Massachusetts

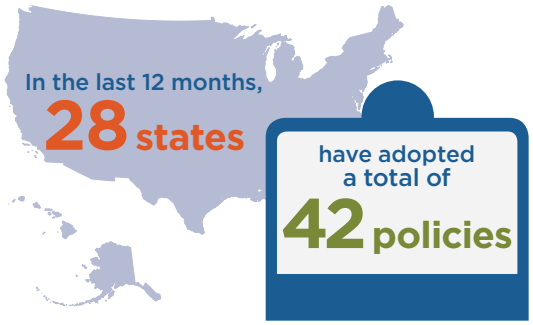
2020 State of Computer Science Education: Illuminating Disparities

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

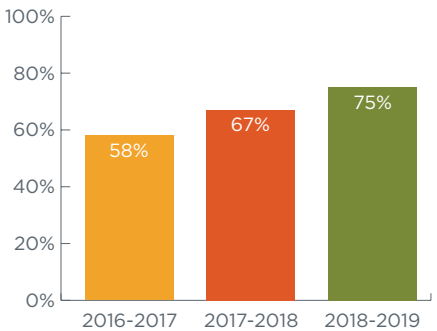
1. Create a state plan for K–12 computer science
2. Define computer science and establish K–12 CS standards
3. Allocate funding for CS teacher professional development
4. Implement clear certification pathways for computer science teachers
5. Create computer science preservice programs at IHEs
6. Establish 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

Massachusetts Computer Science Policy

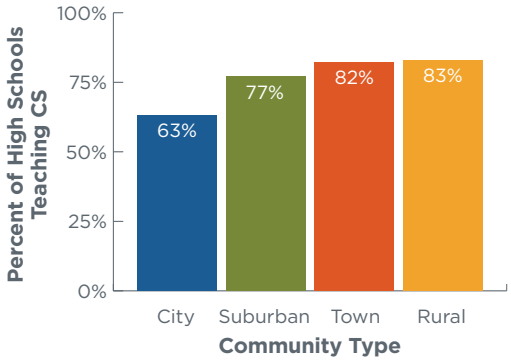
State Plan In Progress	Massachusetts is in the process of creating a plan for K–12 computer science, as required by the FY 2020 state budget. A plan that articulates the goals for computer science, strategies for accomplishing the goals, and timelines for carrying out the strategies is important for making computer science a fundamental part of a state's education system.
Standards Yes	Massachusetts adopted K–12 digital literacy and computer science standards in 2016.
Funding Yes	H4000 (FY 2020) allocated $1M for the implementation of engaging and rigorous Digital Learning Computer Science education; $590K went to the Digital Literacy Now grant program for school district teams to develop digital literacy and computer science state plans and complete professional development. The grant program prioritizes underserved students, including economically disadvantaged students, English language learners, students receiving special education services, students from marginalized racial and ethnic groups, and students in rural areas. H4800 (FY 2019) and H3650 (FY 2016) allocated $850K and $1.7M for professional development and implementation support and required a one-to-one private match.
Certification Yes	In Massachusetts, teachers with or without existing licensure can obtain a 5–12 certification by demonstrating competency in each of the computer science standards through a combination of academic coursework, professional development, mentorship experience, teaching experience, passing the Pearson and/or Praxis CS exam, and/or by completing an approved teacher preparation program.
Preservice Yes	The Massachusetts Department of Elementary and Secondary Education has approved teacher preparation programs leading to certification in computer science and lists these programs publicly.
CS Supervisor Yes	The Massachusetts Department of Elementary and Secondary Education has a Computer Science Content Coordinator.
All HS Offer No	Massachusetts 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 Massachusetts, computer science course can substitute for either a mathematics or laboratory science course if the course includes rigorous mathematical or scientific concepts and aligns with the state computer science standards. Students in technical and vocational programs may substitute a computer science course for a foreign language.
IHE Admission Yes	In Massachusetts, a computer science course can count as a mathematics, science, or foreign language credit required for admission at institutions of higher education if the course meets certain criteria.

Massachusetts is a member of the ECEP Alliance and has CSTA chapters.

High Schools Teaching CS



Percent of High Schools Teaching CS by Community Type



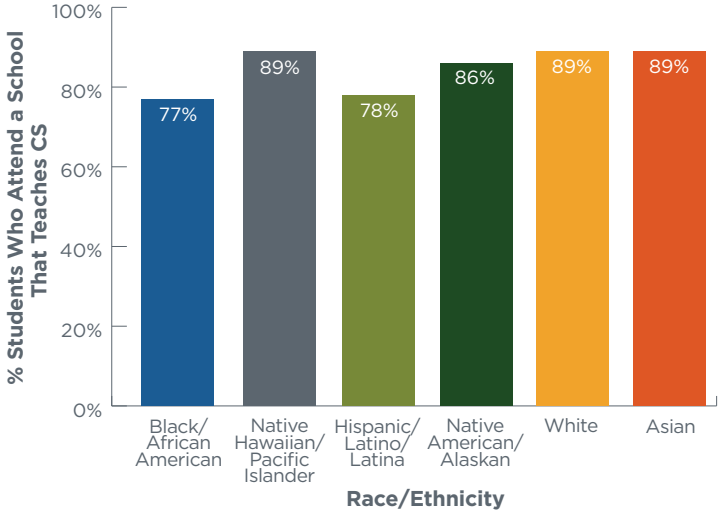
Massachusetts has averaged **19,591** open computing jobs each month*

