraduate science majors at majority institutions. Others include the University of Maryland, Baltimore County (UMBC), which has had considerable success over the past decade, and Yale University, which has also developed a comprehensive program.

Although she remains one of a precious few female minorities in science, Myrick is living proof that well-designed and properly implemented undergraduate diversity programs can produce women and minority scientists knowledgeable about the system training them. She's learned the ropes from people like John Matsui, BSP's director, who says that a generation of studies has identified the key elements of a successful program: relevant and timely academic advice, a community environment, strong mentoring, and early involvement in research.

If U.S. higher education knows what works, then why are undergraduate institutions failing to churn out more diverse groups of scientists? According to the National Science Foundation, only a third of the minority students who begin in the sciences wind up graduating with a science or engineering degree. And, although blacks and Latinos make up nearly 25% of the U.S. population, they earn only 13% of U.S. science and engineering bachelor's degrees and 7% of doctoral degrees. The overall numbers for undergraduate women are better but still fall far short of matching their majority status on campus: They receive only 11% of engineering degrees and 24% of degrees in the physical sciences.

Success, says Matsui, lies in "how we go from general description to implementation." The steps themselves are no great mystery, he and others say. An institution must be committed to putting an effective program in place—and overhauling one that isn't working. Given that support, program faculty and staff must then do two things: take a student-centered approach to the delivery of services and give students what Matsui calls "system smarts"—tools to navigate a campus's academic system and scientific community. "The goal is not to change the system or make an alternative one, but to help students get the most out of what is available," Matsui says.

Future STARS. Yale's Iona Black, right, helps minority students and women learn the culture of science.

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Institutional readiness

To fill the scientific pipeline with more minorities, experts say, individual institutions must begin by lining up support from all sectors of campus. At UC Berkeley, that commitment includes office space within the heart of undergraduate scientific activity and financial support. Sixty to 90 freshmen and transfer students are admitted to the BSP every year. Its 450 current students—about 60% minority and 70% women—require easy access to the program staff and to one another if they are to keep from getting physically or academically lost in the shuffle of a large campus, Matsui says. (Sophomores and juniors are occasionally admitted to the program but need a recommendation from a current BSP student.)

In addition to space provided by the dean of biological science, the UC Berkeley administration has also picked up salaries for several key program personnel. This kind of institutional support follows impressive results: The program graduates minority students with a biology degree at the same rate as Asian and white students, and at twice the rate of minorities not in the program. Matsui credits prominent faculty members and top campus administrators with providing the political clout to get the necessary space and other resources.

The Meyerhoff Scholars Program has enjoyed similar support from the top at UMBC. It was founded by two charismatic leaders, the late Michael Hooker, then UMBC's president, and Freeman A. Hrabowski III, a mathematician and vice provost who succeeded Hooker in 1992. "We also had some of the most prestigious scientists on campus involved since the beginning," Hrabowski says.

With that kind of backing, the Meyerhoff program has helped UMBC become one of the leading producers of African-American students who then earn medical degrees and science doctorates. More than 1500 students apply to enter the program every year, of which 50 are chosen. Since 1996 each class has included about 15 majority students, their presence due in part to a court ruling that broadened the eligibility requirements.

One important feature of the Meyerhoff program—and others like it—is its departure from the cookie-cutter schedule of classes recommended to all incoming freshman science majors. "Start with the existing skills of the students in math and reading, and determine what they need," Hrabowski advises. For example, the program recommends that first-year students limit themselves to two courses in math and science even though most are eager to take more. In addition, program students who have earned Advanced Placement credit in calculus and physics are strongly advised to take the courses anyway. And participants who receive a C are encouraged to repeat the course. "We want students to build a base of knowledge that they can use to become successful in upper-level courses and beyond," Hrabowski explains.

The generous scholarships—$15,000 a year for 4 years—are another key element in the Meyerhoff program, helping to retain talented students who might otherwise forsake the rigors of a science major because of economic necessity. "It may be possible [in some majors] to work on the outside at an unrelated job and still do well in school," Hrabowski says. "But in science it's almost impossible."

