

Promoting a Culture of Inclusion in First-Year Engineering Courses

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EnFUSE Symposium April 28, 2016



Colorado State University

IUSE: (EI)² Exploring Inclusive Engineering Identities Through Freshman Curricular Change



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NSF Award #1432601

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



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Motivation

- Prior project looking at the use of group design projects in statics
 - Video analysis of groups working together
 - In some cases, women were being marginalized
- Literature search found other examples (gender)
 - Felder et. al. (1995)
 - Colbeck et.al (2001)
 - Meadows & Sekaquaptewa (2013)

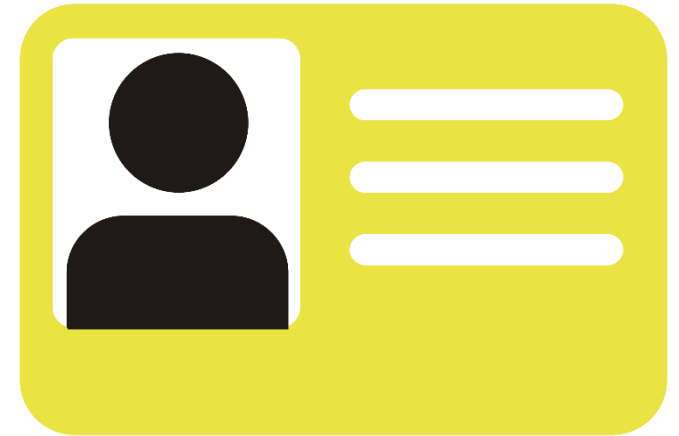


Why are our efforts aimed specific groups of under-represented students?
We need to work on cultural change by working with ALL students.



Theoretical Framework: Engineering Identity Development

- Students come to engineering schools to *become* engineers
- Steps in identity development
 1. Defining the Profession
 - Doing engineering
 - Identifying similarities and value of engineers
 - Identifying differences and value of non-engineers
 2. Interacting
 3. Sensemaking



(Stevens, R., O'Connor, K., Garrison, L., Jocuns, A., & Amos, D.M. 2008)
(Eliot, M., & Turns, J. 2011)



Project Goals for Student Participants

- Intentionally cultivate engineering identity and broaden perceptions about who can identify as engineers
- Kindle awareness and appreciation for how diversity strengthens engineering practice
- Cultivate inclusive classrooms for ALL instead of targeting underrepresented populations



Project Timeline

AY 2014-2015

- Collect baseline data (2 courses)
- Develop experimental curricula

AY 2015-2016

- Implement experimental curricula and assess impact (2 courses)
- Baseline data in 2 additional courses

AY 2016-2017

- Implement revised curricula and collect data on effects



Data Collection

- Quantitative
 - Surveys 5 times during the semester
 - Questions about diversity appreciation, identity development, class activities, self-efficacy, outcome expectations
- Qualitative
 - Free response questions at the beginning and end of the semester



