We have to change policy to change the face of tech.”

- Reshma Saujani, founder and CEO of Girls Who Code
Executive Summary
The State of Girls' Participation in Computer Science
Key Findings
The Impact of Policies by State
What is a Gender-Specific Approach?
Our Recommendations
Our Advocacy Work
Women in Tech Lesson Plans
In Conclusion
Research Methodologies
Get in Touch
In recent years, policymakers across the country have been hard at work passing legislation to increase access to computer science (CS) education at the K-12 level. And with good reason.

Computing jobs are among the fastest-growing in the U.S. economy. These jobs pay more than double the average U.S. salary. And in the coming years, they will be key drivers of national economic growth and mobility.

As a result, policies that aim to increase access to CS education have proven popular on both sides of the political aisle, with 33 states passing such legislation in just five short years.¹

At the heart of these policies is the hope that more CS classrooms will translate into more girls in CS and—eventually—an end to the gender gap in tech.

As an organization dedicated to building a more equitable tech industry, we've kept a close eye on this wave of legislation. Now, with two years of policy implementation underway and a significant number of states reporting data, we can begin recording and evaluating impact.

This report is the first-ever evaluation of whether policies that increase access to CS at the K-12 level actually change the gender makeup of American classrooms.

According to states’ own data from the last two years, states with policies aimed at increasing the volume of CS classrooms have not seen increased participation by girls. Boys still make up the overwhelming majority of students in CS classrooms.

Data does, however, offer insight into the kind of legislation that could make a tangible impact on the gender gap in tech. Numbers indicate a positive relationship between states with Girls Who Code (GWC) programming and the rate of girls’ participation in CS—making a strong case for gender-specific approaches.

This report is also a testament to the importance of tracking and reporting classroom participation data. Access policies are a relatively new trend, and we believe it’s critical to start capturing data early on to understand whether policies are unintentionally perpetuating or exacerbating the gender gap in tech. To that end, this report will be the first in a series of annual analyses to come.

¹ Girls Who Code qualifies policies designed to increase access to computer science as those that fall within at least one of three categories: Computer Science Standards, Funding, or High School Computer Science Offering.
THE STATE OF GIRLS’ PARTICIPATION IN COMPUTER SCIENCE
2017-2018

No data available: Alabama, Alaska, Arizona, Colorado, Delaware, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, New Hampshire, Oklahoma, Rhode Island, South Dakota, South Dakota, Vermont, Virginia, Wyoming

States with >40% participation: Connecticut (41.3), Massachusetts (41.4), Hawaii (41.4), Georgia (42.3), Kansas (42.3), Louisiana (45.0), New Jersey (45.2), New York (45.3)

States with <40% participation by girls: Wisconsin (30.3), Pennsylvania (30.8), Idaho (30.8), Oregon (31.9), North Carolina (32.1), Nebraska (33.5), Utah (33.7), Indiana (36.1), Maryland (36.2), California (36.4), North Dakota (38.4), Mississippi (38.5), West Virginia (38.7), New Mexico (39.7), Nevada (42.7), Tennessee (42.9), Washington (43.2), Texas (47.3), Arkansas (48.3), Iowa (49.3)

I’m one of four girls in a class of 22 with a male teacher. While I respect my teacher and definitely respect my peers, I miss the connection that I had at GWC, where it was so easy to ask and improve in place where there wasn’t any pressure to outperform the boys, or just prove my worth.”

- Hannah Schneider, Girls Who Code alumni

GIRLS’ PARTICIPATION RATE IN K-12 CS IN 2017-18
Nationally, participation by girls in computer science courses in grades K-12 averaged 37.5% of all students.

GIRLS IN HISTORICALLY UNDERREPRESENTED GROUPS (HUGS) PARTICIPATION RATE IN K-12 CS IN 2017-18
Nationally, participation by girls from HUGS in computer science courses in grades K-12 averaged 15.5% of all students.

For 31 States with Available Data
For 31 States with Available Data, only seven (7) provided gender by race breakdown. Black/Latina student data combined - may be duplicated.
In the states with policies to increase access to CS, average participation for girls in K-12 did not increase from 2016-17 to 2017-18. Interestingly, neither did participation overall. Moreover, there was no meaningful difference in terms of participation between the states with policies in place to increase participation in CS, and the states without policies in place to increase access to CS.