Research ready. Alissa Myrick credits the UC Berkeley program with putting her on track for a Harvard Ph.D.

System smarts

Successful programs must also introduce students to what is likely an unfamiliar culture. Many students of color, for example, come from cultural traditions that frown on questioning authority. That trait puts them at a disadvantage in a world that expects students to speak out and defend their positions. At Berkeley, Matsui teaches a course called "Studying the Biological Sciences: An Introduction to the Culture of the University and the Culture of University Science." The required course, which occasionally includes non-BSP students, provides a map that tells students "how the university is organized and how science is done on their campus," Matsui says.

Students learn, for example, that science—both the study and practice of it—is done in groups. Myrick, a member of BSP's first class in 1992, recalls not being invited to join any of the study groups in one class—until she earned one of the top grades on the midterm. "It may not be overt racism, but people tend to form groups with people who are similar," Myrick explains. "Or it may be that people make assumptions that minority students in science classes are not going to be at the top of the class." In addition, BSP gave her the confidence and contacts to form her own study groups.

At Yale University, study groups are the cornerstone of the Science, Technology and Research Scholars (STARS) program. From 20 to 25 students are accepted into the program each year. The required help sessions, each taught in conjunction with a particular course, do not involve doing homework assignments. Instead, paid upper-level undergraduates and graduate students guide discussions of difficult concepts facing students in their biology, physics, chemistry, mathematics, and computer science courses. Facilitators also help students learn how science is done on campus.

The program replaced an earlier effort that Yale officials decided didn't go far enough. "The old model was about generating interest," says STARS co-director and neurogeneticist Robert Wyman about the former program, which paired first-year students with graduate students for 1 year. It ended in the mid-1990s.

STARS doesn't ignore the cultural aspects of doing science, either. As the program's academic director, chemistry professor Iona Black encourages STARS students to participate in a program-supported internship as early as the summer after their first year. During their lab experience, students take Black's "Introduction to Scientific Reasoning" Course. It teaches them how to collect, analyze, and present data, raising their confidence for lab courses and research experiences. These are skills that majority students often get at top high schools.

The course also allows Black to express her high expectations for them and to form a personal bond. "They have to know that you believe they can be successful and that help is there when they face a roadblock," Black says. Adds Wyman, "Her particular style is one of tough love. She doesn't let the students get away with anything. Yet they know she cares."

Black also spends time carefully matching students with potential mentors. She is always on the lookout for cultural differences that have the potential to sabotage a student's progress. For example, Black says that she stresses the inevitability of making mistakes, driving away the unfounded belief among many minority students that they must be perfect to be credible. "Their natural instinct is that they should not make any mistakes," she says. "But everybody goofs in the lab; you just have to own up to it and learn from it."

Combining a student-centered approach with the teaching of system smarts can reduce the importance of the "random factor"—that serendipitous conversation or chance meeting in a hallway—that most scientists of color say played a major role in the earliest stages of their career. The Yale, UC Berkeley, and UMBC programs are also trying to spell out what they have done so that other schools can replicate their success: Hrabowski and his colleagues, for example, have published a detailed description of their methods, including statistical analyses of their outcomes.

Last month, UC Berkeley opened the Faculty Center for Leadership in Educational Access and Diversity to support graduate students and faculty members who want to conduct research aimed at increasing diversity in their disciplines. "The institution must be willing to recognize the value of developing practical means to removing social and cultural barriers," says Gregory Aponte, a professor in the Department of Nutritional Science and Toxicology and director of the new center. "Research related to providing educational opportunities and equity should carry the same weight as research in a person's own field." Among the first projects supported by the center will be research on the success of BSP.

Although that work is expected to heighten awareness of the issue and identify practical steps that UC Berkeley and other universities can take, Wyman believes that it is important for diversity programs to remain flexible. "I don't think we should ever look for a final formula," he says. "You've got to keep studying it." **–CAMILLE MOJICA REY**

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