

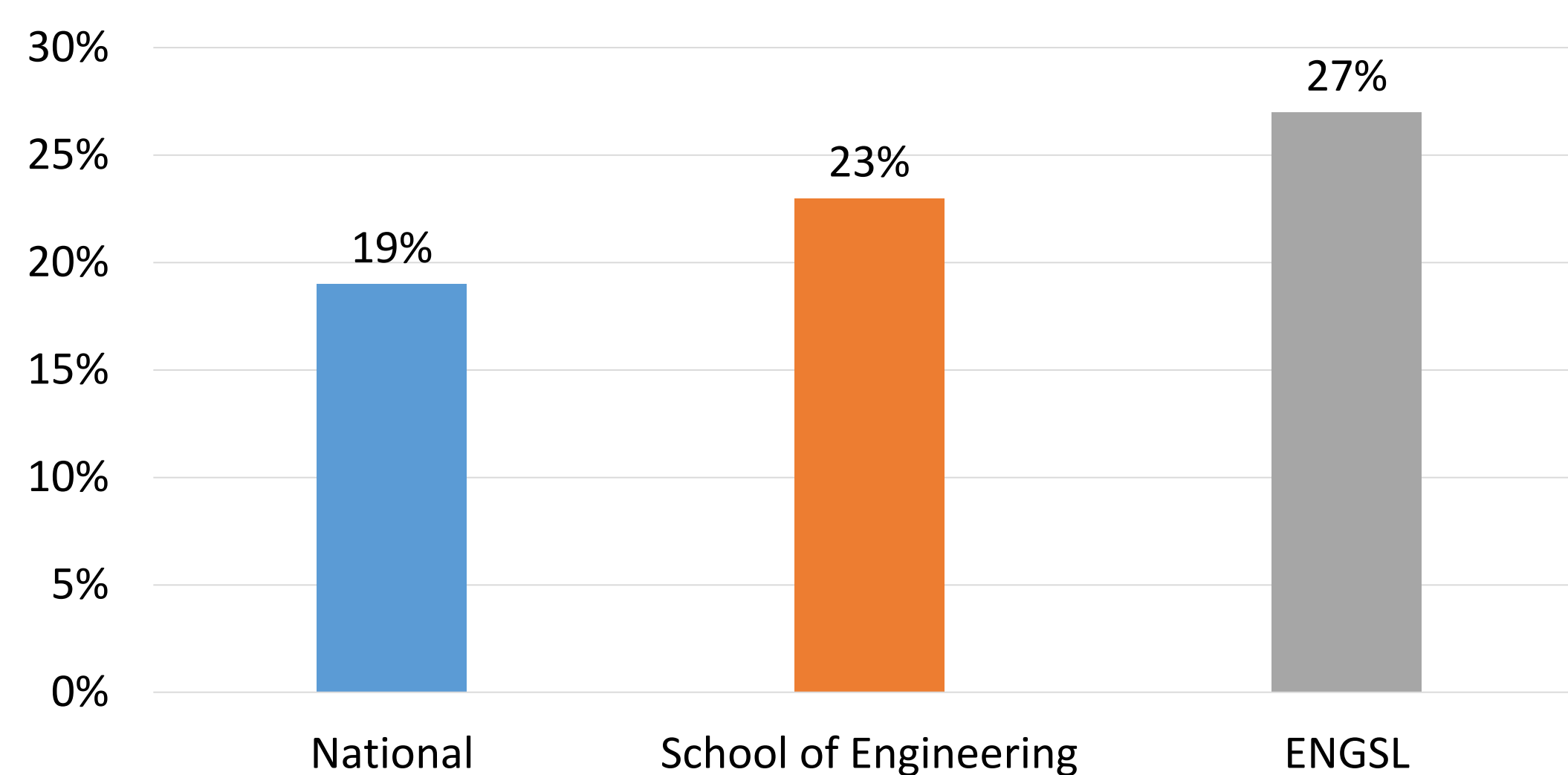


Introduction

- Engineering Service Learning (ENGSL) sees general higher enrollment than traditional engineering courses from women and minorities
- Student outcomes were investigated to see how populations are affected by the course, and contribute to STEM retention
- National, UC Merced School of Engineering, and Engineering Service Learning data comparisons were made for the Fall 2013 semester
- Demographics were analyzed over time, and surveys were analyzed to discover if there were intents to:
 - Remain in engineering
 - Select leadership positions
 - Confidence in skills and abilities

