WELCOME

ncwit.org

K-12 Alliance HUDDLE Winter 2023

NCWIT. Inclusion changes what's possible.

TODAY'S AGENDA

- WELCOME AND INTRODUCTIONS
- K12 ALLIANCE SPOTLIGHT:
  - DR. CAROL FLETCHER
- ANNOUNCEMENTS AND OPPORTUNITIES

NCWIT K-12 ALLIANCE CORE TEAM

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K-12 Alliance
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Addressing Inequities in K-12 Computing Education at the Roots

Dr. Carol Fletcher

Director of EPIC at the Texas Advanced Computing Center, UT Austin

Addressing Inequities in K-12 Computing Education at the Roots

Carol L. Fletcher, Ph.D.

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Texas Advanced Computing Center (TACC)
The University of Texas at Austin
PI, ECEP Alliance

WeTeach_CS

ECEP Expanding Computing Education Pathways

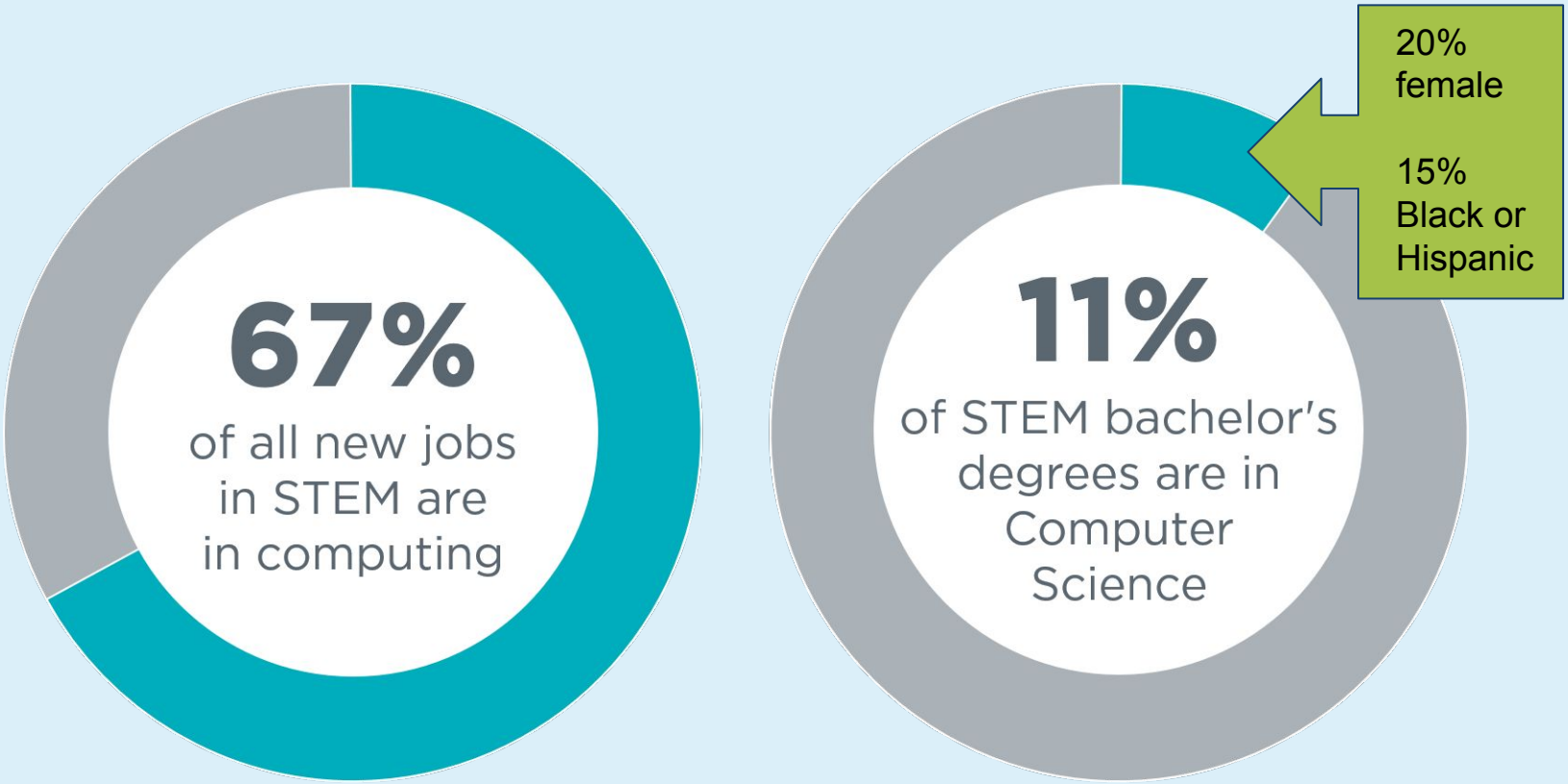
WeTeachCS.org **ECEPalliance.org**

@ECEP_CS @weteachcs @drfletcher88

- Why does diversity in CSEd matter?
- CAPE: Understanding the CSEd ecosystem
- Examining the root causes of inequity
- Individual actions that can lead to systemic change

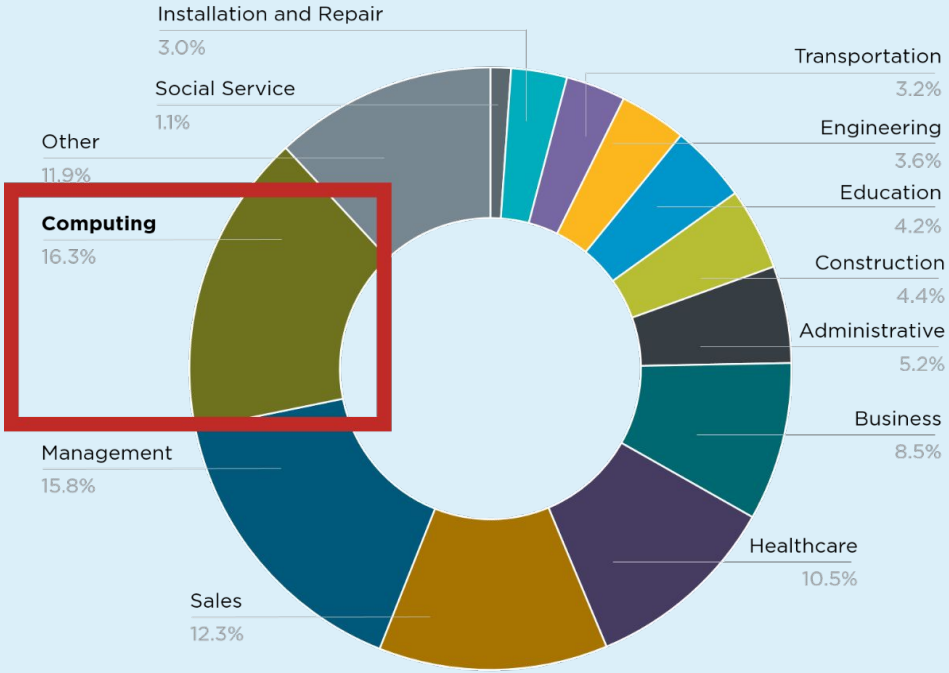
Our job is to prepare today's students for their future, not our past.

