
Current Perspectives and Continuing Challenges in Computer Science Education in U.S. K-12 Schools

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Executive Summary

To ensure respondents correctly understood the definition of computer science, the term was defined for them at the beginning of each survey. Respondents were reminded of this definition throughout the course of the survey.

For this survey, “computer science” means the study of computers, including both hardware and software design, development and programming. This does NOT include just using or having access to a computer in general.

For the purposes of this study, computer science includes learning about or doing things like:

- *hardware and software design*
- *programming a computer*
- *writing and running computer code*
- *machine learning and artificial intelligence*

Computer science does not include:

- *simply using a computer, tablet or smartphone*
- *conducting online research*
- *creating documents or presentations on the computer*

This report presents findings from the third study in Gallup and Google’s multiyear, comprehensive research effort to better understand perceptions of computer science and access to computer science learning opportunities in K-12 schools in the U.S.

The results include interviews with more than 7,000 participants, including students in grades 7 through 12, parents and guardians of students in grades 7 through 12, teachers, principals and superintendents across the U.S. All surveys took place online from late January through early March 2020.

Five years ago, Gallup launched the first of a series of studies to track the growing interest in and commitment to providing opportunities for all students to learn computer science. Since then, digital technologies have continued to evolve and their growing impact underscores why all students should have opportunities to gain foundational skills in computer science. In fact, educators, parents and employers increasingly see access to these opportunities as a critical aspect of educational equity.

Computer science skills not only make it possible for students to engage, create and innovate in an increasingly technology-fueled society, they also prepare them for a quickly evolving job market, where computing occupations now make up about two-thirds of projected new jobs in STEM fields.¹ Further, the U.S. Bureau of Labor Statistics estimates that computer and information technology occupations will grow much faster than the average for all occupations over the next decade.²

The 2020 study provides a fresh look at the landscape of computer science education in the U.S., offering new insights into the current state of computer science education and highlighting themes that have persisted across the three studies.

Key Findings

Parents and guardians and K-12 educators continue to highly value computer science education—as was true in previous studies—and they continue to see computer science education as a key component of their children’s or students’ future success.

- Most parents and guardians in every demographic, including those in populations that are underrepresented in the field, say that computer science is important for their own child to learn.
- Strong majorities of Black parents and guardians (78%), white parents and guardians (68%) and Hispanic parents and guardians (67%) agree that learning computer science is very important or important, but Black parents and guardians are particularly likely to feel this way. A majority of Black parents and guardians (52%) believe it is “very important” for their child to learn computer science, compared with 37% of Hispanic parents and guardians and 32% of white parents and guardians.
- More than six in 10 parents and guardians (62%) say it is likely that their child will need to know computer science for her or his career someday. This is consistent with the findings in both the 2015 and 2016 Gallup and Google studies.³
- Teachers, principals and superintendents think that offering computer science courses is just as important to a student’s future as other required subjects. Consistent with the findings from the 2016 study, majorities of superintendents (75%), principals (73%) and public school teachers (66%) say offering computer science courses is just as important as offering core curricular subjects such as English, math, history and science.⁴

The current study continues to find disconnects between administrators and teachers on the priority of computer science education. Superintendents say priorities have shifted, with computer science education now getting top priority. Fewer teachers and principals think computer science is prioritized this highly.

- Nearly six in 10 superintendents (58%) strongly agree or agree that computer science is currently a top priority in their districts. In 2016, one-third of superintendents agreed computer science was a top priority. Just 28% of principals and 18% of public school teachers say computer science education gets top priority at their districts or schools.
- More superintendents (48%) than principals (40%) or public school teachers (29%) “strongly agree” or agree that teaching computer science has become a higher priority in the past three years in their districts or schools.
- One-third of public school teachers (32%) and about four in 10 principals (43%) agree that their school boards are committed to offering computer science in their schools. More than half (52%) of superintendents say this is the case. Agreement levels among superintendents and principals are slightly stronger relative to 2016.⁵

3 Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>.

4 Ibid.

5 Ibid.

Key Findings (continued)

Female students are particularly skeptical about the merits of computer science education and remain less likely to express interest than male students do in both learning computer science and in pursuing careers in the field.

- Boys are more likely than girls to express confidence and interest in learning computer science. Seventy-three percent of boys say they are confident they could learn computer science if they wanted to, compared with 60% of girls, a gender gap similar to the one observed in 2016.⁶
- About four in 10 students (38%) are at least somewhat interested in learning computer science, but interest is substantially less common among girls (25%) than boys (50%).
- Black (42%), Hispanic (41%) and white (36%) students are similarly likely to express interest.
- Nearly one in four students (23%) expects to pursue a job in computer science someday. Boys are nearly three times as likely as girls to have this expectation—33% vs. 12%, respectively.

Half of all students say there are classes where only computer science is taught at their school. Somewhat more white than Black and Hispanic students say their school has classes dedicated to computer science.

- Overall, half of students indicate there are classes in their schools where only computer science is taught, and thirty percent say there are no classes where only computer science is taught. More high school students (55%) than middle/jr. high school students (39%) say their schools have dedicated computer science classes. Fewer than half of Black and Hispanic students (46% each) and 52% of white students say their schools offer dedicated classes. Two in 10 students, overall, do not know whether their schools offer dedicated computer science classes, including 23% of Black and Hispanic students and 19% of white students. In 2016, fewer than half of Black students (47%) and about six in 10 white and Hispanic (58% and 59%, respectively) students said their schools had classes where only computer science is taught.⁷
- About half (53%) of all principals surveyed say there are classes where only computer science is taught in their school, including 21% of elementary, 64% of middle/jr. high school and 77% of high school principals.⁸

6 Google LLC & Gallup, Inc. (2016, March). Computer Science Learning: Closing the Gap: Girls. Accessed from <http://services.google.com/fh/files/misc/computer-science-learning-closing-the-gap-girls-brief.pdf>.

7 Google LLC & Gallup, Inc. (2016, February). Diversity Gaps in Computer Science: Exploring the Underrepresentation of Girls, Blacks and Hispanics (p. 30). Accessed from <http://services.google.com/fh/files/misc/diversity-gaps-in-computer-science-report.pdf>. Findings from 2016 reflect results from telephone interviews of students, while 2020 study results are from web surveys of students.

8 Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science Education in U.S. K-12 Schools (p. 30). Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>. Findings from 2016 show at least four in 10 secondary school principals had at least one computer science course at their school.

Key Findings (continued)

- Asked whether they have ever learned any computer science (using programming to create software, apps, games, websites or electronics), nearly seven in 10 students (68%) surveyed in 7th through 12th grade say they have. Somewhat fewer Black (65%) and Hispanic students (66%) than white students (70%) say they have ever learned computer science. High school and middle/jr. high school students (68%) are equally likely to say they have ever learned computer science.
- There is high confidence among students that they can learn computer science, with confidence being particularly high among Black students. Nearly three in four Black students (74%), 66% of white students and 63% of Hispanic students are very confident or confident they could learn computer science if they wanted to. High confidence among Black students was likewise reflected in findings from the 2016 study.⁹

Students are generally unconvinced that computer science is important for them to learn. This highlights a need for all stakeholders to provide students with more information about how computer science can help them meet their goals in a variety of fields and to specifically encourage girls to take computer science courses. Students who say they spend an hour or more a week learning computer science are not only more likely to see computer science as important for them to learn but more likely to believe their friends think it is important to learn as well. Additional research is needed to discern causality in the link between exposure to computer science learning and students' perception of importance.

- Girls are particularly skeptical that it is important for them to learn computer science, with just 31% of them saying it is important for them to learn, compared with 49% of boys.
- However, if girls and boys report that they spend at least an hour a week studying computer science at school, they are both more likely to say that learning computer science is important. The same is true for Black, Hispanic and white students.
- Similar percentages of Black (42%), Hispanic (39%) and white (39%) students think computer science is important for them to learn. However, Black students are more likely than white students to think it is important for all students to learn. Nearly half of Black students (48%), compared with 37% of Hispanic students and 32% of white students, say computer science is important for all students to learn.
- Students who go to school in rural areas are less likely than those in city schools to agree they would want to tell their friends if they were interested in computer science (58% vs. 70%, respectively).

9 Google LLC & Gallup, Inc. (2016). Computer Science Learning: Closing the Gap: Black Students. Accessed from <http://services.google.com/fh/files/misc/computer-science-learning-closing-the-gap-black-brief.pdf>.

Introduction

The Changing Landscape of Computer Science Education

The Current Perspectives and Continuing Challenges in Computer Science Education in U.S. K-12 Schools report offers a snapshot of the state of computer science education in the U.S. in 2020.

