

Creating Inclusive Environments in First-Year Engineering Classes to Support Student Learning & Retention

Dr. Christina H. Paguyo, Colorado State University

Dr. Rebecca A. Atadero, Colorado State University

Dr. Karen E. Rambo-Hernandez, West Virginia University

Jennifer Francis, West Virginia University

Colorado
State
University



West Virginia University

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.

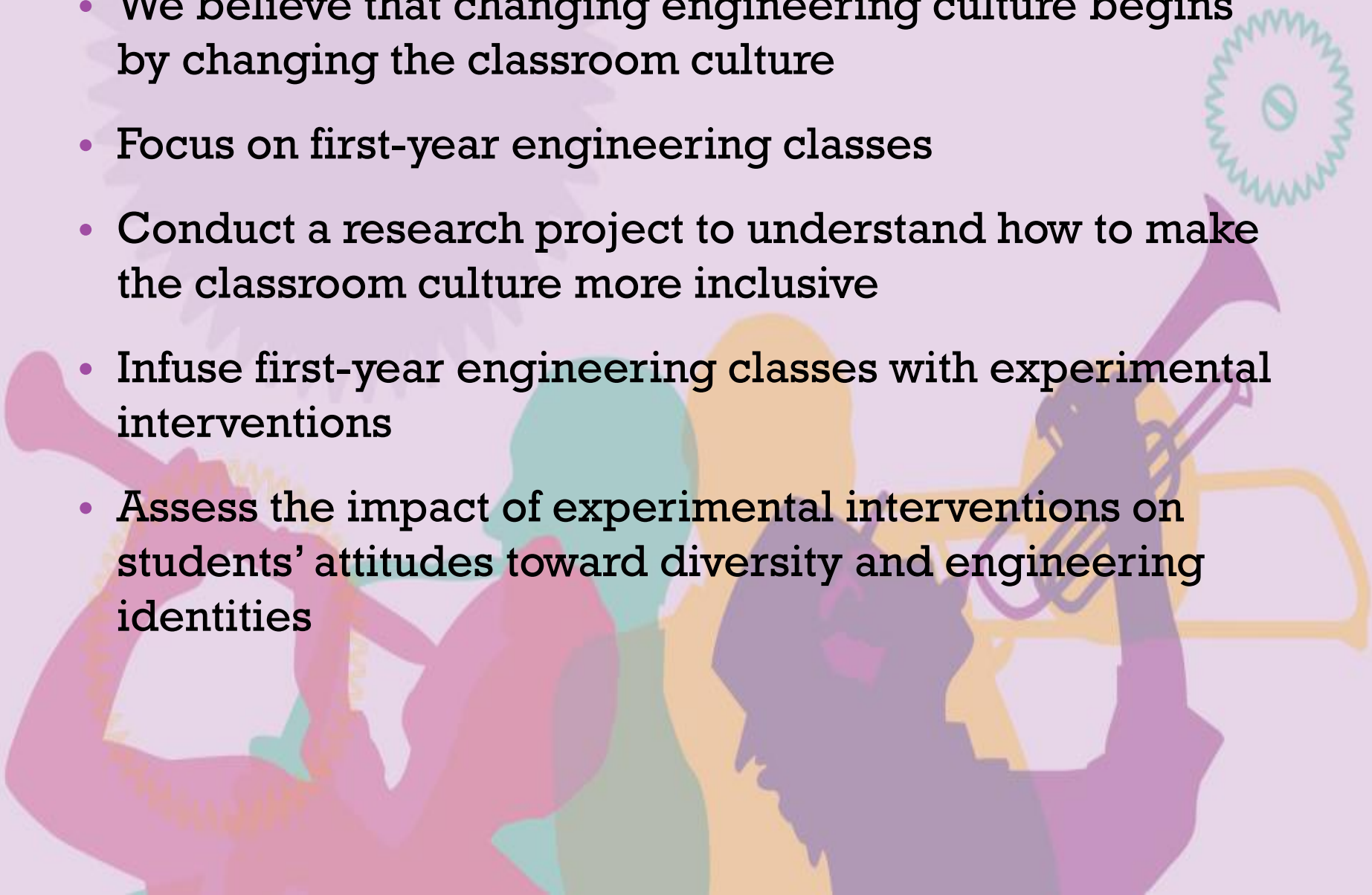
Changing Engineering Culture to Broaden Participation

- Value diverse perspectives and feel valued so ALL students are active participants in becoming engineers