The STEM problem is really a Computer Science problem…



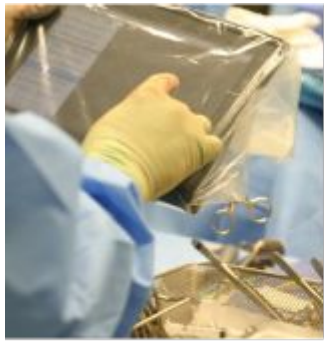
Sources: Bureau of Labor Statistics, National Center for Education Statistics

Computing jobs are the #1 source of new wages in the United States



500,000 current openings:
These jobs are in **every** industry and **every** state, and they're projected to grow at twice the rate of all other jobs.

Computing is revolutionizing EVERY field



Health Care

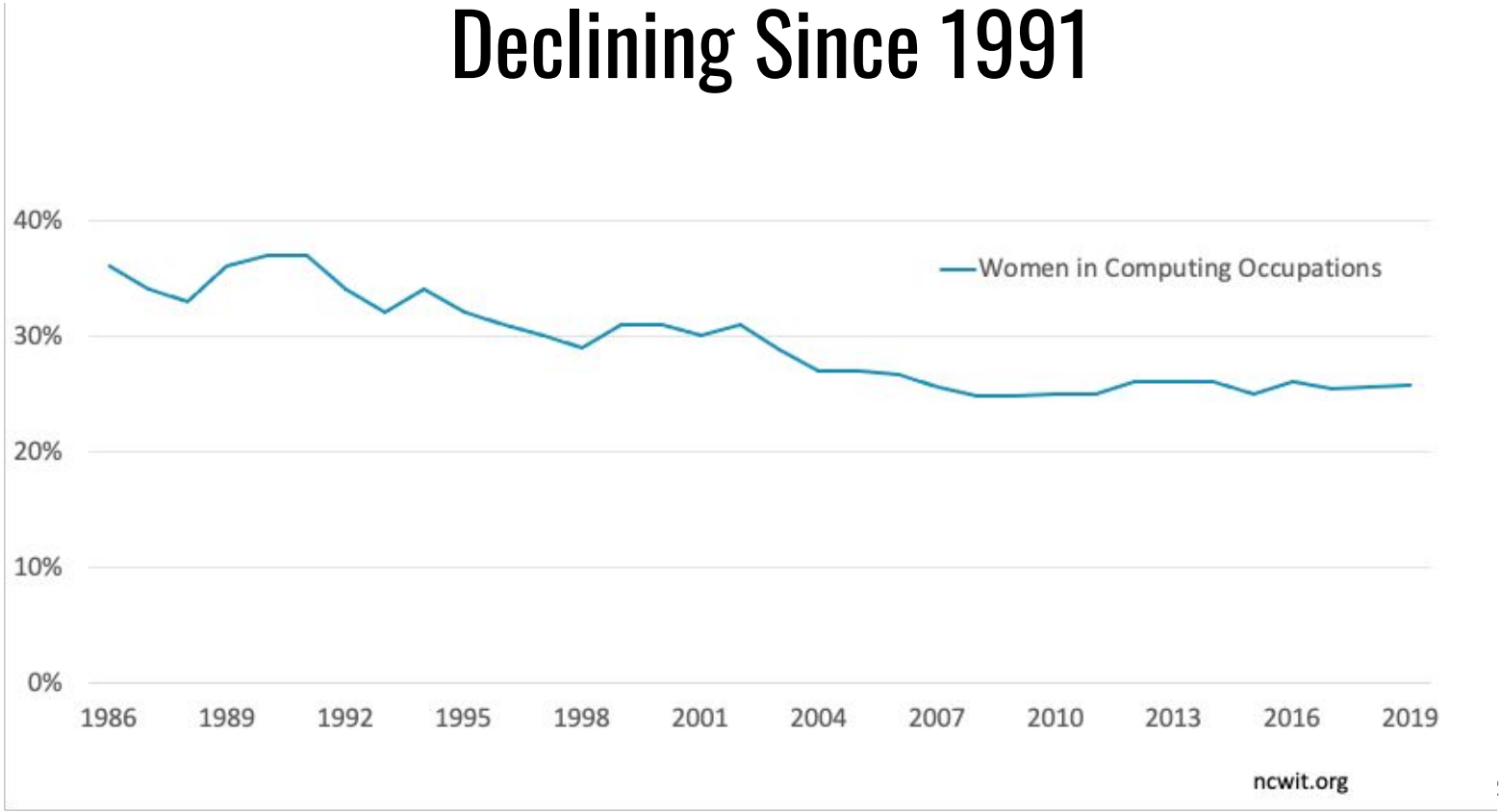
Transportation

Space

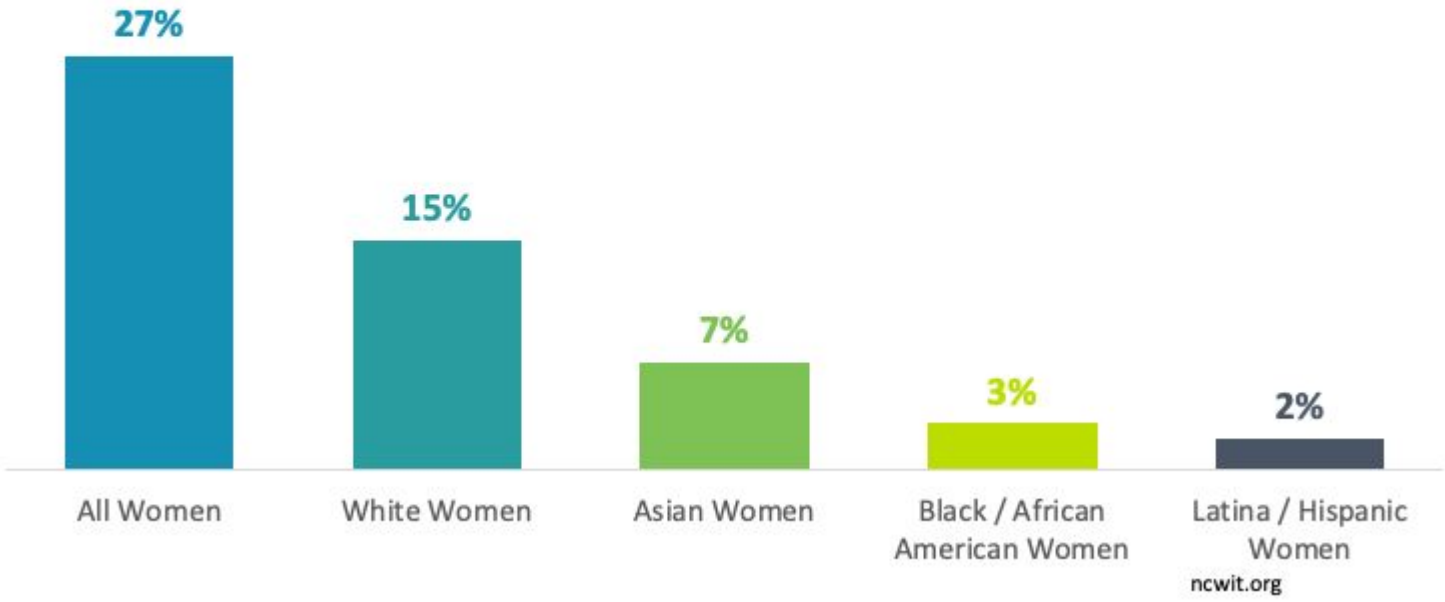
Home

Entertainment

Computing Occupations Held by Women Declining Since 1991

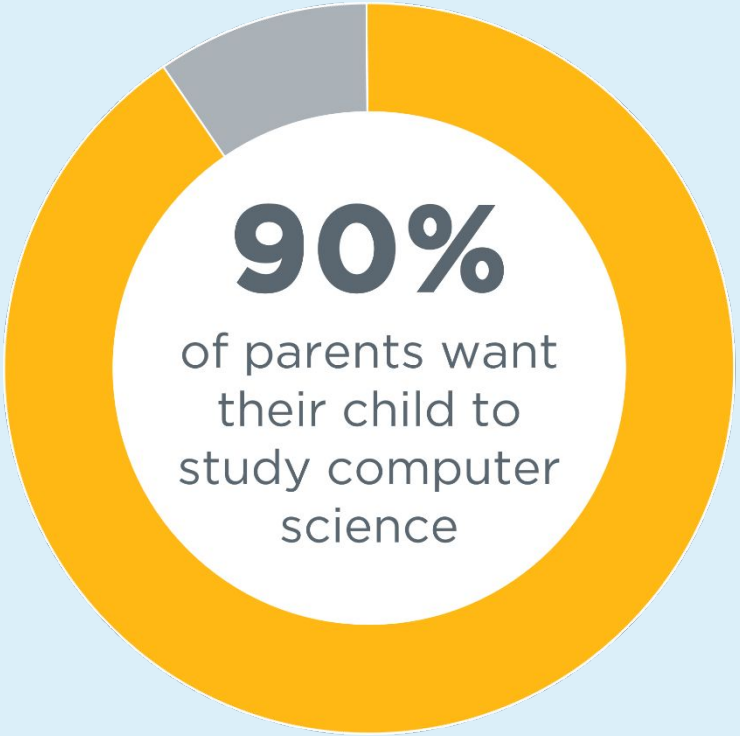


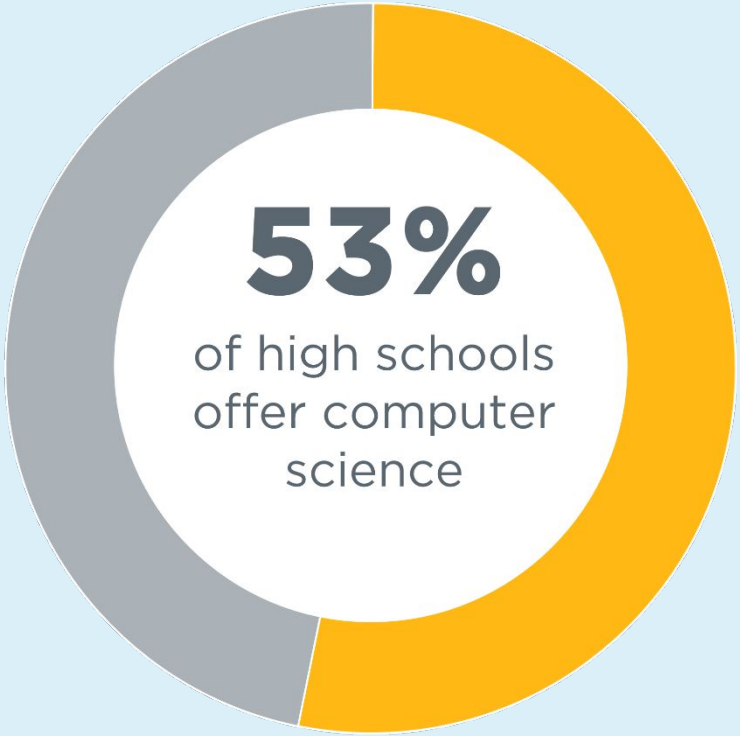
Percentage of Computing Jobs Held by Women



Computers and software are changing everything...

