Building the Nation's Scientific Capacity: Evidence from the Louis Stokes Alliances for Minority Participation Program (LSAMP)

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Concerns over national productivity, international competitiveness, and homeland security have focused attention on the need to increase native participation in the U.S. science, technology, engineering, and mathematics (STEM) workforce. Underscoring this is a call from the National Science Board, which concluded that the "number of native-born S&E [science and engineering] graduates entering the workforce is likely to decline unless the nation intervenes to improve success in educating S&E students from all demographic groups, *especially those that have been underrepresented in S&E careers*."[2] Minorities have been traditionally underrepresented in scientific fields; a growing share of the U.S. population, minorities are a rich pool of potential talent. For over 10 years, they have been the target of a National Science Foundation (NSF) effort to retain minority students in STEM—namely, the Louis Stokes Alliances for Minority Participation (LSAMP) Program. The information presented in this article comes from the Urban Institute's four-year evaluation of the LSAMP program.[3]

Launched in 1991, the main goal of LSAMP was to encourage and facilitate access to careers in STEM fields for underrepresented populations. More specifically, NSF hoped to encourage African-Americans, Hispanics, and American Indians (Asians are not underrepresented in STEM) to enroll in and complete baccalaureate programs in STEM, as well as to continue on to graduate studies in these fields. The challenge was to help students from minority groups who are known to face obstacles at different points in the STEM pipeline that make it difficult for them to attain postsecondary degrees in STEM. The findings highlighted here focus on the progression of LSAMP participants through the STEM education pipeline, comparing them with representative samples of minority and nonminority students.

LSAMP Model: Keeping Students in STEM

The LSAMP Program began with grants to six multi-institution collaborative efforts, called Alliances. Today, 34 Alliances with more than 450 participating institutions throughout the country have graduated thousands of students with bachelor's degrees in STEM. Participants in an LSAMP program benefit from a coherent set of services geared toward supporting them in their studies and introducing them to scientific professions. Research experiences, academic support services, and mentoring to build student interest in STEM are among LSAMP's key characteristics. Financial assistance, in the form of stipends, is also provided to many participants. Unlike traditional scholarship programs, LSAMP takes a comprehensive approach to student development and retention, creating partnerships among colleges, universities, research laboratories, businesses, and government agencies to support student learning and to provide professional and research opportunities. In a nutshell, the LSAMP model is grounded upon two main principles—academic support and professional induction.

