

Computer Science and Our Economic Imperative

Why computer science?

Computing is a fundamental part of daily life, commerce, and just about every occupation in today's economy. Technology is changing the economy even more than globalization, and to meet the demands of the 21st century workforce, every student must have access to K-12 computer science (CS).

Why now?

Tech plays an indispensable role in the response to COVID-19; from developing new pharmaceuticals and manufacturing medical equipment, to telehealth, the past few months have highlighted the critical need for a workforce trained in computer science. **But today, most schools still do not offer computer science courses.**

Learning computer science within K-12 education is not a frill, not a luxury, and not an “add-on.” It is essential to our national emergency response framework, a requirement for mitigating and responding to future similar events, and a key part of our workforce.

Computer science is more important than ever

COVID-19 has affected not only our economy but the future of work. This decade, computing occupations have become the single largest source of new wages in the U.S., with open jobs growing twice as fast as all other jobs. Even as uncertainty around our nation's economy persists, the market for computing opportunities remains competitive with more than 400,000 open jobs.

Technology is changing the nature of work

Openings for software jobs are outpacing production jobs, and in the auto industry, software developers are in higher demand than mechanical engineers. As companies and schools prepare for extended work from home, jobs that allow flexibility in location are critical. Often the solution to fill these openings is to import talent from across the globe; the majority of high-skilled immigration is for computer science occupations.

There are still significant disparities in access to courses

Even when more students have access to computer science than ever in history, most students are denied opportunities to learn. Schools in rural communities and with higher percentages of disadvantaged students are less likely to teach computer science. Students from underrepresented racial and ethnic groups are less likely to attend schools that teach computer science. Further, the transition to online learning during the COVID-19 pandemic has magnified inequities in broadband and device access, increasing the “digital divide” for students from underrepresented groups.



Over
90%
of computing jobs
are outside of
Silicon Valley

In 2019, only

45%

of high schools in the U.S.
taught computer science

Female students made up

29%

of AP computer science exam
takers in 2019

And Black or African American
students made up just

6%

of all AP CS exam takers

The state of computer science education

Computer science within the U.S. K–12 education system is still relatively new, and access is limited, but we are moving in the right direction.

In 2017, the advancement of computer science celebrated a major milestone. More than 50,000 students took a new Advanced Placement (AP) computer science course, the largest launch for any AP course ever. More than 29,700 female students took an AP computer science exam in 2017—a 135% increase over 2016. Participation by Black and Latino students increased by 170% over 2016, to more than 22,000 exams. Even with these gains, significant work remains. Today, female students still only make up 29% of AP computer science exam takers, and students from marginalized racial and ethnic groups historically underrepresented in computer science only make up 22%.

State leaders are addressing the opportunity and equity gap that exists by implementing policy measures. In 2019 alone, 45 states passed or adopted more than 90 state policies that specifically support K–12 computer science education.

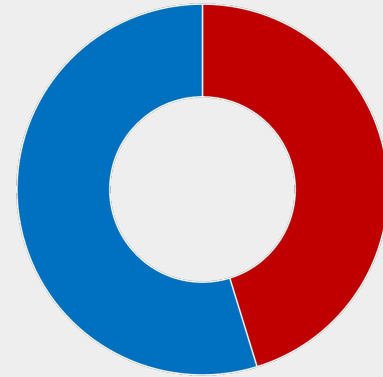
State policy changes for K–12 computer science

The Code.org Advocacy Coalition—a partnership of more than 75 industry, nonprofit, and advocacy organizations dedicated to expanding access to computer science education—works with state and federal leaders to make computer science a fundamental part of K–12. Today, all 50 states and DC have passed one or more of the policy priorities.

Federal support of K–12 computer science

In 2019, the Department of Education made a meaningful policy change by creating a competitive priority for K–12 computer science within the major Education, Innovation and Research (EIR) program. This was a significant step forward, and the first time the U.S. Department of Education focused on K–12 computer science. However, this policy change could sunset at any time. We need to find an ongoing federal policy solution for expanding K–12 computer science.

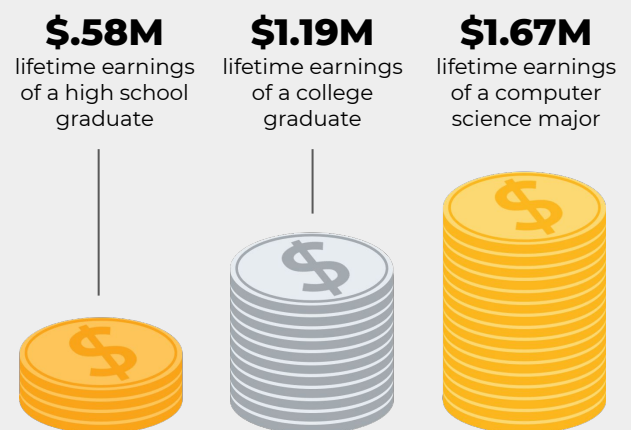
Red states and blue states have the **same opportunities** for computing jobs.



219,518 open jobs in blue states,
181,424 open jobs in red states - June 2020

For example, in Michigan, there are **7,404 open computing jobs with a median salary of \$82,386** — compared with a median salary of \$40,279 for open production jobs.

A computer science major can earn **40% more** than the college average.



Access to K–12 computer science is a fundamental problem our education system faces. This problem is solvable.

The most effective solution: prepare existing teachers to teach computer science and ensure all students can learn online.

Provide federal funding for K–12 schools to teach computer science

Every school should teach computer science, and an investment of \$250 million specifically to retrain part of the existing teaching workforce (rather than hiring new computer science teachers) will make this possible. Keeping costs focused on high-quality professional learning for current in-service teachers keeps costs minimal while allowing for quick scaling.

A \$250 million investment could reach over 32,000 teachers and more than 3.2 million students per year—and 15.8 million students over five years—who currently don't have access to a class.

Provide \$4 billion in federal funding for student home internet connectivity

Between 15 and 16 million students and 400,000 educators do not have access to the technology they need to learn or teach from home during this pandemic. While we are all working toward safely reopening schools, it's abundantly clear that most students will need to be online for at least part of the coming school year. Without specific, targeted funds to help students who do not have Internet access at home or devices, we will be locking students out of the virtual classroom and denying a fundamental right to an education.

Resources

We provide policymakers and educators across the country with numerous resources to foster the expansion of K–12 computer science. These include:

- [The Annual State of Computer Science Report \(September 2019\)](#)
- [Facts and state-level data on computer science](#)
- [Ideas for policy reform at the state and local level](#)
- [Landscape of K–12 Computer Science Education in the U.S.](#)

All of the information shared in this document is public and widely available to help educators, parents, policymakers, and your team understand K–12 computer science issues.

About Code.org

Code.org is a nonpartisan, nonprofit 501(c)(3) dedicated to expanding access to computer science in K–12 education—especially for female students and underrepresented minority students. We were founded in 2013 and are known best for our annual Hour of Code, which encourages people all over the planet to spend just one hour learning a few fundamentals of coding. The event reaches tens of millions in over 180 countries each year. Code.org also creates open-sourced courses for students and adults and offers professional development to prepare teachers to teach computer science at all grade levels.

