

## **Answering How and Why Questions with Qualitative Research**

### **Dr. Catherine E. Brawner, Research Triangle Educational Consultants**

Catherine E. Brawner is President of Research Triangle Educational Consultants. She received her Ph.D. in Educational Research and Policy Analysis from NC State University in 1996. She also has an MBA from Indiana University (Bloomington) and a bachelor's degree from Duke University. She specializes in evaluation and research in engineering education, computer science education, teacher education, and technology education. Dr. Brawner is a founding member and former treasurer of Research Triangle Park Evaluators, an American Evaluation Association affiliate organization and is a member of the American Educational Research Association and American Evaluation Association, in addition to ASEE. Dr. Brawner is also an Extension Services Consultant for the National Center for Women in Information Technology (NCWIT) and, in that role, advises computer science departments on diversifying their undergraduate student population. Dr. Brawner previously served as principal evaluator of the NSF-sponsored SUCCEED Coalition. She remains an active researcher with MIDFIELD, studying gender issues, transfers, and matriculation models in engineering.

### **Dr. Catherine Mobley, Clemson University**

Catherine Mobley, Ph.D., is a Professor of Sociology at Clemson University. She has over 30 years experience in project and program evaluation and has worked for a variety of consulting firms, non-profit agencies, and government organizations, including the Rand Corporation, the American Association of Retired Persons, the U.S. Department of Education, and the Walter Reed Army Institute of Research. Since 2004, she has been a member of the NSF-funded MIDFIELD research project on engineering education; she has served as a Co-PI on three research projects, including one on transfer students and another on student veterans in engineering.

### **Dr. Susan M Lord, University of San Diego**

Susan M. Lord received a B.S. from Cornell University and the M.S. and Ph.D. from Stanford University. She is currently Professor and Chair of Electrical Engineering at the University of San Diego. Her teaching and research interests include electronics, optoelectronics, materials science, first year engineering courses, feminist and liberative pedagogies, engineering student persistence, and student autonomy. Her research has been sponsored by the National Science Foundation (NSF). Dr. Lord is a fellow of the ASEE and IEEE and is active in the engineering education community including serving as General Co-Chair of the 2006 Frontiers in Education (FIE) Conference, on the FIE Steering Committee, and as President of the IEEE Education Society for 2009-2010. She is an Associate Editor of the IEEE Transactions on Education. She and her coauthors were awarded the 2011 Wickenden Award for the best paper in the Journal of Engineering Education and the 2011 Best Paper Award for the IEEE Transactions on Education. In Spring 2012, Dr. Lord spent a sabbatical at Southeast University in Nanjing, China teaching and doing research.

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Joyce B. Main is Assistant Professor of Engineering Education at Purdue University. She holds a Ph.D. in Learning, Teaching, and Social Policy from Cornell University, and an Ed.M. in Administration, Planning, and Social Policy from the Harvard Graduate School of Education.

### **Michelle M. Camacho, University of San Diego**

Michelle Madsen Camacho is Chair and Professor in the Department of Sociology at the University of San Diego. She formerly held two postdoctoral fellowships at the University of California, San Diego, at the Center for U.S.-Mexican Studies and in the Department of Ethnic Studies. Fluent in both quantitative and qualitative research methodologies, her research uses theories from interdisciplinary sources including cultural studies, critical race, gender and feminist theories. Central to her work are questions of culture, power and inequality. She is affiliated faculty with the Department of Ethnic Studies, Women's and Gender Studies, and Latin American Studies.