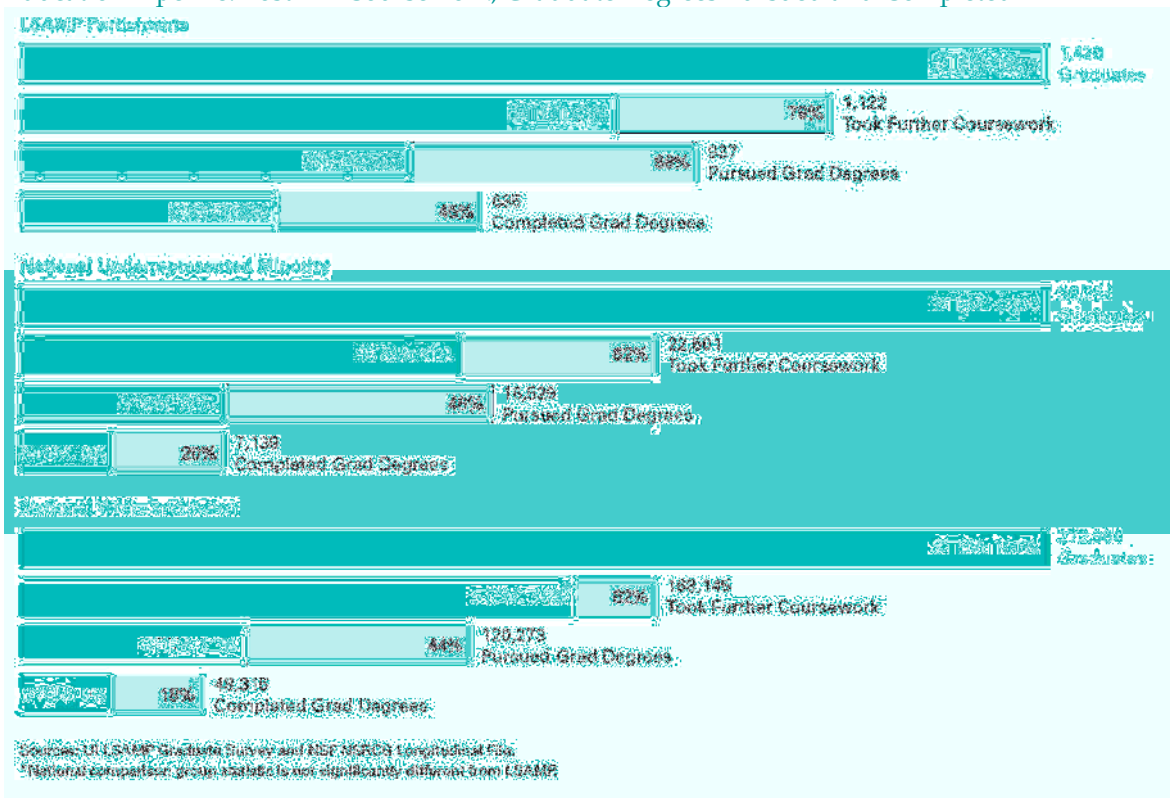
Data: Program versus National Graduates

The data used in this analysis come from two sources—a survey of LSAMP graduates[4] and a nationally representative longitudinal data set of bachelor's degree recipients (none of them LSAMP participants). The survey population included all funded LSAMP participants who graduated in a STEM major between 1992 and 1997. We obtained a 60 percent response rate; analyses indicate no bias was introduced due to nonresponse. Survey data were compared with national data on STEM graduates collected as part of the National Survey of Recent College Graduates (NSRCG).[5] Both data sets were analyzed using appropriate weights to represent the underlying populations. Adjustments were also made to obtain unbiased estimates. Differences reported have a significance level of at least .05.

Findings: STEM Education Pipeline

The figure below presents the most critical student-level outcomes measured, and clearly conveys the differences in the pipeline progression of LSAMP participants (all minority) versus graduates in national minority (African-Americans, Hispanics, and Native Americans) and nonminority (whites and Asians) samples. Since the ultimate goal of the program is to train future scientists, it is important to evaluate if participants stay in the STEM pipeline after completing their bachelor's degrees. To do this, we look at whether they continue their studies in STEM, go on to graduate school, and complete graduate programs (master's and doctorates).

Education Pipeline: Post-BA Coursework, Graduate Degrees Pursued and Completed



The data analyzed show that about 80 percent of LSAMP graduates took further coursework after completing their bachelor's degree, compared with about 60 percent of comparison minority and nonminority BA holders. The majority of them enrolled in graduate programs, as suggested by the fact that about 65 percent of LSAMP participants pursued graduate degrees (compared with 45 percent among the comparison groups). Lastly, about 45 percent of former LSAMP students *completed* graduate degrees, while this was true of about 20 percent of national minority and white and Asian bachelor's degree holders.

Analyses of these data by field of studies show that LSAMP participants, while as likely as whites and Asians to pursue further coursework in STEM, *outperform them as well as other minorities in terms of graduate degree enrollment and completion in STEM*. Thirty-eight percent of LSAMP participants enrolled in STEM graduate degrees, compared with about 20 percent of comparison groups. In addition, 25 percent of former LSAMP students completed graduate degrees in STEM, versus about 9 percent of graduates in comparison groups.

These results reveal a striking difference in the progression of LSAMP participants versus national samples of minorities and nonminorities going through the STEM pipeline. This difference, in favor of LSAMP, is perceived at each step—in pursuit of post-undergraduate coursework, in enrollment in graduate programs, and in completion of graduate degrees, overall and in STEM fields.

Conclusion: LSAMP-Type Intervention Programs Hold Promise

LSAMP was designed and funded to cultivate native talent in STEM. The rationale for focusing on minorities was logical. This was a sizeable, growing, and largely untapped pool of potential talent. Study results suggest that this minority population, provided with appropriate training and support, holds great promise for revitalizing the STEM workforce in the United States.

References

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[1] The Urban Institute is a nonprofit, nonpartisan policy research and educational organization that examines the social, economic, and governance problems facing the nation. The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. The National Science Foundation funded the Urban Institute evaluation of the LSAMP program under contract REC-9912176.

[2] National Science Board, 2003, 1. Emphasis added.

[3] The full report is available at http://www.urban.org.

[4] Only "Level I" LSAMP graduates were included in the study. These are funded program participants who participated in a basic set of activities.

[5] Questions included in the LSAMP survey were identical to those in the NSRCG to ensure data comparability.