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Final Evaluation Report

Educator Workforce Investment Grant in Computer Science

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Executive Summary

Building on nearly a decade of policy actions designed to create a foundation for computer science education in California's K–12 public schools, the state of California created the Educator Workforce Investment Grant in Computer Science (EWIG: CS) to build the capacity of teachers and administrators to deliver high-quality learning experiences. Grant funding supported a series of multiday workshops offered under the umbrella of Summer of CS, facilitated through a network of Computer Science Champions embedded in county offices of education, that sought to build educator knowledge and skills in computer science. The American Institutes for Research® (AIR®) served as the external evaluator for this grant and issued a series of reports and research summaries that identified key findings from different bodies of EWIG: CS work. This final report highlights the major takeaways across all evaluation efforts by summarizing results in five areas: (1) educator professional learning participation, (2) educator experiences with professional learning, (3) the development and reach of CS champions, (4) shifts in teacher practice, and (5) changes in student access to computer science education.

Findings About Educator Professional Learning Participation

A series of multiday workshops offered in the summers of 2023, 2024, and 2025—known collectively as Summer of CS—sought to build the capacity of K–12 educators in California to deliver high-quality instruction in computer science. Registration and attendance data offer insights into the educators who participated in these workshops.

Key Finding #1: Summer of CS served 1,394 educators from 2023 to 2025, many of whom had no prior experience with teaching computer science. The gender representation of these participants was similar to the overall California K–12 workforce.

Findings About Educator Experiences With Professional Learning

Pre- and postworkshop participant surveys administered during Summer of CS in 2024 and 2025 plus focus groups conducted about Summer of CS in 2025 offer insights into the quality of the workshop experience. A follow-up survey administered in fall 2025 to attendees of Summer of CS in 2023 and 2024 supplements these findings by capturing participant perspectives after they returned to their schools for 1–2 years after their workshop.

Key Finding #2: Survey respondents and focus group participants reported positive impressions about Summer of CS workshop content, format, quality, and usefulness. Positive features of the workshops from 2023, 2024, and 2025 identified through surveys and focus groups included the use of high-quality instructional strategies, exposure to high-quality instructors, collaboration and networking with other teachers, and opportunities to receive ongoing support.

Key Finding #3: Survey responses revealed a positive and statistically significant change in participants' confidence in teaching computer science between the beginning of Summer of CS workshops in 2024 and their return to the classroom 1 year later. This growth in confidence persisted despite a small drop between the end of the workshop experience and the time of the follow-up survey.

Key Finding #4: Survey responses revealed a positive and statistically significant change in participants' beliefs about who can and should do well in computer science between the beginning of Summer of CS workshops in 2024 and their return to the classroom 1 year later. These changes were smaller in magnitude than those for educator confidence, but the preworkshop values were also higher, suggesting that educators who participated in Summer of CS workshops already had strong beliefs about the importance of computer science and the ability of all students to succeed. This growth in beliefs persisted despite a small drop from the end of the workshop experience to the time of the follow-up survey.

Findings About the Development and Reach of CS Champions

Members of the EWIG: CS planning team recruited, onboarded, and provided ongoing training and supports for county office of education administrators to serve in the role of a CS Champion. CS Champions coordinated all aspects of grant-funded professional learning in computer science and therefore provided a critical infrastructure for supporting computer science education. Two data sources, a set of focus groups conducted in summer 2024 and a survey administered in fall 2024, offer insights into the CS Champion experience.

Key Finding #5: CS Champions articulated a shared understanding of their role and perceived their activities as pivotal to increasing teacher participation in computer science professional learning. Ninety percent of survey respondents strongly agreed or agreed that they understood their roles as CS Champions, and focus group participants' reflections aligned with the role definition articulated by members of the EWIG: CS planning team.

Key Finding #6: EWIG: CS succeeded in creating a community of computer science education advocates across California. Social network analyses revealed a robust community in which members were connected to multiple other CS Champions.

Findings About Shifts in Teacher Practice

Perspectives from Summer of CS participants immediately before and after their workshop experience are helpful for understanding workshop quality, but a more meaningful measure of success is the degree to which knowledge and skills translate to subsequent classroom behaviors. Follow-up survey findings from attendees at Summer of CS in 2023 and 2024 highlight aspects of classroom instruction during the 2024–25 school year.

Key Finding #7: Summer of CS workshop participants delivered computer science instruction when they returned to their classrooms. Eighty-six percent of Summer of CS participants from 2023 and 2024 taught computer science during the 2024–25 school year, and nearly two thirds reported that they taught computer science at least weekly. The average number of hours of instructional time for these participants ranged from 87 hours at the elementary level to 241 hours in high school.

Key Finding #8: The primary format of computer science instruction was the integration of content into another subject area; this was especially true in the elementary grades. Nearly two thirds of follow-up survey respondents reported teaching this way, including 72% of respondents teaching students in Grades prekindergarten–5 (PK–5). Roughly one third of follow-up survey respondents reported teaching a standalone computer science class during the school day.

Findings About Changes in Student Access to Computer Science Education

The primary outcomes of interest for any investment in K–12 computer science education are exposure and success for students themselves. Without statewide data to monitor the availability of computer science coursework, case studies of six California districts enabled an exploration of trends in access and participation. Data from the California Longitudinal Pupil Achievement Data System (CALPADS), supplemented by interviews with educators in the six districts, illuminated factors that shaped student participation in computer science courses.

Key Finding #9: Case studies revealed a consistent decrease in computer science availability and enrollment that aligned with the COVID-19 pandemic and otherwise found inconsistent patterns of growth. Teacher knowledge, skills, and interest in teaching computer science played central roles in determining course availability, and computer science often confronted competing priorities for students' attention and space in the master schedule.

Key Finding #10: Integration of computer science into other subject areas was a key strategy for expanding access to more students. However, because these learning opportunities do not appear in CALPADS course codes or course-count metrics, the quantitative patterns uncovered through this research understate the extent to which students gained exposure to computer science content.

Key Finding #11: Hispanic and Black students and women were underrepresented in computer science courses relative to their population in the district. Nevertheless, some districts employed strategies with demonstrated success in improving participation among these students.

Key Finding #12: Interview respondents described EWIG: CS as playing a vital role in building computer science capacity by exposing teachers to concepts, tools, and instructional

materials. Workshops offered through Seasons of CS provided training that districts could not deliver independently because of budget constraints and limited internal expertise.

Areas for Continued Attention

Evaluation results point to several positive outcomes associated with California's EWIG: CS investment. Despite reports of quality experiences, increases in confidence and beliefs, and implementation of computer science content in classroom instruction, multiple data sources underscored the reality that educator professional learning by itself is not sufficient to expand computer science learning opportunities across the state in a sustainable way. Continued funding is critical to support ongoing professional learning and the infrastructure that sustains it. Computer science educators must navigate competing priorities that complicate attempts to gain traction and promote the sustainability of their efforts. The pool of educators with the knowledge and skills to foster student learning in computer science remains limited and contributes to wide variation in access across contexts. Finally, even the most committed computer science teachers need the support of district and school administrators to make their work a priority.

