



South Carolina

Computer Science Graduation Requirement Case Study

South Carolina: A Case Study

The purpose of this case study is to provide guidance to states interested in pursuing a computer science graduation requirement. This case study covers the origin of South Carolina's computer science graduation requirement, recent efforts to revise it, and the ongoing effort to implement the revisions. States that are interested in making computer science a graduation requirement should consider the following recommendations:

1. Develop a strategic implementation plan.
2. Allocate funding for initial and continued professional learning.
3. Ensure statewide professional development infrastructure.
4. Hire a state K-12 computer science supervisor to lead the team effort.
5. Communicate to stakeholders completely and frequently.
6. Publish a list of approved, high-quality courses.
7. Allow the credit to be earned in middle school.
8. Develop accountability systems and offer temporary waivers to identify schools that need additional support.
9. Align certification policies and timelines with the implementation timeline for the graduation requirement.

The information in this case study was gathered from state records and interviews with stakeholders including former and current South Carolina Department of Education (SCDE) employees. Special thanks to the South Carolina chapter of the Computer Science Teachers Association (CSTA) and the information on their [website](#).

1980's to 2015: Keyboarding and Computer Science

South Carolina's requirement for "computer science" started back in the 1980s when computers were first entering the classroom and there was a recognized need to transition to new technology.

During this time many states were implementing courses and requirements such as "computer applications" and "computer literacy" to meet the needs of the nation. The state of South Carolina chose the term "computer science" to identify these courses in regulations, but the intention was computing as a general field.

At the beginning of the transition to computers in K-12, typing classes (on typewriters) became keyboarding classes. Afterward, office productivity software courses began to flourish

due to a push to capitalize on technology funding streams and approved textbooks from publishers who expanded on their keyboarding offerings. Business education teachers taught software applications such as Word Perfect, Lotus 1,2,3, as well as the older programming languages taught in business education departments, such as Fortran and COBOL.

New programming languages and the Advanced Placement computer science courses led to increased participation in computer science, yet the majority of students were earning the graduation requirement through office productivity software classes such as Microsoft Office and digital design classes such as Adobe Photoshop ([Burke et al., 2016](#)). The defining characteristic of this era of South Carolina's computer science education history is that students did not have to take computer science to satisfy the computer science requirement.

2016 to 2020:

A True Computer Science Graduation Requirement

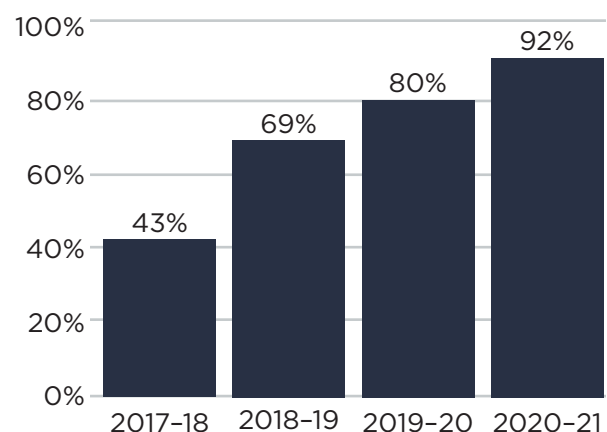
The evolution of South Carolina's computer science graduation requirement has been part of a larger movement to increase computer science education in South Carolina through policy and implementation of those policies.

South Carolina's modern-day computer science education movement began in the summer of 2016 when the development of K-8 standards initiated the first-ever definition for computer science (even though the computer science graduation requirement had already existed for at least two decades) which then triggered a review of the list of courses satisfying the graduation requirement. Around the same time, a Joint Task Force on Computer Science and Information Technology released a report with findings and recommendations. Based on the recommendations in the report, a teacher certification was added for computer science, differentiating computer science teachers from business education and information technology teachers, while still allowing the latter group to teach computer science. Later, 9-12 standards were approved.