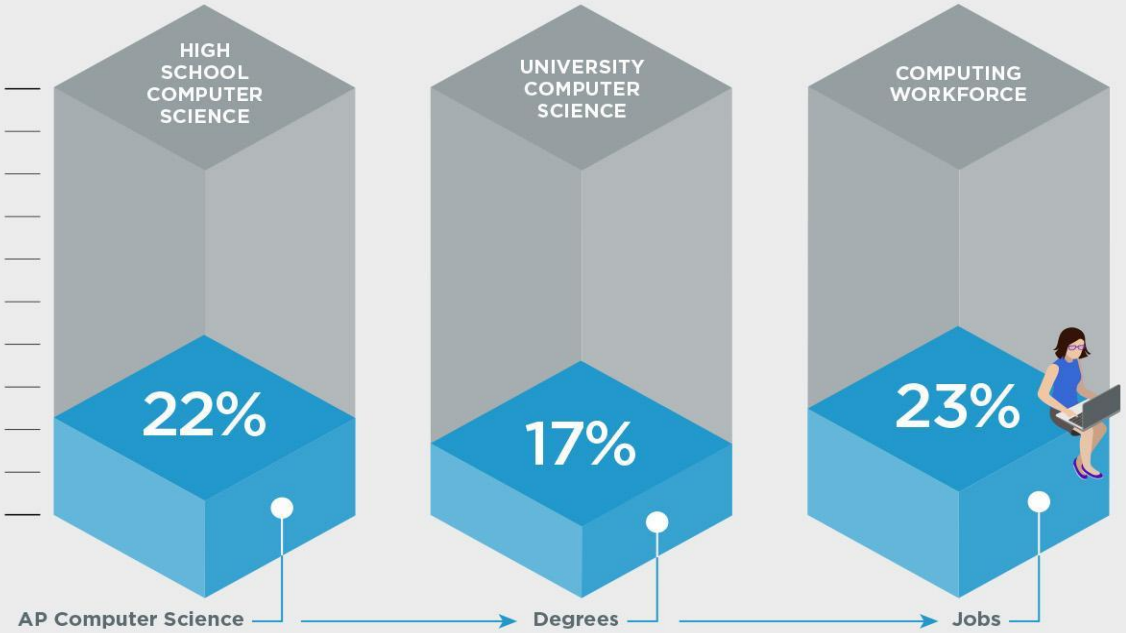
...but half of schools don't teach CS





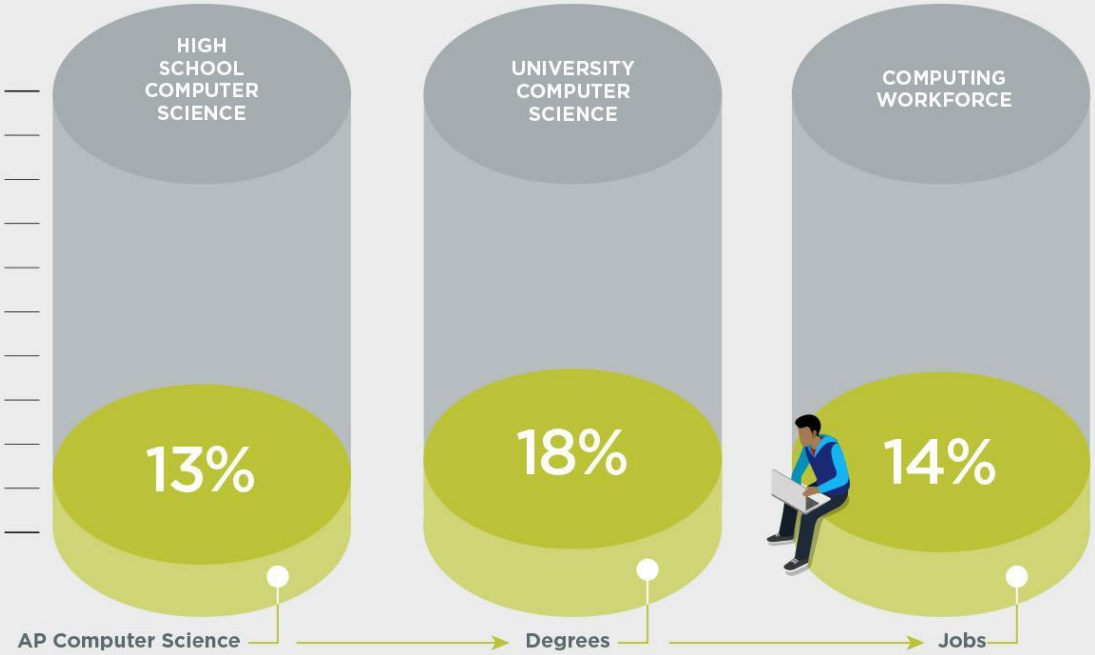
Source: Access Report

The diversity problem in tech starts in schools



Women who try AP Computer Science in high school are ten times more likely to major in it in college.

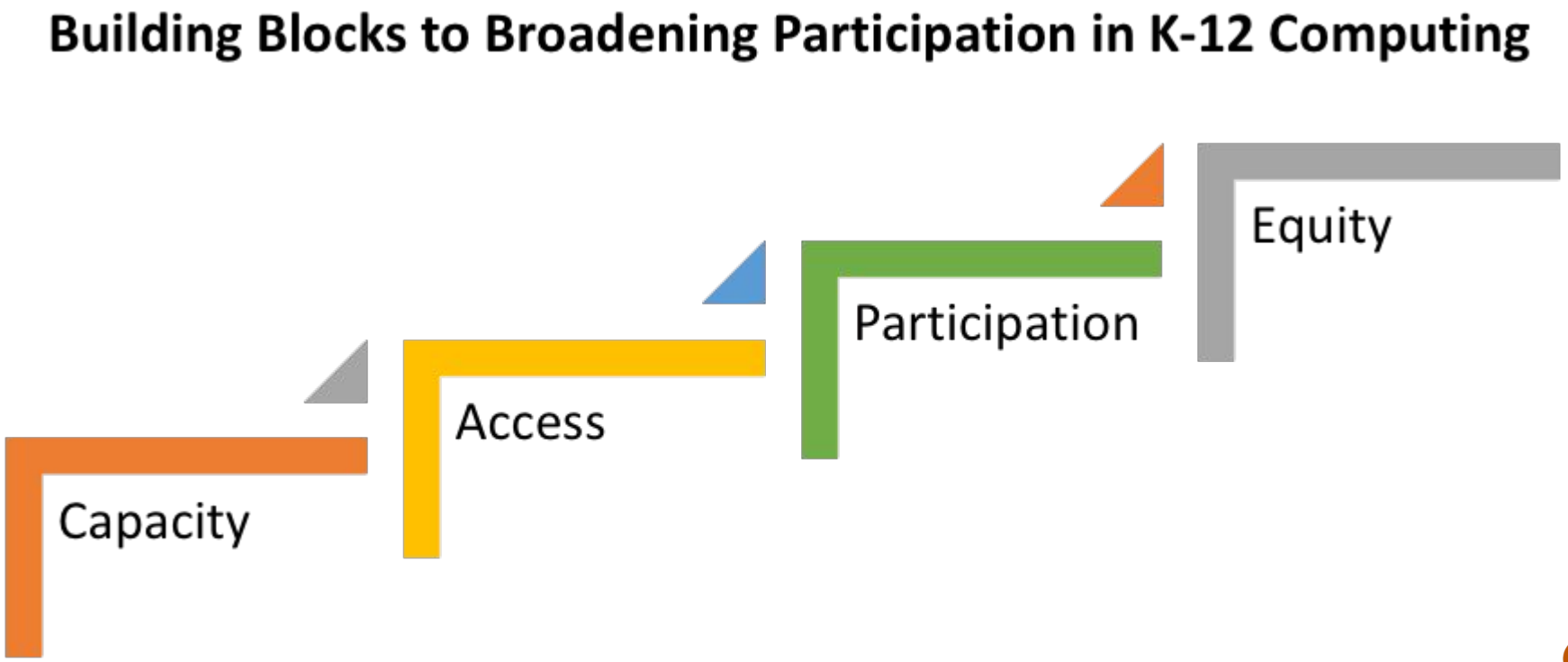
The diversity problem in tech starts in schools



Hispanic and Black students who try AP Computer Science in high school are seven times more likely to major in it in college.

How do we build an equitable CSEd ecosystem?