As EWIG: CS funding expires, members of the California computer science education community must find ways to build on progress and corral new sources of support if they wish to capitalize on the momentum established through this grant.

Introduction

The state of California has taken notable steps over the last decade to embed computer science into the K–12 public education experience. The State Board of Education adopted a set of computer science standards for Grades K–12 in 2018 and the California Computer Science Strategic Implementation Plan (CSSIP) articulates a vision, a mission, and principles to guide the state's efforts. These principles—for example, "Every student and every teacher is capable of learning computer science" and "Every student in California should have equitable access to high-quality computer science curriculum and instruction"—reveal a commitment to expanding access to all students (California Department of Education, 2019). An analysis from Code.org finds that of 10 policies that can make computer science foundational in public schools, seven are in place in California (Code.org, 2025). These signs of growth reflect a deliberate response to not only the growing demand for computer science skills in the workforce (Bureau of Labor Statistics, 2024; Carnevale et al., 2023; Strohl et al., 2024) but also the ubiquity of technology in our everyday lives and a recognition that responsibly navigating a digital world requires everyone to understand the resources around us (Roser, 2023).

Despite the state's progress, student opportunities and outcomes fall short of their potential to make computer science learning available to everyone. The most recent data available in California show that only 39% of high schools offered computer science courses in 2016–17 and that only 3% of the state's nearly 2 million high school students were enrolled in a computer science course that year. Perhaps more importantly, those opportunities are not distributed equally. In 2017–18, only 30% of California students in Advanced Placement (AP) computer science courses were girls, and just 497 Black and 76 Native American students took AP computer science courses (Scott et al., 2019). By 2023–24, girls still represented only a third of AP exam takers (Code.org, 2025).

The CSSIP recognizes that preparing teachers to deliver computer science is a vital but daunting task (California Department of Education, 2019). Indeed, the Code.org analysis identifies preservice preparation as one of the gaps in supportive California state policies and recommends dedicated professional development funding as an area for improvement (Code.org, 2025). Ensuring that teachers can access the appropriate credentials to teach standalone computer science courses is one component of an educator capacity-building effort. However, with the recognition that access often comes in the form of integrating computer science content into other subject areas, one must also understand the importance of equipping teachers in a variety of roles with the knowledge and skills to support students in computer science education. A statewide investment in in-service educator capacity building that was initially launched in 2021 and expanded in 2023 is an opportunity to address this important obstacle to computer science teaching and learning. The lessons learned from this effort can help to inform future efforts to improve computer science education in California and across the country.

California's EWIG: CS Investment

The state of California established the Educator Workforce Investment Grant (EWIG) program to provide professional learning opportunities for teachers, paraeducators, administrators, and counselors across the state. Two investments established through this grant program specifically aimed to promote high-quality computer science instruction and learning experiences aligned to the Computer Science Standards for California Public Schools.[1] The Budget Act of 2021 provided $5 million in initial funding to support activities between 2022 and 2024. A subsequent $15 million investment established through the Education Omnibus Budget Trailer Bill for the 2022–23 California state budget provided resources to build on and expand the initial effort.

The Sacramento County Office of Education (SCOE), Californians Dedicated to Education Foundation, San Bernardino County Superintendent of Schools, and the University of California, Los Angeles served as the lead agencies for EWIG: CS. Members of the project leadership team designed their work according to the following theory of action: By offering a series of capacity-building opportunities to educators free of charge,[2] leaders in California's computer science education community could increase exposure to computer science among the state's educators; build educator knowledge, skills, and confidence to embed computer science into classroom practices at all grade levels; and increase the volume and quantity of computer science learning opportunities for students.

Two aspects of EWIG: CS are especially relevant for the purposes of this report. The first is a series of workshops, branded as Seasons of CS, designed to provide exposure to and build knowledge of and skill in computer science education. These professional learning opportunities took the form of brief orientation workshops throughout the school year, multiday workshops during the summer, and follow-up workshops during the academic year for summer participants. Collectively, the workshops aimed to build the capacity of teachers and administrators to offer high-quality computer science content through dedicated computer science courses and by integrating that content into existing academic courses.

A critical piece of infrastructure designed to support these learning opportunities was a statewide network of Computer Science Champions (or CS Champions) housed among the state's 58 county offices of education. These individuals were charged with designing and delivering the educator workshops and promoting and providing support for computer science education efforts in districts and schools. In a state that features more than 1,000 school

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[1] See https://www.cde.ca.gov/be/st/ss/documents/csstandards.pdf.

[2] Professional learning opportunities sponsored by EWIG: CS often also included a financial incentive for participants.

districts and limited resources within the California Department of Education (CDE) to support capacity building, this form of regional support created an opportunity to serve educators across the state that was tailored to the particular strengths and challenges of the education systems within each county.

The AIR External Evaluation

The American Institutes for Research® (AIR®) partnered with the EWIG: CS lead agencies to serve as the external evaluator for the grant. The evaluation operates as a required component of the overall EWIG: CS program from CDE. To inform its evaluation approach, the AIR team organized a set of research questions around the four components of the Capacity, Access, Participation, and Experience (CAPE) framework, which highlights *capacity* to deliver, *access* to, *participation* in, and *experiences* with computer science education.[3] The CAPE framework directly addresses equity with each component and acknowledges the multiple layers of an educational approach required to equip students to thrive in computer science (Fletcher & Warner, 2021). Guided by this framework, the AIR evaluation sought to address the research questions (RQs) identified in Exhibit 1.

This report summarizes findings that span the full range of data collection and analysis activities that took place in 2024 and 2025 to better understand the strengths and challenges associated with the 2023 installment of EWIG: CS.[4] It draws on data and insights that have already been published in previous reports from the AIR evaluation team (see Exhibit 2).[5] For comprehensive findings and a detailed explanation of our analytic approaches, we encourage the reader to refer to those resources. Our goal in this document is to highlight the key takeaways from five areas of focus identified by CDE in its original request for proposals:

1. Educator professional learning participation
2. Educator experiences with professional learning
3. Development and reach of CS Champions
4. Shifts in teacher practice
5. Changes in student access to computer science education

[3] See https://ecepalliance.org/resources/models/cape
[4] An evaluation of the 2021 grant, conducted by the Kapor Center, shared findings about the early stages of the EWIG: CS program.
[5] To access the full set of publications associated with this evaluation, please visit the project website at https://www.air.org/project/evaluation-educator-workforce-investment-grant-computer-science.

