



Colorado

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

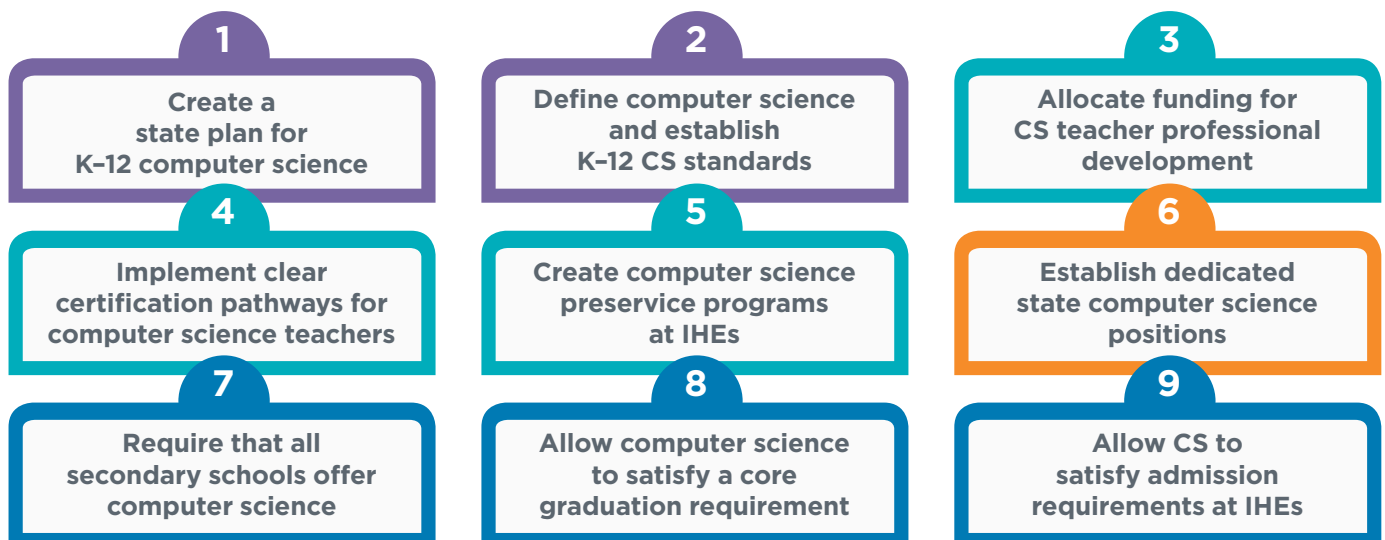
computer science education, supporting teachers and students, and providing leadership and guidance.

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





Colorado Computer Science Policy

State Plan

No

Colorado 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

No

Although Colorado does not yet have a discrete set of rigorous computer science standards across K-12, the state adopted high school computer science standards in 2018. The state could strengthen its computer science programs by publicly adopting discrete standards for computer science focused on both the creation and use of software and computing technologies at all levels of K-12 education. These standards can be guided by the concepts, practices, and recommendations in the K-12 Computer Science Framework, found at <http://www.k12cs.org>.

Funding

Yes

HB 20-1360 (FY 2021) and SB 19-207 (FY 2020) appropriated \$801,657 and \$1,048,600 for Computer Science Education Grants for Teachers, which give priority to applications serving rural areas, areas with high numbers of students eligible for free and reduced-price meals, or areas with high numbers of students from underrepresented racial and ethnic groups. HB 18-1322 (FY 2019) allocated \$500K for K-5 teacher professional development. SB 17-296 (FY 2018 and 2019) allocated up to \$500K annually for teachers pursuing postsecondary computer science education. HB 16-1289 (FY 2017) offered schools \$1K for each student enrolled in AP computer science. Due to COVID-19 related budget cuts, the state reduced funding for FY 2021 from planned allocations (\$250K annually for FY 2021, 2022, and 2023 in HB 19-1277).

Certification

No

Colorado 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

No

Colorado has not yet established programs at institutions of higher education to offer computer science to preservice teachers. The computer science teacher shortage can be addressed by exposing more preservice teachers to computer science during their required coursework or by creating specific pathways for computer science teachers.

CS Supervisor

Yes

The Colorado Department of Education has a Computer Science Content Specialist.

All HS Offer

No

Colorado 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

District Decision

Colorado passed a permissive and encouraging policy to allow computer science to count as either a mathematics or science credit for graduation, but it is a district decision.