Evolution of CAPE



Presented by Carol Fletcher at the 2018 ECEP Convening

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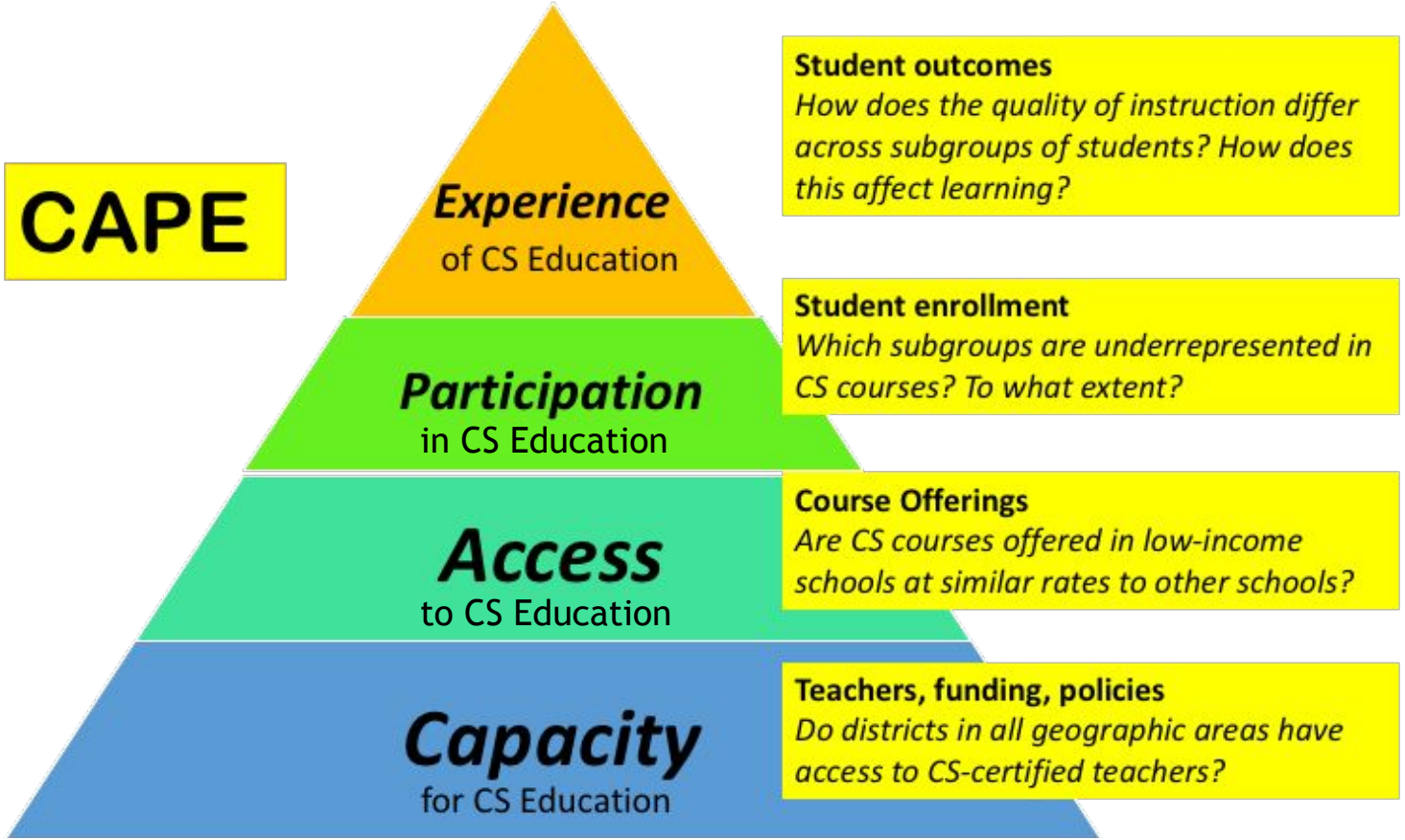

Fletcher, C. L. & Warner, J.R. (2021). CAPE: A Framework for Assessing Equity throughout the Computer Science Education Ecosystem. *Communications of the ACM*, *64*(2), 23-25. https://doi.org/10.1145/3442373

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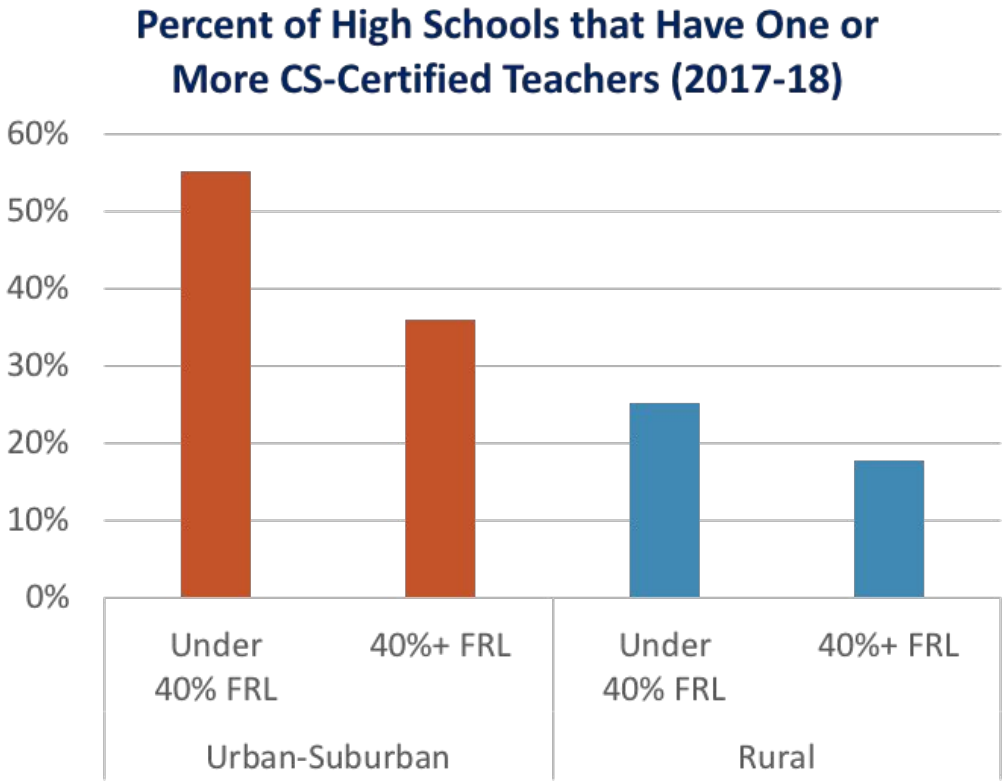
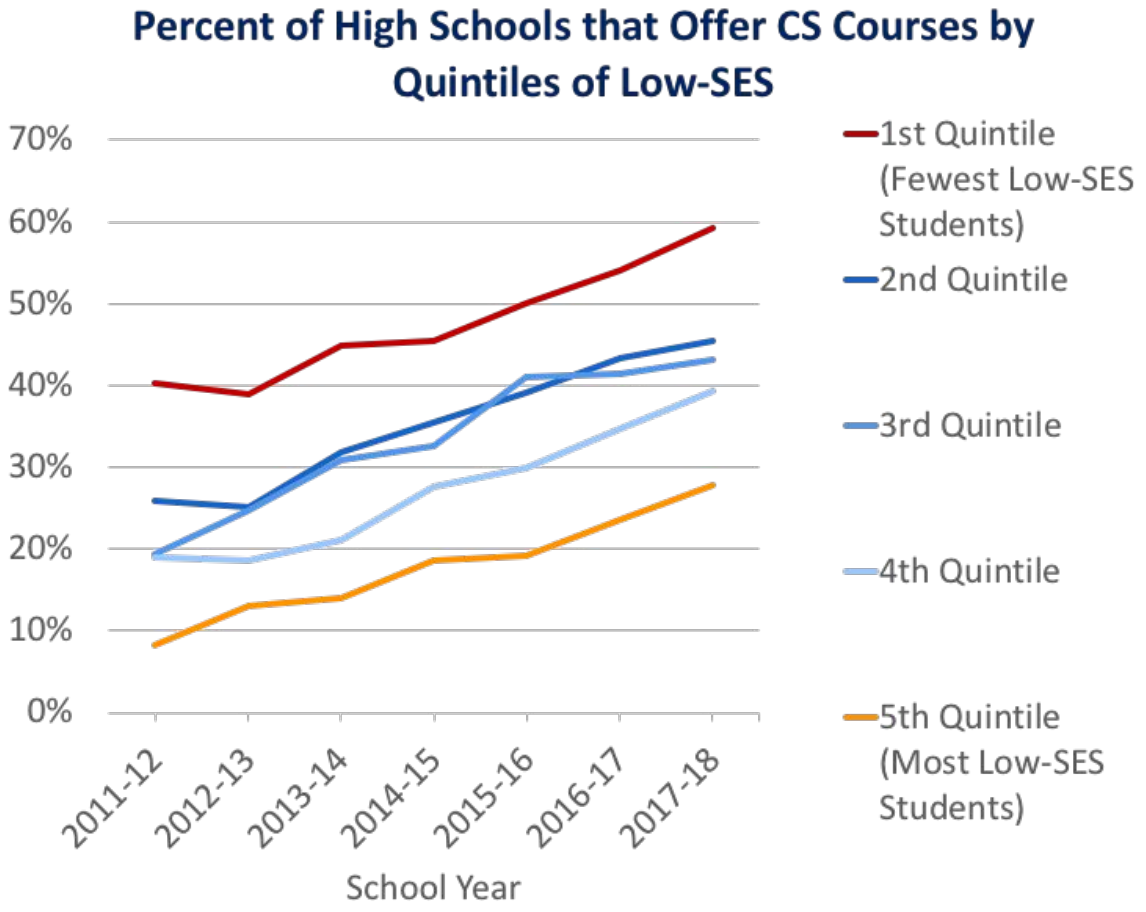
Capacity



