Increasing Nontraditional Female Participation and Completion in CTE: An Update on The Ohio STEM Equity Pipeline Project

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STEM Jobs

• “STEM occupations are projected to grow by 17.0 percent from 2008 to 2018, compared to 9.8 percent growth for non-STEM occupations.” (p.1)

• STEM workers earn 26 percent more than their non-STEM counterparts


Women in STEM

• Women account for nearly half of employed college graduates age 25 and over, but only about 25 percent of employed STEM degree holders and an even smaller share—just about 20 percent—of STEM degree holders working in STEM jobs” (p.5)

• Women with STEM jobs earned 33% more than comparable women in non-STEM jobs


Loss of share of STEM degrees at community colleges

• "In 2009, women earned 62% of all associate's degrees, up from 60% in 2000, and 40% of S&E [science and engineering] associate's degrees, down from 48% in 2000. Most of the decline is attributable to a decrease in women's share of computer science degrees, from 42% in 2000 to 25% in 2009."

Gendered Participation in the STEM Workforce at the End of the Core Academic STEM Pipeline

Gendered Participation in High School STEM CTE

Gendered Participation in Post-Secondary STEM CTE

Gendered Participation in Post-Secondary Core Academic STFM

The STEM Equity Pipeline™

- A research- and evidence-based institutional improvement process to increase the participation, retention, completion, and ultimate job placement of women and other under-represented students in high wage, high tech, high demand STEM jobs.

The National Alliance for Partnerships in Equity

- a consortium of state and local agencies, corporations, and national organizations committed to the advancement of equity and diversity in classrooms and workplaces

- State and Affiliate institutional membership levels (see handout)
NAPE’s Lines of Business

Professional Development
- Provide tools and curricula for educators through conferences, presentations, webinars, and formal training

Research and Evaluation
- Develop reports, identify research-based promising practices
- Provide input to others’ research

Technical Support
- Develop tools and resources for education agencies
- Provide consulting services
- Offer expertise on issues pertaining to access, equity, and diversity

Public Policy and Advocacy
- Work with federal agencies to educate legislators on career equity and diversity issues
- Develop policy briefs
- Alert membership to legislative or policy issues

STEM Equity Pipeline Goals
- Build formal education’s capacity to provide high quality professional development on gender equity in STEM education
- Institutionalize implemented strategies by connecting outcomes to existing accountability systems
- Broaden the commitment to gender equity in STEM education

STEM Equity Pipeline Methods
- Professional Development
  - Institutional change
  - Classroom transformation
  - Counselor Training
- Consulting and Technical Assistance
- Virtual Web-based Professional Learning Community

Virtual Learning Community
www.stemequitypipeline.org
- Public portal for the STEM equity pipeline community
  - Listerv
  - Links
  - Articles, Resources, Reports and Research
  - Calendar of Events in STEM
  - Webcasts, Webinars, Video, Podcasts, Power Points
  - Online courses and Tutorials
  - Performance Data on Women & Girls in STEM
  - Professional Development Needs Assessment
  - Project Evaluation Instruments and Surveys
  - More!

Ohio Project
- 12 Collaborative Projects currently underway throughout the state:
  - Career Centers and CTE Programs
  - Adult Career Center(s)
  - Community Colleges and Four-Year Partners
  - Business & Industry
  - Middle Schools, in some cases
- Three types of Projects: Pilots, ODE Expansion Projects, Team contracting directly with NAPE
- Use PIPE-STEM Model - see NAPE webpage at http://www.stemequitypipeline.org/
Ohio’s investment in expanding and building capacity

- Ohio Department of Education Expansion – Eight sites over two years
- Train the trainer piloted
- Work with schools needing improvement
- Document growth through data (Perkins)
- Others can contract directly with NAPE

Root Causes

- Education
- Career Information
- Individual Characteristics
- Family Characteristics
- Societal Issues

PATTERNS OF IDENTIFIED ROOT CAUSES

Key Themes

- Career Information and Career Characteristics (all stakeholders)
- Negative and Outdated perceptions of Career and Technical Education (CTE)
- Early Intervention (“early and often”)
  - Career Information
  - Career Development (Connecting classroom to careers)

Key Themes

- Parental Influence/Support
- Individual Characteristics
  - Self-efficacy
  - Stereotype Threat
- School/Classroom Climate
- Importance of Mentors/Role Models
- Peers
Strategies