# Answering the How and Why Questions with Qualitative Research


Catherine Brawner, Research Triangle Educational Consultants

Catherine Mobley, Clemson University

Susan Lord and Michelle Camacho, University of San Diego

Joyce Main, Purdue University

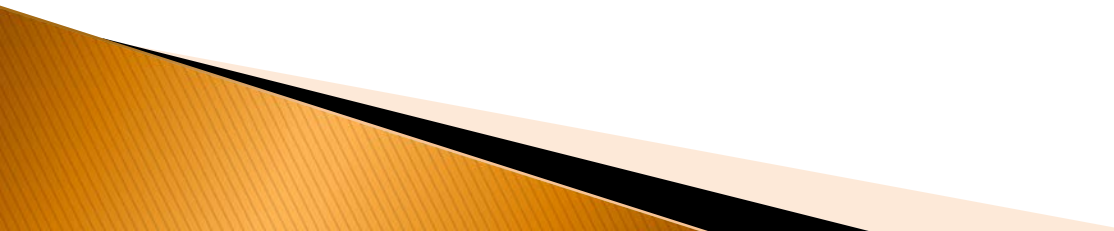
# Session Goals

- ▶ Identify research questions that can be answered through qualitative methods.
  - ▶ Describe several examples of qualitative research methods.
  - ▶ Identify innovative qualitative techniques for eliciting and honoring the stories of students in STEM education.
  - ▶ Allow participants to develop research questions and to practice using the techniques.
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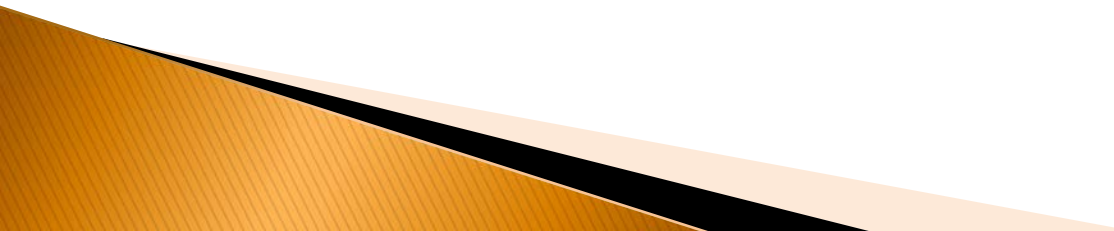
# Framing Question

- ▶ How can academic affairs professionals and STEM education researchers successfully draw out narratives and stories from underrepresented groups who may be reluctant to share their experiences?

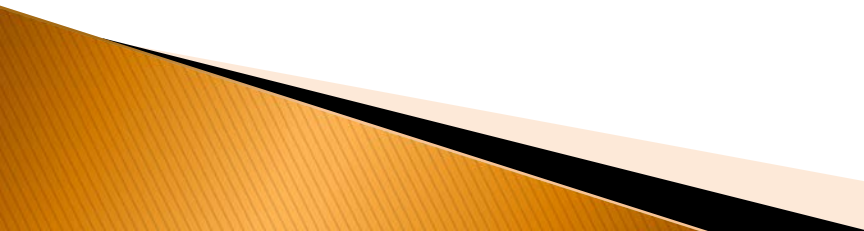
# Today, we will:

- ▶ Share advantages and limitations of qualitative methods for academic affairs professionals and others.
  - ▶ Provide tools and methods for eliciting narratives from underrepresented groups
  - ▶ Practice applying innovative data collection techniques to your own research questions
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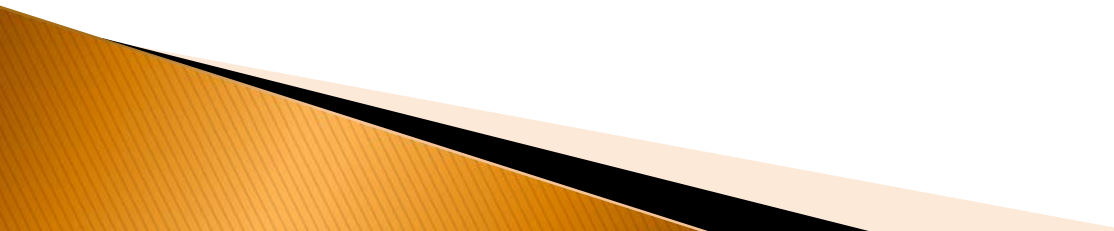
# Many in Higher Education May Prefer Quantitative Over Qualitative Research

- ▶ Familiarity with quantitative methods from researchers' own education, particularly in STEM disciplines.
  - ▶ Lack of understanding about how to analyze qualitative data.
  - ▶ Stakeholder preferences for quantitative data
  - ▶ Burden of institutional review of research that engages human subjects.
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# Qualitative Research Allows Understanding

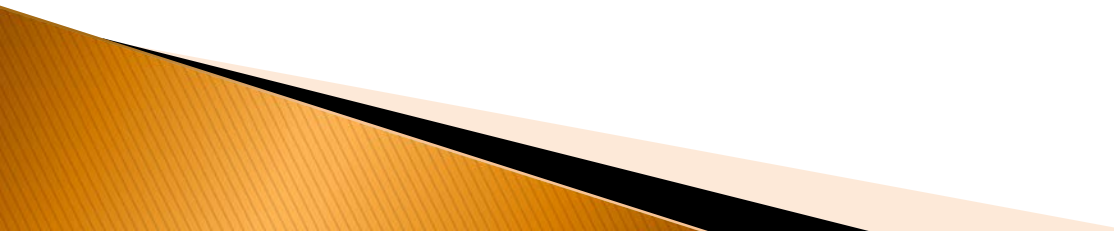
- ▶ **Quantitative** data is excellent at revealing **what** has happened to students with respect to major selection, retention, graduation, and survey responses.
  - ▶ **Qualitative** data collection helps us understand the reasons **how** and **why** certain outcomes occurred for individuals or groups.
  - ▶ **Qualitative** data analysis may help uncover unexpected patterns in data.
- 