Access



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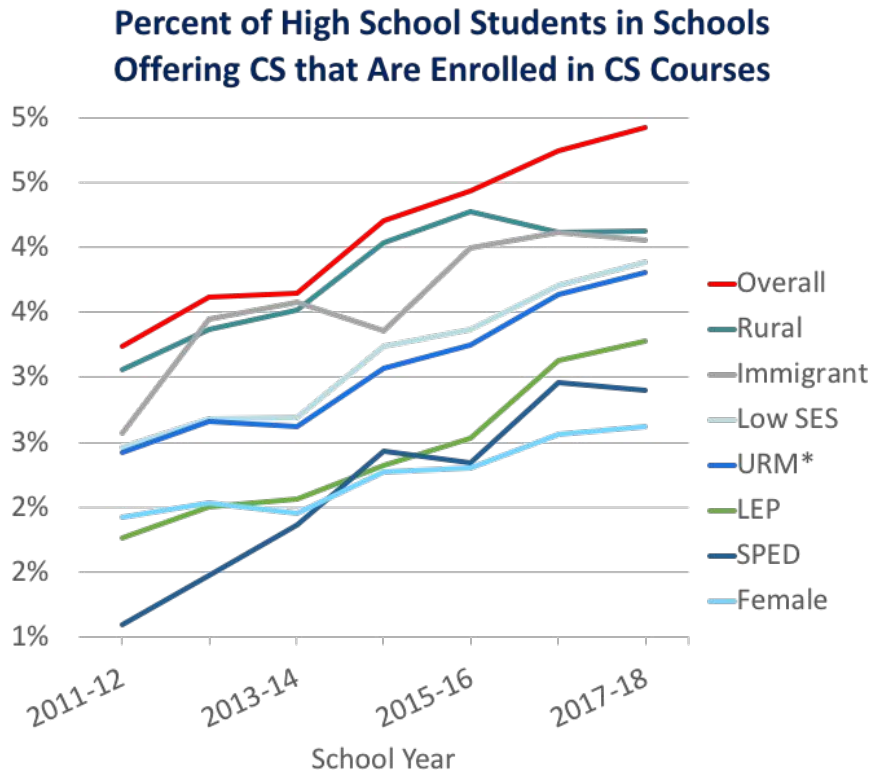
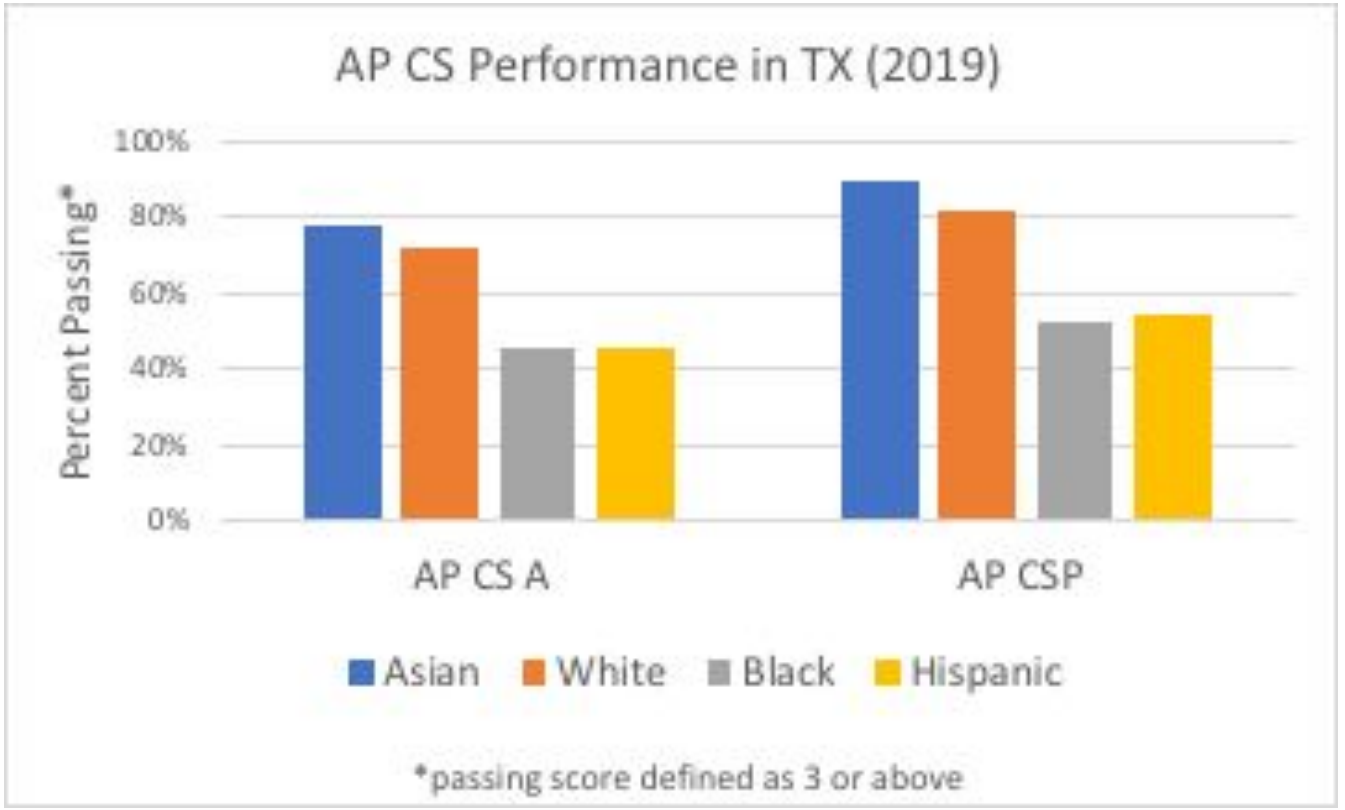
Participation



Experience



How do evaluate the root causes of inequitable outcomes in CS?

