

Project STEP-UP

STEM Trends in Enrollment and Persistence for
Underrepresented Populations



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University of Illinois at Urbana-Champaign

Strategies for Promoting Diversity

The STEM Trends in Enrollment and Persistence for Underrepresented Populations (STEP-UP) project is investigating the matriculation, persistence, and degree attainment of full-time, first-time enrolled women, minorities, and low-income undergraduate students in STEM (science, technology, engineering, and mathematics) fields at a consortium of large research universities. Quantitative and qualitative methods are used to examine factors and programs that impact students' underrepresentation in these fields at universities that are significant producers of the nation's STEM degrees.

The strategies for promoting diversity presented here are drawn from our study results to date. Specifically, we offer strategies derived from two sources of data:

1. Interviews with 55 STEM recruitment and retention program directors, coordinators, affiliated faculty and administrators (n=55). These interviews were conducted on ten participating campuses.
2. Survey data from 1,881 responding undergraduate students, of whom 155 are underrepresented minorities (URMs).

Our recommended strategies address two areas:

1. College and department response(s) to diversity
2. Student targeted strategies that impact student preparation for and persistence in STEM

Colleges and Departments

Colleges need to undertake a process of institutional transformation using STEM as the focus. The process of institutional change needs to be intentional with clearly articulated goals and should be centrally directed and coordinated. A process of overall institutional change to support the improvement of all students' performance in STEM needs to include specific interventions that address URM student needs. A systematic, well-planned intervention, guided by the process of assessment and evaluation, is needed to achieve the desired results.

Informed hiring is an essential element of securing the success of the transformation and especially of the effective operation and delivery of interventions. Program directors and coordinators should be well-trained and knowledgeable in the appropriate program and service areas. STEM expertise may need to be paired with social science, student affairs, and/or higher education expertise.

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Colleges should maximize the opportunities for students to develop a sense of belonging and integration in their department and college. Colleges that ‘own’ their students report greater success of their efforts to sustain and grow diversity. Creating a welcoming environment and providing academic support and opportunities for engagement within the department and the college—particularly engagement with faculty—is an effective approach.

The provision of core recurring funding is necessary to undergird planning and program stability. In addition to enabling the maintenance of an effective staffing model, recurring college and campus funding signifies the legitimacy and value of the program/office/officer(s) to the college and campus. Funding the salaries of program staff, in whole or at least in part, signifies commitment to the academic growth and success of the students.

Pre-College Interventions

Provide high quality financial aid and financial aid counseling early and often. The rising cost of college exerts a large influence on student’s major field choice. Unmet need drives the selectivity of the college choice also, and differential tuition charges by major may impact students’ decisions to enter into and/or stay in STEM fields. The quality of aid goes a long way in shaping students’ available time for study and other forms of academic engagement.

Provide a pre-college mentoring program. URM students are increasingly first-generation students and often lack access to the social networks that intentionally or coincidentally introduce them to a clear understanding of college and even less so to an understanding of career opportunities in the STEM fields. Pre-college mentoring increases students’ understanding of the college-going process, can affirm students’ self-confidence and their STEM-identity.

Provide a pre-College academic/research experience. Pre-college academic enrichment and research experience programs have multiple benefits. These types of programs nurture academic growth and preparedness, which for many URMs is vital since they are too often enrolled in under-resourced secondary schools. They build communities of students with similar backgrounds and shared experiences, and at the same time, make it okay to be bright and eager to learn.

Undergraduate Services and Interventions

Tutorial Services. One of our respondents suggested making tutoring ‘mandatory’. Students point to academic support in the form of tutoring and mentoring by peers as a reason for their persistence. These services are more effective when offered within the student’s home department and college.

Project STEP-UP

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Provide multiple and varied opportunities for academic engagement

Inside and outside of class, academic engagement with faculty and peers is an invaluable asset in assisting students' persistence in STEM. Engagement with faculty can help affirm student's sense of their ability to be successful in STEM.

Provide an undergraduate mentoring program.

URM students are increasingly first-generation students and often could benefit from opportunities to acquire insights into how to "do" college.

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