High Impact Practices and Graduate School Aspirations among Underrepresented STEM Students

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URM's in the STEM Fields

Black, Hispanic, and Native American students are underrepresented in STEM disciplines:

• 33% of White and 42% of Asian students completed their STEM BA degrees in five years compared with 18.4% of Black and 22.1% of Latino students

• URM students account for 16.7% of STEM BA degrees but only 11.7% of MA and 5.6% of PhD degrees in STEM fields
Barriers to URM Completion

- Racial isolation
- Perceived low expectations from faculty
- Lack of peers' support in STEM disciplines
- Perceived discrimination
- "Weeding out" through gateway courses
- Campus racial climate
- STEM culture and competitive environments
Factors influencing graduate/professional school enrollment include

- Academic achievement and parents' education
- Institutional quality
- SES background and UG debt

URM STEM:

- Faculty interactions and grades
- Lower UG debt burdens and faculty research
Increasing access to Graduate/Professional Education

- GEM consortium
- Bridge to Doctorate programs
- Undergraduate research programs
- Institution based preview programs
- National funded post baccalaureate programs
- Exposure to professional societies
Theoretical Framework

Carlone & Johnson (2007) science identity model: in order for students to be successful in science, they need to develop a strong "science identity"

- personal/external recognition of being a "science person" as opposed to a "science student"
- comfortable performing scientific tasks
- perception of competence in science

Students lacking "science identity" will not invest in their human capital (e.g. graduate school)
Research Question

Does engagement in specific college activities promote URM STEM students' aspiration to graduate/professional school?
High Impact Practices

Student engagement: academic and social investment in undergraduate experiences

HIPs (Kuh, 2008): learning communities, FY experience programs, community engagement, student-faculty research, internships, study abroad and global experiences, etc.

HIPs are effective:
- time and energy
- require students to interact/engage with faculty/peers
- increases diversity experiences
High Impact Practices

Due to limitations in the data, the HIPs examined here include
- community service
- internships
- globally-themed experiences
- study abroad
- undergraduate research

Several variations of those HIPs were used in the analysis.
Methods

Student Experience in the Research University (SERU) survey

- administered in 2011 to 213,610 UG at 9 large, public research universities
- 3,708 URM STEM students
- most of the HIPs were located in a module that was randomly assigned to 30% of the population ($n = 972$ URM STEM students)
- 2% American Indian or Alaskan Native, 25.4% Black, 72.6% Hispanic
Measures

Demographic variables:

• gender (46.7% female)
• social class (11.5% low-income, 28.7% working-class)
• first-generation (36.9%)

Factors: campus climate, sense of belonging, and academic engagement

Aspiration to graduation/professional school (83.3% aspired to MA or higher)
Students' Participation in HIPs

• Study abroad: 14.7%
• Globally-themed activity: 67.6%
• Internships: 28.3%
• Research with faculty: 33.9%
• Research course: 43.5%
• Community service: 57.9%
Results

Logistic regression predicting aspirations to graduate/professional school:

• Community service: 2x as likely to aspire to graduate school
• Faculty research: 2.06 times as likely to aspire to graduate school
• Internships: .55 (half) as likely to aspire to graduate school
Discussion

• Community engagement: in line with the "altruistic" claims (Carlone & Johnson, 2007)
• Internships: continued work in industry
• Research: offers recognition, performance, and competence opportunities (Carlone & Johnson, 2007)
Limitations

• Survey questions related to high impact practices
• Regional limitations with survey respondents
• Smaller sample due to the survey module
• Institutional type
Recommendations

• Encourage community engagement efforts among STEM students
• Provide opportunities for faculty research
• Present at symposiums or conferences
• Continue creating supportive environments for STEM students
Thank you!

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