This report is the third in a research series about computer science in K-12 schools conducted by Gallup and supported by Google. The purpose of these studies is to:

- explore perceptions and understanding of computer science
- examine data on access and availability of computer science education for all students in U.S. schools
- gauge the extent to which students, parents and guardians, and educators value and prioritize computer science learning and careers

Building upon the 2015 and 2016 studies, this research provides a current picture of the state of computer science education through the lens of multiple K-12 stakeholders and can help identify increased opportunities for students in the expanding field of computer science. The report also yields important insights that may support strategies to broaden access for groups that continue to be underrepresented in computer science learning.

ABOUT THIS STUDY

Gallup interviewed nationally representative samples of 1,402 public and private school students in grades 7 through 12; 2,092 parents and guardians of students in grades 7 through 12; and 979 public and private school teachers of students in grades preschool through 12. These surveys were conducted online using the Gallup Panel. (See the “Methodology” section for further details.)

Gallup also interviewed 1,521 K-12 principals and 1,479 school district superintendents at public schools in the U.S. via online surveys, drawing samples from an established sample provider. All data were collected from late January to early March 2020, before the COVID-19 pandemic that resulted in closure of the nation’s schools.

The Current Perspectives and Continuing Challenges in Computer Science Education in U.S. K-12 Schools report includes a selection of key findings from the third administration of this ongoing research project. Additional releases are planned for companion reports that will focus specifically on the views of female, Black, Hispanic and rural students.

Perceptions and Understanding of Computer Science

Parents and Guardians and Educators Highly Value Computer Science Education

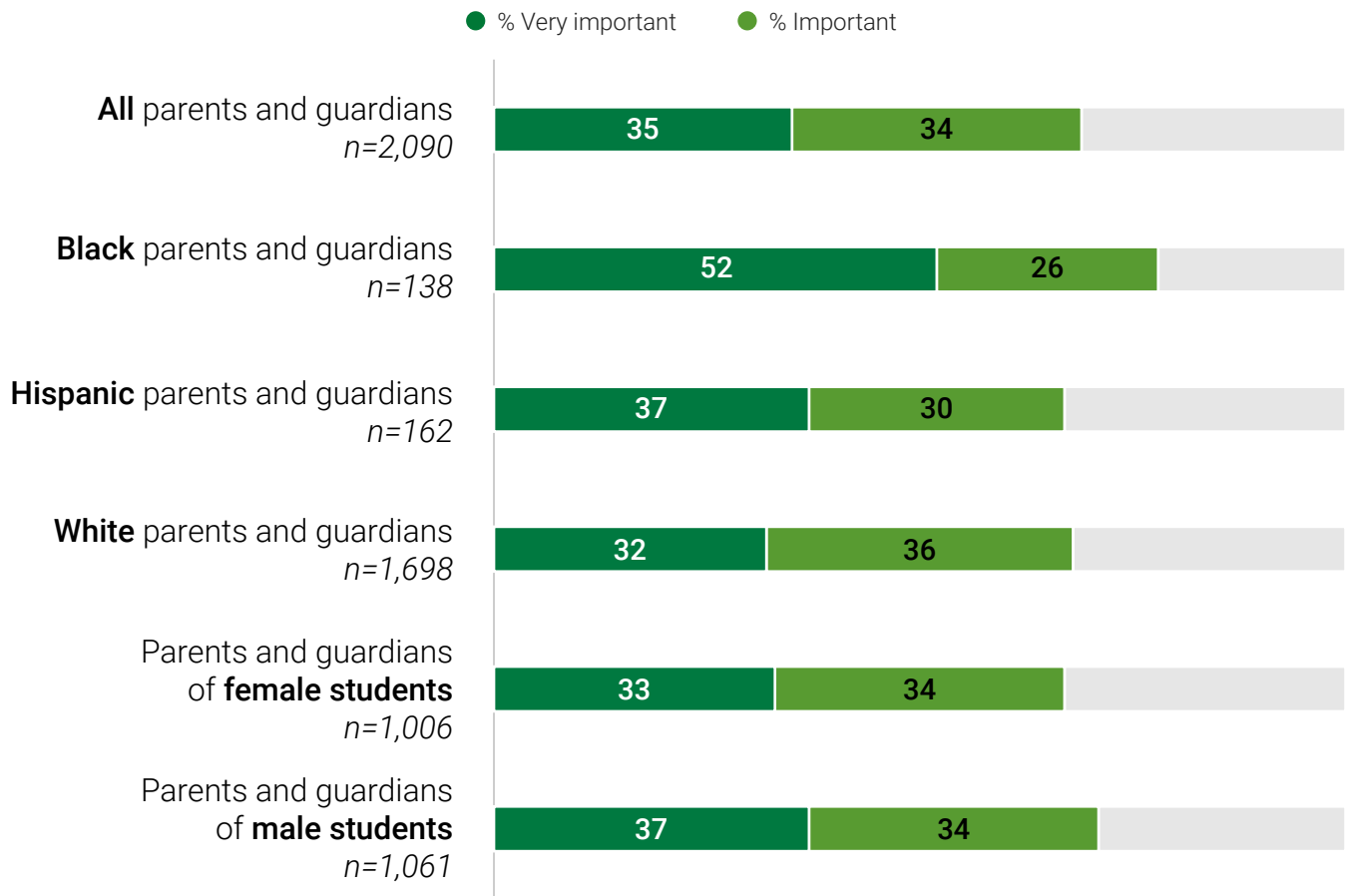
The majority of parents and guardians say computer science is important for their own child to learn, and most educators believe it is as important to students' future success as core subject areas. Many, however, are uncertain about which elements of technology are part of the academic discipline of computer science.

Computer science literacy is highest among students. Students overall have a better grasp of which activities are part of computer science than parents and guardians or educators do.

Only about one in three public school students (34%) in grades 7 through 12 incorrectly identify searching the Internet as a part of computer science, whereas majorities of public school parents and guardians (61%), superintendents (58%), principals (54%) and public school teachers (53%) mistakenly believe that it is.

Nearly half (48%) of public school students also incorrectly identify creating documents or presentations on the computer as a part of computer science, while strong majorities of public school parents and guardians (67%), superintendents (63%), public school teachers (61%) and principals (58%) incorrectly say this.

How important is it for **your child** to learn computer science?



Survey participants were provided the following definition of computer science to inform their responses: *For this survey, “computer science” means the study of computers, including both hardware and software design, development and programming. This does NOT include just using or having access to a computer in general.* Results of the study show parents and guardians are convinced that computer science is important for children to learn. The majority of parents and guardians of students in grades 7 through 12 across key demographic groups say that computer science is important for their own child to learn. Black parents and guardians feel particularly strongly about this, with nearly eight in 10 saying it is important.

Nearly seven in 10 of all parents and guardians (69%) surveyed say that computer science is “very important” or important for their own child to learn. Similar percentages of parents and guardians think it is important regardless of whether the child who participated in the survey—whom they were asked to think about when responding—is in middle/jr. high or high school and whether that child is male or female.

Majorities of Black, Hispanic and white parents and guardians say learning computer science is very important or important for their child to learn, but Black parents and guardians are more likely to say this. A majority of Black parents and guardians (52%) believe computer science education is very important, compared with 37% of Hispanic parents and guardians and 32% of white parents and guardians.¹⁰

¹⁰ Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>.

Educators think offering computer science is just as important as offering other required subject areas. Large majorities of superintendents, principals and teachers say that offering computer science is just as important to students' future success as offering other required courses such as math, science, social studies/history and English.

Majorities of superintendents (75%), principals (73%) and public school teachers (66%) say offering computer science courses is "just as important" as offering other core courses, such as math, science, social studies/history and English. Few educators say that offering computer science courses is "more important" than offering other required courses.

Teachers, principals and superintendents in all demographic groups are generally unified on this point. There are, however, some key differences among public school teachers. Namely, elementary school teachers in public schools (75%) are more likely than high school (59%) and middle/jr. high school teachers (53%) to say offering computer science is just as important to a student's future success as required subjects.

Results of the current study suggest that computer science learning has gained ground in importance among U.S. school administrators. In the 2016 study, fewer superintendents (65%) and principals (66%) said offering opportunities to learn computer science is more important than or just as important as other required courses.¹¹

Do you think offering opportunities to learn computer science is more important, just as important or less important to a student's future success than other required courses like math, science, social studies/history and English?

● % More important ● % Just as important ● % Less important

Teachers*



Principals



Superintendents



*Results include teachers in U.S. public schools.

¹¹ Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>.

