

GEE: Opening Doors and Minds to Engineering

Business Case for Girls Experiencing Engineering

The Program. Girls Experiencing Engineering is a summer program that attracts young women to science, technology, engineering, and math (STEM) fields by increasing awareness of career opportunities, addressing misperceptions and stereotypes, and providing hands-on learning experiences that build confidence and offer leadership opportunities. GEE is hosted by the University of Memphis Herff College of Engineering and has been funded since inception by the Women's Foundation for a Greater Memphis.

National Need Explained. Critical to building an American workforce with 21st century skills is the recruitment, retention, and graduation of students in STEM fields. However, nationwide, lack of student interest in and preparation for various STEM fields, in particular engineering, results in a shortage of workforce talent. In addition, there is a lack of diversity in the STEM workforce. This is particularly important, as people of varied perspectives, backgrounds, and experiences are needed to solve the increasingly challenging problems faced by our global society.

The American Community Survey (ACS) statistics show that women are underrepresented in STEM fields, making up only 26% of the STEM workforce¹. The statistics for engineering are even more sobering. Although the percentage of engineering degrees awarded to women rose slowly from 1966 (0.4%) to a high of 20.9% in 2002, this percentage declined to 18.1% by 2009, and remains below 20% today². These trends continue into the workforce, with women significantly underrepresented in engineering.

Local Relevance Explored. Within the State of Tennessee, it is anticipated that more than 100,000 STEM related jobs will need to be filled within the next six years and 88% of these jobs will require post-secondary education. Memphis mirrors these findings, with a large STEM industry based in transportation and logistics, bioscience, and chemical fields. Because of this significant industry base, it is essential to produce a talented STEM workforce locally.

In Shelby County, women make up 52% of the local workforce but are significantly underrepresented in technical fields³. Women hold only 28% of jobs in the computer, engineering, and science (CES) occupations sector. The disparity is even greater for the subsector of computer and mathematics occupations, where women account for only 19.8% of the workforce. Median earnings for women in the CES sector are \$51,701, as compared to the overall median for women in all employment categories of \$35,623³. This is important because this sector provides the highest median salary of all job categories, and can lead to economic self-sufficiency for women.

Evidence of Success. Since its inception in 2004, the GEE program has engaged 1,422 students (including 934 unique participants as nearly 1/3 are repeat attendees), nearly 700 teachers, and over 250 peer mentors. **Program tracking efforts reveal that of the tracked former participants who have graduated high school, 87% are attending college and 33% are majoring in Science, Technology, Engineering, or Math.** As more students progress from the middle school to the high school GEE programs, graduate, and enter college, it is expected that the number of STEM majors will also rise. This success contributes to the availability and diversity of a local STEM-ready workforce, which is crucial for the local economy.

1. Landivar, Liana (2013). Disparities in STEM Employment by Sex, Race, and Hispanic Origin. American Community Survey Reports, ACS-24.

2. National Science Foundation, National Center for Science and Engineering Statistics, Directorate for Social, Behavioral and Economic Sciences (2013). Women, minorities, and persons with disabilities in science and engineering: 2013. Arlington, VA. Retrieved from http://www.nsf.gov/statistics/wmpd/2013/pdf/nsf13304_full.pdf

3. U.S. Census Bureau, 2015 American Community Survey 1-Year Estimates

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Program Impact 2004-2017. To date, we have impacted:

1,520 middle school and high school participants

Nearly 1/3 of students are repeat participants

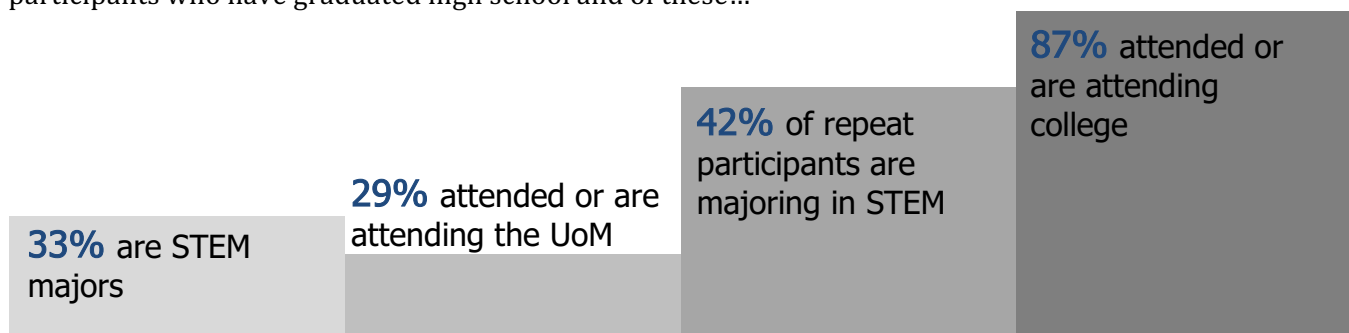
748 math and science teachers

284 high school and college mentors

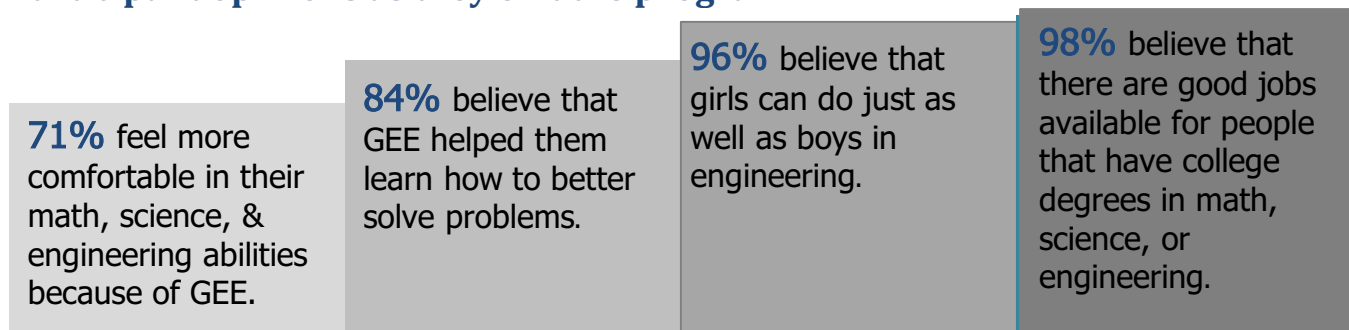
Over the course of the past 14 years, GEE has involved 779 middle school and 741 high school students.

Importantly, approximately 88% of these girls represent minority groups traditionally underrepresented in math, science, technology, and engineering fields. Of the high school girls selected to serve as **mentors**, 73% are now in engineering majors, 86% are in a STEM major, and 100% are in college!

Longitudinal data on current student activities. We have been able to track 474 of 587 former participants who have graduated high school and of these...



Participant opinions as they exit the program.



Hear from GEE Program participants.

“All my life I have wanted to be a scientist, and now **I feel like I can follow my dream.**”

“GEE was **fun, challenging, intriguing,** and engaging!”

“GEE has helped me figure out what I want to do when I go to college. I've enjoyed this program so much, and **I am definitely now considering becoming an engineer.**”