What factors predict HS CS course enrollment?

- 1.1 million TX students attended a HS offering CS in 2017-18
- <4% of TX HS students took a CS course in 2017-18 (~57,000 students)
- Calculated odds ratios of taking a CS course for factors such as gender, socioeconomic status, race/ethnicity, limited english proficiency, special education, school size, rural school status, etc.

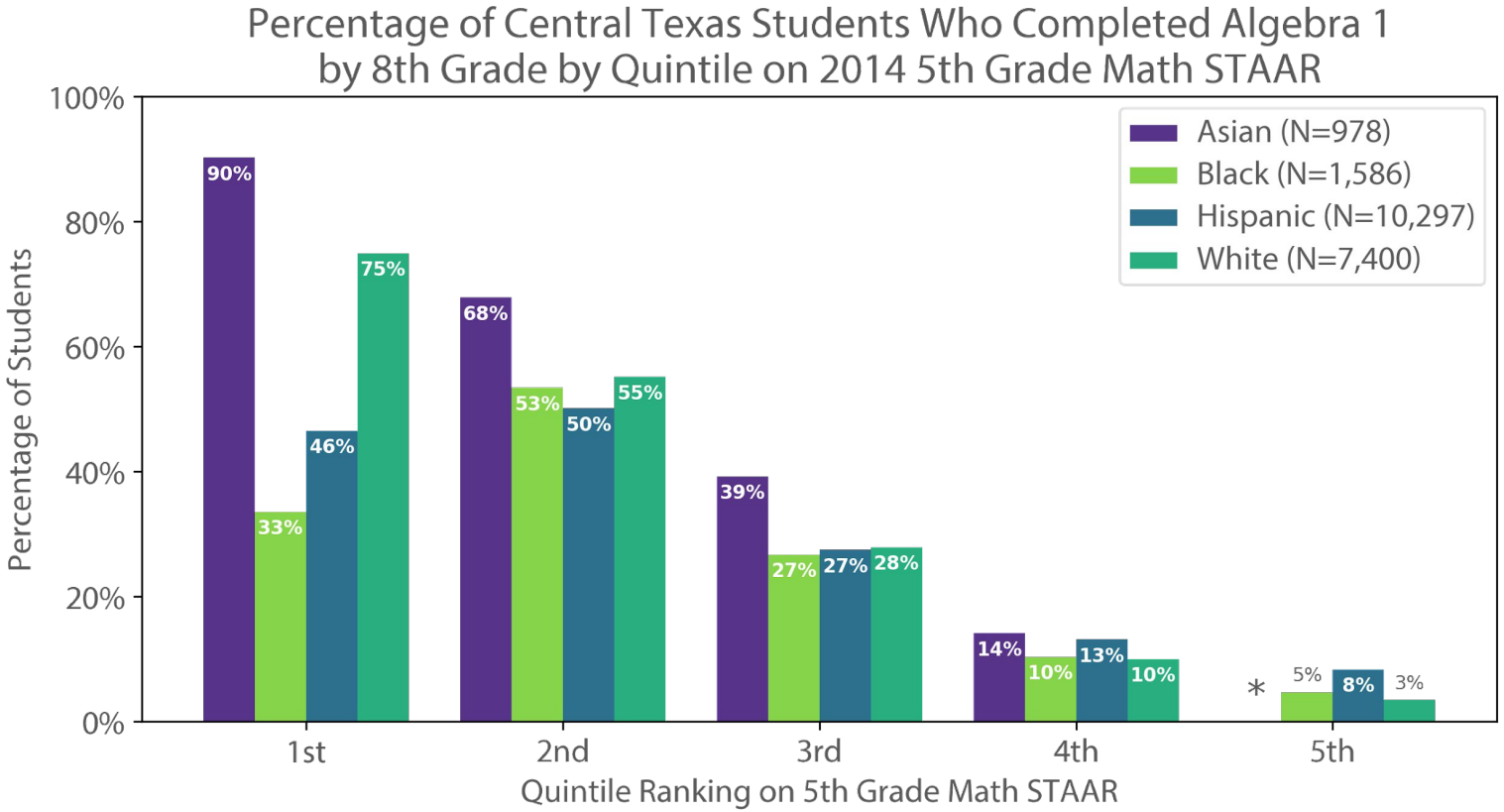
Algebra I enrollment by 8th grade **doubles** the odds of a student enrolling in CS in HS.

Factors Predicting CS Course Enrollment

Variable Name	Odds Ratio	Std. Err.	z	P>|z|
Algebra before HS	2.01	0.03	54.61	0.00
GT	1.77	0.03	38.17	0.00
Female	0.29	0.00	-100.92	0.00
Eco. Disadv.	0.88	0.01	-8.83	0.00
URM	0.64	0.01	-31.68	0.00
Rural	0.75	0.07	-2.91	0.00
LEP	0.77	0.02	-11.06	0.00
Immigrant	1.01	0.05	0.22	0.83
SPED	0.67	0.02	-15.06	0.00
Total CS courses	1.46	0.05	11.28	0.00
CS Program Length	1.05	0.02	2.19	0.03
Total Students	1.00	0.00	-11.32	0.00
Eco. Dis. Percentage	1.27	0.22	1.37	0.17
Advanced CS	1.10	0.12	0.92	0.36
Constant	0.04	0.01	-18.09	0.00

Torbey, R., Martin, N. D., Warner, J. R., & Fletcher, C. L. (2020). ***Algebra I Before High School as a Gatekeeper to Computer Science Participation.*** SIGCSE'20: Proceedings of the 51st ACM Technical Symposium on Computer Science Education, pp 839-844. Portland, OR, USA. https://doi.org/10.1145/3328778.3366877