# Have you wondered...

- ▶ What it's like to be the first in a family to attend college?
  - ▶ How welcoming your campus is to LGBTQ+ students?
  - ▶ How disabilities affect some students' experiences?
  - ▶ What issues student veterans face when transitioning to your institution?
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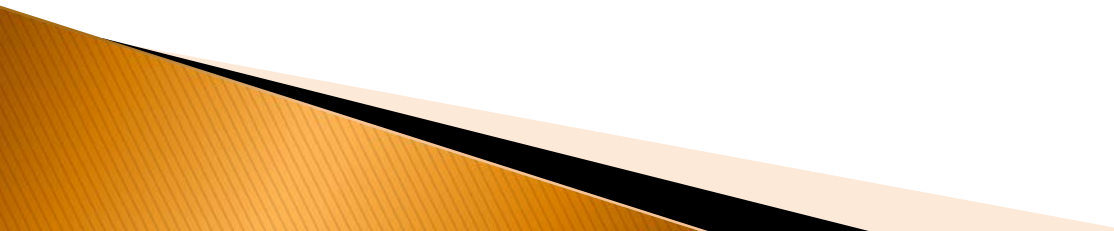


# Methods we will cover today:

- ▶ Conducting effective focus groups using in-group visualization exercises.
  - ▶ Using a life history questionnaire to open discussion in individual interviews.
  - ▶ Using identity exercises to facilitate individual interviews and elicit rich narratives.
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# Techniques for Focus Groups

# Visualization Techniques

- ▶ Allow researchers to get a sense of the group to guide further questions.
  - ▶ Relatively quick.
  - ▶ Allow participants to place themselves on various scales rather than the researchers having to guess or infer.
  - ▶ Prelude to analysis.
- 

# **What is your current role/position as it relates to Diversity and Inclusion?**

|                               |                                 |                                    |
|-------------------------------|---------------------------------|------------------------------------|
| <b>Student Affairs</b>        | <b>Women's programs</b>         | <b>Dean/chair/<br/>other admin</b> |
| <b>Minority programs</b>      | <b>Academic Success/Support</b> | <b>Faculty</b>                     |
| <b>Institutional Research</b> | <b>Admissions</b>               | <b>Transfer Coordinator</b>        |
| <b>Other role</b>             | <b>Other role</b>               | <b>Other role</b>                  |

## Your Turn:

**In my current role serving underrepresented students...**

### *Knowledge of Needs of Underrepresented Students*

I have no idea  
what these  
students need to  
succeed



I fully  
understand  
what these  
students need  
to succeed

### *Access to Resources for Underrepresented Students*

I have none of  
the resources I  
need



I have all the  
resources I  
need

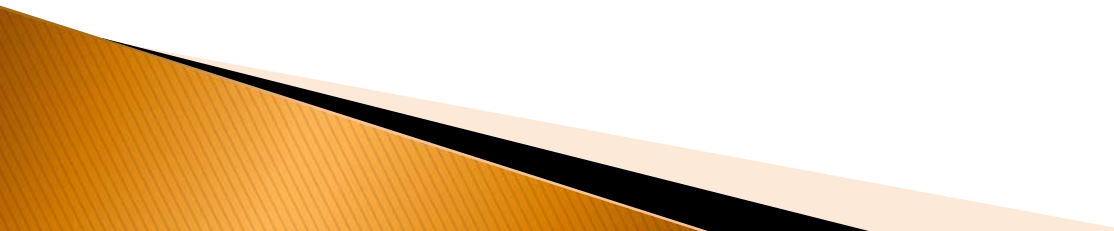
### *Serving Underrepresented Students*

My campus does  
a poor job



My campus  
does an  
excellent job

# Our Research: Engineering Identity

- ▶ Engineering identity is whether individuals consider themselves to have the characteristics of other people in the group.
  - ▶ We wanted to find out how much student veterans feel like they belong in undergraduate engineering.
  - ▶ We adapted an Engineering Identity Scale that is often used with first year students to the focus group format and our students in particular.
- 

## To what extent do the following statements describe you?

*A person who thinks it is valuable to find ways to apply the world's scientific knowledge.*

| Not at all like me | Not like me | A little like me | Somewhat like me | Like me | Very much like me |
|--------------------|-------------|------------------|------------------|---------|-------------------|
|                    |             |                  |                  |         |                   |

*A person who feels finding an answer to a new engineering problem is thrilling.*

| Not at all like me | Not like me | A little like me | Somewhat like me | Like me | Very much like me |
|--------------------|-------------|------------------|------------------|---------|-------------------|
|                    |             |                  |                  |         |                   |



EG-2  
Tlemson

## To what extent do the following statements describe you?

A person who thinks it is valuable to find ways to apply the world's scientific knowledge.

| Not at all like me | Not like me | A little like me | Somewhat like me | Like me | Very much like me |
|--------------------|-------------|------------------|------------------|---------|-------------------|
|                    |             |                  |                  |         |                   |

1 3 2

A person who feels finding an answer to a new engineering problem is thrilling.

| Not at all like me | Not like me | A little like me | Somewhat like me | Like me | Very much like me |
|--------------------|-------------|------------------|------------------|---------|-------------------|
|                    |             |                  |                  |         |                   |

