

Welcome to the National Girls Collaborative Project National Webinar



Microsoft Philanthropies and Inclusive Computer Science Education

April 23, 2019



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1

Agenda

- NGCP Vision and Goals
- Introduction to Microsoft Philanthropies
- Presentation about the 'Guide to Inclusive Computer Science Education'
- Q&A
- Closing



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2

Vision

The National Girls Collaborative Project **brings together organizations** committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).



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3

NGCP Goals

1. **Maximize access** to shared resources within organizations interested in engaging girls in STEM.
2. **Strengthen the capacity** of programs by sharing exemplary practice research and program models.
3. **Use the leverage of a network** to achieve gender equity in STEM.



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4

National Network of Collaborative Teams



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5

Speakers



Greg Bianchi,
Senior Program Officer,
Microsoft Philanthropies




Joanna Goode,
Associate Professor, College
of Education Studies,
University of Oregon

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6


 Microsoft

Inclusive Computer Science Education

Greg Bianchi
Microsoft Philanthropies



7



Our Mission

Increase equitable participation in high-quality computer science education.

8

Why computer science education



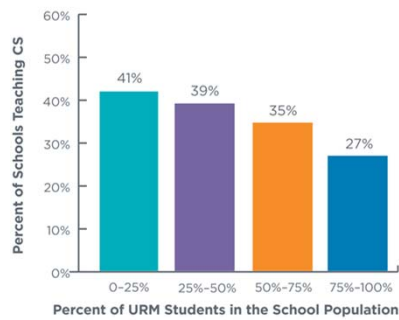
"If we are ensuring that there are diverse teams and diverse folks at the table at every step of the pipeline, it creates the opportunity to have tech look like the world that it represents, which benefits us in a million different ways."

— Dr. JeffriAnne Wilder, NCWIT

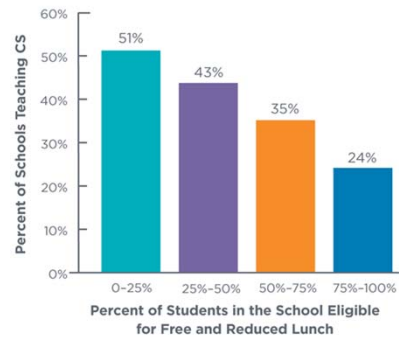
9

K-12 CS access report

Underrepresented Minority Students and Access to Computer Science (CS)



Income Level and Access to Computer Science



10

Microsoft Philanthropies approach

Interest & Belonging	Capacity	Systemic Change
		
		
		
