Factors Influencing Academically Gifted (High-Achieving) Latino Student Success in Engineering

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According to the Literature

- *Rising Above the Gathering Storm*, complied by the National Academy of Sciences, of note were findings such as “…roughly one third of U.S. students intending to major in engineering switch their majors prior to graduation.” Or, even more alarming, the finding that there were “twice as many physics bachelor’s degrees awarded in the U.S. in 1956 than in 2004.”

- [www.giftedblackstem.com](http://www.giftedblackstem.com)
According to the American Society for Engineering Education, 68% of all undergraduate engineering students in the U.S. are White, 14% are Asian American, and just over 5% each are Hispanic and African American.

African American and Hispanic completion of baccalaureates in science, technology, engineering, and mathematics (STEM) disciplines is 20% less that for White students (Anderson & Kim, 2006).

The graduation rates for African Americans and Hispanics in the field of engineering has not moved in a decade—it is still a combined total of about 11% (Grose, 2007).
Despite an overall increase in baccalaureate degree production, the proportion of minority freshmen in engineering has steadily declined since 1995 (Chubin, May, & Babco, 2005).

Referencing the number of degree recipients in the STEM fields, an even more dire report was provided in Chubin’s (2002) article,

- In 2001, 20 percent of bachelor’s recipients in engineering were women, and less than 12 percent were minorities. In absolute numbers, 1,000 women and barely 200 minorities earned a Ph.D. in engineering last year. You only have to do the math to see how far engineering needs to go for minorities to reach parity in degree awards relative to their numbers in the general population. The time to act was the 1980s, a generation ago, when the future composition of the school-aged population became clear. Hundreds of reports and studies later—federal, foundation, and corporate alike—coupled with affirmative action laws that are now under assault, little has changed. It’s regret time now, but no too late to intervene. (p. 72)
While Hispanics represent the largest minority group in the United States at 14.5% of the population, only 4% of engineers in the workforce of this country are Hispanic.

The *American Association for Engineering Education*’s fall 2001 survey of teaching revealed that barely 1,000 African Americans, Native Americans, and Latinos were among 25,000 engineering educators in the nation’s colleges and universities.

According the *American Society for Engineering Education* (2003), Hispanic faculty represent 3.2% of faculty in engineering disciplines.
RESEARCH DESIGN:
Site and Sample Selection

Focus Groups

Case Study Site
(Texas-Top 10)

Case Study Site
(California-Top 10)

Case Study Site
(New Mexico-Top 10)

Case Study Site
(Florida-Top 10)
RESEARCH DESIGN: The “Top 10 + 1”

- Florida International University
- The University of Florida
- The University of Texas—El Paso
- The University of Texas—Austin
- New Mexico State University
- Texas A&M University—College Station
- Cal Poly State—Pomona
- Cal Poly State—St. Luis Obispo
- University of Texas—Pan American
- University of New Mexico
- University of Texas—San Antonio
According to Maton and Hrabowski (2004), many students who abandon science, mathematics, technology, and engineering majors and who underperform in quantitative courses are students of color who possess high scholastic aptitude tests (SAT) scores, impressive high school grade point averages (GPAs), and success in high school honors math and science courses” (p. 547).

Hence, guiding research questions include: What institutional efforts should be developed or enhanced to address the needs of Latino students in the engineering disciplines, especially those who are academically gifted (high-achieving)? Are there institutional factors that can be identified and manipulated in a way to ensure the success of academically gifted Latino students in engineering disciplines? More specifically, does institutional climate, culture, and environment make a difference?
RESEARCH DESIGN: Based on a Series of Factors

- Relationships with Faculty
- Peer Relationships
- Family Influence and Support
- Factors Influencing College Selection
- Self-Perception
- Institutional Environment (Bonner, 2001)
Summarizing over 15 years of empirical literature, Summers and Hrabowski (2006, p. 1870) link the lack of persistence among minority students in STEM to “academic and cultural isolation, motivation, and performance vulnerability in the face of low expectations, peers who are not supportive of academic success, and discrimination, whether perceived or actual.”
QUESTIONS?