3 1 2



## To what extent do the following statements describe you?

| A person who..   | Not at all<br>like me | Not<br>like me | Like<br>me | Very much<br>like me |
|--|-----------------------|----------------|------------|----------------------|
| Thinks it's valuable to find ways to apply the world's scientific knowledge    |                       | 4              |            | 1 2 3                |
| Feels finding an answer to a new engineering problem is thrilling              |                       |                | 3 4        | 1 2                  |
| Thinks engineers discussing new technologies and how they operate is important |                       | 4              | 3          | 1 2                  |
| Thinks advances in engineering can solve many of the world's problems          | 4                     |                | 2          | 1 3                  |

# To what extent do the following statements describe you

| A person who..   | Not at all<br>like me | Not<br>like me | Like<br>me | Very much<br>like me |
|--|-----------------------|----------------|------------|----------------------|
| Thinks it's valuable to find ways to apply the world's scientific knowledge    |                       |                | 3.6        |                      |
| Feels finding an answer to a new engineering problem is thrilling              |                       |                | 3.7        |                      |
| Thinks engineers discussing new technologies and how they operate is important |                       |                | 3.6        |                      |
| Thinks advances in engineering can solve many of the world's problems          |                       |                | 3.4        |                      |

**Your Turn:** Being a \_\_\_\_\_ is a \_\_\_\_\_ for  
an undergraduate STEM student

*Veteran*



*1<sup>st</sup> Generation Student*



*Student with Disabilities*



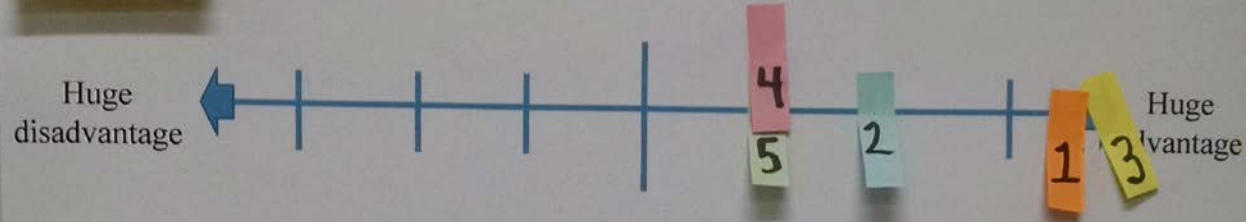
# Example: Potential advantages/ disadvantages of various identities

- ▶ We wanted to know the advantages and disadvantages to the students of being a **veteran** vs. a **transfer** student vs. an **older** student

Being a \_\_\_\_\_  
is a \_\_\_\_\_ in engineering.

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Clemson

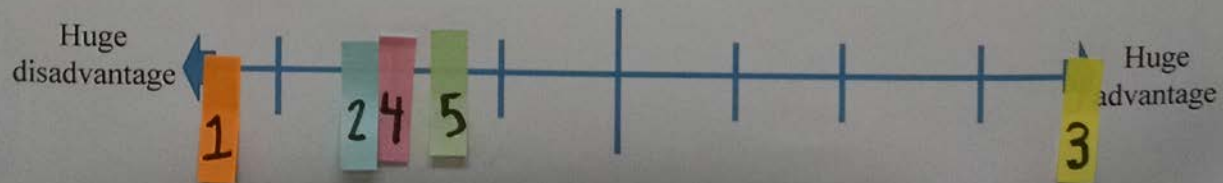
### Veteran




### Transfer Student



### Older Student



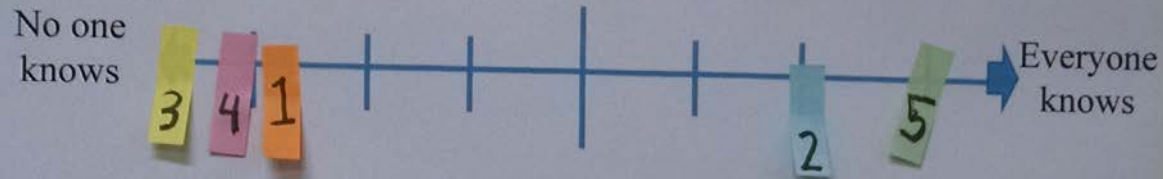
# Example: Student veteran identity vis-à-vis faculty and other students

- ▶ We wanted to learn how the student veterans felt that they were perceived by faculty and other students.
  - ▶ We also wanted them to help us parse out the difference between being a veteran, a transfer, and generally older.
  - ▶ Having them provide this detail kept us from having to guess or infer from their other answers...or pry too deeply.
- 

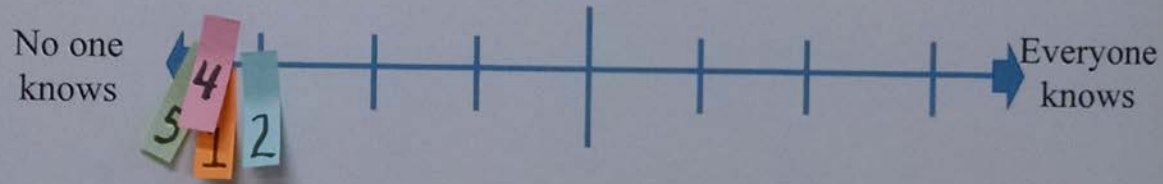
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Engineering faculty  
know that I am a....