Many Students Do Not Believe Learning Computer Science Is Important

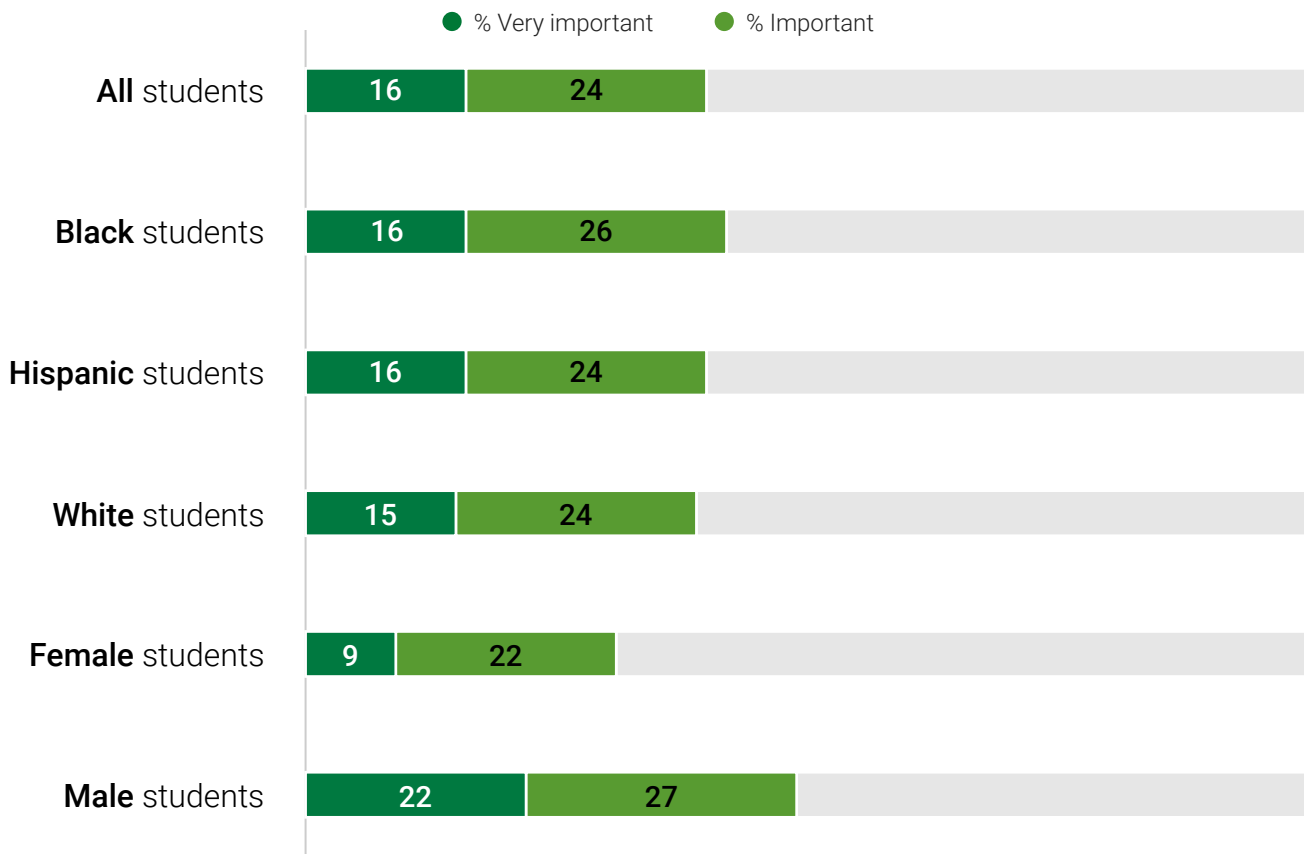
Students are generally unconvinced that computer science is important for them to learn, highlighting the ongoing challenges regarding their perceptions about the field and the opportunities it provides. Female students are particularly skeptical, with just 31% of them saying computer science is important for them to learn, compared with 49% of male students.

However, if girls and boys typically spend at least an hour a week studying computer science at school, they are both more likely to say that learning computer science is important. The same is true for Black, Hispanic and white students.

As noted, additional research is needed to help explain directionality in the link between exposure to computer science learning and students' perception of importance.

Less than half of students believe it is important for them to learn computer science. Most students in grades 7 through 12 do not believe that computer science is important for them to learn; four in 10 students say it is important. While results are similar across school level, region, and racial and ethnic background, boys (49%) are more likely than girls (31%) to think it is important to learn.

How important is it for **YOU** to learn computer science?



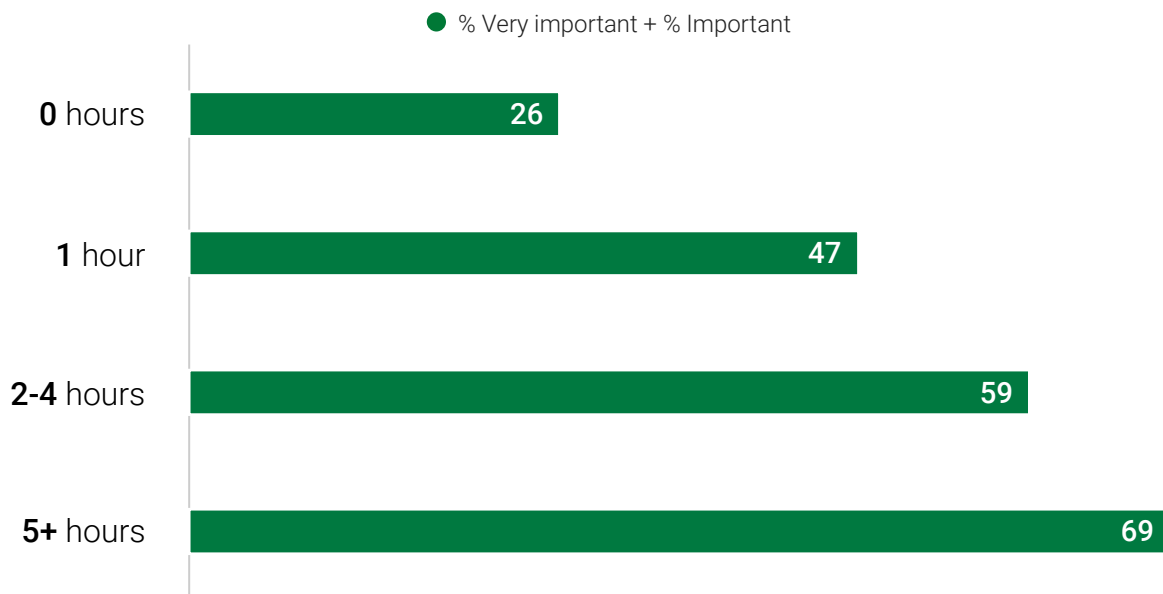
Fewer students (25%) say their friends think it is important to learn computer science. Again, more boys (29%) than girls (19%) say their friends think computer science is important to learn.

While Gallup and Google did not ask students in the 2015 and 2016 studies about the importance of learning computer science, results from those studies showed girls were typically less likely than boys to express interest in learning computer science and in pursuing careers in the field.

The 18-percentage-point gap between girls and boys on the question in the 2020 study—and the gender gaps on other similar questions in the current study—suggests girls’ perceptions, interest and aspiration relative to boys’ have not changed.

How important is it for **YOU** to learn computer science?

by average hours that students spent learning computer science each week at school




Spending time learning computer science is linked to students thinking it is important to learn. The majority of students (55%) say they typically don't spend any time on a weekly basis learning computer science at school. But those who say they spend an hour or more a week learning computer science are not only more likely to see it as important for them to learn, they are also more likely to believe their friends think it is important to learn.

About half of students (47%) who spend one hour a week learning computer science agree that it is important for them personally to learn computer science, which is nearly double the 26% of those who do not spend any time learning computer science.

Similarly, 28% of those who typically spend one hour a week studying computer science agree that their friends think it is important to learn computer science, versus just 16% of those who do not spend any time learning computer science. Both of these percentages increase with more exposure.

The relationship between exposure to computer science learning and attitudes toward it is strong across all student demographics, including for girls and underrepresented minorities. It is important to note that this relationship warrants more investigation to discern whether students who take these classes are predisposed to view computer science positively or whether there is an added effect with exposure.



Disconnects Among Educators on Computer Science Learning Priorities

Teachers, principals and superintendents are not wholly aligned in their views of priorities for computer science learning in their schools and districts. Superintendents see priorities shifting, with computer science education becoming a higher priority. Fewer teachers and principals think computer science is highly prioritized.

The perceived emphasis on computer science learning varies among educators. Nearly six in 10 superintendents (58%) either “strongly agree” or “agree” that computer science education is currently a top priority for their districts, but few principals (28%) or public school teachers (18%) agree it is a top priority for their districts or schools.

Teachers and principals don’t see the prioritization of teaching computer science as clearly as superintendents do. More superintendents (48%) than principals (40%) and public school teachers (29%) strongly agree or agree that teaching computer science has become a higher priority in the past three years in their districts or schools.

A regression analysis of the superintendent survey results shows that the more superintendents think parents and guardians are eager for their children to pursue a career in computer science, the more likely superintendents are to report that teaching computer science has become a higher priority in their school districts.

In addition, teachers and principals are less convinced of their school boards’ commitment to offering computer science education than superintendents are. One-third of public school teachers (32%) and about four in 10 principals (43%) agree that their school boards are committed to offering computer science in their schools; more than half (52%) of superintendents agree this is the case. Agreement among administrators is slightly stronger this year relative to the 2016 study when 40% of principals and 46% of superintendents agreed.¹²

¹² Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>.

