

Investing in What Works: How Federal TRiO Programs Can be Used to Enhance the STEM Pipeline

**A Presentation for the
“Building Diversity in Higher Education: Strategies for Broadening Participation in the Sciences and Engineering Conference”**

By

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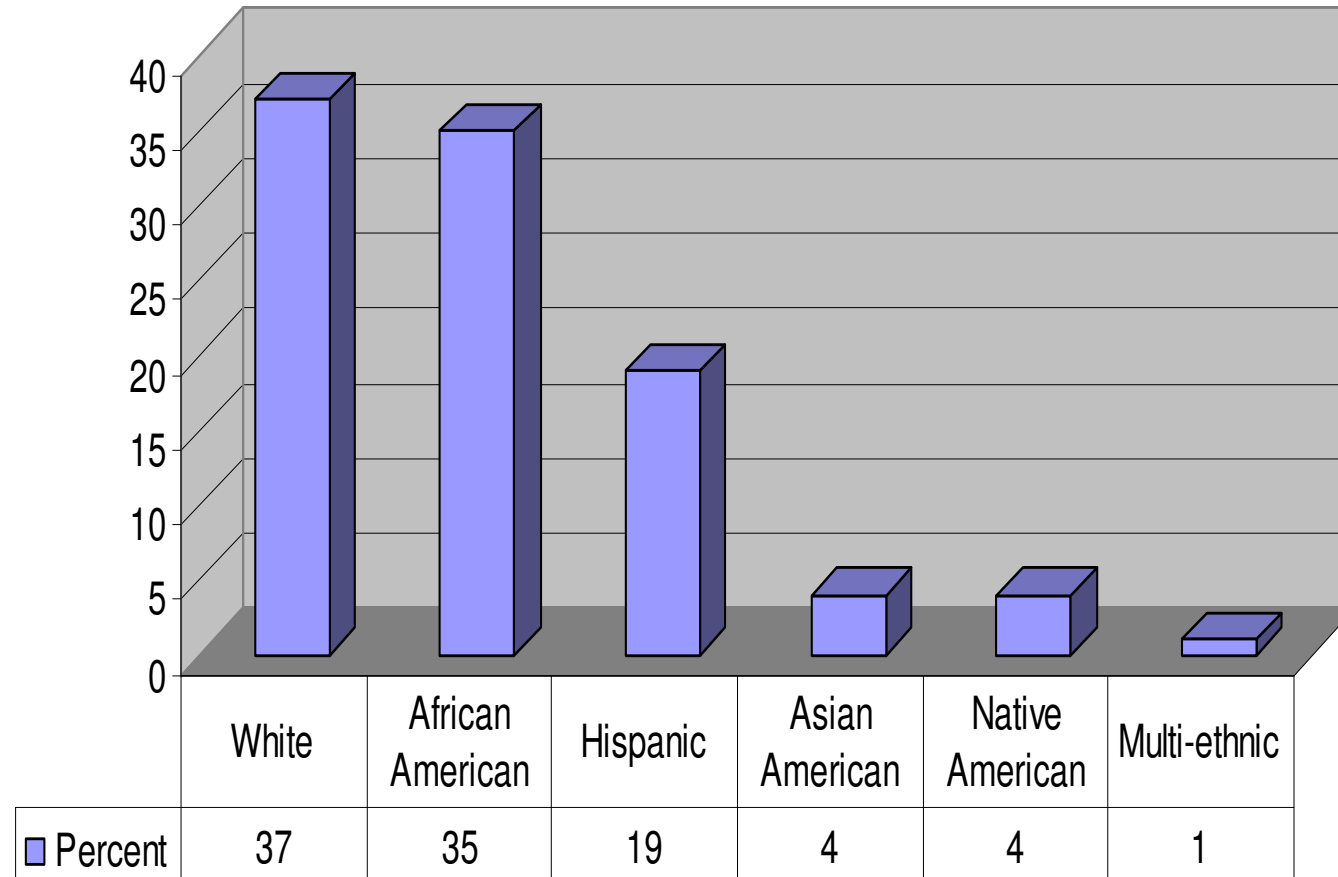
TRiO Programs: Context