Quintile Analysis – Baseline Central TX Cohort Shows Huge Gaps in Math Access

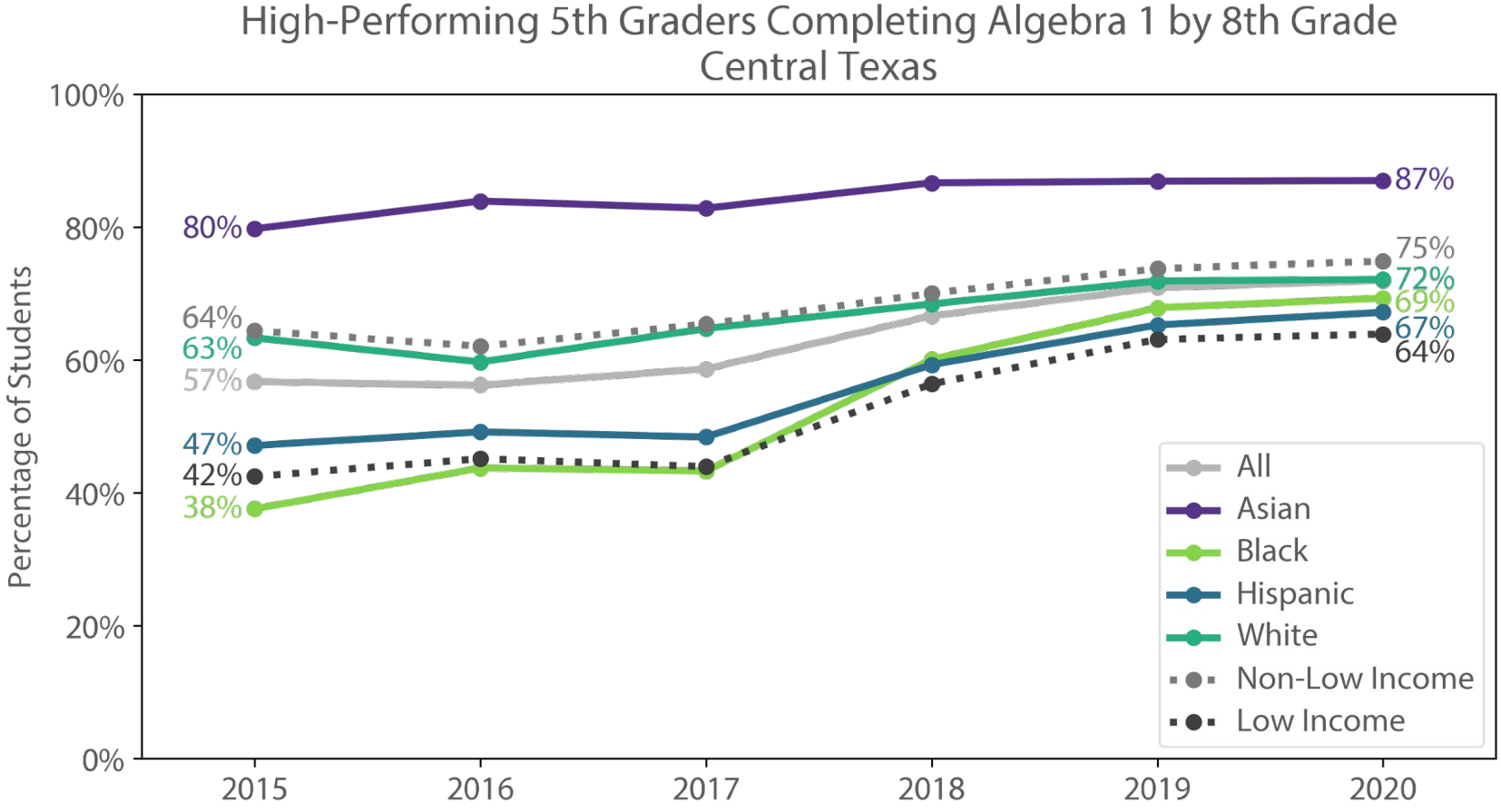


* Masked due to small cell size (fewer than 5 students had this outcome)

Source: E[3] Alliance analysis of PEIMS data at the UT Austin Education Research Center

Three Key Questions

- Who is most likely to be enrolled in Grade 8 Algebra in your school district?
- When do pathways to early Algebra get decided in your school district?
- Who decides if students are placed on an advanced math pathway in middle school in your district?


High-Performing 5th Graders Completing Algebra 1 by 8th Grade
Central Texas
Percentage of Students
100%
80%
60%
40%
20%
0%
2015
2016
2017
2018
2019
2020
80%
87%
64%
63%
57%
75%
72%
69%
67%
64%
47%
42%
38%
All
Asian
Black
Hispanic
White
Non-Low Income
Low Income

Takeaways

- Acceleration strategies reduce disparities in Grade 8 Algebra I completion for high performing students.
  - Closed gaps by race/ethnicity
  - Closed gaps by income
  - Increased Grade 8 Algebra enrollment for <u>all</u> sub-populations

E3 ALLIANCE
EDUCATION EQUALS ECONOMICS

https://e3alliance.org/2022/08/29/call-for-advanced-math-policy-during-texas-88th-legislature/

Implications for Educators

- Examine your data to look for root causes.
- Be brave - Look for structural factors.
- Use standardized test data as an accelerant and not just a gatekeeper.
- Change from an opt-in to a default or opt-out policy for all students in the top 2 quintiles for accelerated math.
- Don’t assume parents understand the importance of math pathways.

Sign Up for the EPIC Newsletter to Stay in the Loop!

Learn About CS-Related News and Events:

- Upcoming PD workshops and online courses
- Grant opportunities
- Policy Updates
- CS Conferences
- Award and Contest Opportunities
- Teaching Positions
- Funding for CS

http://bit.ly/EPIClist

Thank you!

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TACC.utexas.edu/EPIC

ECEPAlliance.org


@WeTeachCS @ECEP_CS

ANNOUNCEMENTS

- NCWIT is proud to introduce the 2023 cohort of National Award Winners and National Honorable Mentions for the Aspirations in Computing Award! We are grateful for everyone who took the time to apply and review this year, and look forward to recognizing these exceptional technologists at an award ceremony with Bank of America on March 11. https://www.aspirations.org/2023-national-aspirations-in-computing-award-recipients-announced

- Are you hosting an AspireIT/ Computing event? Request an AspireIT $500 Stipend Requests are on a first come first serve bases and close on June 15, 2023. Find out more here: https://www.aspirations.org/get-involved/aspireit-near-peer-computing-programs

- Volunteer to review #NCWITAiC23 Collegiate Award applications! Due March 13. Find out more here: https://www.aspirations.org/get-involved/volunteer-reviewers

ANNOUNCEMENTS

- Advising for Future Ready Careers, hosted by NCWIT Counselors for Computing (C4C) and supported by DoDSTEM, is a continuing monthly webinar series designed for school counselors. Each session has a topic related to creating inclusive pathways into computing careers. Next Webinar April 13th. https://ncwit.org/advising-for-future-ready-careers/

- Several positions open with NCWIT- Spread the word! https://ncwit.org/about-ncwit/jobs-with-ncwit/

- Have opportunities or announcements that you would like to share with the NCWIT K-12 community? Please send an email to k12@ncwit.org for

ANNOUNCEMENTS

Announcing CSK5 - The National Online Summit for K-5 Computer Science Education

Tech opportunities for women and girls are crucially accelerated when elementary schools instill tech and CS literacy in all students early. That is the goal of CS is Elementary (aka Family Code Night), and it's free, virtual **CSK5 Summit** for elementary educators, principals and advocates. NCWIT is pleased to be supporting CSK5, and to encourage our NCWIT community to attend and engage as noted below!

Attend CSK5: The Summit is a great learning experience for all elementary education leaders and advocates, featuring State Breakouts, a Solutions Showcase, and inspiring, yet practical school and district success stories. Free, online, and just two hours long, the Summit will be held from 12-2pm Eastern on March 30th. Register and learn more here!

THANK YOU FOR JOINING US!

Contact us at k12@ncwit.org

ncwit.org