Further, teachers and principals are less likely than superintendents to see teachers' efforts to teach computer science as highly valued in their districts or schools. Only one in four public school teachers (25%) and four in 10 principals (40%) agree that teachers' efforts to teach computer science are highly valued, compared with a slim majority of superintendents (53%).

Among educator groups, teachers are less likely than principals and superintendents to believe computer science learning should be incorporated into other subjects at school. Less than half (47%) of public school teachers strongly agree or agree that computer science learning should be incorporated into other subjects at school; 66% of principals and 64% of superintendents agree it should be incorporated.

Majorities of principals (73%) and superintendents (71%) also supported this idea when they were asked a similar question in the 2016 Gallup and Google survey. Teachers weren't posed this question.

Teachers are also less likely than principals and superintendents to believe students should be required to take a course in computer science if it is available. Less than half (49%) of public school teachers, compared with 59% of principals and 57% of superintendents, strongly agree or agree that students should be required to take a computer science course if it is available.

In the 2016 *Trends in the State of Computer Science in U.S. K-12 Schools* report, similar majorities of educators agreed students should be required to take a computer science course.¹³

13 Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>. Teachers were surveyed via telephone in 2016. Mode difference prevents trending data for this population.

Availability, Access and Quality

Students Have Multiple Options for Learning Computer Science

Students report having opportunities to learn computer science at school and also within their communities. Some students and parents and guardians of students in grades 7 through 12 are satisfied with the opportunities they have at school, while educators tend to be less satisfied.

Students are more likely to say they spend time using a desktop or laptop computer at school than a tablet or smartphone.¹⁴ More than four in 10 students (44%) in grades 7 through 12 say they spend no time using a smartphone at school. One in 10 do not use a smartphone at home, while most (91%) use one for at least one hour per day at home. Among devices that students were asked about in the survey, students are most likely to say they use a desktop or laptop computer at school at least one hour per day (85%).¹⁵

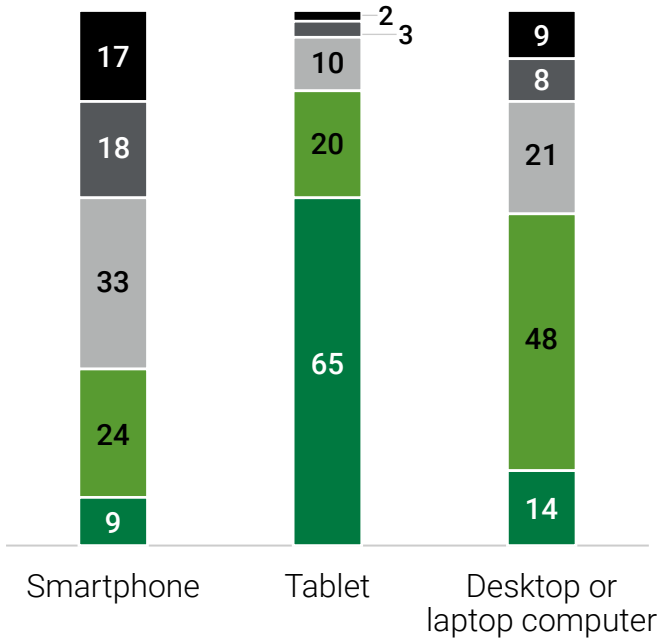
¹⁴ These findings reflect participants' perspectives before the COVID-19 pandemic seriously impacted the United States and disrupted normal school operations.

¹⁵ Pew Research Center. (2019, June 12). Internet/Broadband Fact Sheet. Accessed from <https://www.pewresearch.org/internet/fact-sheet/internet-broadband/>. The 2020 survey was administered online; therefore, students without access to the Internet or a device are not included in this survey. However, Internet coverage is very high among families. At least nine in 10 U.S. adults use the Internet, and about seven in 10 have a broadband connection.

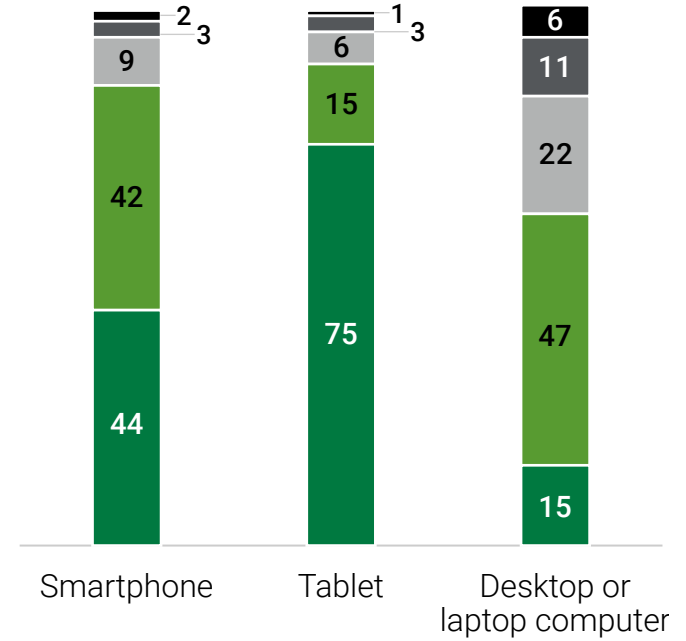
About how many hours **per DAY** do you use each of these devices at [school/home]?

● % 0 hours ● % 1 or 2 hours ● % 3 or 4 hours ● % 5 or 6 hours ● % 7 or more hours

Daily home use among students



Daily school use among students



Schools typically offer one or two dedicated computer science courses. About half (53%) of all principals surveyed say there are classes where only computer science is taught in their school, including 21% of elementary, 64% of middle/jr. high school and 77% of high school principals. The majority (67%) of these principals say there were one to two dedicated computer science courses available in their schools in the past school year. Slightly more than one in four (26%) say there were three to five computer science courses offered in their schools in the past year.

As expected, principals at high schools (35%) are more likely to report higher numbers of dedicated computer science courses (three to five) than principals at middle/jr. high (22%) or elementary schools (6%).

Some students and parents and guardians are satisfied with the availability of computer science opportunities, but teachers are less so. About four in 10 parents and guardians (42%) say they are “very satisfied” or satisfied with the availability of computer science education opportunities at their child’s school. A similar percentage of students (40%) are satisfied with these opportunities. Although more boys than girls report learning computer science outside of school, they are similarly satisfied with the availability of opportunities at school. Four in 10 boys (41%) and nearly as many girls (38%) are satisfied with the availability of computer science opportunities at school.

Results suggest many teachers are dissatisfied with the availability of computer science education. Slightly more than one in four teachers (27%) say they are satisfied with the availability of computer science learning opportunities for students at their schools. While four in 10 high school teachers (40%) are satisfied with computer science education opportunities for students at their schools, about half as many elementary teachers (19%) are satisfied. Somewhat fewer public (26%) than private school (35%) teachers are satisfied with the availability of computer science opportunities.

Nearly half (49%) of students say they learned computer science at school in the past year. Similar percentages of female and male students and Black, Hispanic and white students report that they learned computer science at school.

Among students who have learned computer science in the past year, 21% are currently enrolled in a dedicated class. Forty-three percent are currently enrolled in a class where computer science is taught as part of the class.

Students were also asked more specifically whether they have ever learned any computer science, such as programming to create software, apps, games, websites or electronics; 71% of boys and 65% of girls say they have. In the 2016 study, results from telephone interviews of students showed the majority of boys (59%) and half of girls (50%) said this.¹⁶

The majority of students (55%) report that they do not spend any time learning computer science at school in a typical week, while nearly half (45%) spend one or more hours per week.


One in 10 students report that they spend five or more hours in a typical week learning computer science at school. More girls (59%) than boys (51%) say they spend no time learning computer science at school in a typical week, and twice as many boys (13%) as girls (6%) spend five hours or more doing so.

To provide students with opportunities to practice problem-solving skills and learn the skills needed to build apps, websites or systems, some schools include coding in their computer science education programs. Nearly all principals (91%) indicate that at least “some” students spent time learning coding at their schools this year.

Elementary school principals are most likely to say “most” (23%) or “all” (14%) of their students spent time learning coding during school this year.

Nearly nine in 10 high school principals (85%) report some students spent time learning coding during school this year. Among all principals, a plurality (18%) say one in 10 students at their schools spent a total of 10 hours or more learning to code this year.

¹⁶ Google LLC & Gallup, Inc. (2016, March). Computer Science Learning: Closing the Gap: Girls. Accessed from <http://services.google.com/fh/files/misc/computer-science-learning-closing-the-gap-girls-brief.pdf>.



Quality Ratings for Computer Science Learning Are Generally High

Most parents and guardians and educators rate the quality of computer science learning that their children and students received at school this year as “good.” Teachers are the least likely to rate the quality of computer science learning at their schools highly.

