Pennsylvania

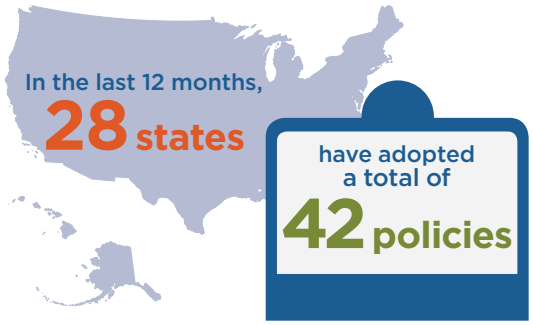
2020 State of Computer Science Education: Illuminating Disparities

Computer science education is more important than ever. The COVID-19 pandemic has highlighted our society's reliance on computing and its power to help businesses innovate and adapt, yet at the same time has surfaced greater disparities for students studying computer science. Computing is the number one source of all new wages in our economy, and there are currently 400,000 open computing jobs across the United States. Yet the U.S. education system does not provide widespread access to this critical subject.

Although access to computer science is key to addressing the equity issues in society, only 47% of our nation's high schools teach foundational computer science. In addition, students from marginalized racial and ethnic groups, students in Title I schools, and students from rural areas are less likely to attend a school that provides access to this critical subject.

States are working to broaden participation in computer science by passing policies to make computer science a fundamental part of the K–12 education system. In addition to adopting more policies, state education leaders extend and innovate on previously adopted policies: continuing to fund computer science education, supporting teachers and students, and providing leadership and guidance.

States that have adopted more of these nine policies have a larger percentage of high schools teaching computer science. States that have funded K–12 computer science professional learning have higher implementation rates than states that have not provided direct funding.



Pursuing an access agenda to K–12 computer science provides policymakers a rare opportunity to address equity, workforce, and education issues on a bipartisan basis. All nine policies can promote access to and equity within rigorous and engaging computer science courses when stakeholders make equity an explicit focus on policy development and implementation monitoring.

Nine Policies to Make Computer Science Fundamental

1. Create a state plan for K–12 computer science
2. Define computer science and establish K–12 CS standards
3. Allocate funding for CS teacher professional development
4. Implement clear certification pathways for computer science teachers
5. Create computer science preservice programs at IHEs
6. Establish dedicated state computer science positions
7. Require that all secondary schools offer computer science
8. Allow computer science to satisfy a core graduation requirement
9. Allow CS to satisfy admission requirements at IHEs

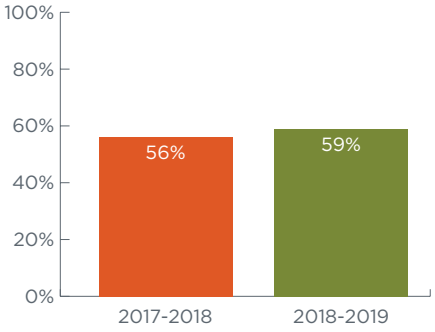
Pennsylvania Computer Science Policy

State Plan No	Pennsylvania has not yet created a state plan for K-12 computer science. A plan that articulates the goals for computer science, strategies for accomplishing the goals, and timelines for carrying out the strategies is important for making computer science a fundamental part of a state's education system.
Standards Yes	Pennsylvania endorsed the CSTA K–12 Computer Science Standards in 2018. Standards within each grade band address concepts of equity, such as bias, accessible technology, and inclusivity.
Funding Yes	Pennsylvania budgets (Act 1A for FY 2019, FY 2020, and the FY 2021 interim budget) each dedicated $20M annually to PAsmart, a program established to expand STEM and computer science education, including teacher professional development. As of August 2020, $5.705M of the FY 2020 funding was distributed in targeted grants to 163 local education agencies which had the fewest computer science offerings and had not yet received a grant. The balance of funds, intended for "Advancing Grants" to deepen STEM ecosystem work at the local and regional level, remains on hold due to the COVID-19 response. PAsmart grants prioritize proposals that boost participation in computer science education for historically underserved and underrepresented populations.
Certification No	Pennsylvania does not yet have clear certification pathways for computer science teachers. The expansion of K-12 computer science education is hampered by the lack of qualified computer science teachers. We can grow their ranks by creating clear, navigable, and rewarding professional paths for computer science teachers.
Preservice Yes	The Pennsylvania Department of Education developed specific program guidelines for state approval of professional educator programs in computer science and lists these programs publicly.
CS Supervisor Yes	The Pennsylvania Department of Education has a Consultant to the Secretary of Education on STEM/ Computer Science.
All HS Offer No	Pennsylvania does not yet require that all secondary schools offer computer science. The state can support the expansion of computer science courses by adopting policies that require schools to offer a computer science course based on rigorous standards, with appropriate implementation timelines and allowing for remote and/or in-person courses.
Grad Credit Yes	In Pennsylvania, any computer science course aligned with the computer science standards can count as a mathematics or science credit for graduation.
IHE Admission No	Pennsylvania does not yet allow computer science to count as a core admission requirement at institutions of higher education. Admission policies that do not include rigorous computer science courses as meeting a core entrance requirement, such as in mathematics or science, discourage students from taking such courses in secondary education. State leaders can work with institutions of higher education to ensure credit and articulation policies align with secondary school graduation requirements.