- Funded under the Title IV of the Higher Education Act of 1965 – three types of programs were funded originally: Special Services, Upward Bound and Talent Search.
- TRiO programs “help students overcome class, social, and cultural barriers to higher education” (Directory of TRiO and GEAR-UP Programs, 2007, p.4)
- Not a race-based initiative. Two-thirds of students must come from families with incomes under \$28,000 where neither parent graduated from college (Directory of TRiO and GEAR-UP Programs, 2007)

TRiO Programs: Demographics

- Number of TRiO programs: 2,670+
 - Number of participants served: 873,000
 - Number of participants with a disability: 22,000
 - Age groups served: 11 through 27
 - Grades served: 6 through 12
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- Source: Directory of TRiO and GEAR-UP Programs, 2007

TRiO Programs: Demographics Continued



TRiO Programs: Demographics Continued

- More than 1,000 colleges, universities, community colleges and community agencies have TRiO programs
- TRiO programs have to apply for funding to exist. As of passing of 2008 Higher Education and Opportunity Act, grant programs will be funded for five-year cycles and will not reach out to foster and homeless students
- Collectively, TRiO programs receive more than \$800 million dollars in funding from Congress through U.S. Department of Education
- Collectively, TRiO program serve less than 10% of eligible Americans

TRiO Programs: Evidence of Success

- Of all the low-income students in the U.S. who graduate from high school and immediately enroll in college, nearly one-third have been served by TRiO programs
- Upward Bound TRiO students are four times more likely to earn an undergraduate degree than those from similar backgrounds who do not participate in TRiO
- Student Support Services TRiO students are more than twice as likely to remain in college than those from similar backgrounds who did not participate

Source: Directory of TRiO and GEAR-UP Programs, 2007

TRiO Programs: Evidence of Success

- Unlike many other funded programs and campus academic departments, TRiO programs' survival depends on demonstrating quantifiable achievement of objectives in the following areas:
 - participation
 - retention
 - graduation
 - service-delivery
 - graduate school enrollment
 - Ph.D. attainment.

TRiO Programs: An Academic Pipeline

- **Talent Search**
 - middle school, high school career development, retention and postsecondary enrollment
- **Upward Bound**
 - High school retention and postsecondary enrollment
- **Upward Bound Math and Science Centers**
 - High school retention, postsecondary enrollment and emphasis on math and science-related services and instruction
- **Veterans Upward Bound**
 - Postsecondary enrollment for veterans

TRiO Programs: Projects and Purposes

- **Educational Opportunity Centers**
 - Postsecondary admissions and financial Aid information and assistance
- **Student Support Services**
 - College retention and graduation
- **Ronald E. McNair Scholars Program**
 - College graduation, graduate school, research and Ph.D. attainment

TRiO Programs and STEM Pipeline

- Although all TRiO programs provide one of America's best opportunities for building diversity in higher education and STEM, two TRiO programs are a “perfect match” for STEM initiatives:
 - Upward Bound Math and Science Centers
 - Ronald McNair Post-Baccalaureate Degree Program

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers

- Intensive pre-college math and science enrichment program
- Designed to assist pre-college students prepare for and succeed in STEM disciplines
- Approximately 112 programs at two-year and four-year institutions
- Serves approximately 6,000 students

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- Offers students “academic enrichment that extends and enhances knowledge and understanding of math, science, English, social science, and other subjects” (Muraskin, 2008, p. 2)
- “By law, UBMS must provide a core curriculum including mathematics, laboratory science, foreign language, composition, and literature” (Muraskin, 2008, p. 2)
- Curriculum Highlights
 - Intensive instruction in math and science, including hands on experiences