Exhibit 1. EWIG: CS Evaluation Research Questions

Research question	CAPE dimension	CDE area of focus
1. To what extent have EWIG: CS professional learning activities reached and included their target audiences? a. To what extent does the pool of participants reflect the California K–12 teaching force? b. To what extent is participation in Seasons of CS orientation workshops associated with subsequent participation in other EWIG: CS professional learning activities?	Capacity	Educator professional learning participation
2. How do EWIG: CS workshop participants describe the quality of their professional learning experiences? a. What changes in knowledge and skills to teach computer science do EWIG: CS workshop participants report after their professional learning experiences? b. What changes in beliefs and confidence to teach computer science do EWIG: CS workshop participants report after their professional learning experiences?	Capacity	Educator experiences with professional learning
3. To what extent do CS Champions believe that the training and support they receive has adequately prepared them to carry out their work? What insights do CS Champions have about their role in equitably expanding computer science education?	Capacity	Development and reach of CS Champions
4. What is the nature and frequency of interactions among CS Champions outside formal professional learning activities?	Capacity	
5. To what extent have the numbers of discrete computer science courses increased during the time period of the 2021 and 2023 EWIG: CS grants?	Access	Changes in student access to computer science education
6. To what extent has participation in discrete computer science courses increased during the time period of the 2021 and 2023 EWIG: CS grants? To what extent has participation increased for historically underrepresented populations?	Participation	
7. To what extent have teachers' instructional practices changed after participating in EWIG: CS professional learning activities?	Experience	Shifts in teacher practice

Exhibit 2. EWIG: CS Evaluation Reports

Report title	Date	Research question addressed	Description
Summer of CS 2024 Survey Findings	October 2024	RQ 1, 2	Survey findings from participants in Summer of CS 2024 provide insights about workshop participation, experiences, and changes in self-reported confidence and beliefs
2024 Annual Report	January 2025	RQ 1 ,2, 3,4	Annual report combines findings from all data collection activities conducted in 2024, including those reported in *Summer of CS 2024 Survey Findings* and *CS Champions and Focus Group Findings*
CS Champions Survey and Focus Group Findings	March 2025	RQ 3, 4	Survey and focus group findings from CS Champions collected in summer and fall 2024 reveal details about the CS Champion role, its perceived influence, and the network of CS Champions across California
Summer of CS 2025 Survey and Focus Group Findings	October 2025	RQ 1, 2	Survey and focus group findings from participants in Summer of CS 2025 provide insights about workshop participation, experiences, and changes in self-reported confidence and beliefs
Summer of CS Follow-Up Survey Findings	January 2026	RQ 2, 7	Survey findings from participants in Summer of CS 2023 and 2024 share information about workshop experiences, classroom behaviors during the 2024–25 school year, and changes in self-reported confidence and beliefs
Case Studies of Computer Science in Six California Districts	January 2026	RQ 5, 6	Analyses of course availability and enrollment data, supplemented by interviews, explore changes in numbers of computer science courses over time and the composition of students in those courses
2025 Annual Report	January 2026	RQ 1, 2, 5, 6, 7	Annual report combines findings from all data collection activities conducted in 2025, including those reported in *Summer of CS 2025 Survey and Focus Group Findings*, *Summer of CS Follow-Up Survey Findings*, and *Case Studies of Computer Science in Six California Districts*

Methods

The findings in this report draw on five key data sources: (1) workshop registration and participation records, (2) surveys, (3) focus groups, (4) course enrollment and participation data, and (5) interviews. For details about the data collection and analysis approaches employed by the research team, we direct the reader to the 2024 and 2025 annual reports. See Exhibit 3 for a crosswalk of these data sources with the research questions described in the Introduction section of this report.

Seasons of CS Workshop Registration and Participation

SCOE administered a database in Airtable that tracked registration and participation for all Seasons of CS workshop participants. The database includes contact and basic demographic information for registrants of the orientation workshops, the summer workshops, and the academic year workshops. It also includes details about whether registrants completed the required paperwork for participation as well as attendance data for each day of training. SCOE provided AIR researchers with access to this database to gather information about Seasons of CS workshop participation (RQ 1).

Surveys of Workshop Participants and CS Champions

The AIR research team administered six surveys over the course of the evaluation to better understand the experiences, perspectives, and behaviors of Summer of CS workshop participants and CS Champions. In 2024 and 2025, Summer of CS participants completed a survey immediately before the beginning of their workshop and directly after its conclusion. These surveys enabled the team to assess participant satisfaction with their workshop, as well as to examine self-reported confidence and beliefs related to computer science and the ways in which these changed from the beginning to the end of the workshop (RQ 2). A follow-up survey administered in September 2025 to participants from Summer of CS in 2023 and 2024 allowed for the further analysis of perspectives and behaviors during the 2024–25 school year (RQ 7).

AIR also designed and administered a social network survey in fall 2024, focusing on CS Champion experiences in their role (RQ 3) and the patterns of communication among members of the network (RQ 4). Survey items focused on a variety of topics related to CS Champion relationships, responsibilities, and supports, as well as opportunities and barriers that might shape the future of computer science education in California.

Exhibit 3. Crosswalk of Data Sources and Research Questions

Data source	RQ1	RQ2	RQ3	RQ4	RQ5	RQ6	RQ7
Seasons of CS registration and participation data	●						
Seasons of CS 2024 pre- and postworkshop survey		●					
Seasons of CS 2025 pre- and postworkshop survey		●					
Seasons of CS 2025 focus groups		●					
CS Champions survey			●	●			
CS Champions focus groups			●	●			
CALPADS data					●	●	
Interviews with case study districts					●	●	
Seasons of CS 2023 and 2024 follow-up survey		●					●

Focus Groups

To supplement survey findings from Summer of CS workshop participants and CS Champions, the research team also conducted a series of focus groups. In summer 2024, six focus groups with a total of 19 CS champions shed additional light on their roles and the greater CS Champion network, the extent to which CS Champions and their work contributed to equitably expanding CS education, and ways in which EWIG: CS training and supports facilitated their success (RQs 3 and 4). In summer 2025, AIR researchers conducted 12 focus groups with 69 participants from the 2025 Summer of CS workshops. Focus group facilitators asked participants about their workshop experience overall, any changes in confidence or beliefs that they attributed to the workshop, and the degree to which they felt prepared to apply what they learned when they returned to school in fall 2025 (RQ 2).

Course Availability and Enrollment

In the absence of statewide data about computer science course availability and enrollment, the AIR team examined these metrics through case studies of six California school districts designed to represent a variety of district sizes, regional representation, and student demographics. To explore the degree to which EWIG: CS has shaped educator capacity, AIR also targeted districts with educators who had participated in Summer of CS workshops. The research team collected reports from the California Longitudinal Pupil Achievement Data System (CALPADS) that included student demographic and course-taking data to analyze enrollment in computer courses by gender, race and ethnicity, and grade level (RQs 5 and 6). To explore potential changes over time, CALPADS data included a 6-year period from the 2018–19 through the 2023–24 school years.