- Year One Sites finalizing plan and implementing starting AU 2012
- Year Two Sites finalizing plan and implementing strategies starting in WI 2013

Themes in Strategies

- Collaboration between secondary and post-secondary in getting students excited about nontraditional STEM occupational pathways
- Educating parents, teachers, guidance counselors, & administrators about STEM opportunities and CTE
- Providing additional supports to under-represented students:
  - Mentors and Role Models
  - Ex. Summer orientation for students in STEM at Stark State

EFFECTIVE PRACTICES FROM THE FIELD (WWW.NAPEQUITY.ORG)

"Select" Best Solutions

Don’t be too quick to adopt best practices before getting the facts straight
- How do you identify possible strategies and model practices?
- How do you evaluate strategies and models?
- How do you compare and assess alternative solutions and make a decision?

Assessing and Comparing Alternative Strategies

- Sound Theory
- Strong Evidence
- Costs/Time of Further Testing
- Resources
- Stakeholder Support
- Failure is Expensive
- Select a Full Range of Choices

Identify Potential Strategies and Models

- Review What Others Propose
  - NSF - New Formulas for America’s Workforce
  - AAUW – Why so Few?
- Benchmark Peers and Leading Performers
  - Programs and Practices That Work
- Develop Your Own Solutions
Review Research Summary

“Nontraditional Career Preparation: Root Causes and Strategies”

Authors: Lynn Reha, ICSPS; Mimi Lufkin, NAPE; Laurie Harrison, Foothill Associates

Expand understanding of CTE

- Content Marketing
  - Tell the authentic story of your students and their successes
  - Use multi-media (break away from traditional advertising)
    - Facebook and Twitter
  - Re-purpose and renew content
  - Enlist partners in telling “the story of CTE”

From “Content marketing and the Future of CT Outreach” Shane Haggerty and Eric Leslie, Ohio ACTE Annual Conference, August 1, 2012

My goal (using a different diagram)

...as related to the Blueprint

- Alignment
  - K-12, post-secondary, Business & Industry
- Collaboration
- Accountability
  - using institutional data to identify and track performance gaps
- Innovation

Resources on

www.stemequitypipeline.org

Don’t Forget These Additional Teacher Focused Resources!

- Gender Equity Tip Sheets
- Teacher Resources Folder

Strategies to retain low income women and student parents in STEM in Community Colleges

- Actively recruit women and student parents
- Provide financial supports and child care services
- Improve and expand developmental education
- Provide strong counseling, advising and academic supports

Strategies to retain low income women and student parents in STEM in Community Colleges

- Create educational pathways (certificate, associates, bachelors)
- Improve curricula and instruction
  - Eliminate gender stereotypes and bias in the classroom

Select a Strategy

- Conduct a SWOT analysis of the strategies to narrow down the choices
  - Strengths
  - Weaknesses
  - Opportunities
  - Threats
- Select a strategy with the greatest strengths and opportunities

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Technical Support
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ADDITIONAL RESOURCES THROUGH NAPE

Professional Development for Educators: STEM (including CTE) Access, Equity, Diversity

The Education Foundation supports NAPE’s professional development LOB with funding and resources.

Micromessaging to Reach and Teach Every Student™

The Blueprint provides the framework for the creation of curriculum and method of delivery that will include the rich content and pedagogical tools needed by educators to transform their practice.
Four unique key components:
• A data-driven process
• The requirement of two (or more) teachers/faculty within a school
• A year-long professional development process
• A virtual, peer-supported learning community

Key Elements
• Modular courses
• Integration of effective practices
• Graduate credit and/or continuing education units
• The integration of national standards

An Introduction to Micromessaging:
A Hybrid Model for Ohio
• Available in Ohio FY2013
• Ben will be trained this year
• Webinars periodically available for teams of teachers
• Available to current projects who have identified classroom climate as a root cause
• Full blown program available in FY2014

Reports of Interest
• Pathways to Prosperity (Harvard 2011)
• STEM (Georgetown 2011)
• Increasing opportunities for low-income women and student parents in community colleges (Costello, 2012)
• The quest for excellence: Supporting the academic success of minority males in Science, Technology, Engineering, and Mathematics (STEM Disciplines) (Toldson & Esters, 2012)

Additional reports

Questions?
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Thank you for your participation this afternoon!
National Alliance for Partnerships in Equity
www.stemequitypipeline.org
www.napequity.org