IHE Admission

Yes

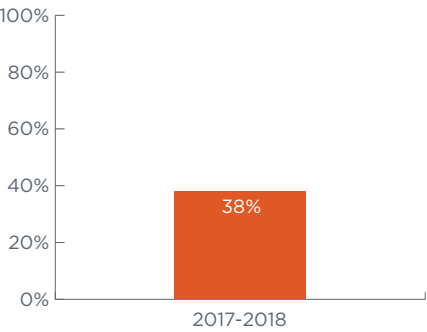
A computer science course with a mathematics prerequisite can count as a mathematics credit required for admission at institutions of higher education in Colorado.

Colorado has a CSTA chapter.

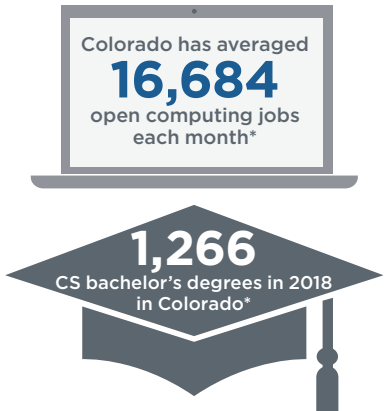
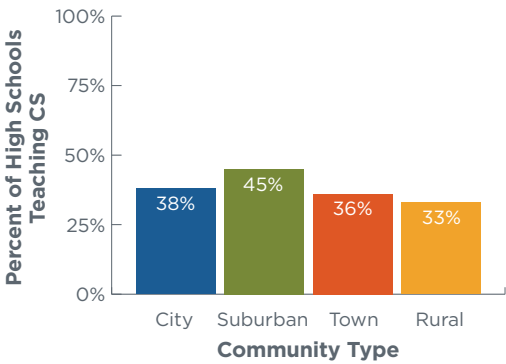