Interviews

The research team then conducted interviews with representatives from each of the case study districts to better understand the quantitative patterns revealed in course availability and enrollment data and the broader context in which computer science was unfolding in these districts. The interview protocol asked participants to describe computer science course offerings, teacher capacity and credentialing, scheduling, recruitment practices, equity efforts, and the role of EWIG: CS–supported professional learning in their district. Interviewers also presented results of the course-taking analyses to each respondent to gather insights about enrollment patterns in the district (RQs 5 and 6).

Limitations

Any research approach features limitations that should shape the reader's interpretation of study findings. Here we highlight important implications of the methods employed for the EWIG: CS evaluation.

Self-Reported Data

First, the findings presented here rely heavily on self-reported data. The Summer of CS workshop participant surveys, participant focus groups, CS Champions survey, and CS Champions focus groups all asked individuals who have been part of the EWIG: CS grant to share their perceptions and memories of their experiences. The resulting data are therefore subject to factors such as recall bias and social desirability bias that might shape their responses to survey and focus group questions.

Statements of Causal Inference

Second, the study design does not permit causal inferences about the impact of the EWIG: CS program. There is no comparison group that would enable us to analyze differences in outcomes reported by program participants to individuals who have not received the same opportunities as those provided by the grant. Although the use of preworkshop, postworkshop, and follow-up surveys enabled a comparison of perspectives in the same individual across time, we cannot claim that EWIG: CS *caused* the results reported here.

The Nature of Survey and Focus Group Data

Online surveys like those used to collect data from workshop participants provide several benefits. However, because the surveys use standardized language for all respondents, some respondents may interpret questions differently, and bounded response options may not fully capture the nuances of all interactions. On the other hand, the nature of a focus group that uses a semistructured data collection protocol can result in variation in the data collected. The number of participants in a focus group, the conditions under which a focus group takes place (especially in person vs. virtual), and the backgrounds of focus group participants can all shape the conversation in ways that complicate the comparability of responses across focus groups.

Educator Professional Learning Participation

The professional learning opportunities promoted by EWIG: CS centered on three types of workshops, all offered under the banner of Seasons of CS:

- **Orientation workshops** offered throughout the year aimed to demystify computer science by giving a broad range of educators access to a content area that may otherwise have been intimidating, providing easy tools to integrate into their daily practice, and sparking interest in further learning.
- **Multiday workshops, branded as Summer of CS**, offered intense learning experiences that enable deep engagement with specific courses or topic areas related to computer science.
- **Academic year workshops** offered participants opportunities for continued engagement and problem-solving regarding topics introduced during summer workshops.

Because of their duration and intensity, Summer of CS workshops were the vehicles through which educators engaged most deeply in building their computer science knowledge and skills.

Summer of CS featured 44 different workshops delivered over the course of 10 weeks in 2024 and 17 workshops delivered over the course of 3 weeks in 2025. The flagship event among these offerings in both years was CSPDWeek, a collection of 10 concurrent workshops conducted during the same week in Anaheim, California. Workshops included between four and 44 participants and ranged from 3 to 5 days in length.

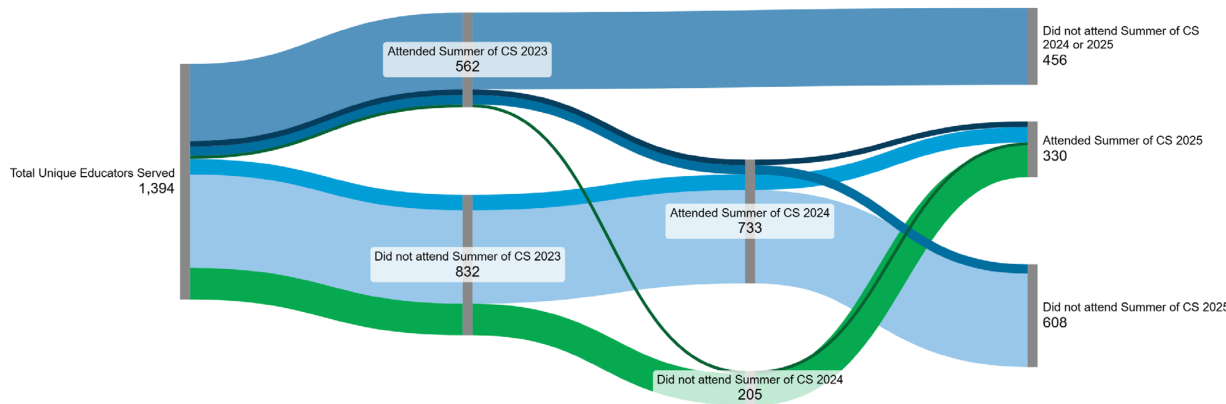
Key Finding #1

Summer of CS served 1,394 educators from 2023 to 2025, many of whom had no prior experience with teaching computer science.

From 2023 to 2025, Summer of CS served 1,394 unique educators.[6] Among these, 86% of participants (1,196) attended a single workshop, 12% (165) attended a workshop in 2 of the 3 years, and 33 educators (2%) attended a Summer of CS workshop in all 3 years. Exhibit 4 shows the participation levels across the 3 years, including the various participation pathways from year to year.

[6] Data-collection activities for this external evaluation began in 2023, well after the Summer of CS 2023 workshops had taken place and before the final version of the registration and participation database had been established. Thus, although we can report overall participation numbers for all 3 years of the 2023 EWIG: CS program period, detailed descriptions of workshop participation focus on 2024 and 2025.

Exhibit 4. Summer of CS Participation 2023–2025



Source: SCOE registration records

Demographics of Workshop Participants

Exhibit 5 compares the gender and race of Summer of CS workshop participants to the overall California K–12 teaching workforce. Workshop participants were more likely to be Asian and multiracial and less likely to be Hispanic or Latino and White than the statewide workforce in 2024 and 2025.

Exhibit 5. Gender and Race of Summer of CS Participants and All California FTE Teachers

Category	Summer of CS participants 2024 (*n* = 733)	Summer of CS participants 2025 (*n* = 330)	California FTE teachers 2023–24 (*n* = 312,219)
Woman	77%	73%	73%
Man	20%	24%	27%
African American	2%	3%	4%
American Indian or Alaska Native	1%	0%	1%
Asian/Filipino	12%	15%	8%
Hispanic or Latino	23%	18%	26%
White	45%	43%	55%
Two or more racial identities	15%	12%	1%
Racial identity not reported	2%	8%	6%

Note. Percentages may not add up to 100% due to rounding. *Source for Summer of CS participant data*: SCOE registration records. *Source for California FTE teachers' data*: California Commission on Teacher Credentialing (2025).