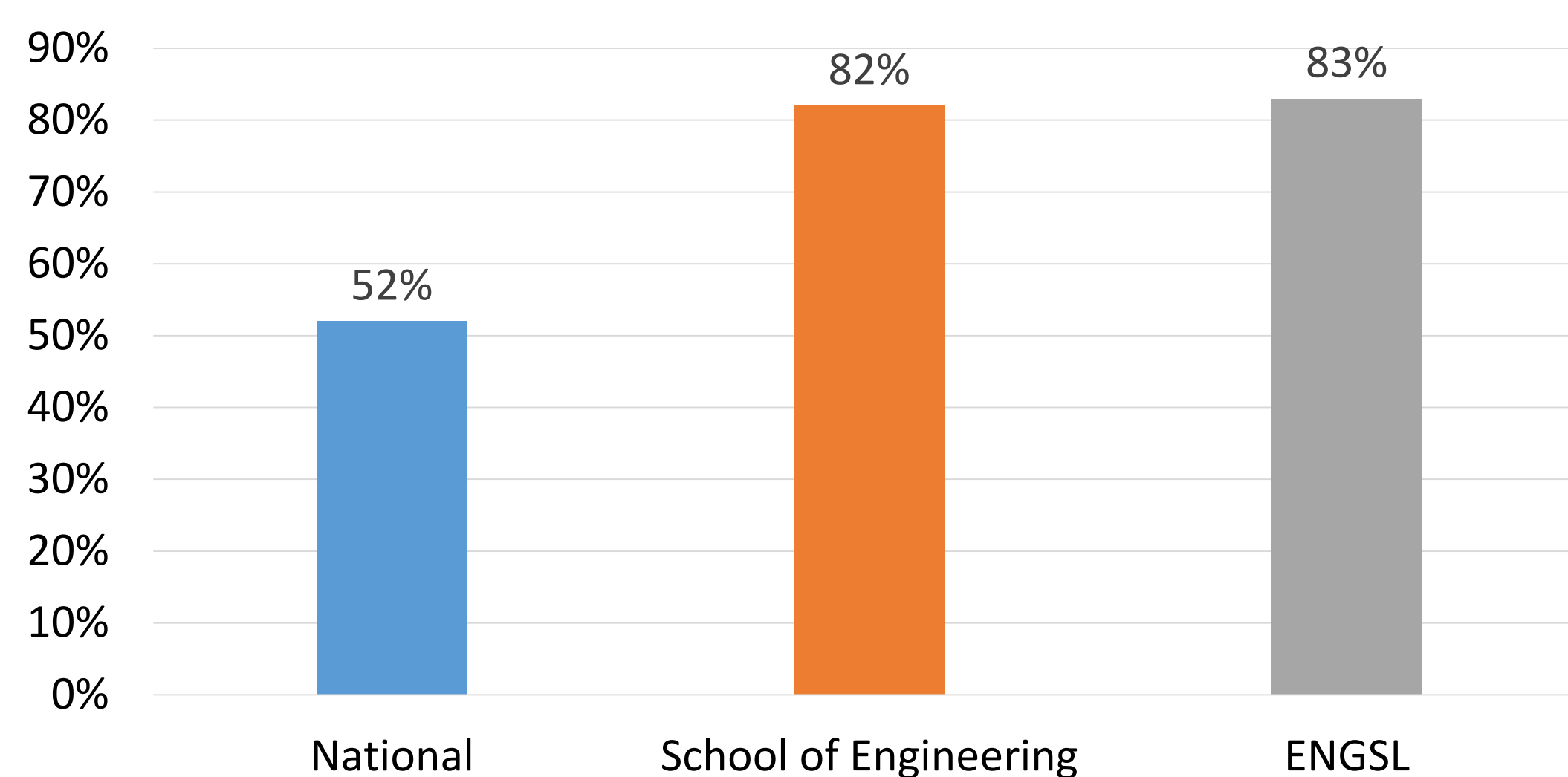
Women in Engineering

- Compared to National and University demographic data, Engineering Service Learning has higher female enrollment in 2013^{1,2}