		
	 The SCRIPT: Strategic Planning Tool for School Districts	

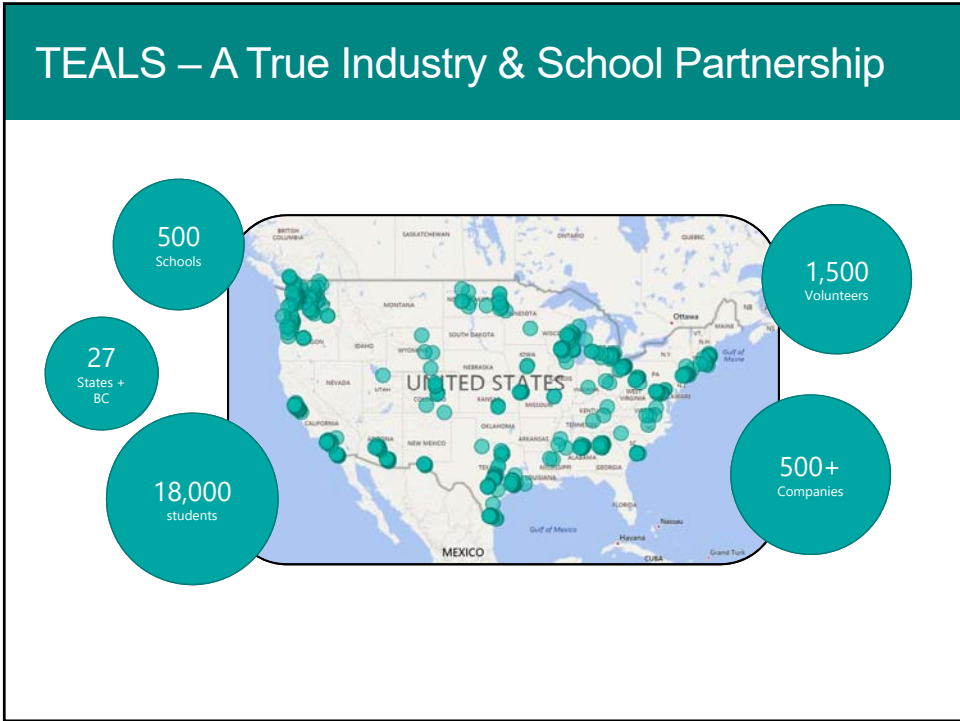
11



Microsoft Philanthropies TEALS Program

- Year-round in class teacher professional development from trained industry professionals
- Industry volunteers support classroom teachers and build CS teaching capacity
- A ten-year track record with hundreds of teachers and schools

12



13

Guides for computer science education

Computer science professional development guide

Computer science is for everyone

Guide to inclusive computer science education

www.microsoft.com/digitalskills

14

Inclusive Computer Science Education:

How educators can encourage and engage all students in computer science

Joanna Goode, University of Oregon

15

Researching the problem

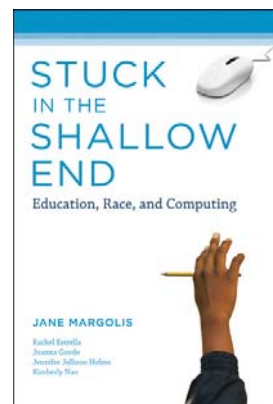
Why are there so few girls and so few students of color studying computer science in school?

Structural Barriers

Inequitable offerings between schools, 'tracking' of students within schools, lack of teacher preparation, "technology rich, curriculum poor"

Belief Systems

"Preparatory privilege" was often misinterpreted by counselors, teachers, and students themselves as differences in aptitude



16

What is computer science, anyway?

The study of computer and the principles and practices used to make them do useful things for society

CS CONCEPTS

- Computing systems
- Networks and the Internet
- Data and analysis
- Algorithms and programming
- Impacts of computing

CS PRACTICES

- Fostering inclusive computing culture
- Collaborating around computing
- Recognizing and defining computational problems
- Developing and using abstractions
- Creating computational artifacts
- Testing & Refining computational artifacts
- Communicating about computing

17

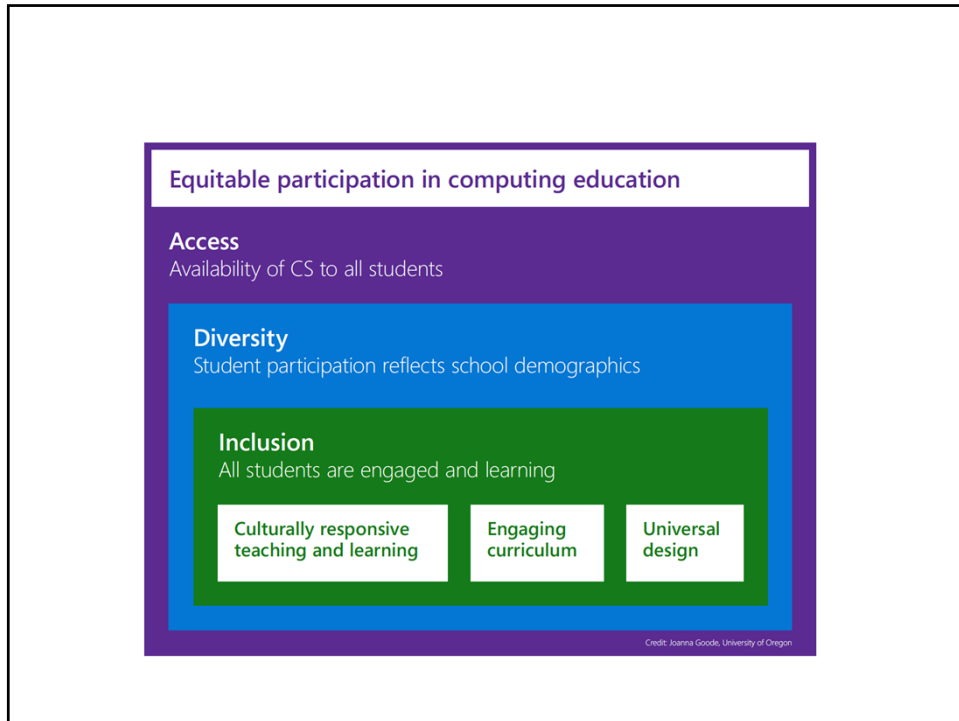
Researching the solution

How can education reform efforts (curricular, instructional, and policy) support inclusive learning opportunities for girls and students of color in computing?