Project Overview

- We believe that changing engineering culture begins by changing the classroom culture
- Focus on first-year engineering classes
- Conduct a research project to understand how to make the classroom culture more inclusive
- Infuse first-year engineering classes with experimental interventions
- Assess the impact of experimental interventions on students' attitudes toward diversity and engineering identities



Project Goals for Student Participants

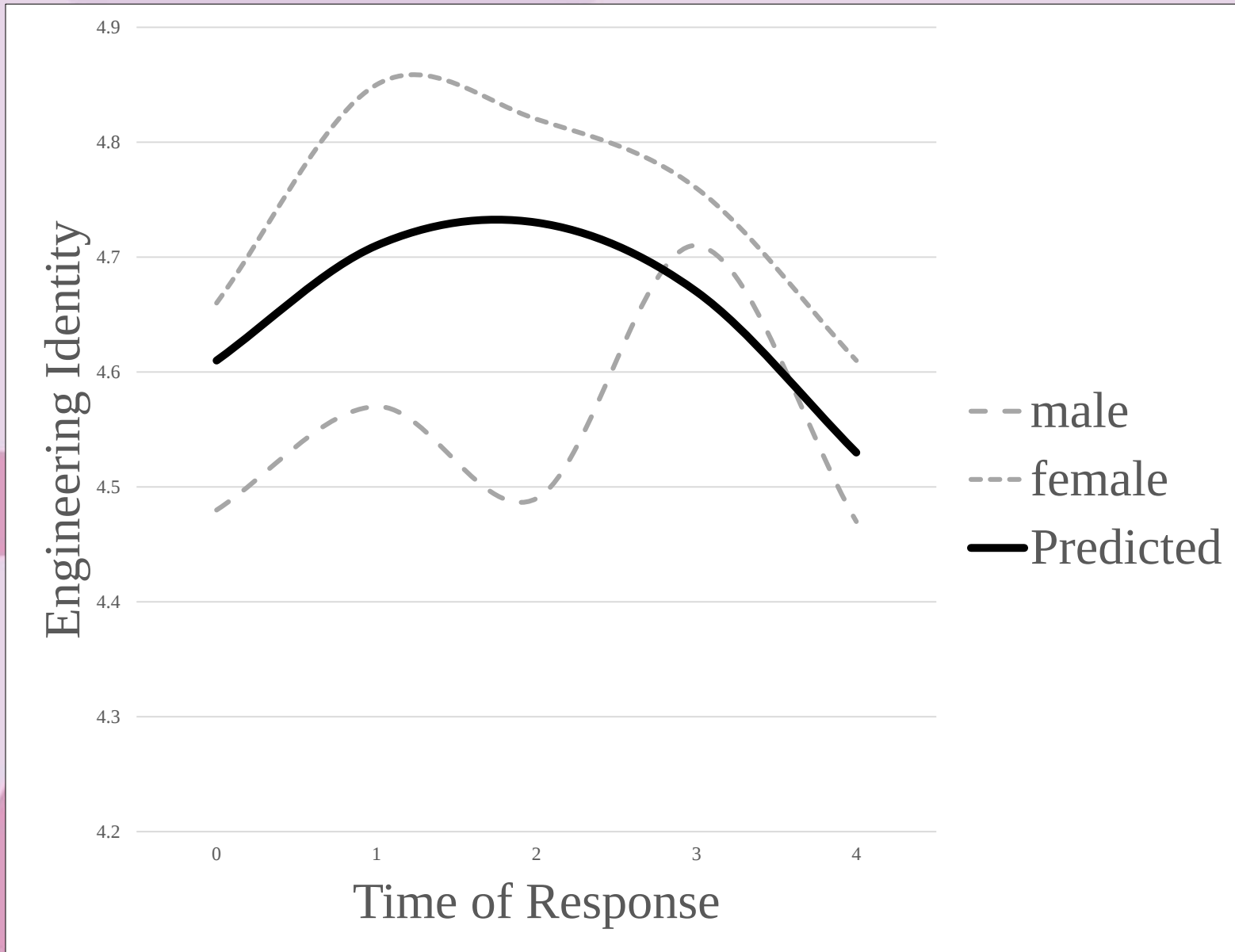
- Broaden perception about who can identify as engineers
- Kindle awareness and appreciation for how diversity strengthens engineering practice
- Cultivate inclusive classrooms for ALL instead of targeting underrepresented populations
- Change engineering culture to support robust learning and retention efforts