2,908 CS bachelor's degrees in 2018 in Massachusetts*

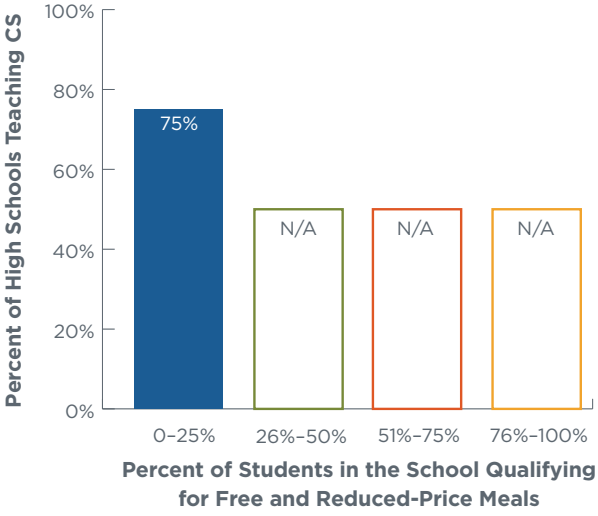
*Sources: The Conference Board and the National Center for Education Statistics

Computer Science Access and Participation in Massachusetts

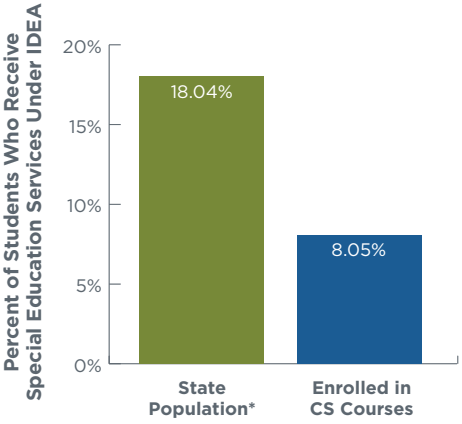
Race/Ethnicity and Access to Computer Science



Income Level and Access to CS

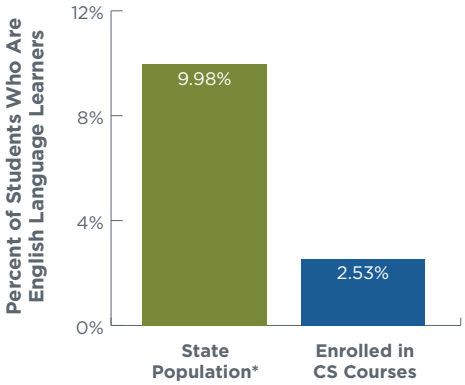


Students with Disabilities and Participation in CS



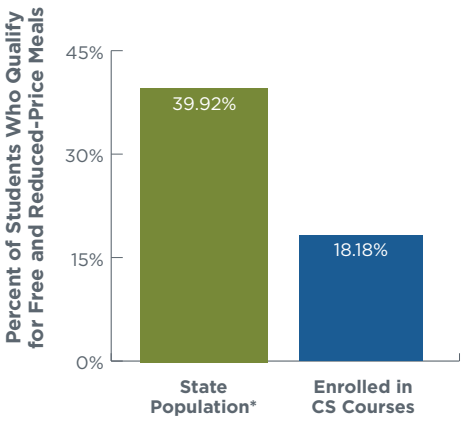
* U.S. Department of Education, Digest of Education Statistics Table 204.70, 2017–2018

English Language Learners and Participation in CS



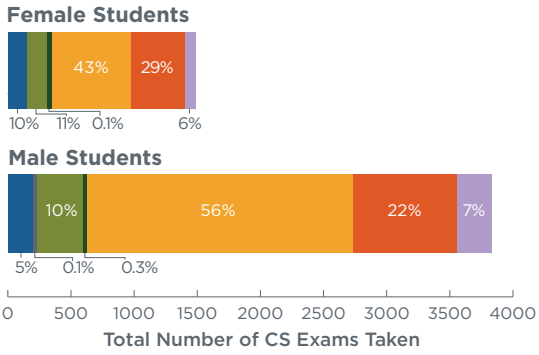
* U.S. Department of Education, Digest of Education Statistics Table 204.20, fall 2017