Students and parents and guardians generally give good marks for computer science learning quality. Three in four parents and guardians overall whose child received computer science learning in the past year rate the quality of that learning as at least “good.” This includes 44% who rate the quality as “very good” or “excellent.” Among public school parents and guardians, 43% rate the quality of computer science education their child received as “very good” or “excellent.”

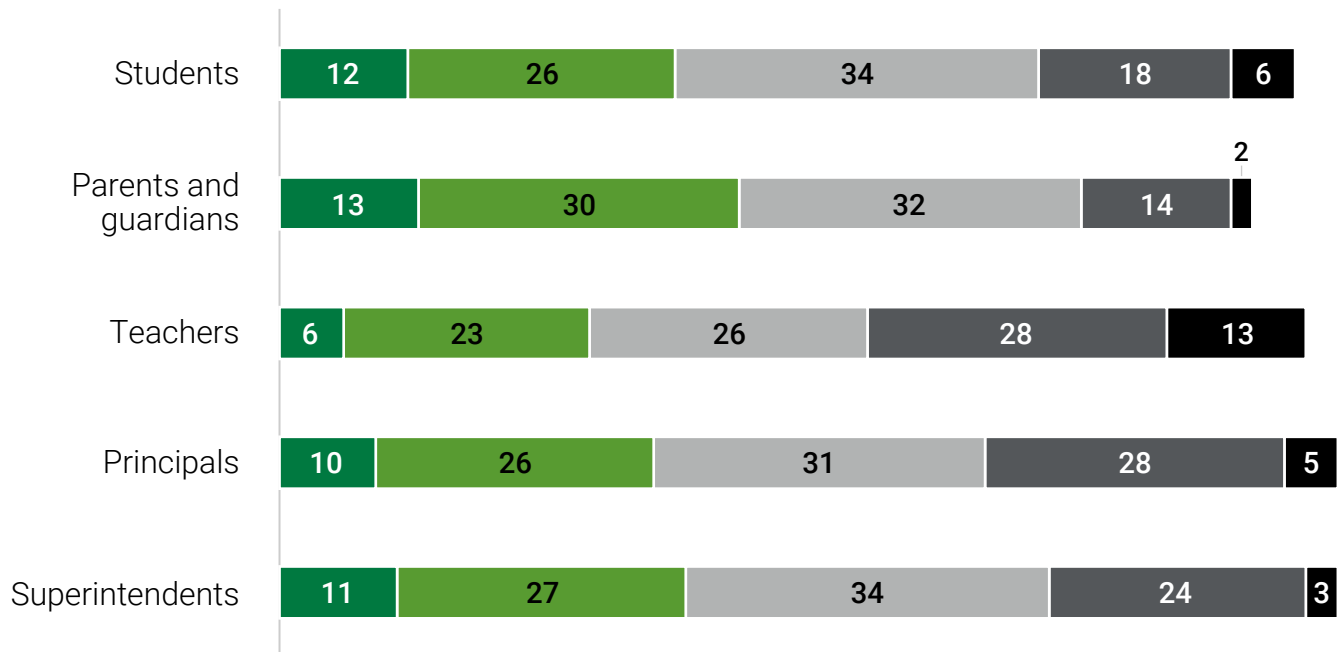
Like parents and guardians, all students surveyed in grades 7 through 12 rate the quality of the computer science learning they received in the past school year mostly positively. Nearly four in 10 (39%) rate the quality of it as very good or excellent. Another 33% rate it as good.

Teachers rate the quality of computer science learning that students received at school in the past year more critically.

Slightly more than one in four public school teachers say the quality of in-school computer science learning students received was very good or excellent, and another 26% say it was good. However, more than one in three say the quality was “fair” (28%) or “poor” (13%). More elementary (53%) public school teachers than middle/jr. high (37%) and high school (28%) public school teachers rate the quality of computer science learning their students received at school this year as fair or poor.

Overall, please rate the quality of computer science learning that [your child/students at your school/students in your district] [has/have] received [at school/during school] this year.*

● % Excellent ● % Very good ● % Good ● % Fair ● % Poor



*Results reflect public school populations. "Don't know" responses not shown.

More than one in three principals (36%) rate the quality of the computer science learning at their schools as very good or excellent. A similar percentage rate the quality as fair or poor. Ratings are fairly similar among superintendents and principals.

Fewer than three in 10 teachers (27%) in public schools, compared with 40% of superintendents and 34% of principals, are "very satisfied" or satisfied with the quality of computer science curricula used in their schools or districts. One in three public school teachers (33%) are satisfied with the quality of computer science instruction at their schools, compared with 43% of superintendents and 39% of principals.

Computer Science in the Classroom and Workplace

Championing Computer Science Learning

Teachers and parents and guardians of students in grades 7 through 12 say they encourage their students or children to learn about computer science. But while teachers nudge students toward a career in computer science, most parents and guardians say they do not.

Parents and guardians and educators see value in computer science in life and at work. Parents and guardians and educators know that computer science is used for positive outcomes in a variety of different jobs and sectors.¹⁷

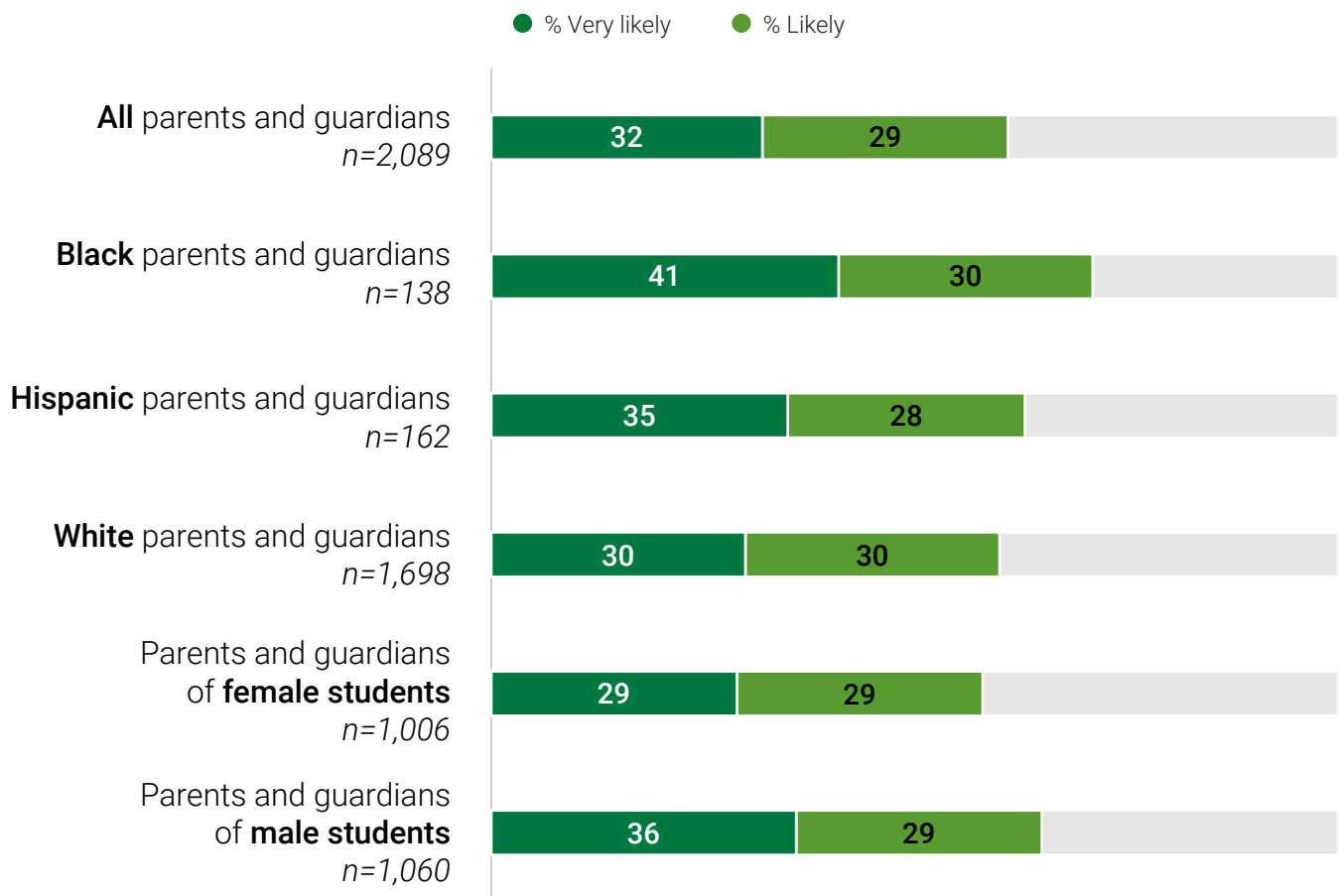
Strong majorities of principals (80%), superintendents (74%) and teachers (70%) “strongly agree” or agree that people who do computer science make things that help improve people’s lives and that computer science is used in many different types of jobs (82%, 81% and 69%, respectively).

