Arkansas Computer Science and Computing Initiative

Southern Legislative Conference of The Council of State Governments / Education Committee

March 10, 2021, meeting on:

“Educating the Workforce of Tomorrow: COVID-19 and Computer Science Education”

This presentation available at:
Program History
Governor Hutchinson Launches #ARKidsCanCode Initiative ● High School Requirement ● First Task Force ● Clear Path to Licensure ● School Grants

ADE Implements Phase I of Strategic Plan ● Interim Course Development ● Flex Credit ● Teacher Stipend Program

Program Expansion ● Unify ADE/CTE courses and credit system ● CS Specialist Team ● Increase Teacher Capacity ● Unified State PD System

Building a National Brand ● Governor’s Computer Science Summit ● Instituting Cybersecurity Focus ● 5-Year CS Report

Continued Growth of Initiative ● New course development focused on pathway options ● Met 5-year student enrollment goal

Moving Forward ● Focus will be on growing the initiative by implementing the Computer Science and Cybersecurity Task Force Recommendations as appropriate and able
Arkansas’s CS Strategic Plan

The ADE Office of Computer Science’s established goals and associated tasks for computer science education implementation in Arkansas are divided into five categories:

1. Standards, Curriculum, and Pathways
2. Educator Development and Training
3. Licensure
4. Outreach and Promotion
5. Program Growth and Student Success

These categories are each addressed in two different groupings based on the status/time frame of its implementation:

1. Current/Planned Future and
2. Past Planned/Completed Work.

Vision - All Arkansas students actively engaging in a superior and appropriate computer science education.

Mission - To facilitate Arkansas’s transition to becoming and remaining a national leader in computer science education and technology careers.
Arkansas (along with ID, IN, MD, and NV) has met all 9 policy ideas

Arkansas

1,544
Open computing jobs
(2.7x the state average demand rate)
with an average salary of $72,662

89%
of public high schools teach a CS class

410
Computer science graduates
Policy Environment (rubric):

- Dedicated state funding for CS PD
- Requires all high schools to offer CS
- K-12 CS curriculum standards

See your state’s details at: https://advocacy.code.org/
In 2017, Arkansas became the first state to meet all 9 of the following:

1. Create a state plan for K–12 computer science
2. Define computer science and establish rigorous K–12 computer science standards
3. Allocate funding for rigorous computer science teacher professional learning and course support
4. Implement clear certification pathways for computer science teachers
5. Create programs at institutions of higher education to offer computer science to preservice teachers
6. Establish dedicated computer science positions in state and local education agencies
7. Require that all secondary schools offer computer science with appropriate implementation timelines
8. Allow computer science to satisfy a core graduation requirement
9. Allow computer science to satisfy an admission requirement at institutions of higher education

See what of these 9 your state is implementing at: https://code.org/advocacy/landscape.pdf
What has Worked?

- Arkansas has placed and continues to place the majority of the appropriated and allocated funding for the Computer Science and Computing Initiative behind training teachers across Arkansas.
- The state employs, through grants, nine Statewide Computer Science Specialists.
- The primary task for these specialists is to provide Arkansas educators with access to quality computer science professional development.
- Though the following specialists may be housed in a particular Education Service Cooperative (ESC) or town, they are statewide specialists and serve the computer science professional development needs of all educators across Arkansas as directed and approved by the ADE Office of Computer Science.

What has Worked?

- Arkansas was the first state to pass comprehensive legislation requiring every high-school in Arkansas to offer high-quality CS
- Arkansas established a national model for the CS flex credit, which allows CS to count in place for math and science
- The Arkansas High School CS Standards and Courses were written with state and national tech industry representatives and input and co-adopted by both the Arkansas Department of Education (ADE) and Arkansas Division of Career and Technical Education (DCTE)
What has Worked?

- Arkansas was the first state to write and mandate grade specific computer science standards for all K-8 students
- $21 million in state funding has been allocated to the CSforAR Initiative with the majority of funds going to developing new CS teachers
- Approximately $5 million in outside financial support has been provided to Arkansas to support the #CSforAR / #ARKidsCanCode initiative
- ARCareerEd has awarded approximately $1 million in state and federal funding to schools to expand high quality career related CS pathways including robotics, mobile application development, and cyber security academies
What has Worked?

- ADE with the assistance of two Governor appointed task forces developed, revised, and adopted a comprehensive strategic plan for CS that continues to be updated and serves as a model for other states implementing CS initiatives.
- Arkansas AP CSA Student Incentive Program continues to be a success with $118,700 awarded to students and schools for AP CSA tests taken in 2019/2020.
- ARCodeKids launched www.artechjobs.com which is a job posting board for use at no cost to employers and job seekers.
What has Worked?

Arkansas has provided access to the Learning Blade platform for all middle school students in Arkansas since 2017 through a partnership with the Arkansas Public School Resource Center.

