Strategies to Increase Access and Success for Underrepresented Students in Career and Technical Education & STEM

Welcome!
The webinar will begin promptly at 11:00 a.m. PST/2:00 p.m. EST

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Strategies to Increase Access and Success for Underrepresented Students in Career and Technical Education & STEM

June 15, 2017
Today’s Presenter

Ben Williams
Director of Special Projects
National Alliance for Partnerships in Equity (NAPE)
STRATEGIES TO INCREASE ACCESS AND SUCCESS FOR UNDER-REPRESENTED STUDENTS IN CAREER AND TECHNICAL EDUCATION & STEM

Ben Williams, Ph.D., Director of Special Projects
@NAPEquity | @BenWilliamsPhD | #NAPEPD
Objectives for Today

• Learn how to use NAPE’s PIPE™ as a framework for continuous improvement focused on access & equity
• Explore the power of “micromessages” and their effects on students’ perceptions of career pathways
• Identify effective strategies to increase access and success for students from groups historically under-represented in high-skill, high-wage, and high-demand STEM career pathways through CTE, especially Native American students
• Integrate one to two strategies into your own personal or institutional plan for the 2017-2018 academic year
RADIO

Reflect on bias and stereotypes

Anticipate impact of decisions, words, and behaviors

Discover and address negative micromessages

Identify ways to give positive micromessages

Offer high expectations and wise feedback
NAPE’s Mission

We build educators’ capacity to implement effective solutions for increasing student access, educational equity and workforce diversity.
What We Do

Professional Development
To ensure equity in programs preparing students for college and careers

Research and Evaluation
Of effective practices and programs

Public Policy and Advocacy
For equity in education to ensure a strong and diverse workforce

Technical Assistance
For federal agencies and state and local education agencies

Realize the potential of every student: Access, Equity, and Diversity
NAPE Member States (39)
The Process We Employ
LET’S THINK OF HIGH-SKILL, HIGH-WAGE, AND HIGH-DEMAND CAREERS
WHAT ARE THE OPPORTUNITIES IN THESE FIELDS IN YOUR REGION OR COMMUNITY?
Fast Facts from 2014 to 2024

- Computing jobs will grow by \( 16\% \)
- Engineering jobs will grow by \( 11\% \)
- Advanced manufacturing jobs will grow by \( 12\% \)
- Of all job openings, \( 51\% \) will require training at the middle skill level

Opportunities

Across post-secondary pathways

• For the next 55 million job openings (until 2020):
  • 35% will require at least a bachelor’s
  • 30% will require some college or an associate’s
  • 35% will not require education beyond high school

Note: At the current production rate, the US will fall short by 5,000,000 workers with post-secondary education.

DEMAND FOR STEM WORKERS EXCEEDS SUPPLY

Science and engineering are the fastest growing occupations

U.S. scientists and engineers with a PhD

- U.S. Citizen 34%
- Foreign-born 66%

Most cyber security and anti-terrorism jobs require U.S. citizenship and a PhD. In 2010, the number of U.S. scientists and engineers with a PhD was nearly half that of foreign-born.

ENGINEERING

12%
2014-2024 WORKFORCE GAP
-25%
Supply

Computing

19%
2014-2024 WORKFORCE GAP
-15%
Demand

The existing STEM workforce is aging; 46 percent of STEM jobs are held by those older than 45. When they retire, they take their knowledge with them.

WORKFORCE GAP

Women's participation in STEM jobs has plateaued since 2001

2001 VS. 2014

- 13% Engineering
- 27% Computing
- 10% Advanced Manufacturing

African Americans and Latinos are grossly underrepresented in U.S. STEM jobs

African American/Latino Percentage of:

- U.S. working-age population
- Computing workforce
- Advanced manufacturing workforce

Change the Equation. Solving the Diversity Dilemma. Available at changetheequation.org/solving-diversity-dilemma.