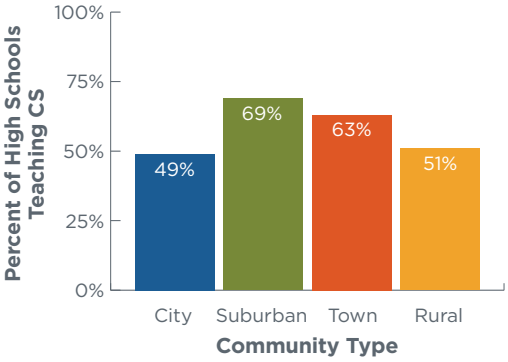
Pennsylvania has CSTA chapters and Governor Tom Wolf is a member of the Governors' Partnership for K–12 Computer Science.

Computer Science Access and Participation in Pennsylvania

High Schools Teaching CS



Percent of High Schools Teaching CS by Community Type

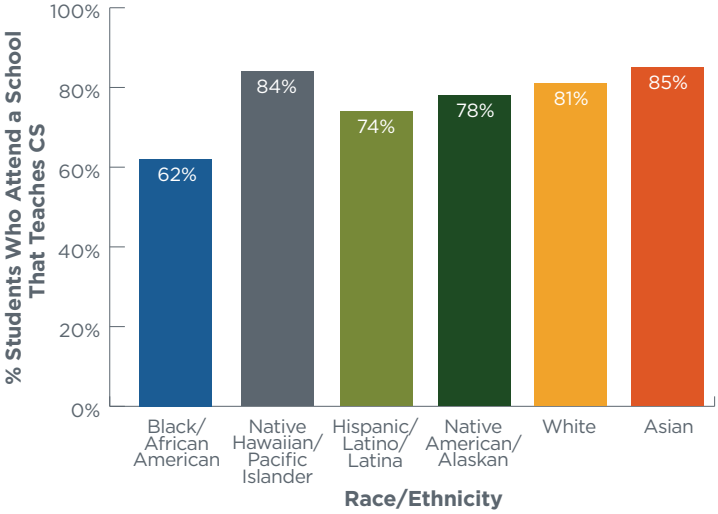


Pennsylvania has averaged **19,899** open computing jobs each month*

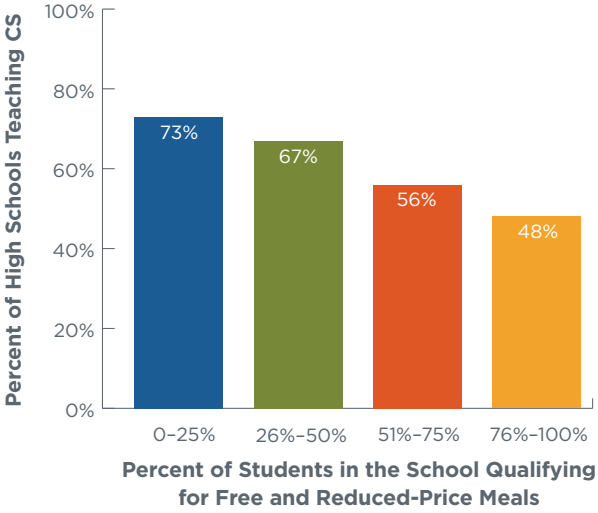
4,036 Bachelor's degrees in 2018 in Pennsylvania*

*Sources: The Conference Board and the National Center for Education Statistics

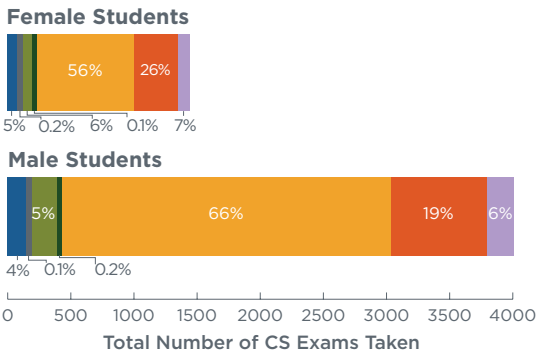
Race/Ethnicity and Access to Computer Science



Income Level and Access to CS



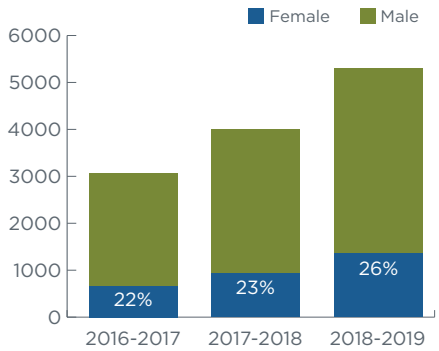
AP CS Participation by Race/Ethnicity and Gender