Exploring
Computer
Science

18



19

<p>Access</p> <p>Diversity</p> <p>Learning space</p> <p>Instruction</p> <p>Curricular materials</p>	<p>For each of these sections, we will:</p> <ul style="list-style-type: none"> • Discuss key considerations related to equity and inclusion • Provide related resources
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20

Access

Elementary School – Integration of computing lessons often takes place across other subject areas (See case study)

Middle & High Schools - Computer science courses are typically stand-alone courses; typically not part of core, required curriculum

Informal Learning Spaces – Content and availability to participate in programs widely varies



21


DIVERSITY: School Considerations

SCHOOL ECOSYSTEM – Administrators, counselors, teachers, families, and students can all advocate for and support CS learning opportunities

COUNSELORS – As gatekeepers to non-required courses, counselors can be excellent champions for CS learning, or they can unknowingly filter out students.

“If you change the way that guidance counselors think about who is right for computer science, that changes who they recommend for the course. And then you have students giving it a try who never would have done that before.”

— Leslie Aaronson, NCWIT



22

DIVERSITY: Attracting CS learners

"I tell students the people behind the cool technologies we use should reflect the same types of people who use it."

— Doug Bergman, Porter-Gaud School

Generate a steady narrative about how CS is creative and critical to solving real-world problems

Role models and other guest speakers can connect with students in different ways by talking about their work and experiences

Enlist current CS learners to promote CS education with 'peer presentations' or with younger children

Address **intersectionality** by introducing students to female role models of different races and ethnicities.

Visit [FabFems](#) to learn more.

23

INCLUSION: Learning Spaces

"Have representations of a diverse range of figures in computing, and people who have different types of roles in STEM as well. Students are in that classroom every day, so those signals can be very powerful reminders to them."

— Frieda McAlear, Kapor Center

Feature examples of real-world applications of CS in learning spaces

Display student projects and contributions

Arrange learning space to promote collaboration and hands-on activities

Design learning spaces that are accessible to students with diverse abilities

Make sure technology resources support the needs of students

24

INCLUSION: Learning Spaces - Universal Design

“Look for a curriculum that has threads of universal design, rather than choosing a narrow curriculum and trying to make it inclusive.”

— Dr. Maya Israel, Creative Technology Research Lab

In physical spaces, support accessibility to CS learning environments for all types of people

Lessons should account for students' varied abilities and **use accommodation, assistive technologies and other approaches** to make computing accessible for students with disabilities

Students should be **taught principles of universal design** as they begin creating their own technologies

25

INCLUSION: Instruction - Inquiry

Emphasize the problem-solving process, and how different perspective and approaches can result in multiple solutions encourage students to take ownership over their own learning

Encourage exploration and creativity and support growth mindset of students

Encourage risk-taking and showcase mistakes as learning opportunities, by showcasing learning through sharing “my favorite bug of the day”

Help support scaffolds and differentiated supported, as needed, for learners



26

INCLUSION: Instruction - Culturally Responsive Teaching and Learning

“I saw one team of girls who wanted to create an app that would warn people with asthma about poor air quality, because it was something directly relevant to their lives.”