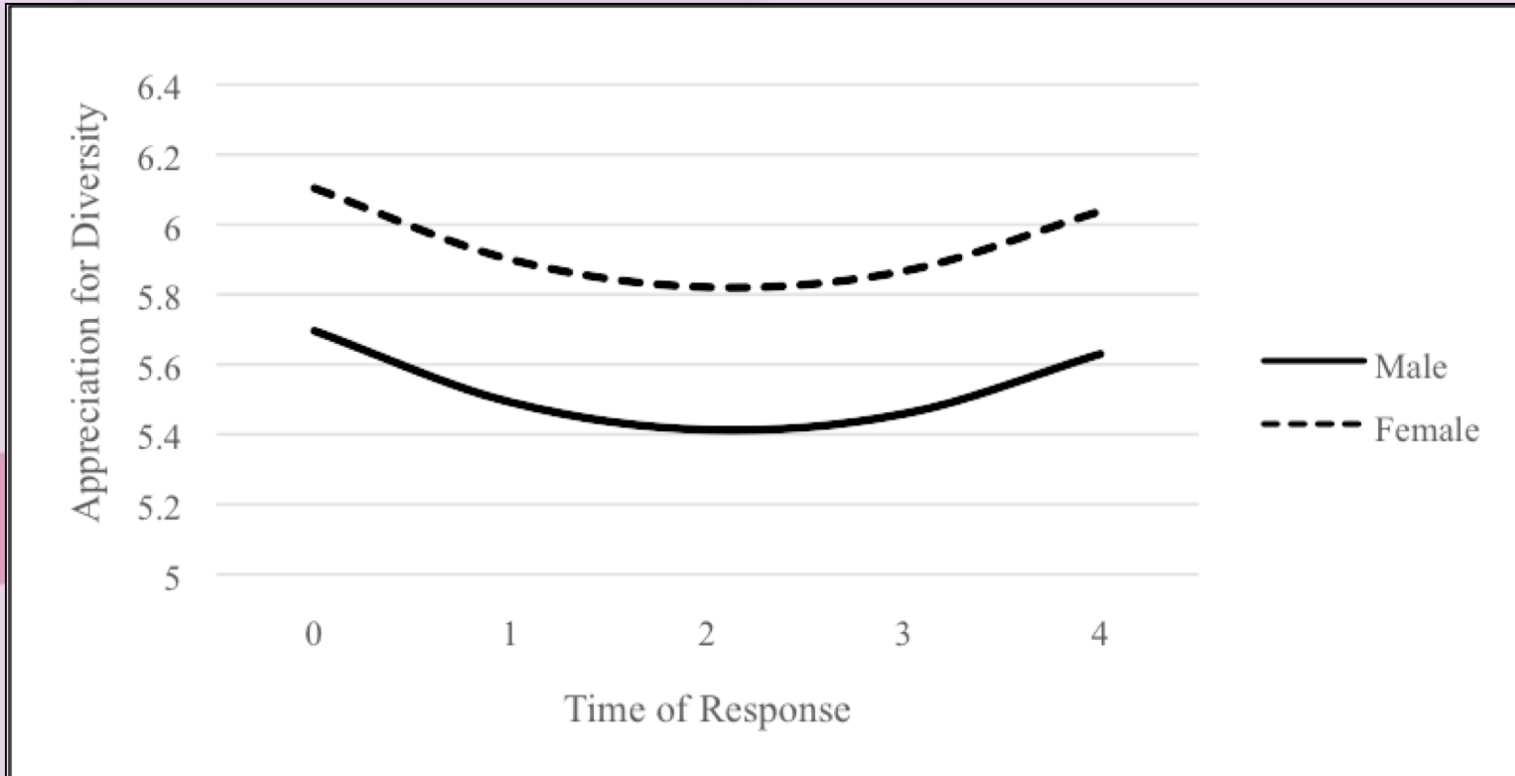
Baseline Survey Data from Fall 2014

- Data from 5 online surveys collected from 2 classes for first-year students
 - Civil and Environmental Engineering
 - Open Option Engineering
 - Sample size of 90 students
- Survey questions
 - Identity: How students identified as engineers
 - Diversity: How students appreciated diversity
 - Activities: How students rated class activities

