

Computer Science Education

A Policy Brief by A+ Education Partnership



EDUCATION
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The Big Idea:



High-quality computer science education is key to ensuring that Alabama students can compete in a changing world.

Introduction

Today's world is filled with more technology and innovation than ever before. Alabama should be prepared not only to utilize this technology but also to benefit from its prevalence. As more computing jobs become available, Alabamians need to be prepared to excel in them to grow the economy and bring employers to the state. Teaching computer science to K-12 students is the first step to ensuring that Alabama is ready to move into the future.¹

According to Code.org, there are 6,032 open computing jobs in² Alabama with an average salary of \$86,870. In the 2021-2022 school year, Alabama enrolled 35,679 students in computer science courses. Nationally, the number of students taking the AP Computer Science Principles exam grew from 50,000 in 2017 to 102,610 in 2021.³ As the rest of the world is gearing up to teach and place students in computer science, Alabama needs to level the playing field by making sure students here have the same preparation and opportunities.

There is a clear connection between teaching students computer science and the workforce⁴: students who learn computer science in high school are six times more likely to major in it in college. The number of computing jobs is expected to continue to grow, and Alabama students should be able to fill them. Offering computer science in every high school across the state will create massive growth in Alabamians pursuing computer science careers by exposing students to new career paths and giving them the skills to succeed in postsecondary education and careers.

What Is Computer Science?

Computer science is the design, creation and use of computer software and systems. People working in computer science jobs do a variety of tasks, including programming apps and websites, designing efficient ways to send and receive information through technology, as well as the study of the algorithms that power computers.

Every company today relies on technology and computing to some extent. Design and management of websites and applications, accounting software, payment systems, and more are just a small part of the business world. For manufacturing or engineering companies, advanced technology is taking the place of employees doing strenuous, repetitive tasks by hand. While many are fearful of the jobs that will be lost to automation, many more careers will open up in the creation and management of the new technology being used in manufacturing. This further emphasizes the need for high-quality computer science education for our students.

¹ Code.org. Support K-12 Computer Science Education in Alabama. [LINK](#)

² Alabama State Department of Education.

³ Jones, Sasha (2018). Computer Science. [LINK](#)

⁴ Code.org. Support K-12 Computer Science Education in Alabama. [LINK](#)

What is a high-quality computer science course?

A high-quality computer science course teaches students why and how computers work. Computer science classes build on computer literacy, educational technology, digital citizenship, and information technology to teach students coding and computational thinking, or problem-solving based on steps to be carried out by a computer, and gives students an understanding of how computers and technology impact their lives and the world around them.

- **Elementary (K-5):** computer science is integrated into other core courses while building computational thinking skills.
- **Middle school (6-8):** computer science and coding are introduced to students with the intent of building interest and engagement.
- **High School (9-12):** a number of courses are offered which provide a survey of computer science and coding and some which go in-depth on coding specific programming languages.

State Legislation on Computer Science Education

In the past several years, the Alabama Legislature has passed a number of bills that address the teaching of computer science in the state's public schools, including:



2019 Computer Science Bill

In 2019, the Legislature passed HB 216, which required all public schools in the state to provide high-quality computer science courses to students, specifically:

- All public high schools to offer an authentic computer science program by 2020-2021 school year
- All public middle schools to offer instruction in computer science courses by the 2021-2022 school year
- All public elementary schools to offer instruction in the basics of computer science and computational thinking by the 2022-2023 school year



Education Trust Fund Budget

The Education Trust Fund Budget, which funds K-12 and higher education in the state, has increased the funding to train and develop computer science teachers from \$300,000 in FY 2019, to \$1.3 million in FY 2020, to \$2.3 million in FY 21, and holding at \$2.3 million for FY 22.



AMSTEP

AMSTEP, or Alabama Math and Science Teacher Education Program, is run by the Alabama Commission on Higher Education (ACHE) and provides \$5,000 of student loan forgiveness for math and science teachers per year teaching in the classroom, which was expanded to include computer science in the 2021 legislative session.



TEAMS Act

Teacher Excellence and Accountability in Math and Science Act, or TEAMS Act, creates a new competitive salary matrix for math and science teachers (including computer science) to recruit teachers of STEM classes in grades 6-12 who might otherwise want to work in industry due to better pay. This act is helping recruit and retain talented and nationally-certified computer scientists to teach in classrooms.