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What We Do

P³

Performance
Participation
Pipeline
Does participation or completion lead to employment in nontraditional fields?
Data Collection

*Disaggregation required in Perkins IV*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race/Ethnicity</th>
<th>Special Populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Male</td>
<td>• American Indian or Alaskan Native</td>
<td>• Underrepresented gender students in a nontraditional CTE program</td>
</tr>
<tr>
<td>• Female</td>
<td>• Asian or Pacific Islander</td>
<td>• Single parent</td>
</tr>
<tr>
<td></td>
<td>• Black, non-Hispanic</td>
<td>• Displaced homemaker</td>
</tr>
<tr>
<td></td>
<td>• Hispanic</td>
<td>• Limited English proficiency</td>
</tr>
<tr>
<td></td>
<td>• White/non-Hispanic</td>
<td>• Individuals with a disability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Economically disadvantaged</td>
</tr>
</tbody>
</table>

*When are the intersections of equity important?*
Data Collection

Recommended Analysis

Current Context
- National level data
- State level
- Best performer in state
- Selected peer benchmark
- Set your own benchmark

Site Specific
- District
- School/College
- Programs

Trends
- At least 2 years
- Prefer 3-5 years
WHAT DO YOU EXPECT TO SEE?
WHAT BARRIERS KEEP STUDENTS FROM PURSUING PROGRAMS THAT LEAD TO THESE STEM JOBS?
# Nontraditional Career Preparation

**ROOT CAUSES & STRATEGIES**

The goal of Nontraditional Career Preparation is to assist you in recruiting and retaining more students into nontraditional careers through the most effective means possible. This chart provides a “quick find” to the research and is intended as a summary. Online and downloadable versions of the complete document are available on the NAPE website at www.napequity.org/root.

<table>
<thead>
<tr>
<th>ROOT CAUSE</th>
<th>THEORY</th>
<th>STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic Proficiency</strong></td>
<td>When female students are academically proficient, they are more likely to persist in pursuing nontraditional careers, while the opposite is more predictive for male students.</td>
<td>• Teach students that ability can be expanded. • Intervene to reduce underachievement. • Provide math camps for female students. • Identify and assist students who aspire to science and engineering careers but lack academic preference. • Create incentives for taking AP courses. • Teach visual-spatial skills. • Use age-appropriate video games that appeal to female individuals.</td>
</tr>
<tr>
<td><strong>Access to and Participation in Math, Science, and Technology</strong></td>
<td>Encourage participation and success in math, science, and technology courses, especially those taught in an applied and “hands-on” manner.</td>
<td>• Utilize real-life teaching strategies. • Kindle and sustain interest in math. • Make math and science a requirement. • Make other programs available such as after-school or weekend or summer camps. • Involve, involve, and educate parents.</td>
</tr>
<tr>
<td><strong>Curriculum</strong></td>
<td>Essential elements of a bias-free curriculum include relevancy, inclusive images and text, and hands-on instructional practice.</td>
<td>• Foster interest and curiosity, as well as skill, in math and science. • Provide comprehensive professional development. • Stress professional development self-assessment. • Utilize intervention programs for information technology (IT) in formal education. • Identify and correct bias in curricular and professional materials.</td>
</tr>
<tr>
<td><strong>Instructional Strategies</strong></td>
<td>Female students prefer learning experiences that they help to design, that are learner-centered, and that involve them in a community.</td>
<td>• Provide comprehensive pre-service and in-service professional development relating to gender issues. • Stress professional development self-assessment. • Utilize intervention programs for IT in formal education. • Incorporate student experiences in the instructional process. • Utilize virtual or hands-on science activities.</td>
</tr>
<tr>
<td><strong>School/Classroom Climate</strong></td>
<td>Students who experience a school climate supportive of nontraditional careers and gender equity are more likely to participate in nontraditional careers.</td>
<td>• Facilitate informal support groups. • Enforce civil rights and sexual harassment policies and practices. • Address climate issues. • Provide inclusive hiring processes. • Field recommendations. • Strengthen support systems and eliminate barriers. • Schedule students in nontraditional programs in cohorts whenever possible. • Support nontraditional student clubs and after-school activities.</td>
</tr>
<tr>
<td><strong>Support Services</strong></td>
<td>Students enrolled in nontraditional career and technical education programs who receive support services are more likely to succeed.</td>
<td>• Provide tutoring, child care, transportation, and tuition assistance. • Post tutoring locations and hours in a highly visible area of the classroom. • Make loan laptops available to students.</td>
</tr>
<tr>
<td><strong>Family Characteristics</strong></td>
<td>Characteristics and engagement of family of origin have a strong influence on career choice.</td>
<td>• Design activities to promote family roles in gender-neutral career guidance. • Invite, involve, and educate parents. • Involve parents in developing their child’s career plan. • Engage male and female students by providing activities that may not have been culturally stigmatized to participate in.</td>
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Key barriers to Success

