Boston Youth Education Roundtable: A Sustainable Future through Empowerment and Equality
Defining STEM & Sustainability

- **Defining STEM:** Science, Technology, Engineering, and Math
  - Some call it “STEAM”

- **Defining Sustainability:** The ability to make use of something without it being completely used up or destroyed, or to make last for a long time
  - Has environmental, social, and economic applications
STEM Skills Explained

- Warnings about danger in emphasizing too much STEM
- STEM worker attributes beyond technical knowledge:
  - Digital skills
  - Communication skills
  - Flexibility
  - Orientation toward diversity
  - Global experience
  - Troubleshooting skills
  - Teamwork ability
  - Analytical skills
  - Critical thinking
  - Entrepreneurship
  - Openness to continuous learning

U.S. CHAMBER OF COMMERCE FOUNDATION
Education and Workforce
STEM Skills Are More Relevant than Ever

Non-routine tasks are on the rise in today’s labor market
Example STEM Industries
Example Energy Pathways

**Energy Pathways**
- Building Energy Efficiency
- Energy Engineering
- Energy Management
- Energy R&D
- Energy-Related Manufacturing
- Transportation Energy Efficiency

**Energy Occupations**
- Environment Engineering Tech
- Environmental Engineers
- Water and Waste Treatment Plant and System Operators
- Commercial and Industrial Designers
- Logisticians
A Changing Workforce

- In 1973 a high school diploma was the passport to the American Dream
  - 72% of 91 million person workforce had no more than a high school degree
- Post-secondary education is necessary to compete in the global economy
  - By 2007 63 million jobs added with fewer for those with a high school degree
- Economic forecasters widely agree that these trends will continue
  - 2/3 of all jobs will require at least some postsecondary education
Increasing Demand for Advanced Credentials

Percentage of Workforce by Educational Level:

- Master's degree or better
- Bachelor's degree
- Associate's degree
- Some college, no degree
- High school graduates
- High school dropouts

Number of people:
- 1973: 91 million
- 1992: 129 million
- 2007: 154 million
- 2018: 166 million
Wealth is Following Advanced Credentials

- **1980 Employment**
  - High School Dropout: 23%
  - High School/GED: 19%
  - Some College/AA: 37%
  - Bachelor’s and higher: 22%

- **1980 Wages**
  - High School Dropout: 30%
  - High School/GED: 19%
  - Some College/AA: 34%
  - Bachelor’s and higher: 17%

- **2009 Employment**
  - High School Dropout: 51%
  - High School/GED: 26%
  - Some College/AA: 31%
  - Bachelor’s and higher: 9%

- **2009 Wages**
  - High School Dropout: 18%
  - High School/GED: 5%
  - Some College/AA: 26%
  - Bachelor’s and higher: 22%
A Growing Skills Gap for Students

- 96% of CAOs believe students are ready for careers compared to 11% of business
- 35% of students believe they are prepared for careers
- 40% of students don’t complete college
- 54% unemployed or underemployed after graduating
- Youth unemployment is double the national average
A Growing Skills Gap for Employers

- 92% of executives believe a skills gap faces their industry
- 49% can’t fill open positions
- 37% can’t take on new business
- 6 million unfilled positions by 2020
- 65% plan to hire newly credentialed individuals
STEM Demand is High but Supply is Low

- STEM skills remain in high demand but are scarce in terms of supply
  - Openings for STEM positions go unfilled longer than non-STEM openings
  - Estimated shortage of 1.1 million STEM workers by 2024

- STEM workers earn more than non-STEM workers
  - $500k on average over lifetime for STEM degree holder; women earn 30% more

- Equity challenges persist in STEM workforce
  - Blacks and Latinos represent about 7% of the U.S. STEM workforce
  - Engineers: Blacks 3.6%, Hispanics 6.6%, and women 14.8%
Once those students enroll in college, undergraduate STEM attrition by major is substantial.
STEM Degrees versus STEM Workers

Only about half of STEM college graduates choose to work in STEM careers

- 100: All students who enter college and obtain a Bachelor’s degree
- 19: Students who graduate with a Bachelor’s degree in a STEM major
- 10: STEM Bachelor’s degree-holders working in STEM (immediately after college)
- 8: STEM Bachelor’s degree-holders working in STEM (after 10 years)
Lack of STEM Interest and Access