Computer Science Access and Participation in Colorado

High Schools Teaching CS

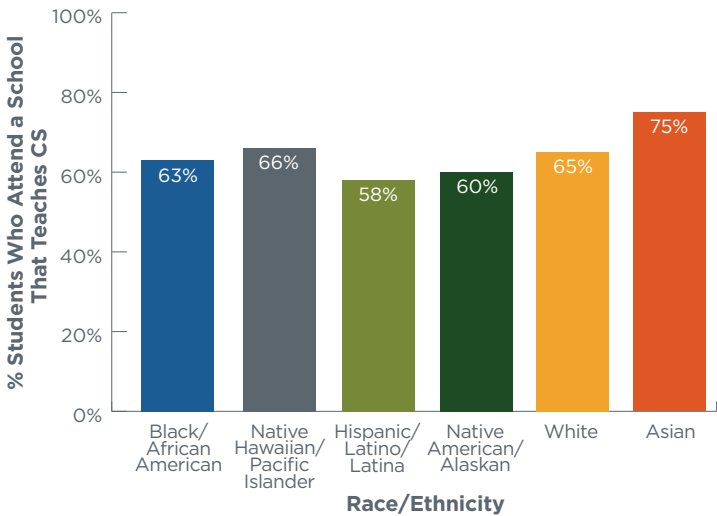


Percent of High Schools Teaching CS by Community Type

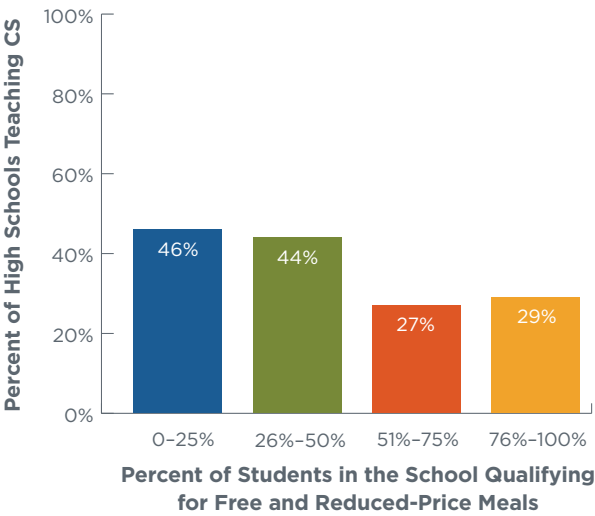


* Sources: The Conference Board and the National Center for Education Statistics

Race/Ethnicity and Access to Computer Science

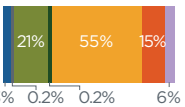


Income Level and Access to CS

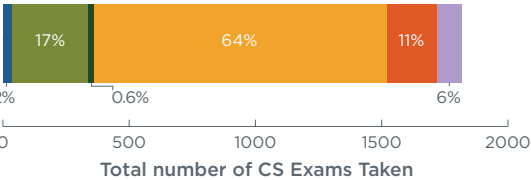


AP CS Participation by Race/Ethnicity and Gender

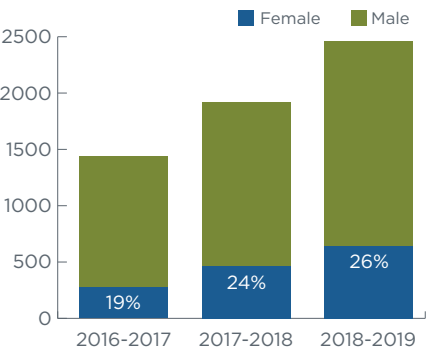
Female Students



Male Students



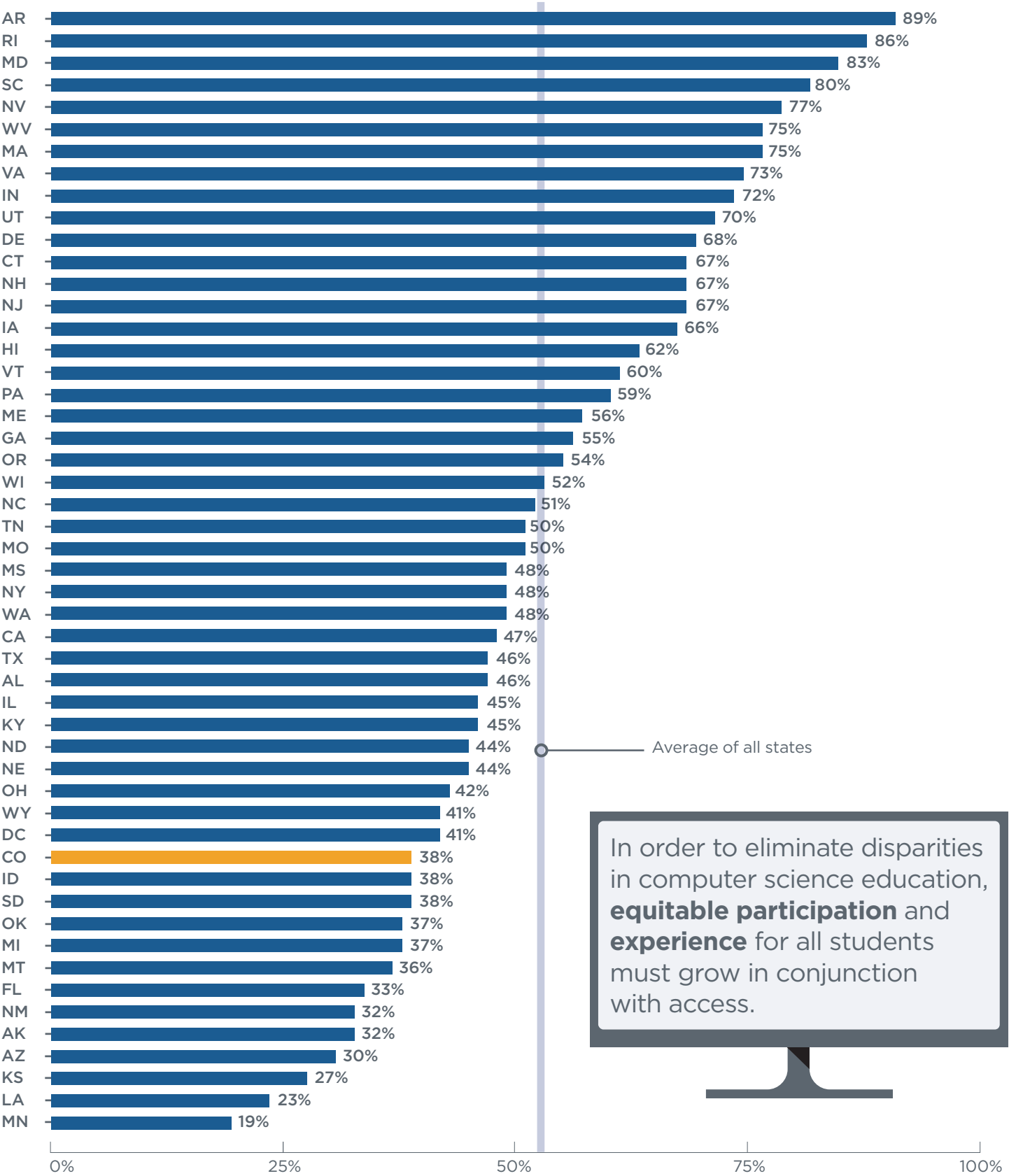
AP CS Student Participation



Hispanic/Latino/Latina students are 1.5 times less likely than their white and Asian peers to attend a school that offers AP CS, and 1.5 times less likely to take an AP CS exam when they attend a school that offers it. Black/African American students are 2.3 times less likely and Native American/Alaskan students are 1.7 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