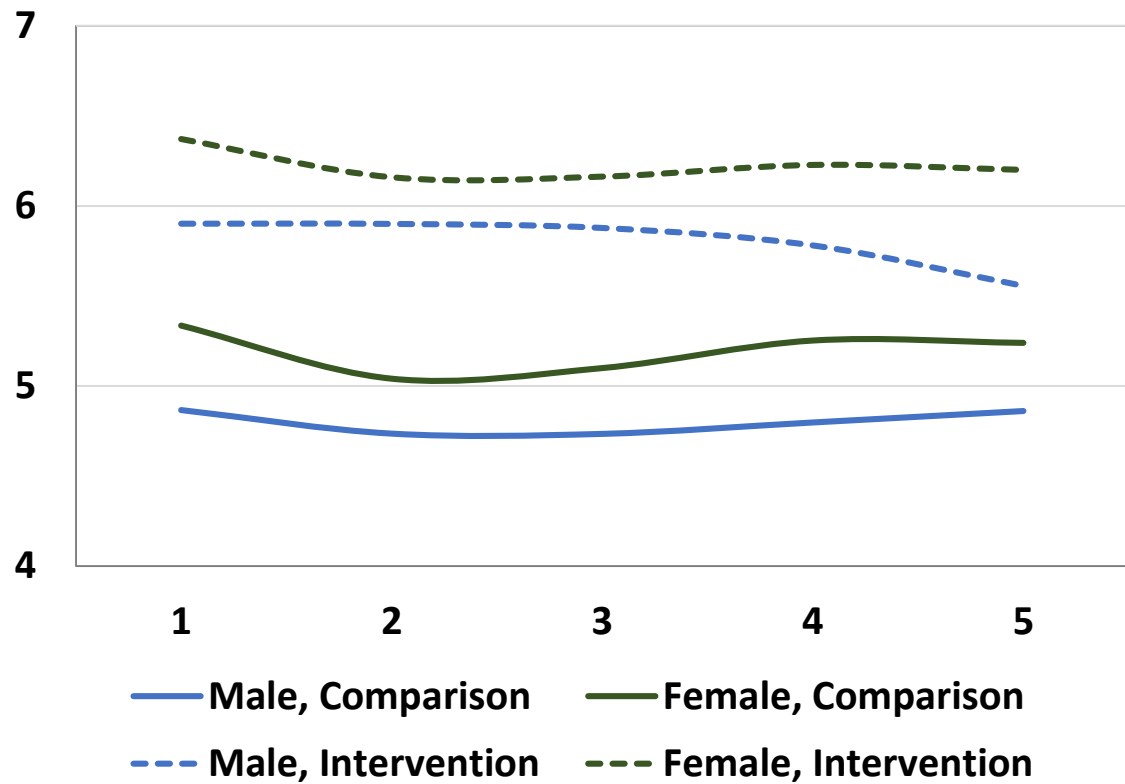
Experimental Activities

- Welcome presentation from Dean
- Panels of Professional Engineers
- Student Trading Cards
- Lecture on the Nature of Engineering
- Interactive Theater Sketch