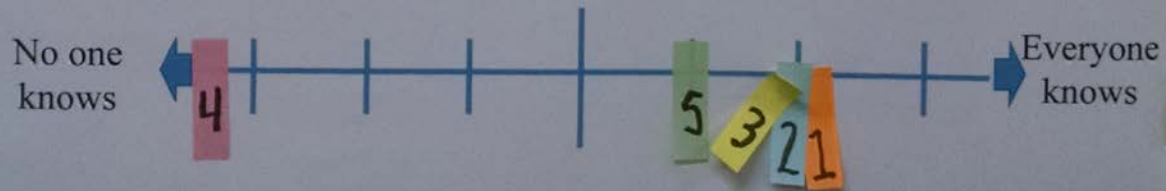
### Veteran



### Transfer Student



### Older Student



# Engineering faculty know that I am a....

*Veteran*



*Transfer Student*

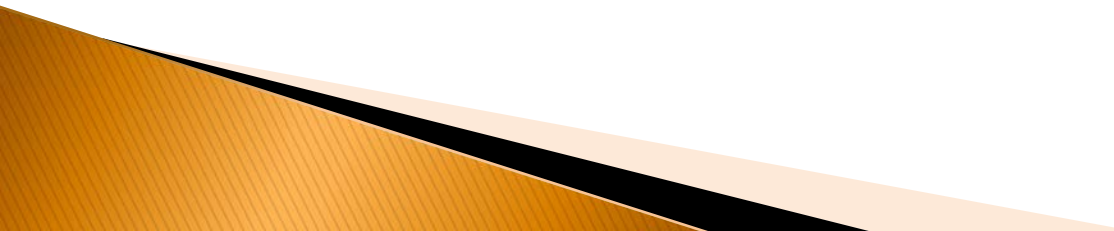


*Older Student*



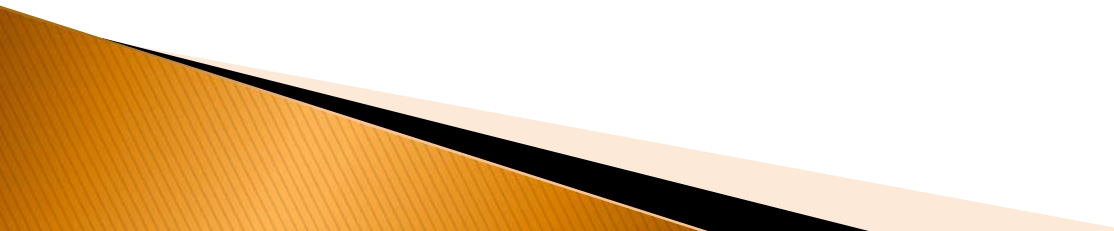


# Focus Group Technique Summary

- ▶ The purpose of the various exercises was to:
    - Avoid a dull series of linear questions.
    - Stimulate a free-flowing discussion on these various dimensions and provide a visual reference for everyone in the room.
    - Have the respondents help us draw conclusions about the impact of their various identities on their interactions and experiences in their engineering studies.
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# Techniques for In-Depth Student Interviews

# Student Qualification Survey

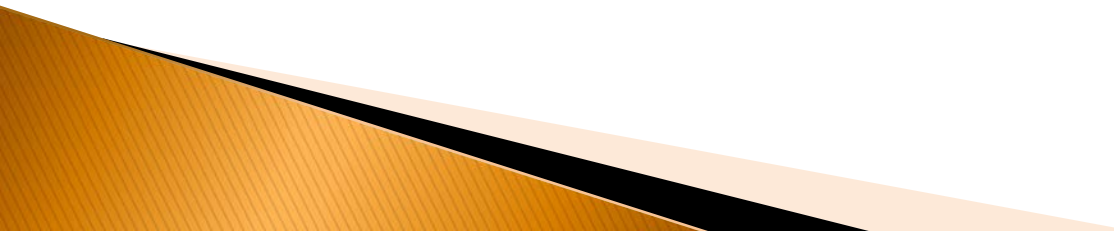
- ▶ To recruit participants, we posted flyers around campus and asked campus contacts to e-mail student veterans in engineering.
  - ▶ The qualification survey
    - protected the students' confidentiality.
    - provided a place to give IRB-required informed consent.
    - allowed us to gather demographic, military service, and scheduling information.
    - saved time during interview by allowing us to know key information in advance.
- 