Following regulation changes in 2018, the SCDE announced a revised list of courses that satisfy the computer science graduation requirement. Half of the state's school districts applied for waivers in the first year of the revised graduation requirement implementation, allowing more time to get teachers prepared to teach the courses on the revised list.

For FY 2020 and 2021, Governor McMaster and the South Carolina Legislature allocated funding for teacher professional development. This funding allowed the SCDE to partner with

High Schools Offering CS



The Citadel, the CSTA, and the South Carolina chapter of the CSTA to identify and provide professional learning to districts in need of help preparing their teachers to teach computer science. These efforts have been a large factor in increasing the percentage of South Carolina public schools offering computer science. See the Appendix for a detailed timeline of South Carolina's computer science actions.

As this case study demonstrates, a computer science graduation requirement should be preceded by the successful implementation of many of the Code.org Advocacy Coalition's [nine policy recommendations](#) as well as the development of a robust professional development infrastructure. During the revisions to the computer science graduation requirement, South Carolina adopted funding, a computer science certification, and standards. While other key policies, such as the development of a state strategic plan and the hiring of a state CS supervisor, are still in progress, recommendations from a 2016 task force and a partnership between the SCDE, CSTA, and the Citadel have helped guide the state's computer science initiatives.

Recommendations: Lessons Learned from South Carolina

The following recommendations are based on lessons learned from South Carolina's development and implementation of a computer science graduation requirement. These recommendations build upon the Code.org Advocacy Coalition's [nine policy recommendations](#).

1. Start with a strategic implementation plan

A study should be conducted to assess the impact of a computer science graduation requirement as an initial step in a state strategic implementation plan. The implementation timeline should include a transition phase to allow the state to identify and support schools that need more help, in areas such as funding, selecting courses, enrolling students, and getting teachers trained. The plan should include stakeholder input, especially from teachers, school and district administrators, and, if available, the local CSTA chapter. See a toolkit for developing state plans at bit.ly/statetoolkit.

In South Carolina, the consequences of revising the list of courses that satisfy the state computer science requirement were not fully considered when the revision was initiated by a new definition for computer science adopted during the development of computer science standards. One of the resulting challenges has been clear and complete communication between the department of education and school districts. Funding for a state plan has been proposed in the FY 2022 state budget but is yet to be adopted.

2. Allocate funding for initial and continued professional learning

States should provide resources for professional learning to prepare in-service teachers from diverse backgrounds to teach K-12 computer science and to support their development through opportunities such as communities of practice. Funding priority should be given to

districts in which a demonstrable effort will be made to engage students from underrepresented groups.

South Carolina's Funding for Computer Science

FY 2020	500k for computer science professional development
FY 2021	500k for computer science professional development
FY 2022	1.2M for computer science regional specialists and professional development

3. Ensure adequate statewide professional development infrastructure

Teacher preparation at the scale required to implement a new graduation requirement will require a proven statewide infrastructure for preparing teachers. This professional development backbone may be composed of state education centers, early-adopter school districts, institutions of higher education, and/or for- and non-profit organizations, but all teachers should have access, especially those serving underrepresented groups in computer science.

States that are transitioning from a previous requirement that all high schools offer at least one computer science course to a requirement that all students take at least one computer science course should realize that schools will now need to offer multiple sections of computer science. Multiple sections will require multiple computer science teachers, depending on the size of a school's student population. For example, a school with 2000 students (500 per grade level), will require, at minimum, 4 computer science teachers, assuming they each teach 125 students a year.

The SCDE has partnered with The STEM Center at The Citadel to provide professional development since 2018. This partnership has been a strong factor in the increase of high schools offering computer science; 92% of public high schools offered computer science in the 2020–21 school year, compared to 43% in the 2017–18 school year.

4. Hire a state K–12 computer science supervisor to lead the team effort

A statewide computer science initiative can be a demanding effort to manage across multiple departments of a state education agency, not to mention external partners. Although a team approach is recommended due to the variety of stakeholders required to address all aspects of a computer science graduation requirement, a full-time employee dedicated to lead the initiative helps to organize the effort and streamline communication.