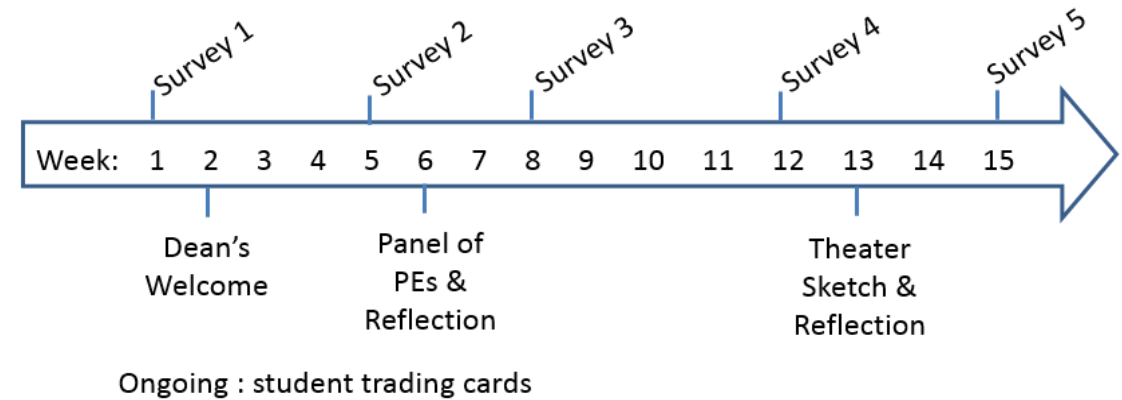


Preliminary Findings

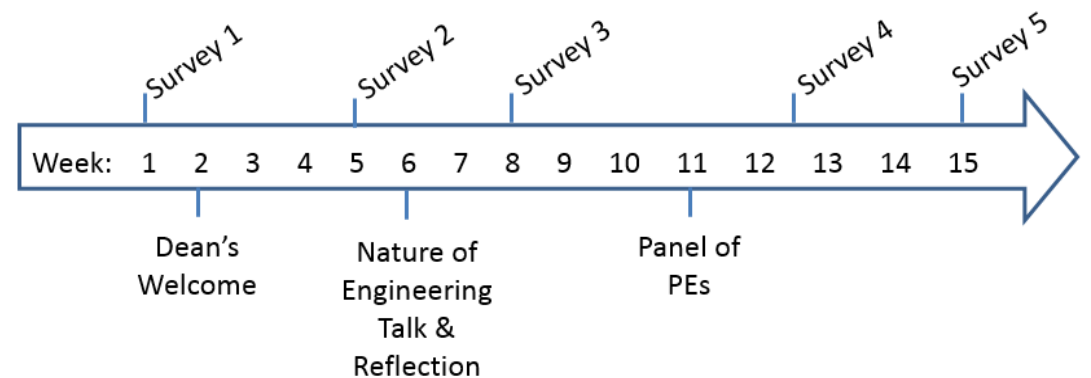
Appreciation for Diversity



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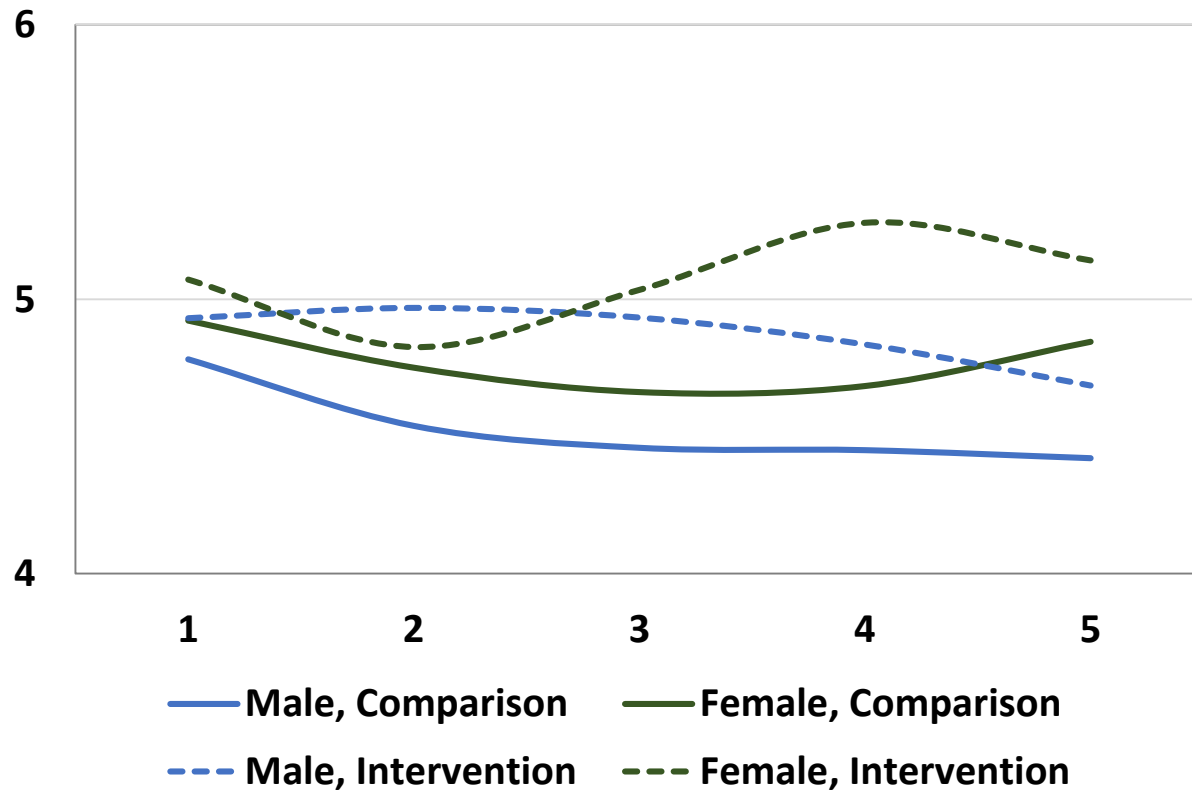