Although parents and guardians and students were not posed these questions in the 2020 study, when Gallup and Google asked similar questions in 2016, they almost universally agreed that people who do computer science make things that improve people’s lives (94% and 93%, respectively) and that computer science can be used in a lot of different types of jobs (97% each).¹⁸

17 Computer Science Teachers Association. (2019). #CSforGood. Accessed from <https://www.csteachers.org/page/csforgood>. During the 2019 Computer Science Education Week, the Computer Science Teachers Association created posters that feature diverse people using computer science for good.

18 Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>. Parents and students were interviewed via telephone in 2016. Mode differences prevent trending these data.

How likely is your child to need to know computer science for their career someday?



Nearly all parents and guardians (96%) say they would be supportive of their child if their child wanted to learn computer science, including 87% who say they would be “very supportive.” This support is present among parents and guardians in all demographic groups.

Majorities of parents and guardians across all demographic groups agree that it is likely that their children will need to know computer science for their careers someday.¹⁹

Students acknowledge that adults in their families would support them if they wanted to learn computer science. More than nine in 10 students (92%) say adults in their families would be supportive of them learning computer science, with 73% saying they would be very supportive. This is true across all demographic student groups, and importantly, there is almost no difference between female students (92%) and male students (93%) in expected support.

¹⁹ Google LLC & Gallup, Inc. (2016). Trends in the State of Computer Science in U.S. K-12 Schools. Accessed from <http://services.google.com/fh/files/misc/trends-in-the-state-of-computer-science-report.pdf>. In 2016, 87% of students and 86% of parents said it was at least somewhat likely that they or their child would have a job someday where they or their child would need to know computer science. These results were very similar to 2015. Mode differences prevent trending these data in 2020.

Parents and guardians and teachers encourage students to study computer science, with parents and guardians of boys being more likely to recommend computer science as a career option. Most students are receiving encouragement to take computer science courses from the adults in their lives, whether at school or at home. But while teachers and parents and guardians encourage students to study computer science, most students are not aspiring to a computer science career.

The majority of teachers (52%) say they have personally encouraged a student to take a computer science course, and a similar percentage (53%) say they have personally encouraged a student to pursue a career in computer science. High school teachers are more likely than elementary and middle/jr. high school teachers to say they have done these things.

While the majority of parents and guardians (70%) of students in grades 7 through 12 say they have encouraged their child to learn about computer science, half as many (35%) say they have encouraged their child to pursue a computer science career. Parents and guardians are also more likely to recommend computer science as a career option if their child is a boy (42%) than if their child is a girl (27%).

Less than half (45%) of students say an adult in their lives has encouraged them to pursue a career in computer science. Of these, most (57%) say a teacher has personally encouraged them. Slightly more Black and Hispanic students (49% and 54%, respectively) than white students (40%) say an adult has encouraged them to pursue a career in computer science.

While female students are less likely than male students to have received encouragement from an adult in their lives to pursue a career in computer science (37% vs. 52%), female students who have received such encouragement are about as likely (54%) as male students (59%) to say they have been encouraged by a teacher.

PARENTS AND GUARDIANS

(% Yes)

70%

Have you ever encouraged your child to learn about computer science?

35%

Have you ever encouraged your child to pursue a career in computer science?

TEACHERS

(% Yes)

52%

Have you ever personally encouraged a student to take a computer science course?

53%

Have you ever personally encouraged a student to pursue a career in computer science?

Confidence and Interest in Computer Science

The majority of students are confident they can learn computer science, but boys are more likely than girls to express confidence and interest in learning computer science and pursuing it as a career.

Boys' confidence and interest in learning computer science exceeds that of girls. Two-thirds of students (67%) in grades 7 through 12 say they are "very confident" or confident that they could be successful in learning computer science if they wanted to.

While Black, Hispanic and white students are just as likely to feel confident, boys (73%) are more likely to say they are confident they can learn computer science than girls (60%). This 13-percentage-point gap by gender is consistent with the 17-point gap in confidence observed in 2016.²⁰

Exposure to computer science is linked to students' confidence in learning it. Students who report spending at least one hour learning computer science at school each week are more likely to be confident they could successfully learn computer science than those who spend no time learning it each week. Nine in 10 students who spend at least five hours on average per week studying computer science are confident they could learn it if they wanted to.

Parents and guardians also believe their child is confident he or she can learn computer science. Nearly three in four parents and guardians (73%) of students in grades 7 through 12 say their child is confident he or she could be successful in learning computer science.

Parents and guardians of male students are more likely than parents and guardians of female students to say their child is confident in learning computer science (79% vs. 66%). The size of the confidence gap among parents and guardians by their child's gender—13 percentage points—is notably the same as the gap between male and female students themselves.

²⁰ Google LLC & Gallup, Inc. (2016, March). Computer Science Learning: Closing the Gap: Girls. Accessed from <http://services.google.com/fh/files/misc/computer-science-learning-closing-the-gap-girls-brief.pdf>. In 2016, less than half of girls (48%) and 65% of boys were "very confident" they could learn computer science.

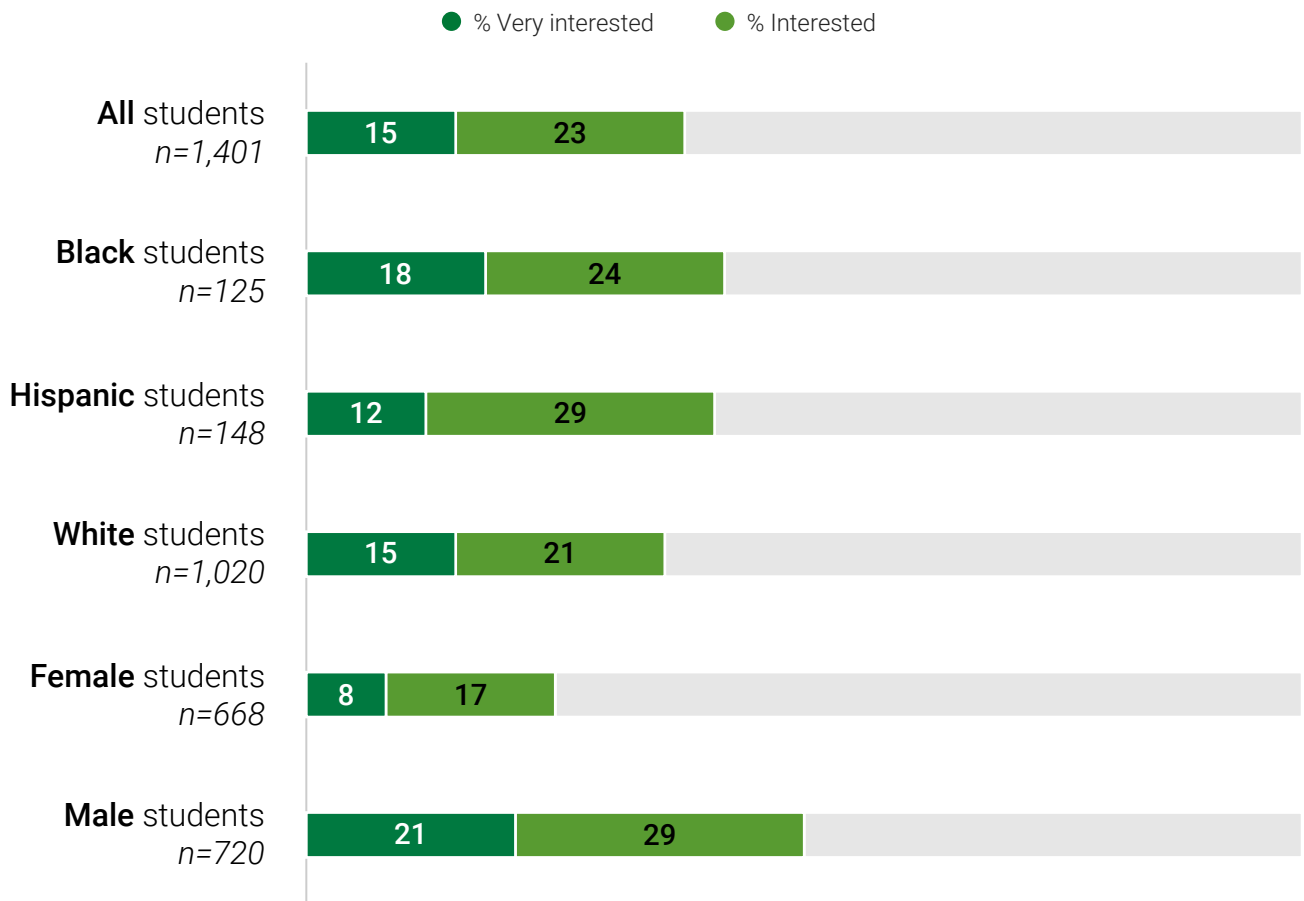
About four in 10 students (38%) are at least somewhat interested in learning computer science, but the low interest among girls (25%) compared with boys (50%) blunts interest overall. Black (42%) and Hispanic (41%) students express similar levels of interest.