• Stereotype Threat

• Low expectations
  • “Inappropriate pedagogies that lack the incorporation of technology and ignore students’ cultural experiences.” (Upadhyay, 2005)
  • “Instructional methods that fail to encourage or incorporate a ‘connected, relational understanding’” (Boaler, 2012, p.135)

• Lack of role models and mentors in whom students can see themselves mirrored

MICROMESSAGES
The Lens We Apply

- Behavior
- Cultural Stereotypes
- Bias
- Micromessages
- Accumulation of (Dis)Advantage
- Self-Efficacy

Educator Point of Interruption
WHAT ARE CULTURAL STEREOTYPES?
What cultural stereotypes are prevalent at your institution?

What is the impact of these stereotypes on students?
“The single story creates stereotypes, and the problem with stereotypes is not that they are untrue, but that they are incomplete. They make one story become the only story.”

Chimamanda Adichie: *The Danger of a Single Story*, TedTalk
Reflection Questions

• What are the stories we tell about students and our cultural assumptions of their career interests, pursuits, and pathways?

• What is the impact of single stories, or cultural stereotypes on your students (current and prospective)?
Micromessages sent and received when we interact with others

Small, subtle, unconscious messages

Micromessages

- Valued
- Included
- Encouraged
- Intentional
- Positive

- Micro-Affirmations

- Micro-Inequities
  - Excluded
  - Devalued
  - Unintentional
  - Negative
  - Discouraged

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Cultural Stereotypes
Bias
Accumulation of (Dis)Advantage
Micromessages
Self-Efficacy
Self-Efficacy

Self-confidence does not equal self-efficacy!
Inspire the Courage to Excel

**Self-efficacy** is the belief one holds in their ability to perform a specific task.
Inspire the Courage to Excel

ACHIEVEMENT
INTEREST & MOTIVATION
ENGAGEMENT
PERSISTENCE
PERFORMANCE

An individual with high self-efficacy is more likely to adopt and commit to more challenging goals.

self – efficacy is the belief one holds in their ability to perform a specific task.
Inspire the Courage to Excel

Doubt
Fear
Avoidance

**self – efficacy**

is the belief one holds in their ability to perform a specific task

An individual with low self-efficacy is more likely to avoid challenges.
Why Think About Micromessaging?

Impact is more important than Intent!
Root Cause Analysis
Through Action Research

- Surveys
- Equity Audits
- Interviews
- Focus Groups
Research- and Evidence-based strategies with links: www.napequity.org/root

EARLY INTERVENTION
Review the Theory and Evidence.

Recommendations and Strategies*

- **Conduct interventions for middle school students:** NSF's New Formulas for America's Workforce 2 Projects provide programming for American girls for whom timing of their future plans can have an ill-timed conjunction with eroding self-efficacy and greater awareness of social messages, about femininity.
- **Target elementary and middle school students, especially for math interventions:** "Intervention programs should be started early to counteract the belief that 'mathematics is a matter for boys.'"  
- **Intervene early in youth's development:** Interventions that address occupational factors may be vital to getting students ages 10-13 more interested in an Information Technology career. The intervention leader for the intervention.
Super Strategies to Effectively Serve Native American Students in CTE and STEM