# Military Experience

| <i>Branch(es)</i> | <i>#</i> | <i>Years of service</i> | <i>#</i> |
|-------------------|----------|-------------------------|----------|
| Navy              | 13       | 5 or fewer              | 14       |
| Marine Corps      | 7        | 6 to 10                 | 12       |
| Air Force         | 3        | 11 to 15                | 2        |
| Army              | 3        | 15 to 20                | 0        |
| Multiple          | 2        | More than 20            | 1        |
| Coast Guard       | 1        |                         |          |

# Life History Exercise

Once the students agreed to be interviewed, we asked them to fill out a life history exercise in advance. This served as an ice breaker when students were asked to talk through the various events from when they graduated from high school to the present.



Age 18 Age 19 Age 20 Age 21 Age 22 Age 23 Age 24 Age 25 Age 26 Age 27 Age 28 Age 29 Age 30+ x N/A

[illegible][illegible]☒

☐ ☐ ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☐ ☐ ☐ ☐ ☐

☐ ☐ ☐ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐ ☐ ☐

Left the military

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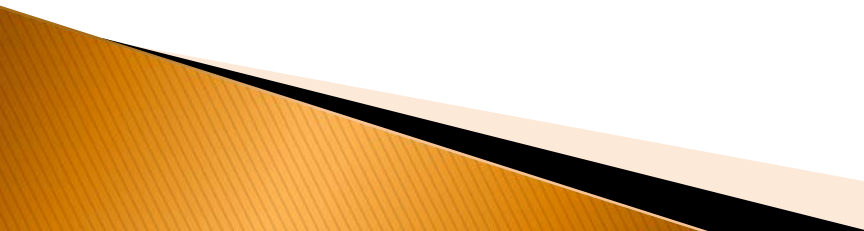
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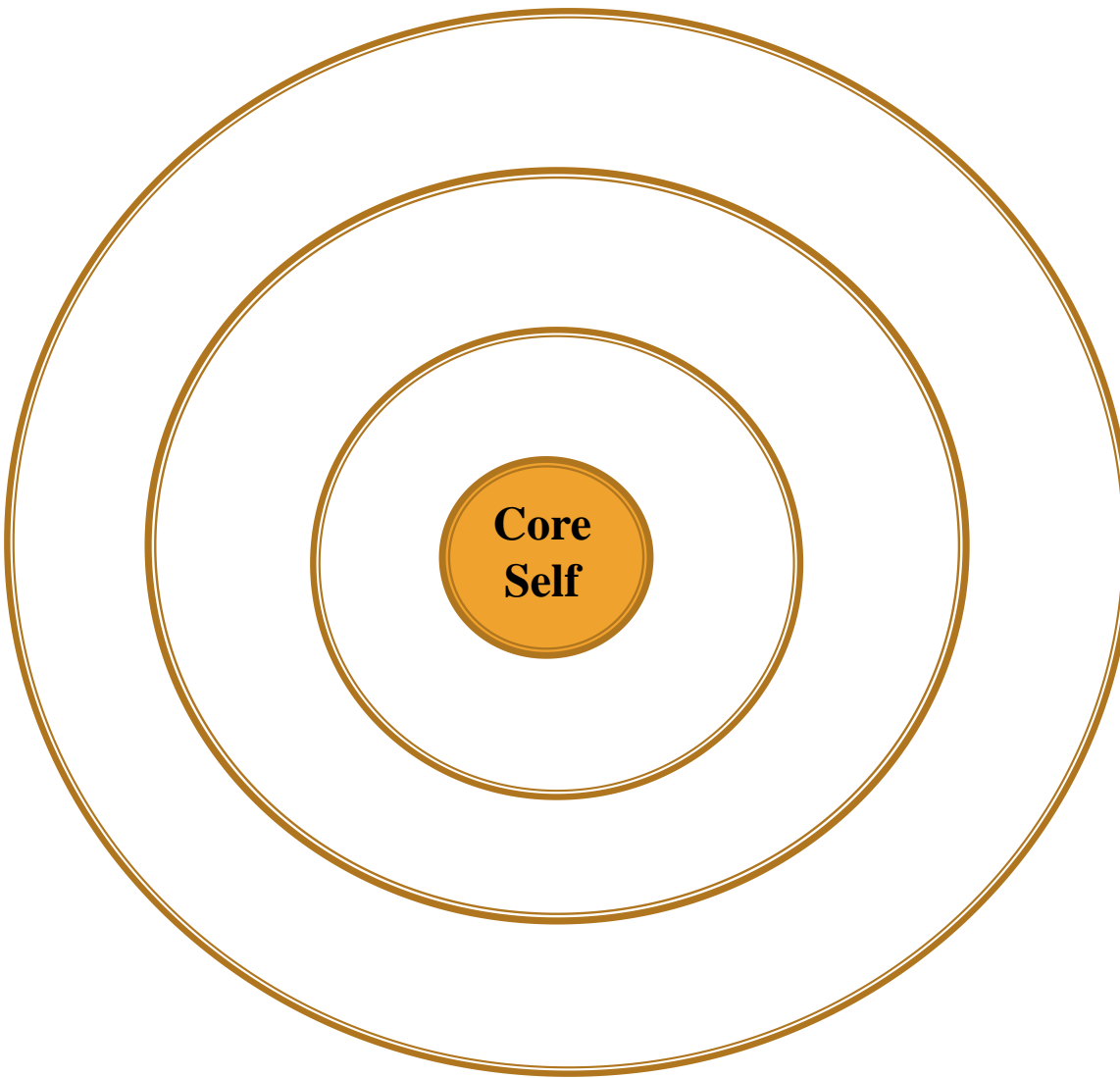
# This simple exercise provided rich detail and insight