— Dr. Allison Scott, Kapor Center

Rigor - Maintain high expectations for all students to counter stereotypes about who excels in CS

Relationships – Build relationships with students to identify opportunities to connect learning to their experiences

Relevance - Connect to students’ cultural experiences and realities, including real-world topics

Acknowledge how issues of power and privilege in CS realm has history of marginalizing groups of people, examine how policies and collective agency might disrupt these forces

27

Inclusion: Curricular Materials


Allow **students choice** and variety in aesthetics and features in their work

Use **hands-on, project-based learning**
Develop **cohesive progression of CS Learning** opportunities

Select **materials that highlight diversity** and inclusion in meaningful ways

Include **lessons that build on cultural assets**, knowledge, and interests of students

Incorporate **learning materials that are accessible** for students of all abilities



28

Inclusive Guide Acknowledgements

- ❖ Leslie Aaronson, National Center for Women & Information Technology
- ❖ Jake Baskin, Computer Science Teachers Association
- ❖ Doug Bergman, Porter-Gaud School
- ❖ Callista Chen, Tech Bridge Girls
- ❖ Leigh Ann DeLyser, CSforAll
- ❖ Lien Diaz, Georgia Tech College of Computing
- ❖ Maya Israel, Creative Technology Research Lab
- ❖ Andy Ko, University of Washington
- ❖ Frieda McAlear, Kapor Center
- ❖ Brook Osborne, Code.org
- ❖ Allison Scott, Kapor Center
- ❖ JeffriAnne Wilder, National Center for Women & Information Technology

29

Inclusion guide resources

Diversity

Girls in STEM Action Guide for education and nonprofit leaders, teachers and parents:

<https://aka.ms/stemactionguide>

FabFems: <https://www.fabfems.org/find>

NCWIT Counselors for Computing resources:

<https://www.ncwit.org/project/counselorscomputing-c4c>

NCWIT Top 10 Guide for engaging counselors as allies:

<https://www.ncwit.org/resources/top-10-ways-engage-school-counselors-allies-effortincrease-student-access-computer>

Meet Code Creators video series from Code.org and Skype in the Classroom: <https://aka.ms/codecreators>

Diversity posters and displays from Code.org:

<https://hourofcode.com/us/promote/resources#posters>

Find diverse guest speakers in CS through Skype in the Classroom: <https://education.microsoft.com/skype-in-the-classroom/find-guest-speakers>

TACTICaI Teaching Brief for effective CS co-teaching:

<https://ctrl.education.illinois.edu/TACTICaI/coteaching>

Access

Computer Science Professional Development Guide:

<https://aka.ms/CSPDguide>

Computer Science Is for Everyone Student Recruitment Toolkit:

<https://www.microsoft.com/en-us/digital-skills/resources>

AccessCSforALL resources for a range of student abilities:

<https://www.washington.edu/accesscomputing/accesscsforall>

Additional CS education research:

<https://csedresearch.org/>

Accessible learning and universal design

Profiles of CS professionals and students with disabilities from Alliance for Access to Computing Careers:

<https://www.washington.edu/accesscomputing/resources/choosecomputing/profiles>

How Can We Include Students with Disabilities in Computing Courses video:

<https://www.washington.edu/doiit/videos/index.php?vid=64>

Universal Design for Learning framework:

<https://ctrl.education.illinois.edu/TACTICaI/udl>

INSTRUCTION

Strategies for Effective and Inclusive CS Teaching course by the University of Texas at Austin: <https://stemcenter.utexas.edu/strategieseffective-and-inclusive-cs-teaching>

CSforAll teachers community of practice:

<https://csforallteachers.org/>

Computer Science Teachers Association (CSTA) information and membership:

<https://www.csteachers.org/>

30

Inclusion resources cont.

Accessible learning and universal design

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CSforAll teachers community of practice:
<https://csforallteachers.org/>

Computer Science Teachers Association (CSTA) information and membership:
<https://www.csteachers.org/>

MakeCode for MicroBit Curriculum for hands-on learning:
<https://makecode.microbit.org/courses/csintr>

Code.org CS Fundamentals (elementary school):
<https://code.org/educate/curriculum/elementary-school>

Coding with Minecraft (elementary school):
<https://education.minecraft.net/class-resources/coding-with-minecraft>

CS Discoveries (middle school):
<https://code.org/educate/csd>

Exploring Computer Science (high school):
<http://www.exploringcs.org/curriculum>

TEALS Intro to CS (high school):
<https://tealsk12.gitbook.io/intro-cs/>

AP CS Principles (high school):
<https://apcentral.collegeboard.org/courses/ap-computer-scienceprinciples/course>

Quorum programming language:
<https://quorumlanguage.com/>

31

**Inclusive practices
& policies are
essential
for ensuring
Computer Science
is accessible
and engaging
for All children**



32

Questions and Discussion



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33

Thank you!



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34