Like confidence, exposure to computer science is also positively related to students' interest in learning it. Students who report spending at least one hour learning computer science at school each week are more likely to be interested in learning it than those who spend no time learning it each week. Three in four students (74%) who spend at least five hours on average studying computer science each week say they are interested in learning it, compared with 27% who spend no time studying it.

Parents and guardians and educators generally gauge the interest levels of students fairly well. About one-third of parents and guardians (32%) say their child is interested in learning computer science.

Parents and guardians of boys (42%) are more likely to say this than parents and guardians of girls (22%). Black, Hispanic and white parents and guardians express similar opinions on their child's interest: About one in three in each group say their child is interested in learning computer science.

How interested are you in learning computer science?



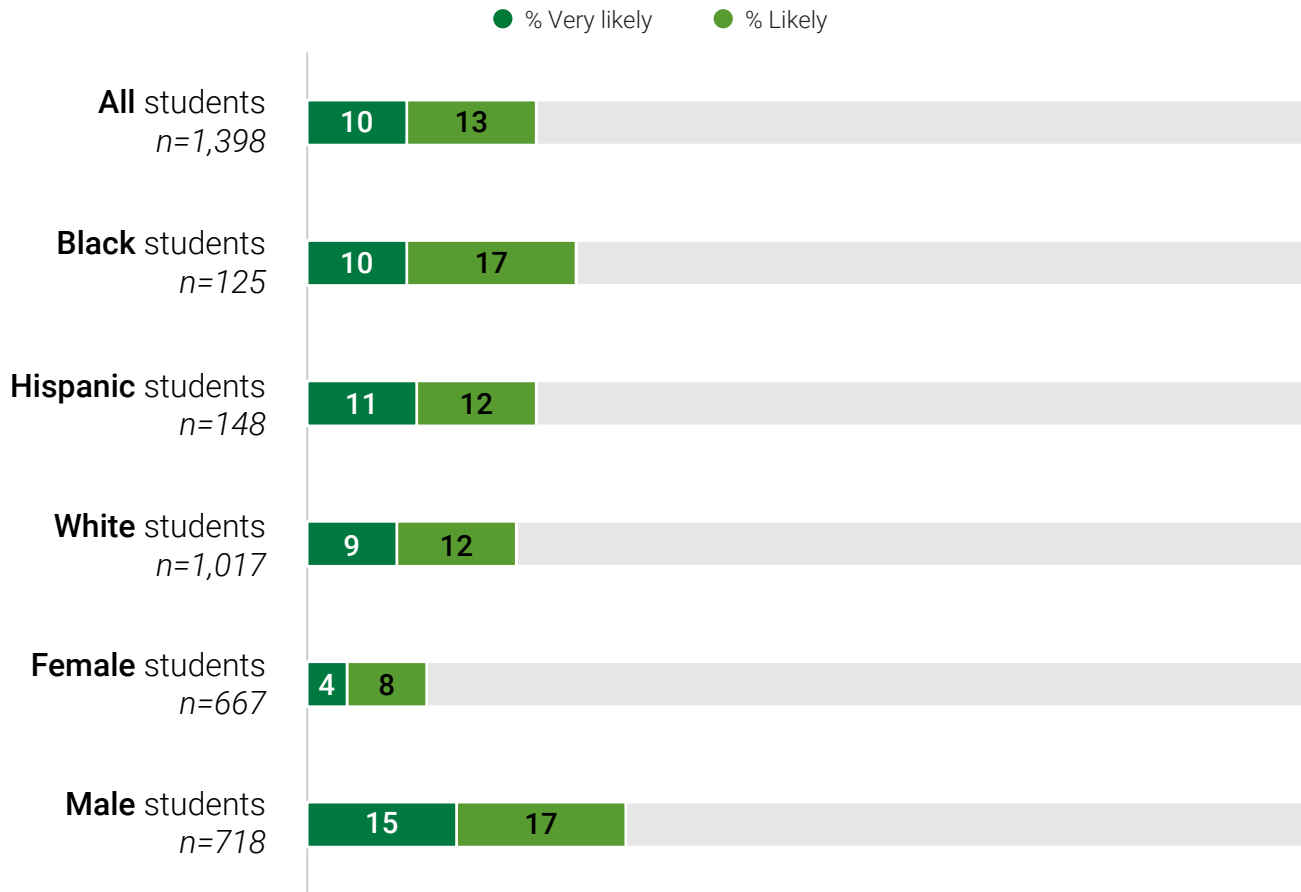
The estimates from superintendents and teachers are the nearest to students' levels of expressed interest in learning computer science: 40% of superintendents and 35% of teachers say their students are interested in learning computer science (versus 38% of students). Closer to half of principals (45%) say students are interested.

About one in four principals (27%), superintendents (26%) and teachers (23%) "strongly agree" or agree that parents and guardians of students in their schools or districts are eager to have their children pursue a career in computer science.

Slightly more than one in three parents and guardians (35%) of students in grades 7 through 12 agree they are eager to have their child pursue a career in computer science someday. More Black (39%) and Hispanic (42%) parents and guardians than white parents and guardians (32%) agree, and parents and guardians in cities (39%) are more likely than those in rural areas (23%) to agree they are eager to have their child pursue a computer science career.

While there is no difference in agreement by the gender of the parent or guardian, 40% of parents and guardians agree that they are eager to have their male child pursue a computer science career, while 29% are eager to have their female child pursue a career in computer science.

How likely are you to pursue a job in computer science someday?

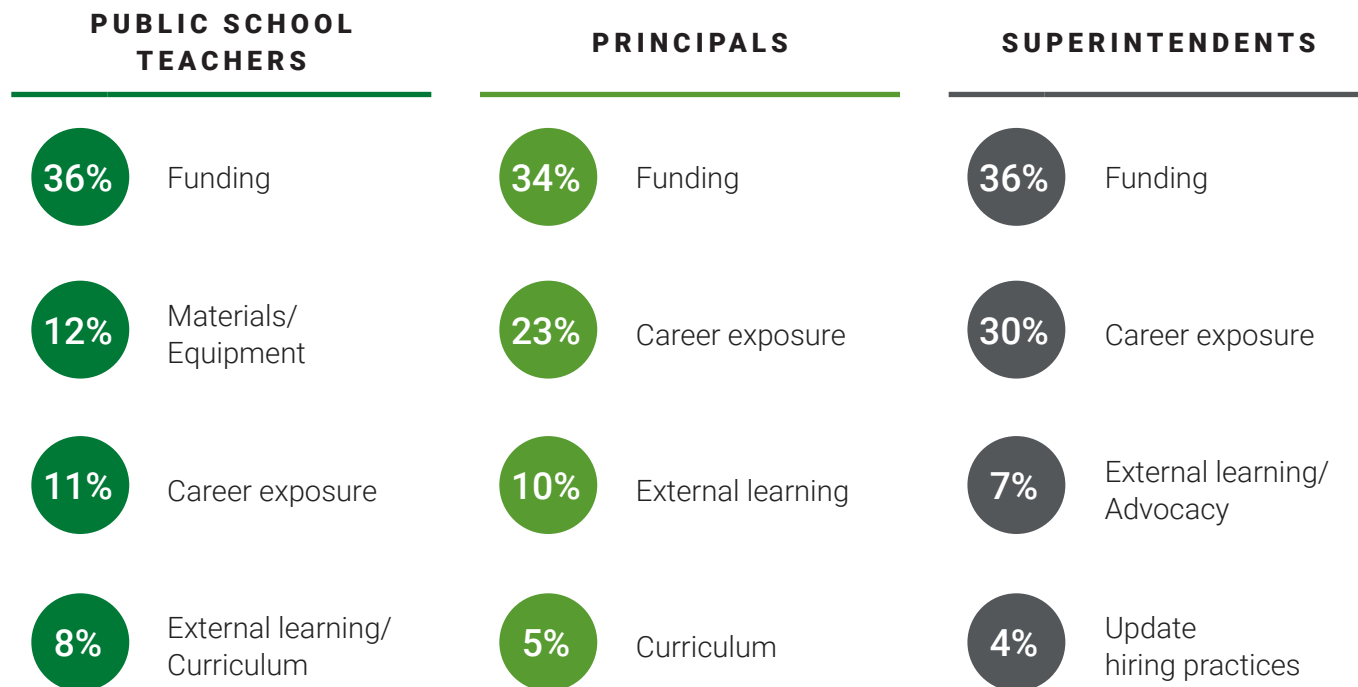


Nearly one in four students expects to pursue a job in computer science someday; boys are more likely than girls to have this expectation. About one in four students (23%) says it is “very likely” or likely that they will pursue a job in computer science someday. This percentage projects to millions of students, which, when equity is achieved, would make it possible for more students to be creators as well as users of technology.