Economically Disadvantaged Students and Participation in CS

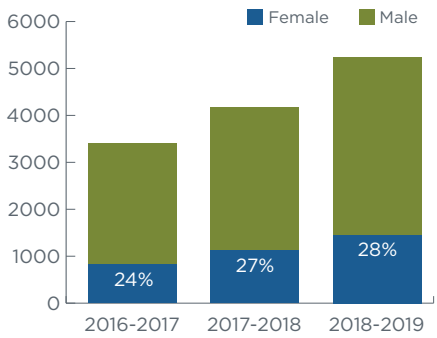


* U.S. Department of Education, Digest of Education Statistics Table 204.10, 2016–2017

AP CS Participation by Race/Ethnicity and Gender

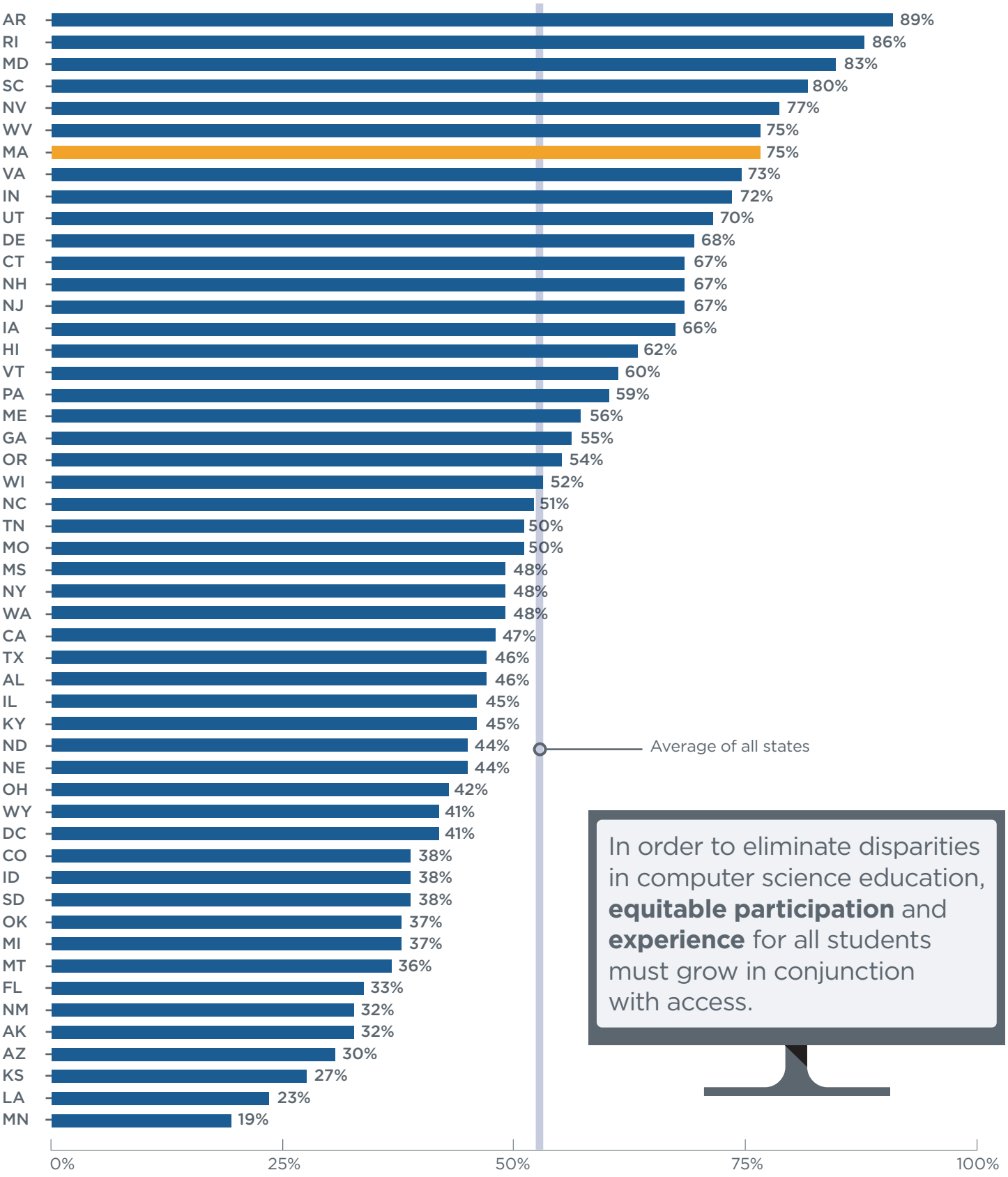


AP CS Student Participation



Hispanic/Latino/Latina students are 1.7 times less likely and Black/African American students are 1.5 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