In the eleven (11) states that had CS Standards in place during the 2017-18 school year and tracked data on girls’ participation, girls’ participation declined by .38 percent. The rate of girls’ participation in Arkansas declined by 4.14 percent. In the six (6) states that allocated funding for CS in the 2017-18 school year, and tracked data on girls’ participation, girls’ participation declined by .58 percent. The only state where the rate of girls’ participation increased was Utah, with an increase of 3.4 percent.

We determined that there is a relationship between the presence of Girls Who Code and the rate of girls’ participation in K-12 CS at the state level. In states with more girls served by Girls Who Code, CS classrooms were closer to parity. In states with lower concentrations of girls served by GWC, K-12 CS classrooms were further from parity.

KEY FINDINGS

In the three (3) states that had a policy in place requiring high schools to offer CS for the 2017-18 school year, and tracked data on girls’ participation, girls’ participation declined by .84 percent.

A Bivariate Pearson Correlation found that, within states, GWC participation and girls’ CS course participation have a statistically significant linear relationship (p < .05). The direction of the relationship is positive, meaning that these variables tend to increase together (i.e., greater GWC participation is associated with greater CS course participation among girls). The magnitude, or strength, of the association is approximately moderate (r = .4).
The data shows that existing policies to bring more girls into computer science aren’t just missing the mark, they may actually be doing more harm than good.”

- Dr. Tarika Barrett, COO of Girls Who Code

THE IMPACT OF POLICIES BY STATE

This chart depicts the change in girls’ participation rates (from school years 2016-17 to 2017-18) in states with access policies in place and that tracked data. According to the data, policies have little impact, and in some cases negative impact, on the rate of girls’ participation in K-12 CS.

Importantly though, these states are the few that track diversity in K-12 computer science classrooms. As a result, we can measure the impact of access policies and consider how to correct course where necessary. Too many states do not track such data, making it impossible to understand the impact of access policies. Moreover, a vast majority of states do not make this data publicly available—a standard that makes the process of gathering important data incredibly tedious. From our research with Accenture\(^{13}\), we know that 70 percent of the growth in the computing pipeline could come from changing the path of the youngest girls. It’s critical that we understand whether existing policies work, to correct course and guarantee we reach girls at their critical point in the pipeline.

\(^{13}\)Accenture and Girls Who Code (2016). Cracking the Gender Code
Before being a part of GWC, I honestly felt alone in the tech community in and out of school. At times it would feel like I didn’t belong in this type of industry because there just wasn’t as many females to make it feel normal.”

- Uriyah Ruiz, Girls Who Code alumni

WHAT IS A GENDER-SPECIFIC APPROACH?

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At Girls Who Code, our gender-specific approaches include providing girls with safe, girls-only spaces, and centering curricula on women in tech so that girls can imagine themselves in computing roles.

For policymakers, a gender-specific approach involves creating policies that are designed specifically to bring girls into CS—by, for example, funding gender inclusion training for teachers.
In order to make real progress on the issue, lawmakers must implement policies designed specifically to increase participation by girls.

To that end, Girls Who Code released a Policy Agenda with recommendations for lawmakers designed specifically to attract K-12th-grade girls to CS and retain them in the field all along the pipeline. Those policy recommendations include:

**OUR RECOMMENDATIONS**

- **Track and Report Data on Computer Science Participation**
  We cannot manage what we cannot measure. We need a clear understanding of the extent of the gender gap in tech in order to devise targeted solutions.

- **Increase Exposure To Women And Other Underrepresented Minorities In Tech**
  You cannot be what you cannot see. In order to drive and maintain girls’ interest in CS we must provide them with female role models.

- **Fund Gender Inclusion Training Within Professional Development**
  We must equip teachers with the tools they need to understand—and correct for—how gender biases impact learning.

- **Expand Computer Science Courses to all Middle Schools, Not Just High Schools**
  Nearly 70 percent of the growth in the computing pipeline would come from changing the path of the youngest girls—especially those in middle school.

Girls Who Code created a space for me in a field that, all my life, was male dominated. It’s important to understand the severity of the gender gap is in our classrooms, so that we can take the first steps to fix it and bring more girls into the field.”

- Brenna Nieva, Girls Who Code alumni
Girls Who Code is actively working with state governments to pass legislation that aligns with our Policy Agenda.