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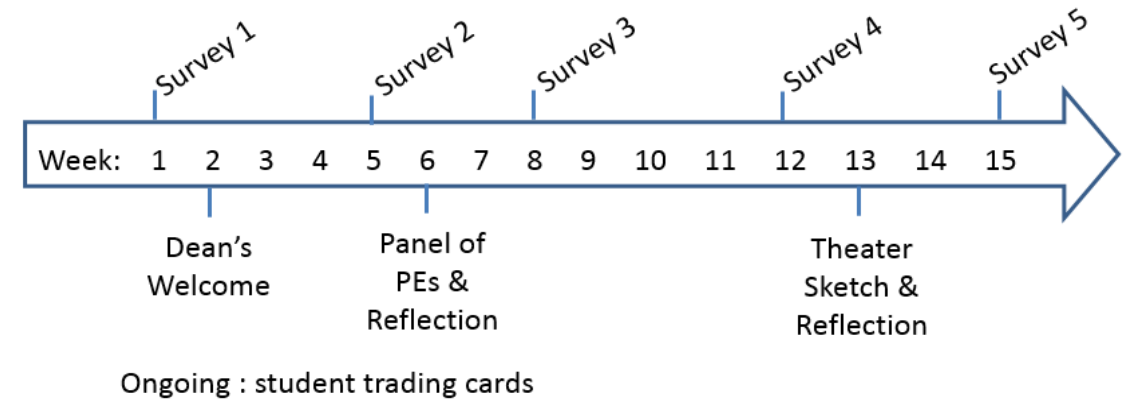