- ▶ “I didn’t do very well in high school... So, getting into college was pretty much a non-issue, I just didn’t have the grades for it and didn’t have the money for it. I joined the Marine Corps directly out of high school. Served four and a half years but about two and a half years in I got injured...The last year or so I started college while I was in; went to community college, got out, finished my Associate’s... transferred here. I worked multiple jobs while I’ve been going to school. ...I got married when was I was 19 in the Marines; I had my first child, my son, at 21.”

# Identity Circle Exercise

- ▶ Helped us discover how important veterans' different identities are to their “core” sense of self.
  - ▶ Facilitated discussion around potentially difficult topics such as combat-related disabilities, sexism, and racism, without having to ask about these issues directly.
  - ▶ “Think aloud” protocol.
- 





## ***SELF***

Gender

Race/ethnicity

Socioeconomic Class

Sexual orientation

Age

Religion

## ***AT HOME***

Spouse/partner

Parent

Caregiver

Single

## ***SERVICE-RELATED***

Veteran in general

Veteran of a Specific Branch

Combat Veteran

Reservist

Disability

## ***STUDENT/WORKER***

Engineering Student

Transfer Student

First-generation student

Employee

Volunteer

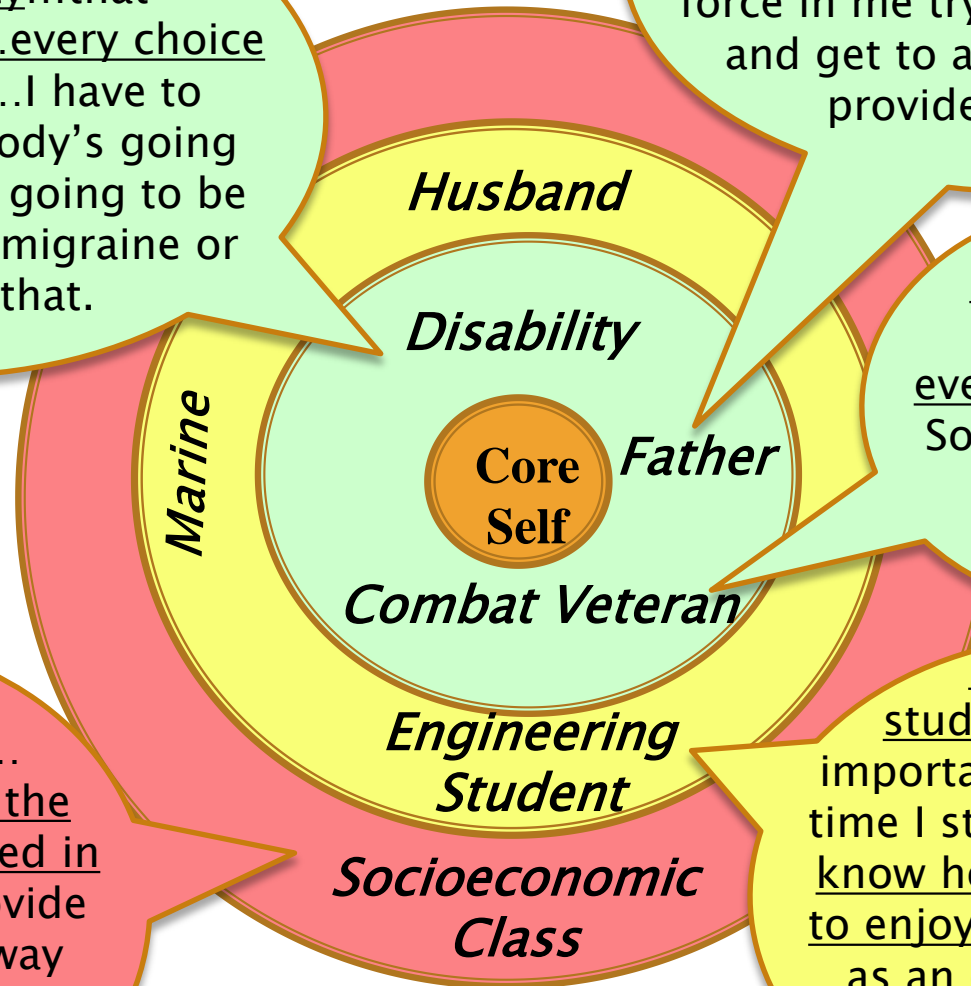
Another important thing is my disability...that essentially affects...every choice I make because...I have to determine if my body's going to let me or if I'm going to be debilitated with a migraine or things like that.

