Boosting Success for 21st Century Learners Webinar Series

Equity Strategies for K-12 STEM: A focus on gender, race, & computer science

This webinar for school administrators and teachers will provide an overview of civil rights laws and issues as they pertain to the classroom, discuss their impact on student achievement and school reform, and provide participants with practical tips to apply in the classroom.

Disclaimer

The Mid-Atlantic Equity Center is committed to the sharing of information regarding issues of equity in education. The contents of this practitioner brief were developed under a grant from the U.S. Department of Education. However, these contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the federal government.
Equity Strategies for K-12 STEM

A focus on gender, race, & computer science

Melissa Koch, Director of Build IT and ICT4me
SRI International

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The Mid-Atlantic Equity Center

The Center is one of ten equity assistance centers funded by the U.S. Department of Education under Title IV of the Civil Rights Act of 1964. The Center provides technical assistance and training to school districts in the areas of:

- Race
- Gender
- National Origin/English Language Learning
Melissa Koch, Senior Educational Developer, SRI International’s Center for Technology in Learning (CTL).
The Next Steve Jobs

Genius is everywhere—but we’re wasting it. How to unleash the great minds of tomorrow.

by Joshua Davis
The Underrepresented in Computing

- **Women**: hold only 25% of computing jobs though they make up 50% of the workforce.
- **Latinos/as**: hold nearly 9.5% of computing jobs.
- **African-American women and men**: hold 5% of computing jobs.
- **Latina and African American Women**: hold only 3% of computing jobs.
Women in Computer Science Majors

% Of Women Majors, By Field

Medical School  Law School  Physical Sciences  Computer science

Source: National Science Foundation, American Bar Association, American Association of Medical Colleges
Credit: QuocTrung Bui/NPR
What can we do and when?

- K-12 computer science: Efforts happening in and out of school at all grade levels.
- Recruit Everyone
- Keep Everyone
The Interactive Equity Guide
Gender, Race, & Culture

Recruitment

- **What content you use** to recruit youth matters.
- **Where** youth are recruited from matters.
- **Who** recruits the youth matters.
What Content You Use Matters

Images in flyers, videos, or other media used to recruit youth should include youth or adults who look like them (i.e. same gender and same racial background):

- People engaged in using and creating technology
- People collaborating
- People creating, building, making something
- People making a difference for society
Reflection on Recruiting

Please text in your responses into the chat box...

- Who should recruit?
- Where should they recruit?
Curriculum

- Provide role models
- Encourage effort-focused mindset
- Encourage collaboration
- Provide time for play: tinkering and non-programming computer play
- Show the social impact of technology and computer science
- Connect content to their lives and their communities
- Address stereotype threat
What is a stereotype?

- A stereotype is a widely-held and oversimplified image or idea of a particular type of person or thing.
- Stereotypes can discourage youth from pursuing learning and career interests.
- Computer science has a stereotype: a computer scientist or anyone who writes computer code or builds computers is a white male working alone in a cubicle and is socially challenged.
- Women, Latinos, and African American also have stereotypes in relationship to science, technology, engineering, mathematics, and computer science.
What is a stereotype threat?

- Stereotype threat is the threat of being viewed through the lens of a negative stereotype or the fear of doing something that would confirm that stereotype.

![Diagram showing stereotype threat](image)
Impact of Stereotype Threat

- Bar graph showing math scores for men and women with and without stereotype threat.
  - Men: No stereotype threat (score), Stereotype threat (higher score).
  - Women: No stereotype threat (score), Stereotype threat (lower score).

- Vertical axis: Math score
- Horizontal axis: No stereotype threat vs. Stereotype threat (for both men and women)

- Column graph showing mean items solved (adjusted by SAT) for Blacks and Whites with and without stereotype threat.
  - Stereotype Threat: Mean items solved for Blacks and Whites.
  - No stereotype Threat: Mean items solved for Blacks and Whites.

- Vertical axis: Mean items solved (adjusted by SAT)
- Horizontal axis: Stereotype Threat, No stereotype Threat (for both Blacks and Whites)
Reflection on Stereotype Threat

**Please text in your responses...**

1. How has a stereotype about a group you belong to impacted your actions?
2. How have you overcome a stereotype threat?

[running thread of stereotypes that folks can read, who will do this???]
Addressing Stereotype Threat

- Teaching students about stereotypes and stereotype threat
- Providing role models in STEM and CS
- Encouraging all youth in having an effort-focused mindset
- Addressing the anxiety and associated thoughts that distract threatened individuals. Provide explanations on why anxiety and distraction are occurring that do not blame the individual or validate the stereotype.
- http://reducingstereotypethreat.org/reduce.html
Classroom Environment

- The Hidden Curriculum
- Language
- Creating an Environment in the Classroom
- Addressing the larger learning environment (e.g. school setting)
- Stereotypes
- Encouragement
Encouragement: Inspire a Growth Mindset
## Ability-focused vs. Effort-focused Mindsets

<table>
<thead>
<tr>
<th>Ability-focused (inspire fixed mentality)</th>
<th>Effort-focused (inspire growth mentality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>You are either good at math or you are not.</td>
<td>Anyone can learn mathematics, if they try.</td>
</tr>
<tr>
<td>You have to have spatial reasoning skills to be an engineer.</td>
<td>You need to learn spatial reasoning skills to be an engineer.</td>
</tr>
<tr>
<td>You are great with technology.</td>
<td>You did a good job developing that website.</td>
</tr>
<tr>
<td>You must be really smart to have done these mathematics problems.</td>
<td>You must have worked hard at these mathematics problems.</td>
</tr>
<tr>
<td>Euclid and Lovelace are two brilliant mathematicians who were geniuses. They had natural talent in mathematics.</td>
<td>Euclid and Lovelace were dedicated mathematicians committed to mathematics. Overtime, their passion for math led them to develop extraordinary mathematics skills.</td>
</tr>
<tr>
<td>Teacher compares students to each other. (e.g. grading on a curve)</td>
<td>Teacher compares individual students’ last performance to their current performance, noting change.</td>
</tr>
</tbody>
</table>
Elizabeth is in middle school and excited about gymnastics. She’s been practicing for a gymnastics competition and expects to do well. At the competition, she doesn’t place in any of the events. What does her father do to encourage her growth in gymnastics:

Please select the best response using the polling feature...

1. Tell her that he thought she was the best.
2. Tell her she was robbed of a ribbon that was rightfully hers.
3. Reassure her that gymnastics is not that important.
4. Tell her she has the ability and will surely win next time.
5. Tell her she needs to work harder to win.
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Classroom Management

- Fostering “Everyone has a voice to be heard and hands to help.”
- Organizing and supporting groups
- Recruiting, supporting and maintaining role models
Reflection on Voices

Please text in your response...

How can we ensure that everyone has a voice in the computer science classroom?

Voice = verbal response and hands-on participation.