Preliminary Findings

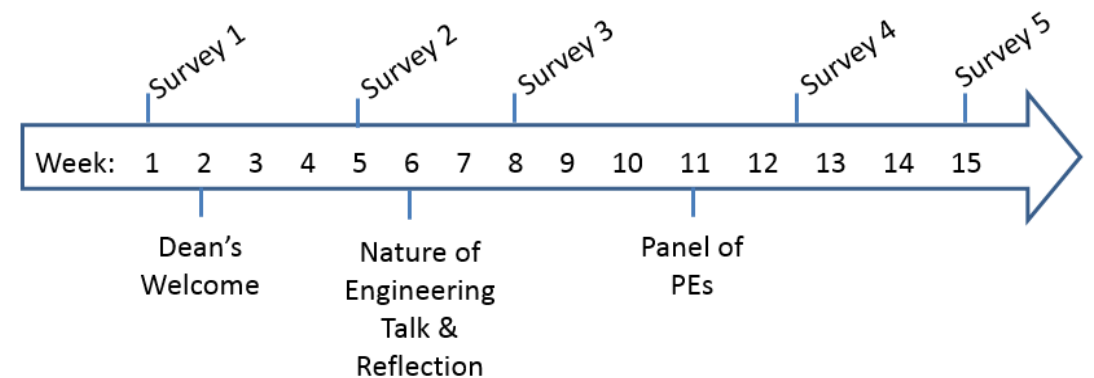
Engineering Identity



ENGR 101

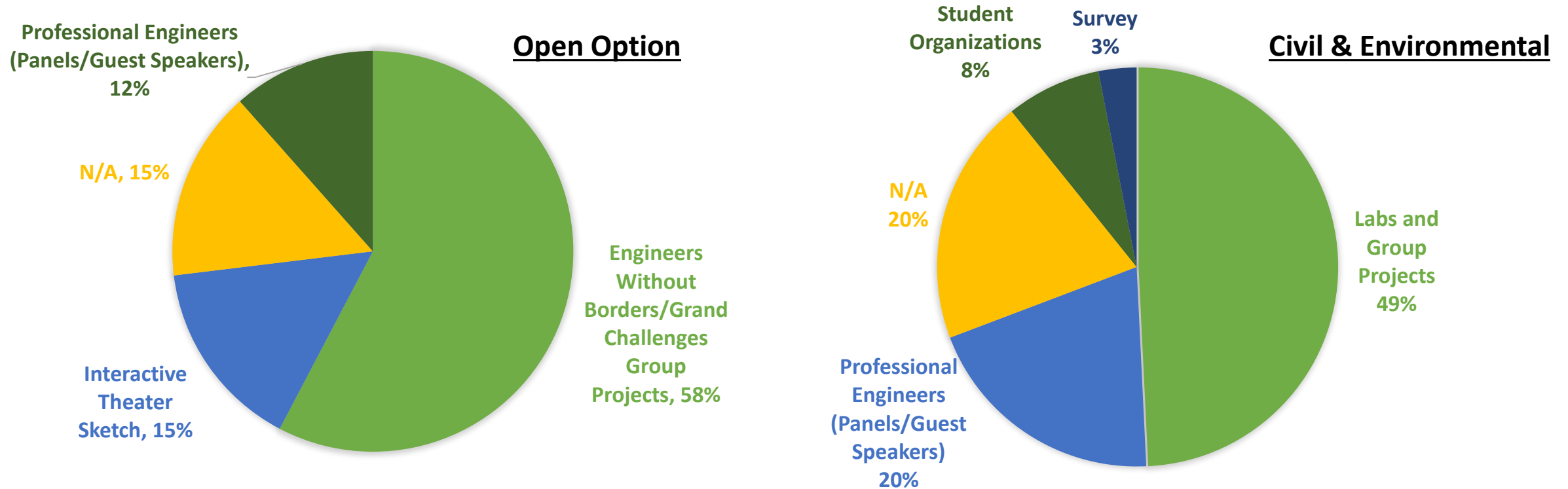


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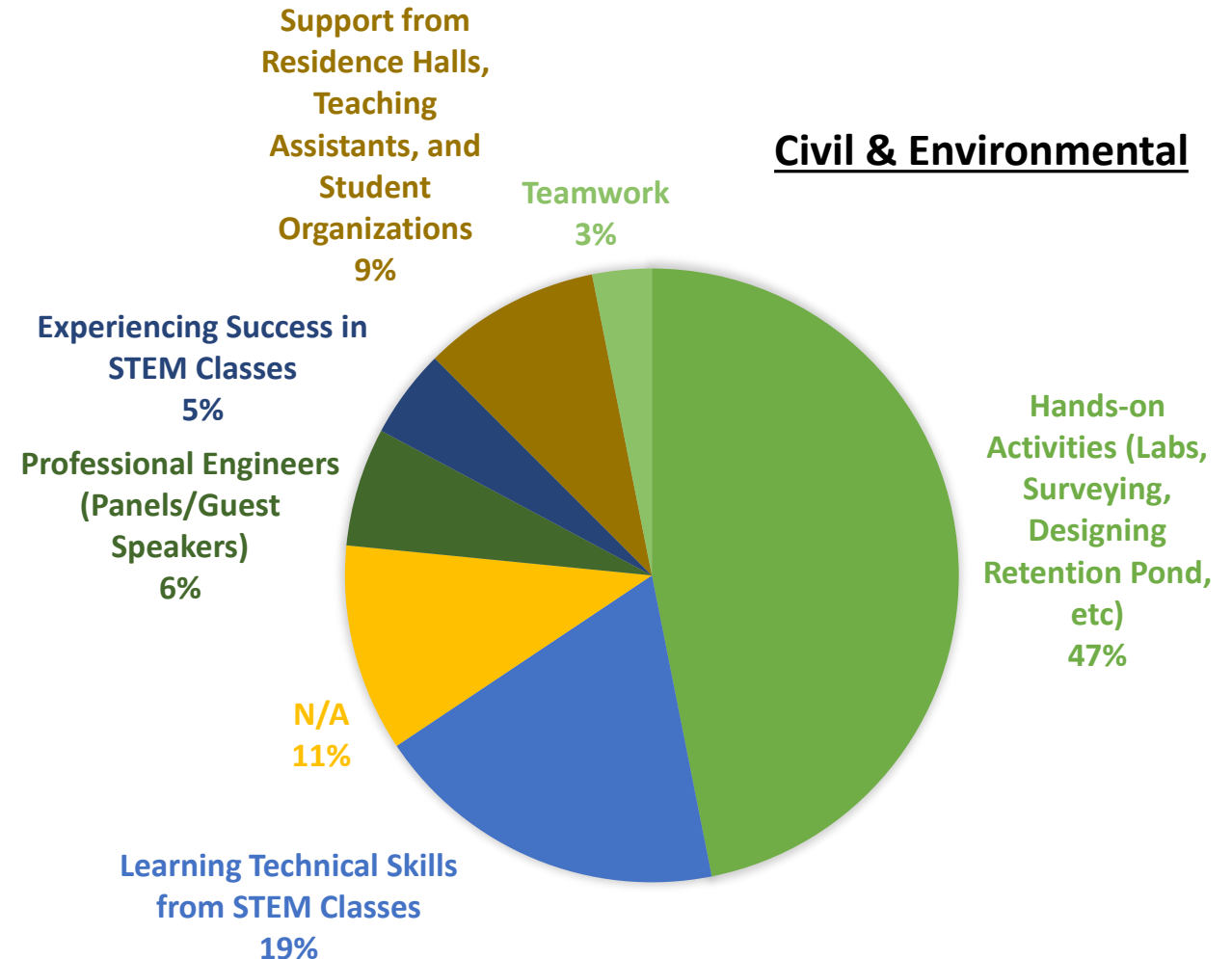
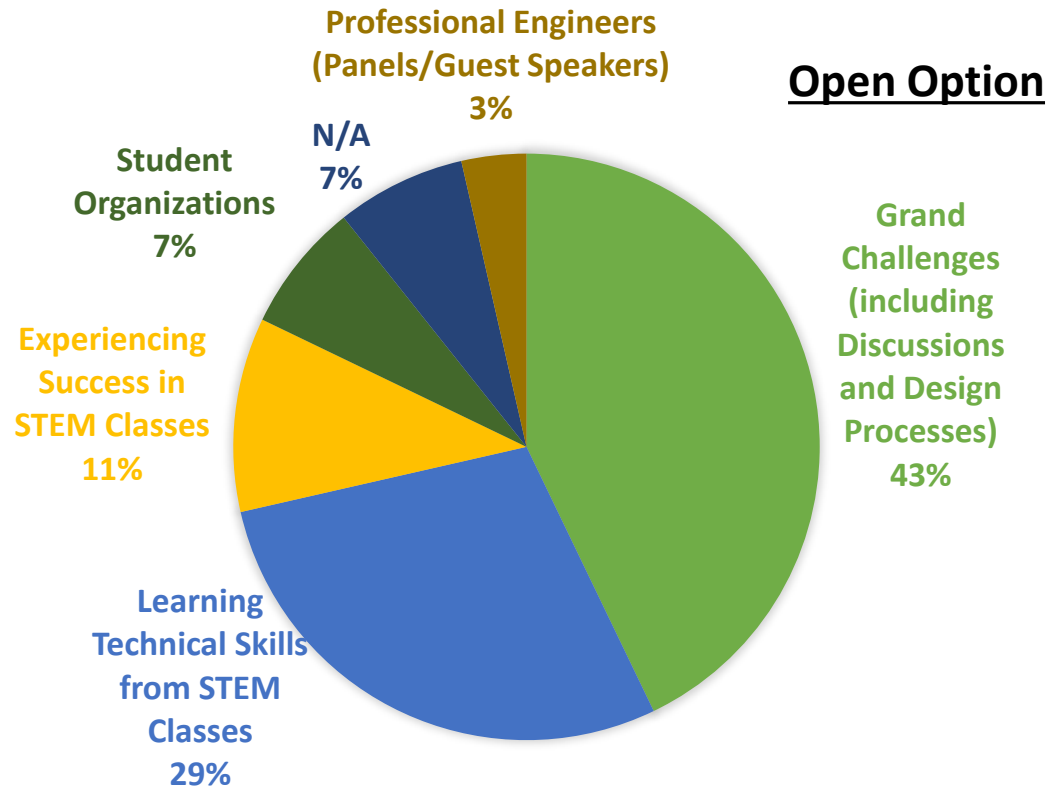
Preliminary Findings

- Which course activities increased your appreciation for diversity in engineering?



Preliminary Findings

- Which course activities helped you identify as an engineer?



Anticipated Changes for Fall 2016

- Position diversity activities in direct relation to effective teamwork
- Be more ambitious and direct when talking about sensitive issues
- Extend to additional freshman classes



Thank you

- Questions
- Comments
- Suggestions



References

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