• **Group**
  – Design group activities based on successful teamwork
  – Assign group roles contrary to first instinct

• **Cooperation**
  – Balance cooperative activities with competitive ones
  – Allow students to grade based on cooperation

• **Give and Share**
  – Encourage and value sharing of information/knowledge

Source: Handout (downloadable today). Authors: Wren Walker-Robbins, PhD, Meagan Pollock, PhD, and resources from [http://literacynet.org/lp/namericans/values.html](http://literacynet.org/lp/namericans/values.html)
Super Strategies to Effectively Serve Native American Students in CTE and STEM

- **Patience**
  - Employ strategies to call on every student
  - Wait 15 seconds after a question before any prompts

- **Listen**
  - Model and teach to notice and listen first, and then question
  - Create a classroom welcome to listeners as well as talkers

- **Flexible Time**
  - Allow time for low-pressure learning not tightly restricted
  - Although order is important, be empathetic when it comes to time

Source: Handout (downloadable today). Authors: Wren Walker-Robbins, PhD, Meagan Pollock, PhD, and resources from [http://literacynet.org/lp/namericans/values.html](http://literacynet.org/lp/namericans/values.html)
Super Strategies to Effectively Serve Native American Students in CTE and STEM

• **Work Value**
  – Explain value and purpose of every lesson and activity (relevance)
  – Encourage learning and effort towards it over performance

• **Communities of Practice**
  – Peer observation
  – Small group professional development
  – Action research

Source: Handout (downloadable today). Authors: Wren Walker-Robbins, PhD, Meagan Pollock, PhD, and resources from [http://literacynet.org/lp/namericans/values.html](http://literacynet.org/lp/namericans/values.html)
EXPANDING PERCEPTIONS OF CAREER PATHWAYS

Roseburg High School, Douglas ESD, Oregon
Select: Strategies

- Welding instructor buy-in
- Welding equipment
- Freshmen Cruise
- “Pride Night” (Open House)
- Explore Nontraditional Careers
Results

Fall 2015: 4 female students enrolled in Welding

Spring 2016: **38 female students enrolled in Welding (800% increase!)**
Students this fall
Recent ACTE Techniques Article

INCREASING ACCESS, EQUITY AND DIVERSITY:

NAPE’s Program Improvement Process for Equity

By Rae Williams

The demand for a skilled workforce continues to grow, and the workforce needs for science, technology, engineering, and math (STEM) jobs is set to dramatically increase by 2028. To meet this demand, educational institutions must ensure equitable access and outcomes for all students.

NAPE’s Program Improvement Process for Equity (PIPE) is a research-based approach to improving outcomes for all students, with a particular focus on increasing access, equity, and diversity in STEM fields.

The PIPE process includes the following key components:

1. Data Collection: Gather data on student demographics, academic performance, and other key indicators.
2. Needs Assessment: Identify areas where improvements are needed.
3. Action Planning: Develop specific actions and interventions to address identified needs.
4. Implementation: Put the action plans into practice.
5. Monitoring and Evaluation: Continuously monitor progress and evaluate outcomes.

NAPE’s PIPE process is designed to be inclusive and responsive to the needs of all students, regardless of background or ability. By implementing this approach, educational institutions can ensure that all students have the opportunity to succeed in STEM fields.

For more information on NAPE’s PIPE process, visit napequity.org/pipe.

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Accessible from napequity.org/pipe
Check the RADIO, and tune-in to micromessages!
RADIO

Reflect on bias and stereotypes

Anticipate impact of decisions, words, and behaviors

Discover and address negative micromessages

Identify ways to give positive micromessages

Offer high expectations and wise feedback
Take-Aways and Questions
“I am only one, but still I am one. I cannot do everything, but still I can do something; and because I cannot do everything, I will not refuse to do something I can do.”

-Edward Everett Hale
Thank you for your participation!

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Director of Special Projects

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www.napequity.org
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This webinar will be archived on the IES You Tube channel.

Watch for an announcement about its availability in your e-mail inbox!

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