Minorities in Engineering

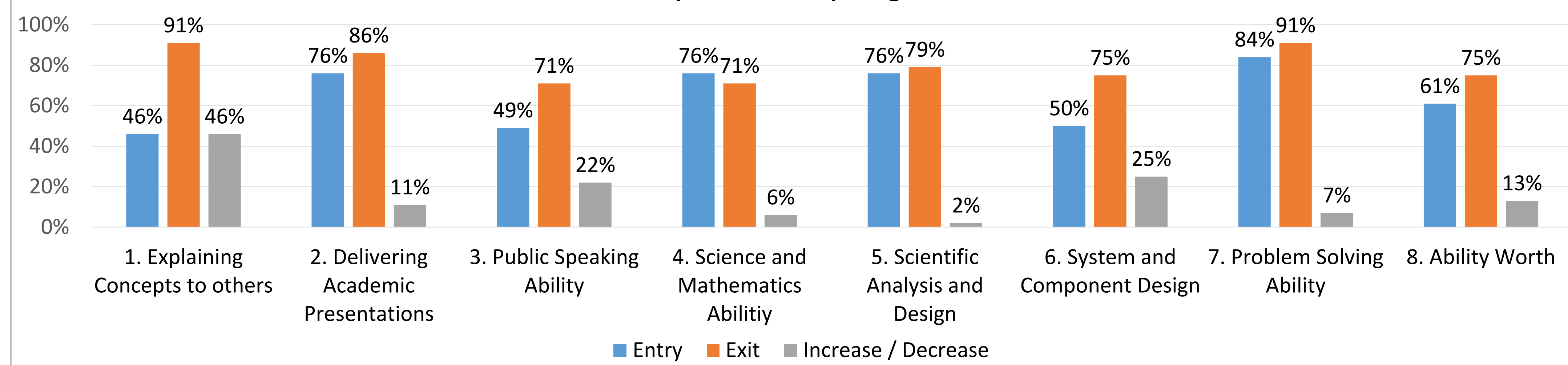
- Compared to National and University demographic data, Engineering Service Learning has higher minority(non-Caucasian) enrollment in 2013^{1,2}



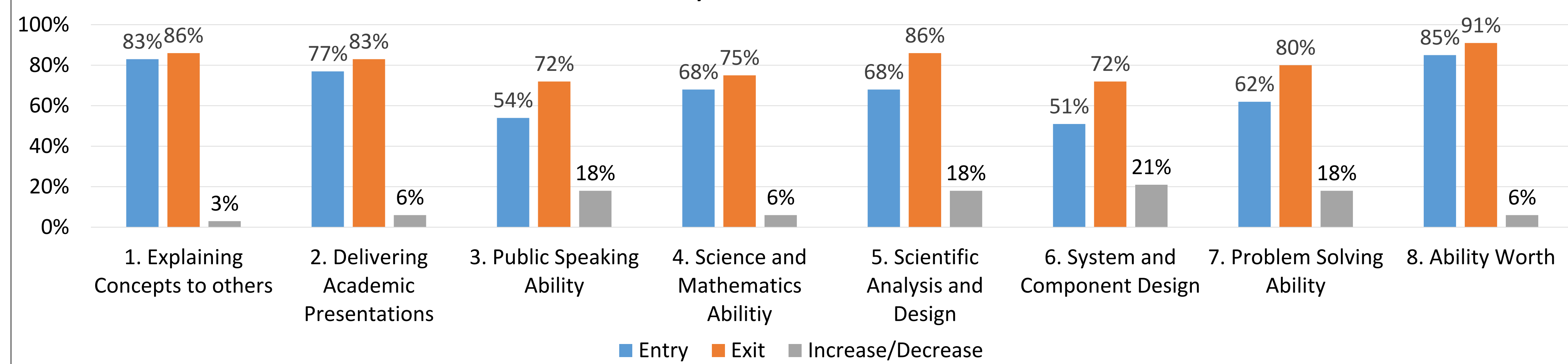
Growth in Skillset for Women and Minorities

Pre and post surveys conducted on 192 students to monitor the growth and change of the students across the semester in the Engineering Service Learning course in 2016. Learning outcomes are assessed through this and weekly reflections