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

Curriculum Highlights Continued

- Activities that provide students with opportunities to learn from mathematicians and scientists who are engaged in research, teaching, applied science in colleges, hospitals, government laboratories, or other public and private agencies
- Activities that pair students with graduate or undergraduate science and math majors who may serve as tutors and counselors
- A six-week summer session with daily coursework (Muraskin, 2008, p. 2)

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- According to the evidence (Olsen, et al, 2007), when compared to non-participants, students who attended UBMS between 1993 and 1995:
 - Had higher grades, including grades in math and science
 - Were more likely to take chemistry and physics in high school
 - Were more likely to enroll in more selective four-year institutions

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- Were more likely to major in math and science
- Were more likely to complete a four-year degree in math and science

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- Research (Muraskin, 2008) shows that the following features may explain UBMS' success:
 - An intensive educational experience, especially during the summer
 - Innovative curricula
 - A great deal of study time

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- An environment that values and rewards learning
- A climate where everyone matters
- Performance to build self- confidence
- Strict behavioral rules couple with education and interpersonal skills

Enhancing STEM Pipeline through TRiO Upward Bound Math and Science Centers Continued

- Dedicated professionals who want to improve students' lives
- Strong, inspiring message
- Targeted student recruitment
- Links to college “bridge” programs

Enhancing STEM Pipeline through TRiO McNair Post-Baccalaureate Degree Program

- 170+ programs around the country
- More than 4,000 undergraduate student scholars nationally
- Tends to be more female than male
- Mostly African American, then Hispanic/Latino/a, then white and smaller pockets of Asian, American Indian/Alaska Native, Hawaiian/other Pacific Islander

Source: Seburn, Chan, Kirshstein (2005)

Enhancing STEM Pipeline through TRiO McNair Post-Baccalaureate Degree Program

- Students tend to be mostly juniors and seniors from diverse disciplines
- Cost per participant is about \$10,000
- Common services are:
 - Summer Research
 - Academic counseling
 - Skills seminars
 - Assistance with graduate school applications
 - Research Conferences
 - Graduate School Visits

Source: Seburn, Chan, Kirshstein (2005)

Enhancing STEM Pipeline through TRiO McNair Post-Baccalaureate Degree Program

- Broad purposes of McNair Programs:
 - Research based
 - Graduate school preparation
 - PhD training and preparation
 - Diversify professoriate

Enhancing STEM Pipeline through TRiO McNair Post-Baccalaureate Degree Program

- 500 participants received earned doctorates by 2001 (program began 1991)

Source: Seburn, Chan, Kirshstein (2005)

- Read sample STEM-related research projects from McNair Journals

Building Diversity in Higher Education: Strategies for Broadening Participation in the Sciences and Engineering Conference – Ten Strategies

1. Don't duplicate, replicate. Use what exists.
2. Adopt, sponsor or partner with a TRiO program.
3. Match funding to serve more students.
4. Mentor or volunteer for a TRiO program.
5. Create Articulation Agreements with TRiO programs.
6. Reward student excellence with admissions and other unique opportunities.
7. Meet regularly with TRiO leaders to monitor relations and get recruitment ideas.

Building Diversity in Higher Education: Strategies for Broadening Participation in the Sciences and Engineering Conference - Final Thoughts

8. Offer TRiO Named scholarships.
9. Sponsor visits to labs so students can watch experiments the way interns watch surgeries in teaching hospitals.
10. Promote learning communities within TRiO programs (e.g., math cohort, engineering cohort, technology cohort)

Building Diversity in Higher Education: Strategies for Broadening Participation in the Sciences and Engineering Conference - Final Thoughts

How is diversity achieved?

*Faculty have to **care** more than others believe is wise*

*Administrators have to **risk** more than others believe is safe*

*Universities have to **dare** more than others believe is practical*

*Students have to **dream** more than others believe is possible*

-Author unknown

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