Additional details about Summer of CS participants may also be instructive, even when comparable statewide data do not exist. Exhibit 6 demonstrates that workshop participants served students across elementary, middle, and high school grades. The exhibit also illustrates the range of prior experience with CS instruction among workshop attendees. More than half of Summer of CS participants in 2024 reported no prior experience with teaching computer science, and a third did so in 2025.

Exhibit 6. Teaching Assignments and Experience for Summer of CS Participants

Category	Summer of CS participants 2024 (*n* = 733)	Summer of CS participants 2025 (*n* = 330)
Grade level: 9–12	29%	37%
Grade level: 6–8	40%	45%
Grade level: TK–5	46%	39%
Years teaching computer science: 0	51%	34%
Years teaching computer science: 1–2	22%	28%
Years teaching computer science: 3–5	14%	20%
Years teaching computer science: 6–9	6%	8%
Years teaching computer science: 10 or more	7%	10%

Note. Percentages for grade level do not add up to 100% because respondents can teach more than one grade level. *Source:* SCOE registration records.

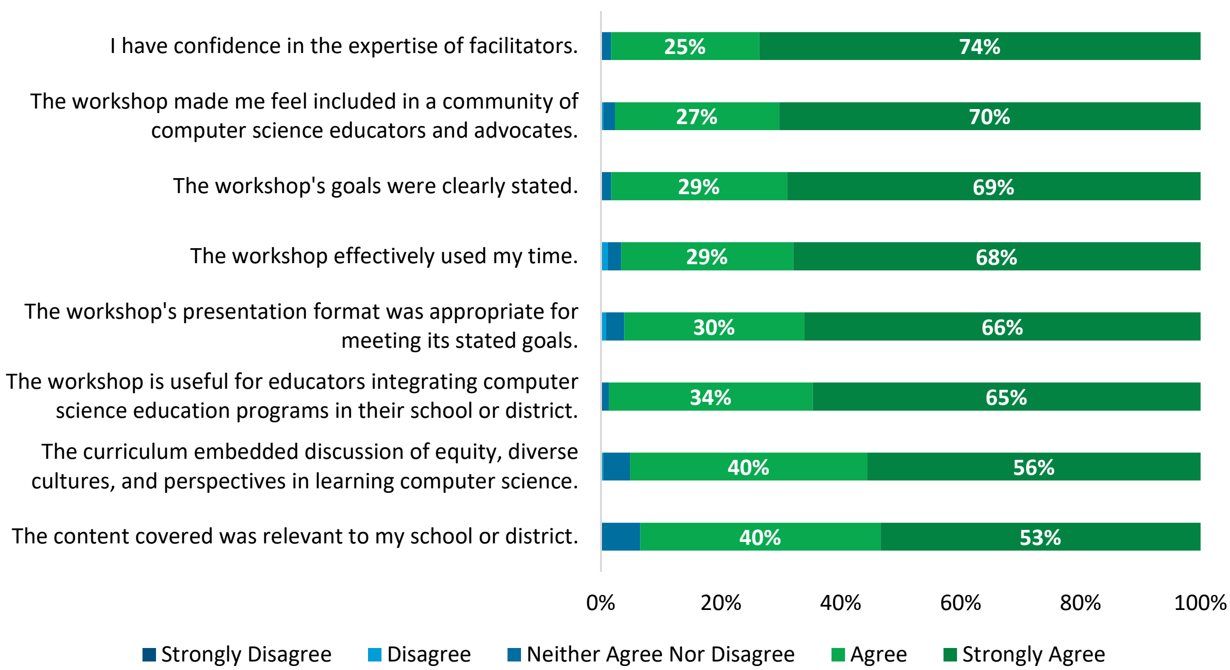
Educator Experiences With Professional Learning

Beyond overall participation levels, a key measure of success for Summer of CS is participants' perspectives about the quality of their workshop experiences. Perspectives from participants from Summer of CS in 2023, 2024, and 2025—captured through focus groups and surveys—reveal high levels of agreement about the quality and usefulness of their workshops.

Overall Perceptions of Quality

Exhibit 7 shows participant responses about workshop quality from the postworkshop survey pooled from 2024 and 2025. Nearly all respondents agreed or strongly agreed with statements that described the relevance, usefulness, and execution of their workshop. For example, 56% of respondents strongly agreed and 40% agreed that the curriculum embedded discussion of equity, diverse cultures, and perspectives in learning computer science. Similarly, 70% of respondents strongly agreed and 27% agreed that the workshop made them feel included in a community of computer science educators and advocates.

Exhibit 7. Participant Perceptions of Summer of CS Workshop Quality, 2024 and 2025



Note. n = 1,192. Response categories with 5% or less do not have a data label. Categories may not add up to 100% due to rounding.

Source: Summer of CS 2024 and 2025 postworkshop survey

Contributing Factors to Workshop Quality

Focus group participants from Summer of CS 2025 and respondents to the fall 2025 follow-up survey (who had participated in Summer of CS 2023 and/or 2024) offered their perspectives about aspects of the workshops that were valuable to them.

High-Quality Pedagogical Strategies

The most frequent observations pointed to the quality of pedagogical strategies employed in their workshops. For example, multiple focus group participants described the value of experiencing engaging strategies through the lens of a student. One CSPDWeek participant explained, “What I really like about it is we’re taught by teachers who make it engaging for us, so we could then turn around and make it engaging for our students.” Write-in survey responses also referred to the pedagogical approaches to the workshop, with particular attention paid to the opportunities to engage in hands-on learning opportunities. “Getting to work on real coding projects,” one educator explained, “really helped solidify my understanding of programming concepts and gave me practical experience beyond just theory.”

Key Finding #2

Survey respondents and focus group participants reported positive impressions about Summer of CS workshop content format, quality, and usefulness.

High-Quality Instructors

Closely tied to the quality of instructional approaches were observations about the high quality of workshop trainers overall. A focus group participant shared, “The presenter was well prepared, they had all the materials, and overall, whenever we had to troubleshoot something, they were very knowledgeable about the content.” One survey response described the instructor’s contributions in this way: “She modeled effective teaching strategies while providing excellent curriculum. Her support classes during the year enabled me to feel supported and teach the … curriculum to my students. I could not have done it without the support and encouragement that [the instructor] and the [workshop name] provided.”

Collaboration and Networking With Other Teachers

The most common highlight of Summer of CS mentioned in the open-ended survey responses was the opportunity to connect with other educators through the workshop experience. As one participant explained, “Working alongside peers fostered a sense of community, encouraging knowledge sharing and teamwork, which enhanced both my technical and interpersonal skills.” Another respondent added, “Another highlight was collaborating with other educators. Hearing how others planned to apply these lessons gave me fresh perspectives and a sense of community, which is especially valuable since resources in my school are limited.”