Black (27%), Hispanic (23%) and white (21%) students are about as likely to say they are likely to pursue a job in computer science. However, nearly three times as many male students (33%) as female students (12%) say it is likely they will pursue a computer science job someday.

What can businesses or other organizations do to ensure more schools can make high-quality computer science education available to students?

*First response**



*Surveys of teachers, principals and superintendents included this open-ended question. Free responses were cleaned and coded. Results reflect frequencies of the coded responses.

About half of principals say that resources have been allocated at their schools to support clubs or activities dedicated to teaching students computer science concepts outside of class. More than four in 10 also report there is professional learning available to teachers to support incorporating computer science into other classes or subject areas. This is true across school levels.

In addition to funding, educators are most likely to mention that organizations and businesses can support high-quality computer science education by providing career exposure and sharing materials or equipment.

Conclusion

The 2020 *Current Perspectives and Continuing Challenges in Computer Science Education in U.S. K-12 Schools* report provides a view of the current landscape of K-12 computer science education in the U.S. through the lens of students, parents and guardians, and educators.

Many parents and guardians and educators embrace computer science in a way that many students—and particularly girls—still do not. Most parents and guardians are convinced that computer science is important for their child to learn, and educators see computer science courses as just as important to offer as required core subjects. However, most students remain unconvinced that computer science is important for them to learn.

Emblematic of the social barriers to computer science learning that girls have faced for years, in the most recent study, girls are less likely than boys to see computer science as something important for them to learn, and they are less likely to express interest in pursuing careers in this area. Relatedly, parents and guardians of boys are more likely than parents and guardians of girls to encourage their child to pursue a computer science career, which suggests there are persistent gaps in perceptions and aspirations that present challenges to bridging diversity gaps in engagement, learning and opportunities.

The survey, however, also reveals a potential way to help bridge these divides: exposure to computer science. If students engage in at least one hour of computer science learning a week, they are not only more likely to see computer science as important for them to learn but more likely to say their friends think it is important as well. Similarly, the more time students spend learning computer science each week, the more confident they are that they could learn computer science and the more likely they are to be interested in learning it.

Whether students who take part in computer science learning are inclined to view computer science more positively to begin with, or whether there is an effect that comes with greater exposure, warrants further investigation.

About one in four (27%) superintendents reports that their state has made computer science education funding or resources available to their district. Of these, 78% have used those resources in their districts. It will certainly take more resourcing to boost students' interest, aspiration and competency in computer science. It will also take effective policymaking that prioritizes and addresses learning standards, certification, development and infrastructure support.²¹ Perhaps most critically, it will take ongoing collaboration among families, educators and policymakers to integrate computer science learning within existing curricula to give all students a chance to choose a pathway in the expanding world of computer science.

21 Code.org. (2018). K-12 Computer Science Policy and Implementation in States. Accessed from https://www.ncwit.org/sites/default/files/file_type/landscape_of_cs_action_in_states_.pdf.

Methodology

This study is the third in a research series about computer science in K-12 schools in the U.S. conducted by Gallup and supported by Google.

The purpose of these studies is to monitor data that may influence the ongoing and future implementation of computer science education in U.S. schools. The research goal is to determine the extent to which students, parents and guardians, and educators value and prioritize computer science education.

At present, there is some confusion in education and among parents and guardians regarding what the term “computer science” means. For this reason, it was essential to create a standardized definition and to frequently share this definition with all respondents throughout the course of the survey. In each of the five surveys (students, parents and guardians, teachers, principals and superintendents), the operating definition for computer science was defined for the respondent as follows:

For this survey, “computer science” means the study of computers, including both hardware and software design, development and programming. This does NOT include just using or having access to a computer in general.

For the purposes of this study, computer science includes learning about or doing things like:

- hardware and software design
- programming a computer
- writing and running computer code
- machine learning and artificial intelligence

Computer science does not include:

- simply using a computer, tablet or smartphone
- conducting online research
- creating documents or presentations on the computer

METHODS

Results from the *Current Perspectives and Continuing Challenges in Computer Science Education in U.S. K-12 Schools* report are based on surveys conducted with students, parents and guardians, teachers, principals and superintendents in the U.S. All interviews were conducted via web, in English only.

Student results are based on interviews with 1,402 students in grades 7 through 12 who attend U.S. public and private schools. The responses were collected via an online survey between Jan. 29 and Feb. 17, 2020 (pre-COVID-19). Surveys were conducted using the Gallup Panel (see “The Gallup Panel”). The research team received parental consent from Panel members before interviewing their children as part of this study.

The student sample was weighted to correct for unequal selection probability and nonresponse. Weighting targets are based on the students’ grades in school, gender, race and ethnicity. The data are weighted to match known targets for grade in school according to the National Center for Education Statistics (NCES) and gender, race and ethnicity according to U.S. Census Data.

For results based on the total sample of students, the margin of sampling error is ± 3.4 percentage points at the 95% confidence interval.

Parent and guardian results are based on 2,092 surveys of parents and guardians of students in grades 7 through 12 in U.S. public and private schools. The responses were collected between Jan. 29 and Feb. 17, 2020 (pre-COVID-19). Surveys were conducted via an online survey using the Gallup Panel (see “The Gallup Panel”).

The parent and guardian sample was weighted to correct for unequal selection probability and nonresponse. The data are weighted to match known targets for age, gender, education, phone status, region, race and ethnicity, according to the Current Population Survey 2017.

For results based on the total sample of parents and guardians, the margin of sampling error is ± 2.3 percentage points at the 95% confidence interval.

Teacher results in this study are based on 979 surveys completed by teachers who were at that time teaching in U.S. public and private schools. The responses were collected online Feb. 3-11, 2020 (pre-COVID-19). Each teacher indicated that they taught first grade or higher but may also teach other grades. (Preschool through 12th grade were represented in this sample). Surveys were conducted using the Gallup Panel (see “The Gallup Panel”).

The teacher sample was weighted to correct for unequal selection probability and nonresponse. The data are weighted to match known targets for U.S. teachers for gender, age, race and ethnicity, years of teaching experience, level and school type (public vs. private), according to the NCES.

For results based on the total sample of teachers, the margin of sampling error is ± 5.3 percentage points at the 95% confidence level.

Unlike methods of selection for opt-in panels, for the Gallup Panel, Gallup selects respondents at random, and because all U.S. households have an equal and known probability for selection, the Panel is a representative sample of all American households.

Principal results in this study are based on 1,521 responses of school principals. The responses were collected via an online survey between Feb. 5 and March 2, 2020 (pre-COVID-19). Gallup contacted principals using a sample provided by established education sample providers. The sample source is representative of all principals currently in public schools in the U.S.

The principal sample was weighted to correct for unequal selection probability and nonresponse. The data are weighted to match known targets for years of experience, school enrollment size and region, according to the NCES.

For results based on the total sample of principals, the margin of sampling error is ± 3.2 percentage points at the 95% confidence interval.

Superintendent results in this study are based on 1,479 responses of district superintendents. The responses were collected via an online survey between Feb. 5 and March 2, 2020 (pre-COVID-19). Gallup contacted principals using a sample provided by established education sample providers. The sample source is representative of U.S. public school districts.

The superintendent sample was weighted to correct for unequal selection probability and nonresponse. The data are weighted to match known targets for district enrollment size and region, according to the NCES.

For results based on the total sample of superintendents, the margin of sampling error is ± 2.7 percentage points at the 95% confidence interval.

The sum of percentages included in this report may differ from chart or table results due to rounding.

Margins of sampling error are larger for subgroups. Samples for all five groups (students, parents and guardians, teachers, principals and superintendents) are weighted to correct for unequal selection probability and nonresponse. All reported margins of sampling error include the computed design effects for weighting.

In addition to sampling error, question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of public opinion surveys.

THE GALLUP PANEL

The Gallup Panel is one of the nation's few research panels that is representative of the entire U.S. adult population aged 18 and older. Adults are recruited to the Gallup Panel using address-based sampling (ABS) and random-digit-dial (RDD) methods. Because Gallup selects respondents at random, and because all U.S. households have an equal and known probability for selection, the Panel is a representative sample of all U.S. households.

ABOUT GOOGLE

Google's core mission is to organize the world's information and make it universally accessible and useful. Google creates products to increase access to opportunity, break down barriers and empower people through technology. To help reach these goals, Google works to inspire young people around the world not just to use technology but to create it. There is a need for more students to pursue an education in computer science, particularly girls and minorities, who have historically been underrepresented in the field. More information on Google's computer science education efforts is available at [g.co/csedu](https://www.google.com/csedu).

ABOUT GALLUP

Gallup delivers analytics and advice to help leaders and organizations solve their most pressing problems. Combining more than 80 years of experience with its global reach, Gallup knows more about the attitudes and behaviors of employees, customers, students and citizens than any other organization in the world.

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