Findings about Identity

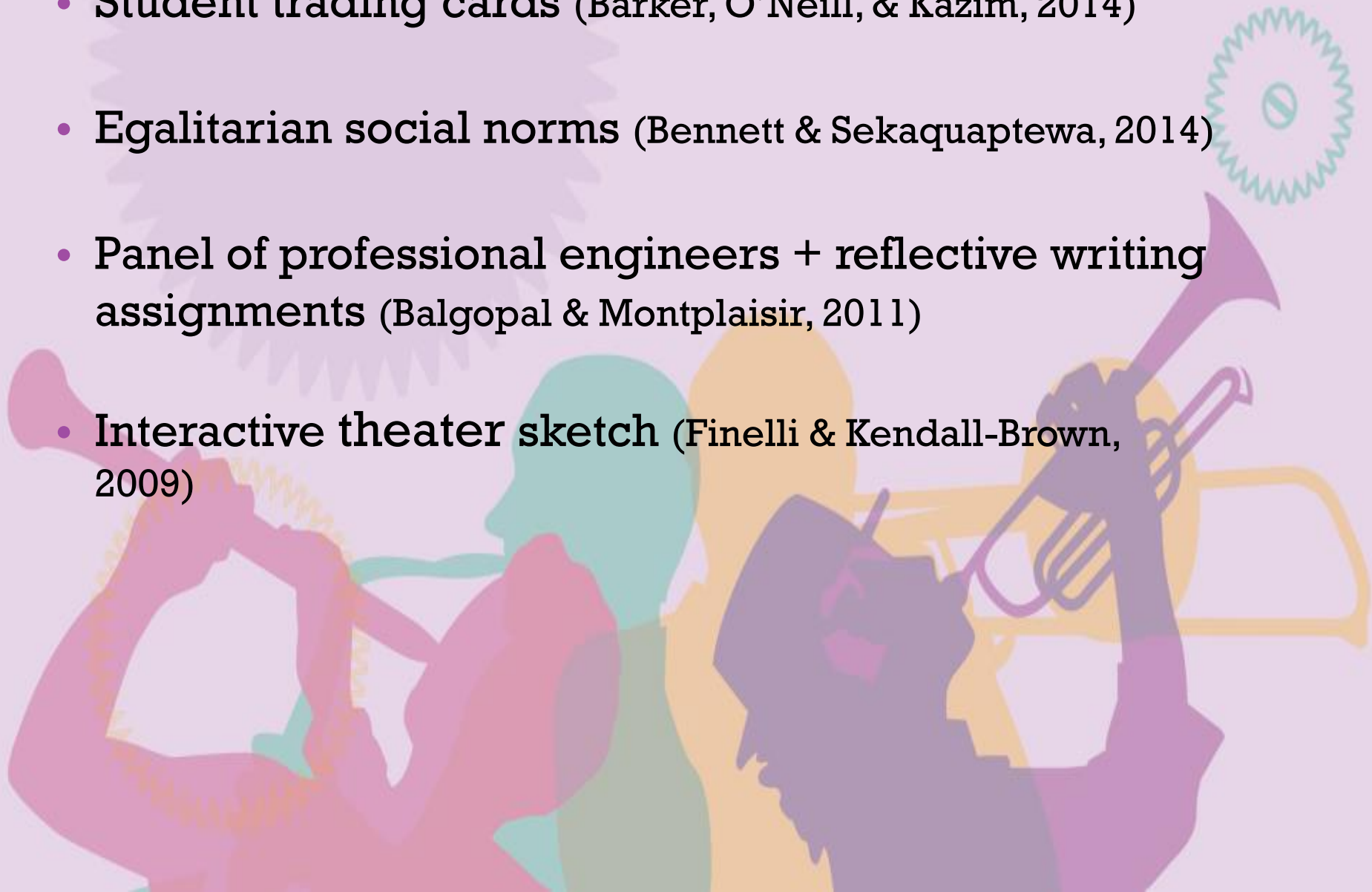


Findings about Diversity



Proposed Inclusive Engineering Activities

- Student trading cards (Barker, O'Neill, & Kazim, 2014)
- Egalitarian social norms (Bennett & Sekaquaptewa, 2014)
- Panel of professional engineers + reflective writing assignments (Balgopal & Montplaisir, 2011)
- Interactive theater sketch (Finelli & Kendall-Brown, 2009)



Implications

- Educators and institutions are responsible for changing engineering culture and intentionally teaching students about issues of inclusivity
- Inclusive engineering environments can help build **inclusive engineering identities**
- Inclusive engineering identities include these traits:
 - Engineering knowledge and ways of thinking
 - Inclusive approach that values diversity of thoughts, identities, backgrounds, and expertise
 - Recognize social responsibility of engineering to serve all populations

Thank you for your time and interest! If you have questions or suggestions, please contact:

Rebecca A. Atadero (PI)

rebecca.atadero@colostate.edu

Karen E. Rambo-Hernandez (Co-PI):

kerambohernandez@mail.wvu.edu

Christina H. Paguyo (Postdoctoral Fellow):

christina.paguyo@colostate.edu

Jenn Francis (Graduate Research Assistant):

jlfrancis@mix.wvu.edu