Ongoing Sources of Support

An additional feature of some workshops that emerged in focus group conversation and write-in survey responses was the opportunity for ongoing support throughout the year. This support often took the form of the academic year workshops offered in the academic year after Summer of CS. More than four in five respondents (82%) reported having attended at least one of these academic year workshops, and about half (51%) reported attending three or more. One focus group respondent shared:

> Being able to meet with those people again and my presenters throughout the year really supported me in implementing what I learned last year. It kind of keeps you from going, "This is too hard," as opposed to, "Well, this is hard, but I have somebody I can reach out to and somebody who I have to meet with and that's going to check up with me," and that really helped.

Changes in Participant Confidence

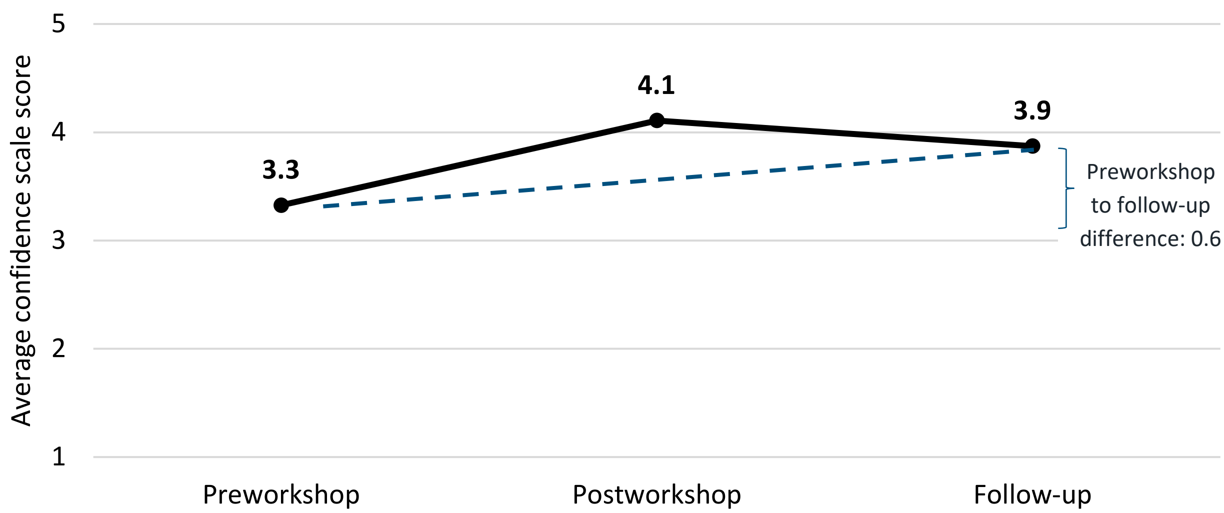
Workshop participant perceptions of quality provide useful evidence about the value of a professional learning experience, but these are insufficient for understanding the effectiveness of an effort like Seasons of CS. Teacher knowledge, understanding, and skills are critical to meet students' computer science learning needs effectively.

> **Key Finding #3**
>
> **Survey responses revealed a positive and statistically significant change in participants' confidence in teaching computer science between the beginning of Summer of CS workshops in 2024 and their return to the classroom 1 year later.**

A set of eight survey items addressed participant confidence in teaching computer science. At the beginning of their Summer of CS workshops, immediately after the workshop's conclusion, and—for participants in Summer of CS 2024—a year after workshop participation, respondents expressed their level of agreement or disagreement with statements like the following: "I am confident in my ability to answer student questions about computer science material" and "I am confident in my ability to teach in alignment with California computer science standards." The AIR study team combined these items into a single measure of participant confidence, then tracked changes over time for participants in Summer of CS 2024.

Collectively, survey responses revealed an increase in average participant confidence after the Summer of CS workshop experience. With a difference of 0.8, the average magnitude of this change is nearly a full point on the five-point Likert scale. However, between the end of the workshop and the administration of the follow-up survey a little more than a year later, respondents reported a drop in average self-reported confidence of 0.2 point. It may be that the experience of returning to the classroom introduced challenges that educators did not anticipate or fully appreciate during their workshop experience. The most important takeaway from these findings is nevertheless positive. From the beginning of the workshop experience, participants reported positive and statistically significant change in their confidence to teach computer science even after spending a full year back in the classroom. (See Exhibit 8.)

Exhibit 8. Changes in Average Workshop Participant Confidence Scale Score



Note. *n* = 307. Survey scale scores have been rescaled to the original Likert range of 1–5 for ease of interpretation.
Source: Summer of CS 2024 preworkshop, postworkshop, and follow-up surveys

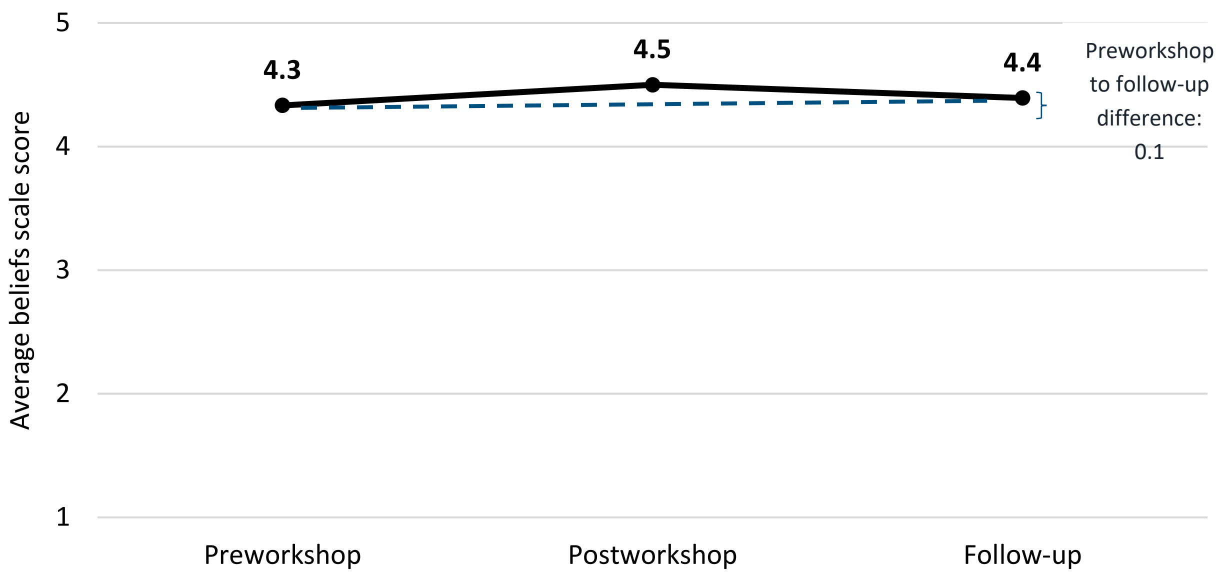
Changes in Participant Beliefs

Similar to measures of confidence, a set of five survey items explored participant beliefs about who should experience and be successful with computer science education. Respondents shared their level of agreement or disagreement with statements like the following at the beginning of their Summer of CS workshops, immediately after the workshop's conclusion, and—for participants in Summer of CS 2024—a year after workshop participation: "All students should learn the fundamentals of computer science" and "All students can understand concepts underlying computer processes." As with items about confidence, the AIR study team combined these items into a single measure of participant beliefs, then tracked changes over time for the subset of participants from Summer of CS 2024 who responded to surveys at the beginning of their 2024 workshop, the end of their 2024 workshop, and in fall 2025.