LEGEND

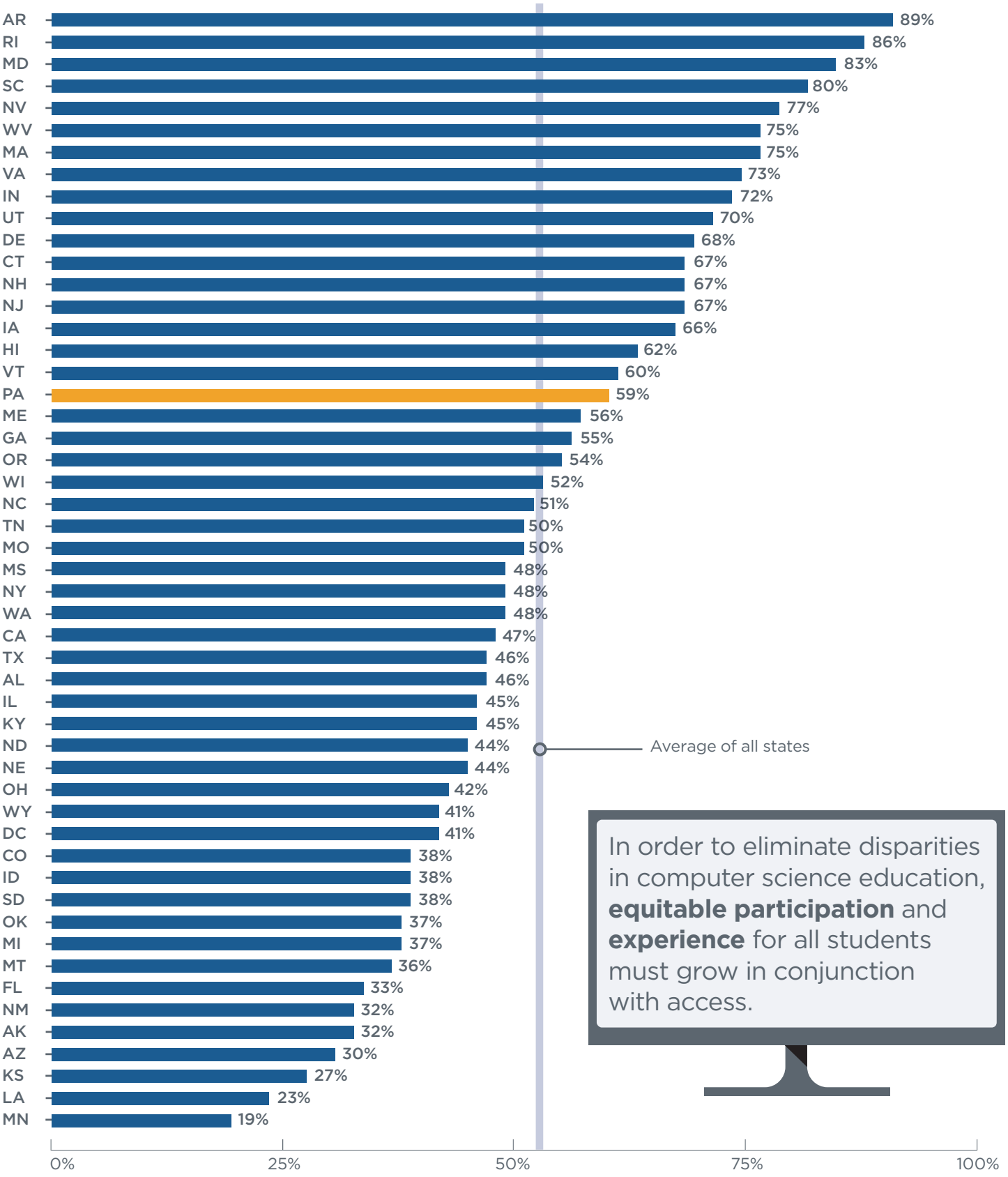
- Black/African American
- Native Hawaiian/Pacific Islander
- Hispanic/Latino/Latina
- Native American/Alaskan
- White
- Asian
- 2+ Races/Other

AP CS Student Participation



Hispanic/Latino/Latina students are 2.5 times less likely and Black/African American students are 3.6 times less likely than their white and Asian peers to take an AP CS exam when they attend a school that offers it.

Percent of High Schools Teaching Computer Science by State



In order to eliminate disparities in computer science education, **equitable participation** and **experience** for all students must grow in conjunction with access.

For more details on policy, access, and participation, see the full 2020 State of Computer Science Education report at advocacy.code.org/stateofcs

Advocacy Coalition

ECEP Expanding Computing Education Pathways

CSTA