12th grade math proficiency and interest in STEM by race/ethnicity.
STEM Access Varies by Region

[Map showing STEM access variations by region with different colors representing different math scores.]
STEM Education Today

- The vast majority of jobs will require some level of postsecondary education
- However, our current talent pipeline is stagnating
- Further compromised by lack of equity
- Not only failing to produce enough credentials, but they are often misaligned
- Still a premium on STEM majors and credentials, but where you go matters
- Competition is increasingly global
Leading Practice: Mentorship

- Used to promote career awareness and goes beyond labor market data
- Opportunity for employees to serve as role models
- Often requires training or structure to sustain it
- Best practices when tied to specific objectives such as the execution of a project
- Important to have a feedback loop with a teacher or adult
Leading Practice: Mentorship
Leading Practice: Career Pathways

- Series of courses in a program of study measured by course concentrators
- Often integrates work-based learning (e.g., internships/apprenticeships)
- Can feature the attainment of stackable industry credentials
- Best practice when articulates into a postsecondary program
- Employers typically serve as advisors or providers of work-based learning
Leading Practice: Micro-Credentials

- Digital badge movement tied to competency attainment or experience
- Can be a feature of a career pathway or tied to a mentorship experience
- Useful for showing learning progressions toward larger academic goals
- Best practice when authenticated by employer partners
- Increasingly explored as stand-alone credentials
Leading Practice: Micro-Credentials
Emerging Approach: Talent Supply Chains

- Organizing employers to close the skills gap to address a core business need
- *By employers, for employers* – Improving the ability of companies to work together as end-customers to manage their talent pipelines as a shared practice
- Employers communicate their needs and requirements in their own voice
- Establishes performance-based partnerships
- Provides students with greater transparency on where employers recruit talent
Emerging Approach: Talent Supply Chains
Emerging Approach: Endorsements

- Extending industry practices around quality assurance to human capital (e.g., ISO)
- Voluntary approach for setting partnership requirements
- Provides a layered approach that allows customization for industries and employers
- Allows providers to benchmark themselves against requirements
- Need to get the incentives right for employers and talent suppliers to participate
Emerging Approach: Innovation Challenges

- In today’s economy companies must continually compete on innovation
- Workers too are in a race against routine work
- Challenges provide a real-world, authentic experience pursued by a interdisciplinary team of students
- Scalable compared to most work-based learning experiences
- Can be used to accomplish different objectives and can be paired with credentials
Emerging Approach: Innovation Challenges
Next Steps

- **Mentorship**
  - Set a goal, gauge interest among employees, and build/license a platform

- **Career pathways**
  - Advise schools on course progressions and host work-based learning experiences

- **Micro-credentials**
  - Design a digital badge around STEM and sustainability literacy
Next Steps

- **Talent supply chains**
  - Organize employers to manage demand for 1 or 2 critical STEM occupations

- **Endorsements**
  - Convene partner companies to set requirements for a STEM endorsement

- **Innovation challenges**
  - Organize a challenge design workshop and invite education partners
Considerations for Moving Forward

STEM and Sustainability

- **Option 1**: Promote an innovation challenge in energy efficiency/renewable energy that links to mentorship and micro-credentials.

- **Option 2**: Develop an endorsement system that recognizes sustainable practices but also supports career pathways and closing the skills gap.
Considerations for Moving Forward

Create an integrated approach to manage STEM engagement and investments across the value chain
Considerations for Moving Forward

- Do you have a goal or objective in mind?
- Who in your company needs to be involved and at what level of buy-in?
- What outside partners are necessary or preferred?
- What is your current and future capacity to lead or participate?
- How do you know if you have been successful?
Recommended STEM Coalitions and Partners

STEMconnector®

GEORGETOWN UNIVERSITY Center on Education and the Workforce

PROJECT LEAD THE WAY

CHANGE THE EQUATION

BHEF BUSINESS HIGHER EDUCATION FORUM

Creating Solutions. Inspiring Action.

U.S. CHAMBER OF COMMERCE FOUNDATION Education and Workforce
For More Information Contact

Jason A. Tyszko
Executive Director
jtyszko@uschamber.com