Benefits to Workers, Employers, and the Alabama Economy

More students choosing computer science as a career path will not only help to fill the more than 4,000 open jobs in Alabama but also will encourage more employers in the industry to move to Alabama, which brings jobs of all kinds to Alabamians. It encourages innovation and allows Alabamians to be on the cutting edge of new technologies.

In addition, the average wage for those working in computer science fields is almost twice as high as that of the average Alabamian, so these jobs being in the state create more opportunities for Alabamians to earn higher annual salaries and bring more wealth to their municipalities and the state as a whole. Bringing⁵ high-wage jobs to Alabama helps reduce poverty in the state and encourages growth for the state's economy.

Equitable Access to High-Quality Computer Science Courses

Black students are more interested in computer science and are more confident in their abilities than white students but are less likely to attend a school that offers it. Education leaders should ensure that all students in Alabama have the opportunity to learn relevant skills while in high school to prepare them for the workforce or for higher education, and to ensure that students from historically marginalized groups have equal access to high-paying jobs. In addition, women who take computer science in high school are ten times more likely to major in it in college, an even higher rate than for the general population.⁷ It is important that the state pushes women to be just as active in STEM as men are and have the opportunity to learn and contribute to innovation just as much as men do.

The teaching of computer science in high school does more than increase minority access to high-paying jobs. Careers that historically had lower representation of minority workers require investment to bring those jobs to those communities. By encouraging all Alabama students to learn computer science, the state prepares students for the jobs of the future, whether in computing fields or otherwise, as well as opening doors and creating opportunities for underserved communities and diversifying the white-collar workforce.

By passing the 2019 Computer Science bill, Alabama is ensured equity for all students by providing statewide access to computer science education in every school district. Teacher training that is equitably implemented across the state allows for all students to have the same high-quality education.

⁵ Code.org. Support K-12 Computer Science Education in Alabama. [LINK](#)

⁶ Code.org. Support K-12 Computer Science Education in Alabama. [LINK](#)

⁷ Code.org. Support K-12 Computer Science Education in Alabama. [LINK](#)

The Current State of Computer Science Education in Alabama



Course Offering and Instruction: There are 9 high school computer science courses approved by the Alabama State Department of Education (ALSDE), and 4 courses approved at the middle school level. Elementary level computer science instruction will be integrated into K-5 instruction beginning in the 2022-2023 school year.⁸ As of the 2020-2021 school year, there are 21,819 middle school students enrolled in computer science courses and 10,756 high school students enrolled in computer science courses.⁹



Professional Development: Four in-state providers received funds from the ALSDE in 2021 to offer professional development opportunities for computer science teachers at all levels.¹⁰ In summer 2021, 776 teachers were trained, with a total of 3,389 teachers having been trained since 2016.¹¹

A+ Policy Recommendations

1

Fully implement the 2019 Computer Science Bill to ensure that every student has access to a high-quality, authentic computer science education.

2

Continue to expand funding for teacher training - Teacher training programs in Alabama did not graduate a single new teacher prepared to teach computer science in 2018. Funding teacher training will ensure that every child has access to a high-quality education in computer science.

3

Expand high-quality course offerings - Alabama should continue to expand its high-quality computer science course offerings, including Computer Science Discoveries (middle school level course) and AP Computer Science Principles and AP Computer Science A (high school level courses) so that more students have access to more classes that will challenge and educate them.

4

Encourage educators who teach computer science to seek specialized and advanced certification in the field, so they are able to take advantage of the benefits provided through the TEAMS Act - More computer science teachers with advanced certification means more students are benefitting from the best computer science education they can get.

⁸ CS4Alabama.org. Approved High-Quality Computer Science Courses. [LINK](#)

⁹ Alabama State Department of Education (2021). Enrollment Data.

¹⁰ CS4Alabama.org. 2021 Summer Computer Science Professional Learning. [LINK](#)

¹¹ Alabama State Department of Education (2021). Computer Science Presentation.



A+ drives improvements in public education for every Alabama student. We set and deliver high expectations by advocating for policies, practices, and investments that advance learning and by partnering with schools to build the capacity of teachers and leaders.

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