> **Key Finding #4**
>
> **Survey responses revealed a positive and statistically significant change in participants' beliefs about who can and should do well in computer science between the beginning of Summer of CS workshops in 2024 and participants' return to the classroom 1 year later.**

Exhibit 9 shows results from this analysis. The average preworkshop score for beliefs (4.3) was higher than that for confidence (3.3), indicating that educators began their workshops already agreeing with these survey items at high levels. Despite these higher initial values for the beliefs scale, we still saw a positive and statistically significant change of 0.2 point between the beginning and end of the Summer of CS workshop in 2024. A year later, in fall 2025, self-reported beliefs about who can and should succeed in computer science had dropped, on average, by 0.1 point from the postworkshop levels. As with results about self-reported confidence, it is possible that the realities of classroom instruction in the year after the workshop tempered some of the positive feelings that respondents had reported immediately after Summer of CS. The overall finding nevertheless remains positive. From the beginning of the workshop experience to the follow-up survey administration after a year in the classroom, participants reported a positive and statistically significant average change in the beliefs scale. (See Exhibit 9.)

Exhibit 9. Changes in Average Workshop Participant Beliefs Scale Score



Note. *n* = 353. Survey scale scores have been rescaled to the original Likert range of 1–5 for ease of interpretation.
Source: Summer of CS 2024 preworkshop, postworkshop, and follow-up surveys.

Development and Reach of Computer Science Champions

The workshops made available through the EWIG: CS program were possible because of an infrastructure that was also supported by the state's computer science investment. Throughout the life of the grant, members of the planning team recruited, onboarded, and provided ongoing trainings and supports for county office of education administrators to serve in a role they called CS Champions. These individuals coordinated and delivered Seasons of CS workshops themselves and also served as a general source of support and expertise for computer science education for the regions where they worked. This role was especially important, given the limited capacity that often exists within districts and schools and the limited capacity for building a computer science education field at the state level. The following findings highlight CS Champion insights about their roles and the nature of the network that connected CS champions across the state.

The CS Champion Role

A role description developed by the EWIG: CS leadership team included the following expectation for CS Champions supported through the grant: "Become an expert in at least one curriculum/grade span and build the capacity to support a relevant workshop for educators regionally and/or across California. Further, offer support of other efforts, including contracted providers in offering sessions across grade bands to match local needs." The description went on to identify five specific responsibilities for CS Champions:

1. Become familiar with grant objectives, goals, and parameters for expenditures.
2. Participate in monthly EWIG: CS COE Champion Forum Meetings.
3. Conduct ongoing district and community outreach and recruitment.
4. Coordinate regional and statewide CS workshops for K–12 teachers, paraeducators, counselors, and administrators.
5. Provide ongoing professional learning support.[7]

CS Champions' Understanding of Their Role

Through survey responses and focus group discussions, CS Champions articulated a shared understanding of their role and responsibilities that aligned with the description detailed above. The vast majority of respondents (90%) strongly agreed or agreed that they understood their role as a CS Champion.

[7] COE CS Champion Roles and Workshop Checklist

Focus group participants expressed a consistent vision of the CS Champion role as one that aligned with the foregoing description but often spoke to the bigger-picture goals of the EWIG: CS program rather than the specific details that the program entails. Specifically, respondents noted that their responsibilities required them to connect with and know relevant computer science staff and experts, share computer science resources and activities, and advocate for the equitable expansion of computer science education in the state. At the end of one focus group session, participants collectively shared the following definition:

> "CS Champions serve as liaisons from grant leads to educators and collaborative implementers of CS programs to provide high-quality professional learning for all educators to broaden participation in CS so that all students experience equitable and inclusive CS education."

Roughly half of focus group participants ($n = 9$) shared that their role as a CS Champion included acting as knowledge broker and relationship facilitator; respondents used terms such as *liaison*, *point of contact*, and *connector* of computer science experts, resources, and professional learning to describe this responsibility. One participant explained that, as a CS Champion, they were the "connective tissue" that brought relevant computer science information from the state to their region and county.

Key Finding #5

CS Champions articulated a shared understanding of their role and perceived their activities as pivotal to increasing teacher participation in computer science professional learning.

CS Champions' Perceptions of Their Influence

CS Champions perceived their activities as being pivotal to increasing teacher participation in computer science professional learning. One of the most consistent perspectives across focus groups was a feeling of accomplishment in expanding teacher engagement in computer science learning opportunities. Thirteen of 19 focus group participants expressed their belief that their contribution to and connection with the CS Champions network contributed to increased teacher engagement with computer science learning opportunities. Several participants described an increase in teacher participation in workshops and training sessions offered at the county, regional, and state levels, noting an emphasis on teacher recruitment into computer science education. One CS champion relayed their experience with engaging teachers by explaining,

> We had monthly [professional learning] sessions, and we had people coming back month after month after month after month, and just eating it up and going, 'When's the next one? When's the next one?' … I mean, when a teacher wants to continue learning, then I think you've done a pretty good job.

Findings About the Network of CS Champions

Beyond the relationship between CS Champions and educators in districts and schools, anecdotal accounts from leaders associated with EWIG: CS also underscored the value of the CS Champions network as an outcome in its own right. Computer science education remains a nascent field in K–12 public education, and the small size of many programs and limited resources to support them mean that educators often operate in isolation from one another (Code.org, 2025). A network that enables colleagues across organizational lines to share knowledge and resources, coordinate improvement efforts, and find emotional support from one another can help to improve the quality of CS education efforts and promote the sustainability of programs and services (Cutts et al., 2017). To that end, social network analysis and focus group responses suggest that EWIG: CS fostered a robust community of advocates and leaders who could guide and support the equitable expansion of computer science education in California schools.