Closest to the center, the two most important things are being a combat veteran and being a father. My kids are the driving force in me trying to better myself and get to a point where I can provide for them.....

...Being a combat veteran has influenced everything I am now. So those two things affect my past and my future.

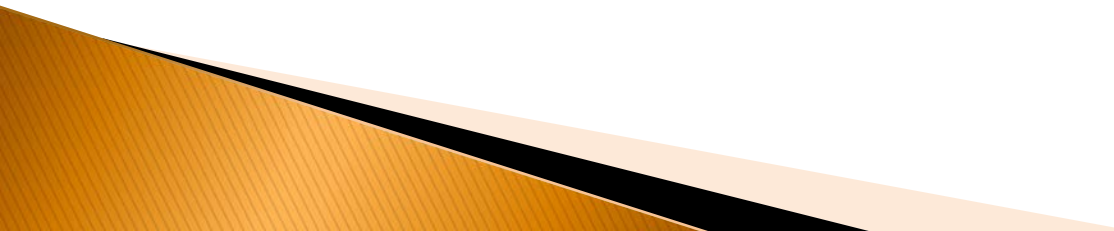
Engineering student because it's important but at the same time I started to see I don't know how much I'm going to enjoy actual engineering as an engineer, unless I find a job that really, really challenges me.

Socioeconomic class is on here... I want to be above the class that I was raised in and continue to provide for my family the way my parents tried to but weren't really able to.



# Your Turn: IDENTITY CIRCLE


Place the identities below that apply to you [you may add others] on one of the rings to illustrate how “central” a particular part of your identity is to your current work/life experiences. For example, if the most salient or important part of your identity is being a parent, you would place the dot on the first ring surrounding the inner core. You don't necessarily need to add all of the identities listed below to the diagram, just those that are most central to your current work/life experiences.



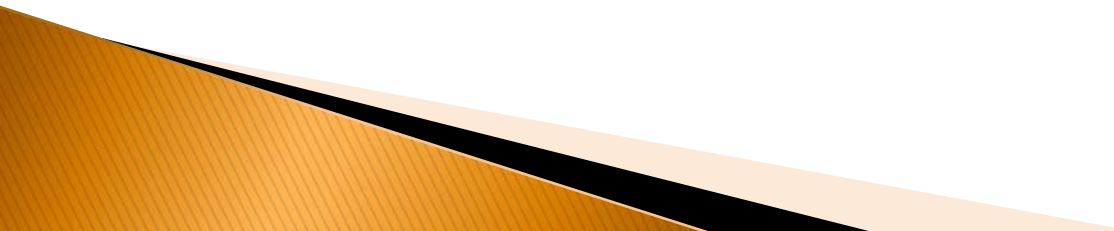
# Identity Circle Discussion

- ▶ How did you feel as the interviewee?
  - Were you more or less likely to reveal something personal about yourself using this exercise than if you had been asked directly?
- ▶ How did you feel as the interviewer?
  - Did you feel that you were more or less able to gain insight than you would using a different way to ask the questions?


# Interview Technique Summary

- ▶ The purpose of the various exercises was to:
    - Break the ice – so participants would feel comfortable talking with us.
    - Approach personal issues, such as disability or socioeconomic status or sexual orientation, with respect, while encouraging participants to reveal issues that impact their decision making and their experiences.
    - Allow us to learn quickly what motivates a student from an underrepresented group without asking a long series of questions.
- 

# Your Turn: Think–Pair–Share

- ▶ What research questions do you have that might be suited to a **focus group or individual in-depth interview** format?
  - ▶ What sorts of interactive activities might help answer those questions?
- 

# Summary

- ▶ Focus groups and interviews allow decision makers to learn why individuals behave as they do.
  - ▶ Triangulation, or the use of different measurements (e.g., focus groups and interviews), for the same concept strengthens our understanding of the social phenomena that we are researching.
  - ▶ **Qualitative** data can also explain **quantitative** findings from other sources (e.g., institutional research and surveys)
  - ▶ Multiple methods can also illuminate differences that need to be explored further.
- 



# Thank you!

## Acknowledgements

Our Research Team Members who couldn't be with us today:



**Dr. Susan Lord**  
*University of San Diego*



**Dr. Michelle Camacho**  
*University of San Diego*



**Dr. Joyce Main**  
*Purdue University*

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**National Science Foundation**  
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