5. Communicate to stakeholders completely and frequently

Memorandums announcing the list of approved courses for the graduation credit, directions for the content of locally-developed courses, and information about applying for a waiver should only be the beginning when communicating to district administrators, school principals, school counselors, and teachers. Communication should be frequent and two-way, allowing district and school-level issues to be addressed as they come up. Existing statewide meetings of key stakeholders can be leveraged to present and answer questions about the rationale for the computer science requirement and details of its implementation. In turn, these district stakeholders should be prepared to address the same issues with their school-based leaders.

State education agencies should publish clear timelines and processes on a state computer science webpage and include a comprehensive FAQ similar to this one created by the South Carolina chapter of the CSTA.

6. Publish a list of approved, high-quality courses

Define computer science and use that definition to inform the selection or criteria for high-quality courses approved to satisfy the graduation requirement. Make the definition and accompanying list of approved courses publicly accessible.

For example, every year South Carolina publishes the Activity Coding System for the Student Information System. See page 115 for the list of approved computer science courses for the [2021–22](#) school year. This information is updated on the state [accountability](#) webpage under the High School Courses and Requirements section.

7. Allow the credit to be earned in middle school

One argument that often comes up when suggesting additional high school graduation requirements is that students do not have room in their already packed schedules. If students are able to earn high school credit by taking high school courses in middle school, they not only lighten their high school schedules, but they receive early exposure to computer science. This early exposure in middle school can lead to more interest in computer science pathways in high school, which they will now be able to fit into their schedule!

In South Carolina, [SBE Regulation 43-232](#) for Defined Program 6–8, Section I, Paragraph B specifies the requirements for offering courses to seventh- and eighth-grade students for high school credit. Additionally, the SCDE has also divided the course codes for two one-credit introductory courses into two half-credit courses to better accommodate scheduling at the middle school level.

8. Develop accountability systems and offer temporary waivers to identify schools that need additional support

Data should be collected to keep schools accountable to preparing enough teachers and offering enough classes to allow all students to earn their computer science graduation requirement. Schools that are not meeting this expectation should receive additional support. Additionally, schools that may not be able to meet the first year of required implementation should be able to apply for a temporary waiver. These schools should also receive additional support.

South Carolina provided districts with an option to [apply](#) for a waiver for the first year of implementation, the 2019–20 school year. Subsequently, teacher recruitment for workshops run by The Citadel in the summer of 2020 targeted all of the schools that had applied for a waiver to prepare them for the 2020–21 school year.

9. Align certification policies and timelines with the implementation timeline for the graduation requirement

States should create flexible certification pathways years before a graduation requirement takes effect and provide a deadline by when certification will be required to teach computer science or specific computer science courses. This deadline should be set after the year the

computer science graduation requirement takes effect to ensure that teacher certification does not create a significant obstacle to the implementation of the graduation requirement.

States should provide resources, funding, and clear directions for teachers to earn their certification.

South Carolina is currently piloting teacher certification exam support and an alternative certification consisting of micro-credentials. Additional certification recommendations can be found at [Recommendations for States Developing Computer Science Teacher Pathways](#) and [Micro-credentials: Addressing Certification and Professional Learning in Computer Science](#).

Appendix:

Timeline of South Carolina's Actions

Feb 2016	The South Carolina team of the NSF-funded Expanding Computing Education Pathways Alliance (ECEP), releases a K-12 computer science landscape report, which includes data on the variety of courses, such as keyboarding, that are being used to satisfy South Carolina's computer science requirement. The report found that 54.3% of respondents taught keyboarding while only 23.2% taught programming. South Carolina has been a member of ECEP since 2012.
Jul 2016	The SCDE convenes a committee to write K-8 computer science standards. South Carolina did not have any computer science standards prior to this.
Aug 2016	The State Board of Education (SBE) approves revisions to the Required Credentials for Professional Staff Members (p. 29), allowing many different certification areas to teach computer science courses.
Nov 2016	The SCDE and the Education Oversight Committee release a Joint Task Force on Computer Science and Information Technology report with findings and recommendations regarding Computer Science education in South Carolina.
Dec 2016	The SCDE convenes a committee to review the list of courses that fulfill the computer science graduation requirement. Participants are asked to identify courses that would align with the CSTA definition of computer science that is recognized by the task force. Using the task force's recognized definition, many software applications courses currently approved are defined as digital literacy courses, not computer science courses.
Jan 2017	The SBE approves a computer science certification area for initial teacher licensure or as an add-on endorsement.
May 2017	The SBE approves the K-8 South Carolina Computer Science and Digital Literacy Standards. Districts will be expected to implement the standards for all students in kindergarten through grade eight, beginning with the 2018-19 school year.
Jun 2017	The SCDE released a content overlay resource for the K-8 Computer Science and Digital Literacy Standards. This document provides examples of ways the standards can be embedded in or taught in conjunction with academic standards in the content areas of mathematics, English language arts, science, and social studies.
Oct 2017	The SCDE sends a memorandum informing districts about the upcoming standards development for grades 9-12 and potential changes to the previously approved list of courses for computer science credit.

Dec 2017	The SBE approves the removal of “keyboarding” from regulation 43-234 (Defined Program, Grades 9-12 and Graduation Requirements).
Jan 2018	The SCDE convenes a committee to write the 9-12 computer science standards.
Mar 2018	Following the SBE action, the SCDE announces the removal of keyboarding from the list of courses to fulfill the computer science graduation requirement for the 2018-2019 school year.
May 2018	The SBE approves the use of the Praxis examination for computer science certification.
Jun 2018	The SCDE hosts the first-ever CS Symposium in coordination with the Education and Business Summit.
Aug 2018	The SBE approves the South Carolina Computer Science Standards for High School. It is not mandatory for courses or curriculum to align with these standards.
Sep 2018	The 2018 State of Computer Science Education reports that 43% of public high schools in South Carolina offered at least one foundational computer science course in the 2017-18 school year.
Nov 2018	The SCDE convenes a committee of CS stakeholders and leaders to provide recommendations on the state’s CS initiative. This committee releases a comprehensive report, detailing recommended policies and actions.
Jan 2019	The SCDE announces changes to the graduation requirement. The revised list of courses that fulfill the computer science graduation requirement will go into effect for the 2019-2020 school year for all students who have not yet earned a computer science credit. School districts are allowed to apply for a one-year waiver to postpone implementation of the new list to the 2020-2021 school year. About half of all South Carolina school districts received a waiver.
Jun 2019	The South Carolina chapter of the CSTA hosts the second annual CS Symposium in coordination with the SCDE’s Education and Business Summit. The SCDE funds Code.org regional partner, The Citadel, to deliver professional development workshops through the summer and fall/spring of the 2019-2020 school year.
Sep 2019	The 2019 State of Computer Science Education reports that 69% of public high schools in South Carolina offered computer science in the 2018-2019 school year.
Oct 2019	Governor McMaster joins the Governors’ Partnership for K-12 Computer Science, a group of bipartisan state leaders committed to advancing policy and funding to expand access to, and increase equity in, K-12 computer science education.

Jul 2020	The SCDE partners with The Citadel, the CSTA, and the South Carolina chapter of the CSTA to host South Carolina's inaugural CSPDWeek. Later in 2020, these organizations receive a multimillion-dollar federal Education Innovation and Research grant that will allow the partnership to continue offering CSPDWeek for the next three years.
Sep 2020	The SBE approves the Computer Science Education Program Approval Standards for program providers seeking to offer a program leading to certification in computer science.
Sep 2020	The 2020 State of Computer Science Education reports that 80% of public high schools in South Carolina offered computer science in the 2019–2020 school year.
May 2021	The SCDE hires a state computer science supervisor.
Nov 2021	The <i>2021 State of Computer Science Education</i> reports that 92% of public high schools in South Carolina offered computer science in the 2020–2021 school year.