- Since 2017, 44,000+ Arkansas students have completed 1,274,077 computer science and STEM lessons online totaling 177,109 hours of online learning.
- As of December 2020:
  - Number of online lessons completed this school year: 87,328+
  - Percent increase in lesson plans downloaded since 12/2019: 18%
  - Number of students’ receiving downloadable lessons this year: 13,940
Current Data
High School Computer Science Student Enrollment

- **Student Count**
  - 2014/15: 1,104
  - 2015/16: 3,973
  - 2016/17: 5,500
  - 2017/18: 6,184
  - 2018/19: 8,044
  - 2019/20: 9,813
  - 2020/21: 10,450

- **Percentage Growth Since 2014/15**
High School Student Enrollment in Higher Level Computer Science Courses
Computer Science Enrollment Grade Level Percentages
Computer Science Enrollment Percentages Based on Race

- Hispanic: 12.21% (Blue), 13.59% (Red)
- Native American/Alaskan Native: 0.72% (Blue), 0.63% (Red)
- Asian: 3.97% (Blue), 1.70% (Red)
- Black/African American: 19.63% (Blue), 19.18% (Red)
- Native Hawaiian/Pacific Islander: 0.40% (Blue), 0.47% (Red)
- White: 60.29% (Blue), 61.15% (Red)
- Two or More Races: 2.78% (Blue), 2.89% (Red)
In-State Student Enrollment in Computer Science
Degree Programs

[Bar chart showing enrollment numbers from 2014 to 2020 with a line graph depicting percentage growth since 2014.]
High School Computer Science Teacher Certifications

Computer Science Licensure

- 5014 Technical Permit
- 5016 Approval Code
- Full 528 Certification

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2020 Computer Science and Cybersecurity Task Force
Computer Science and Cybersecurity Task Force Report Contents

- Task Force Overview
- Computer Science and Computing Initiative Progress Update
- Task Force Findings and Recommendations
  - Five Broad Recommendation Categories
  - Twenty-One General Recommendations
  - More than 100 Specific Recommendations and Actionable Items
- Review of the 2016 Computer Science and Public Technology Task Force Recommendations and Progress

Governor Hutchinson’s Phase I Prioritization of CSCTF Recommendations

- Require one computer science credit to graduate
- Require every public high school to have at least one endorsed or certified computer science teacher
- Provide incentives for training and teaching computer science
- Increase internships and partnerships with private technology companies

Governor Hutchinson’s Phase I Prioritization of CSCTF Recommendations

- Increase higher education computer science course and student enrollment
- Attract new tech companies to Arkansas and incentivize tech companies to expand in the state
- Develop policies to attract tech workers to Arkansas

Computer Science Education Advancement Act of 2021

Senate Bill 107 - 93rd General Assembly - Regular Session

Bill Sponsors:
Senator Jane English
Representative DeAnn Vaught
Computer Science Graduation Requirement

Legislation:

- Would require one credit in a high school Computer Science or Computing Course for graduation
- Would begin with the 9th grade class of 2022-2023
- If an 8th grade student in the 2021-2022 school year takes a high school computer science course for credit, it would meet this requirement

Computer Science Graduation Requirement

Regulation:

- Would allow any of the more than 55 computer science and computing courses to meet the requirement
- Would allow for the earned credit to still be utilized as a flex credit
  - Could still replace the student’s 4th year math requirement
  - Could still replace the student’s 3rd science requirement (not biology)
  - Could still replace one (or more) of the student’s six required career focus/elective credits
- Multiple and unused credits can be utilized in any of the requirement areas as the student needs. This is automatically determined by the state’s Triand system.

Computer Science Graduation Requirement

- New courses were written to support 9 state-developed specific pathways:
  - Artificial Intelligence and Machine Learning
  - Computer Engineering
  - Cybersecurity
  - Data Science
  - Game Development and Design
  - Mobile Application Development
  - Networking
  - Programming
  - Robotics

Computer Science Graduation Requirement

- Existing Advanced Placement (AP), International Baccalaureate (IB), Concurrent Credit, Independent Study, and Internship options allow for multiple additional flexible pathways
  - AP - two course options
    - AP CS Principles which is an introductory course
    - AP CS A which is an advanced course
  - IB - one advanced computer science course
  - Concurrent Credit - 9 concurrent credit and 9 weighted concurrent credit course codes that schools can utilize
  - Independent Study - up to one credit for school approved independent work that builds upon Arkansas standards
  - Internship - up to one credit for school approved internship that builds upon Arkansas standards

Computer Science Graduation Requirement

- ADE approved Division of Career and Technical Education (DCTE) options allow for multiple additional flexible pathways:
  - Computer Science Career Practicum options - up to four credits

Computer Science Teacher Requirement

- Would require every public high school to employ at least one high school computer science certified teacher
- Would begin with the 2023-2024 school year

Computer Science Teacher Requirement

○ Traditional Certification gained:
  ■ through one of four postsecondary new teacher education programs
  ■ by an existing teacher passing the CS PRAXIS
  ■ ADE APPEL, MAT, or PPTL alternative certification processes

○ Approval Code gained through:
  ■ state-provided training
  ■ partner (e.g., ASMSA) provided training approved by ADE
  ■ college credit hours in CS and CS Certifications

○ More information on all CS licensure pathways is available at:

Computer Science Teacher Requirement

○ Technical Permits
  ■ The 5013 is designed for public school classified staff members who have experience with students that also meet training or industry certification requirements: http://bit.ly/CSforARTechPermit5013
  ■ The 5014 is designed for candidates with professional and relevant industry experience in computer science and computing that also meet training or industry certification requirements: https://bit.ly/CSforARTechPermit
  ■ Both options require a school based mentoring program

Program Connections

○ Follow us:
○ Email us at: CSforAR@arkansas.gov

http://cs.arkansas.gov