JUNE 2018
GWC releases Policy Agenda with recommendations designed specifically to attract girls to, and retain them in, CS

JULY 2018
GWC launches Women in Tech Lesson Plans, the organization’s first free in-school resource to promote women’s representation in technology

SEPTEMBER 2018
Pennsylvania becomes the first state to promote GWC Women in Tech Lesson Plans, followed by Vermont, Virginia, and Maryland

DECEMBER 2018
Newark, New Jersey introduces GWC Women in Tech Lesson Plans to all middle schools, opens GWC Clubs for more than 3,000 girls

APRIL 2019
Washington State passes “Girls Who Code Bill” HB 1577 first-ever law requiring school districts to track and publicly report girls’ participation in CS

MAY 2019
Colorado passes HB 1277, designed to increase participation for underrepresented groups in STEM

Assuring we’re reaching all students requires us to have the data on who is engaged with computer science. It will make a difference for young girls and students of color.”

- Washington State Senator Lisa Z. Wellman, Chair, Early Learning & K-12 Education
Before the Girls Who Code lesson plans, girls in my classroom had few women in tech as a part of their curriculum to look up to. They really identify with these women. It’s going to be a game-changer.”

- Teacher, Illinois

WOMEN IN TECH LESSON PLANS

Girls Who Code offers free, downloadable lesson plans featuring historical and contemporary women pioneers in tech — specifically designed to make all students think differently about who can be successful in computing.
IN CONCLUSION

At Girls Who Code, we believe that closing the gender gap will take rooting out bias and discrimination still widespread at every stage in the pipeline. It will take building girls’ bravery and resilience, making them feel like they belong, and demonstrating that they can use tech to solve problems they care about.

At the center of this work is the need for thoughtful policies that take gender into account. The support of national, state, and local governments are a crucial part of efforts to making our classrooms more diverse.

To be sure these policies have their intended effect of making our CS classrooms more diverse, it is incumbent upon us to track, report, and evaluate participation data.

The problem of the gender gap in our classrooms—as in our workplaces—is a complicated one. But it is not an impossible problem to solve.

We can bring more girls into tech, and we can do more to support them at all points along the pipeline. Together, we can make sure that our girls have a part to play in defining the future of our economies, our communities, and our lives.
Computer Science:
The definition and breadth of what constitutes computer science is contested and evolving. For the purpose of this research, we based our definition of computer science on well-established CSTA standards, excluding courses that do not require computational thinking skills (such as desktop publishing, communication, and graphic design courses). We define CS as the study of computing concepts including but not limited to programming, robotics, web development, hardware and software, and more.

This report uses 2016-17 school year data as a baseline, and includes 2017-18 data to measure shifts. At this time, it was the earliest available data for the greatest number of states.

Data Request Specifications
For each data request, Girls Who Code requested data for CS course enrollment by:

- Gender
- Race/Ethnicity; including: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Multiracial, Other
- Gender by Race/Ethnicity
- Free and Reduced Lunch Eligibility

Where applicable, Girls Who Code supplied states with the specific course codes based on prior definition.

Each state was asked to include two datasets, as follows:

1. Statewide cumulative number of total unique students enrolled in computer science courses, by gender
2. Individual student enrollment per course by demographic subgroups, with students counting once in each total even if they were taking multiple courses

METHOD OF DATA COLLECTION
Girls Who Code obtained completed data reports from SDOE or State Departments of Public Instruction through:

1. Data Requests
2. Open Records Requests
3. Research Requests
4. FOIL Requests
5. Research Proposals
6. Informal Channels

The data requested varied based on what was available at each SDOE. When possible, Girls Who Code applied the computer science definition against the master course list or catalog to request the specific courses. If a standard course catalog was not available or made public, the SDOE was sent the Girls Who Code definition and standard of CS. Girls Who Code honored states’ definition of computer science if we were unable to send specific course codes, and trusted each state followed our definition.

Ultimately, states were categorized based on the data, responses, or lack thereof:

- Data is tracked, only at the high school level, but is not publicly available
- Data is available at district level and by individual courses, but is not publicly available
- Data is tracked and publicly available

Data received from each state varied based on the data available at each department as per tracking requirements and compliance standards. Data should be reviewed on a state by state basis, but limitations persisted around:

- Sample Size: available data varied from only prior-to-secondary or secondary data to all available data.
- Inconsistent Data:
  ◊ Compliance issues around data as each school or district reports to the state can lead to incomplete or inaccurate data with no checks.
  ◊ Standard course codes are a work in progress for many states; many states define any course that involves computers as computer science.

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14 CSTA Standards. https://www.csteachers.org/page/standards
As a part of our state-level work, Girls Who Code provides legislators with sample language to guide the policy drafting process. Some states — like Washington — have passed bills that reflect these recommendations almost word-for-word. We urge states to track computer science participation, and have prepared recommendations for any state interested in beginning the process. If you are interested in learning more and working together, please get in touch.

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