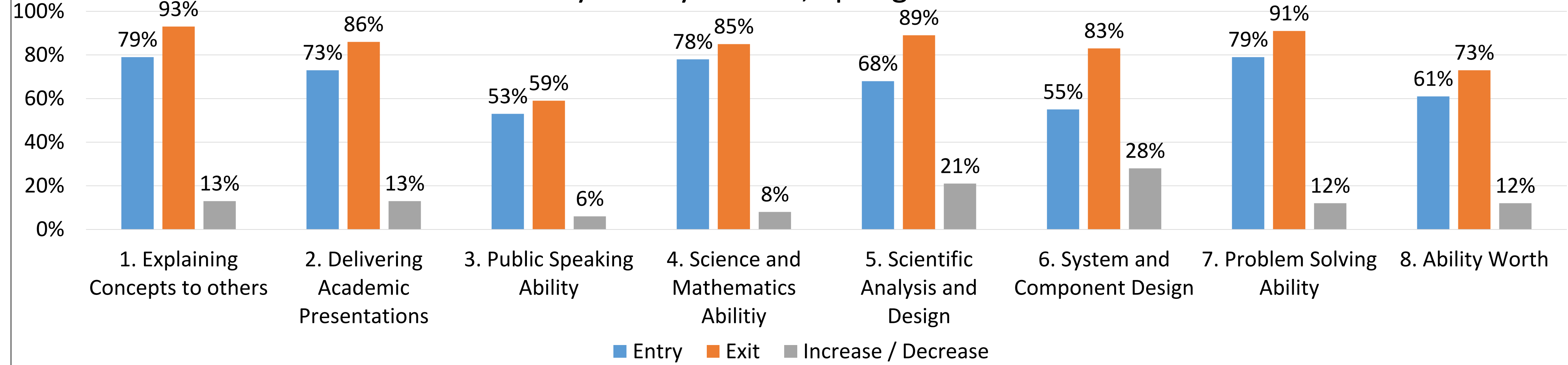
Women Survey Results, Spring 2016 Semester



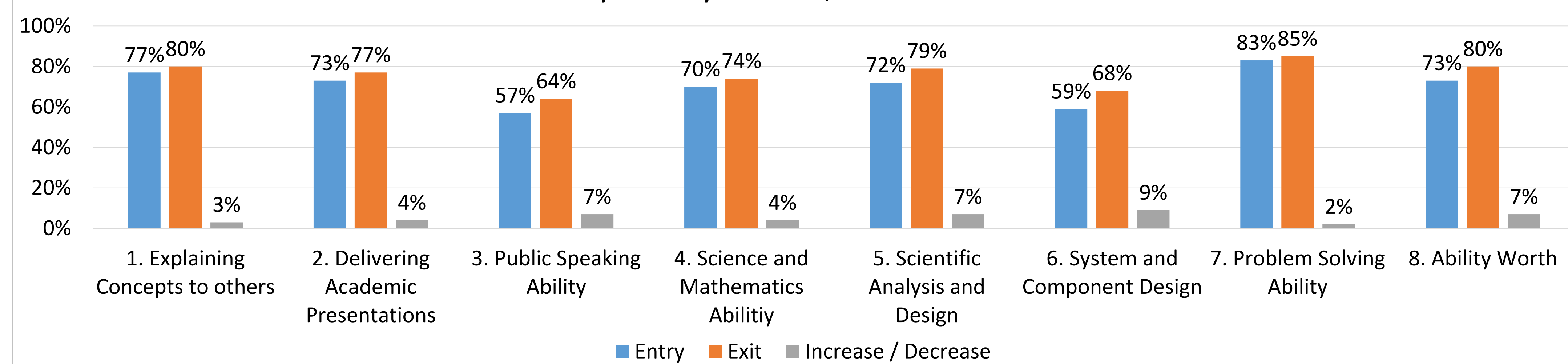
Women Survey Results, Fall 2016 Semester



Minority Survey Results, Spring 2016 Semester



Minority Survey Results, Fall 2016 Semester



Future Steps

- The duration data presented is relatively short. While preliminary data looks promising, Engineering Service Learning will continuously collect information from the students enrolled in the course to identify long-term trends
- Gender and ethnicity data will continue to identify inclusiveness of participants in Engineering Service Learning

Conclusions

- Based on the data shown, Engineering Service Learning has an observable affect on the student growth in the following areas³:
 - Leadership Capabilities
 - Technical Capabilities
 - Professional Development
- While some indicators show little change, Engineering Service Learning shows general positive trends in student outlooks and views. Engineering Service Learning encourages women and minority students who are historically at a disadvantage in STEM fields to remain in STEM related majors through the use of real-world projects, the development of professional and technical skills to create a safe zone for students to develop³
- Despite positive results, there are examples of negative experiences. For example, when asked at the beginning of the semester if students were able to contribute to correcting misinformation, it was noticed that there was a 14% decrease from the responses at the beginning of the semester

Resources

1. NSF, Undergraduate in Engineering Enrollment <https://www.nsf.gov/statistics/2017/nsf17310/static/data/tab2-10.pdf>
2. UC Merced, Student Demographics <http://irds.ucmerced.edu/docs/School%20Demographics/School%20of%20Engineering%20Demographics.pdf>
3. Huff, James, Zoltowski, Carla, Oakes, William. *Preparing Engineers for the Workplace through Service Learning: Perceptions of EPICS Alumni*. Journal of Engineering Education. 2015. Print.