Connections Among CS Champions

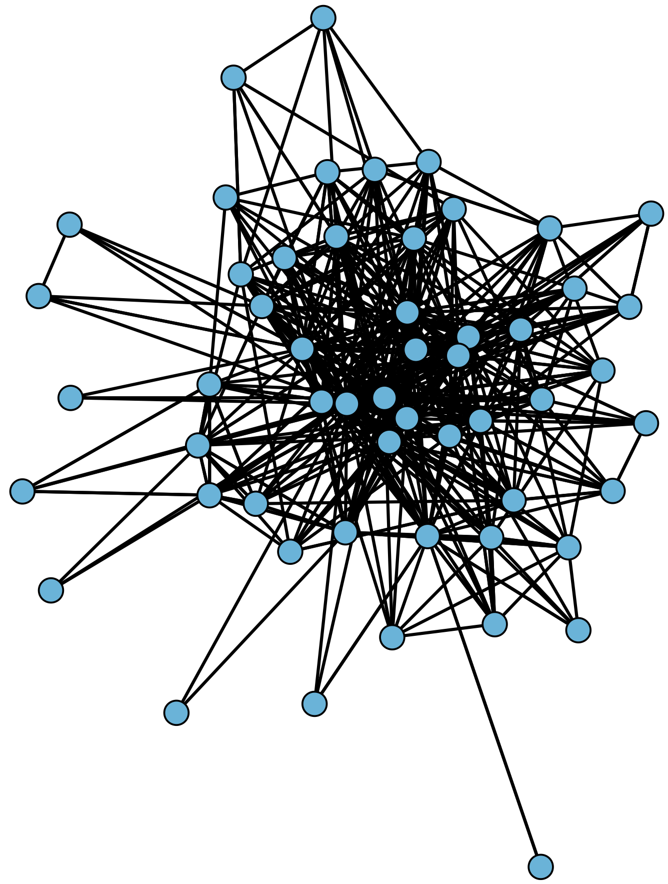
An analytic technique known as social network analysis enables researchers to describe interactions within social settings and how the structure of interactions relates to broader phenomena of interest. To assess how the CS Champions operated as a community around EWIG: CS goals, the AIR team created and analyzed a survey to examine their communication patterns as a social network, with the understanding that communication about these topics provided an opportunity for CS Champions to share their knowledge surrounding CS Champion work.

Key Finding #6

EWIG: CS succeeded in creating a community of computer science education advocates across California.

Networks consist of two components: the nodes (the actors) and the edges (the relationships among those actors). We plot them in Exhibit 10, which presents the full network diagram, wherein each node (depicted as a blue circle) represents a CS Champion and the lines between them represent an instance of communication between the two individuals on at least one occasion outside the formal activities of the EWIG: CS program.

Exhibit 10. CS Champions Network Diagram



Note. n = 48, reporting on the network of 54 CS Champions. *Source:* CS Champion survey.

There are 407 relationships in this network, with an average of 15.1 communication ties. Exhibit 10 demonstrates that there is a group of people who are more actively communicating. We found that 85% of the network has at least five communication ties, but 26% of the network has at least 20 communication ties. Despite this variation among members of the network, it is noteworthy that the entire network is connected. That is, each CS Champion can reach any other member of the CS Champions network. Because there are other social environments characterized by sharp bifurcations or social divisions in communication among individuals, this is a nontrivial piece of evidence that suggests that the CS Champions were functioning as a cohesive group.

Characteristics of the CS Champion Network

Beyond overall findings about the CS Champion network, further exploration helps us better understand the connections that existed among members based on their history with the grant, their personal backgrounds, and their location. Survey data reveal that 49% of the ties among

CS Champions were formed before the EWIG: CA grant. Our data do not allow for conclusions about the causality of these connections, but the fact that more than half the ties (51%) were formed during the EWIG: CS life cycle indicates that the grant period coincides with the development of new relationships among CS Champions. We also tested the ties for each CS Champion based on their tenure working in computer science education, gender, and racial identity and found no statistical evidence that these factors had any relationship with one's position in the CS Champions network. Finally, although we found evidence that network connections are strong within the state's regions, survey results also revealed substantial communication across regions. Thus, the CS Champions network tied together computer science leaders across a large and diverse state.

Shifts in Teacher Practice

Perceptions of workshop quality, reports of changes in confidence and beliefs, and evidence of a statewide infrastructure to support professional learning offer promising signals about the perceived value of California's EWIG: CS investment. However, they provide incomplete information about the degree to which opportunities for computer science education have improved. Given the stated goal of the EWIG: CS investment of "providing high-quality CS instruction and CS learning experiences," we need to understand the degree to which quality learning translates into practice when educators return to their classrooms, schools, and districts. Self-reported data from the fall 2025 follow-up survey offer a window into the nature of computer science learning provided by workshop participants after their summer experience.

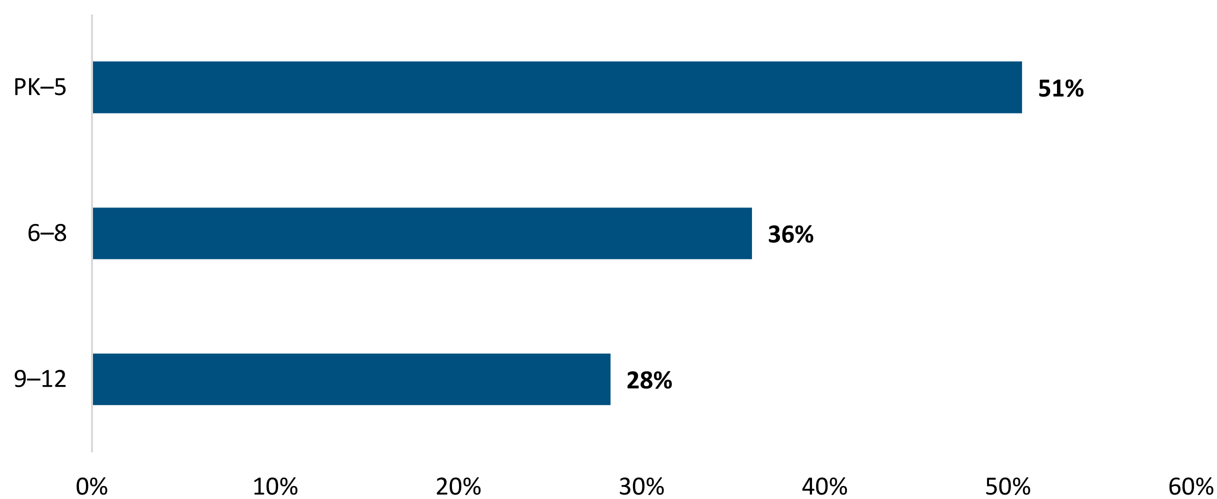
Students Taught

Consistent with the aims of the workshop program, a strong majority of workshop participants went on to incorporate computer science content into their classroom instruction: 86% of respondents reported teaching computer science in some capacity during the 2024–25 school year. Roughly half of these educators served students in Grades PK–5, more than a third served middle-grade students, and more than one quarter reported delivering computer science education to students in high school (see Exhibit 11).

Key Finding #7

Workshop participants delivered computer science instruction when they returned to their classrooms.

Exhibit 11. Grade Bands to Which Participants Taught Computer Science



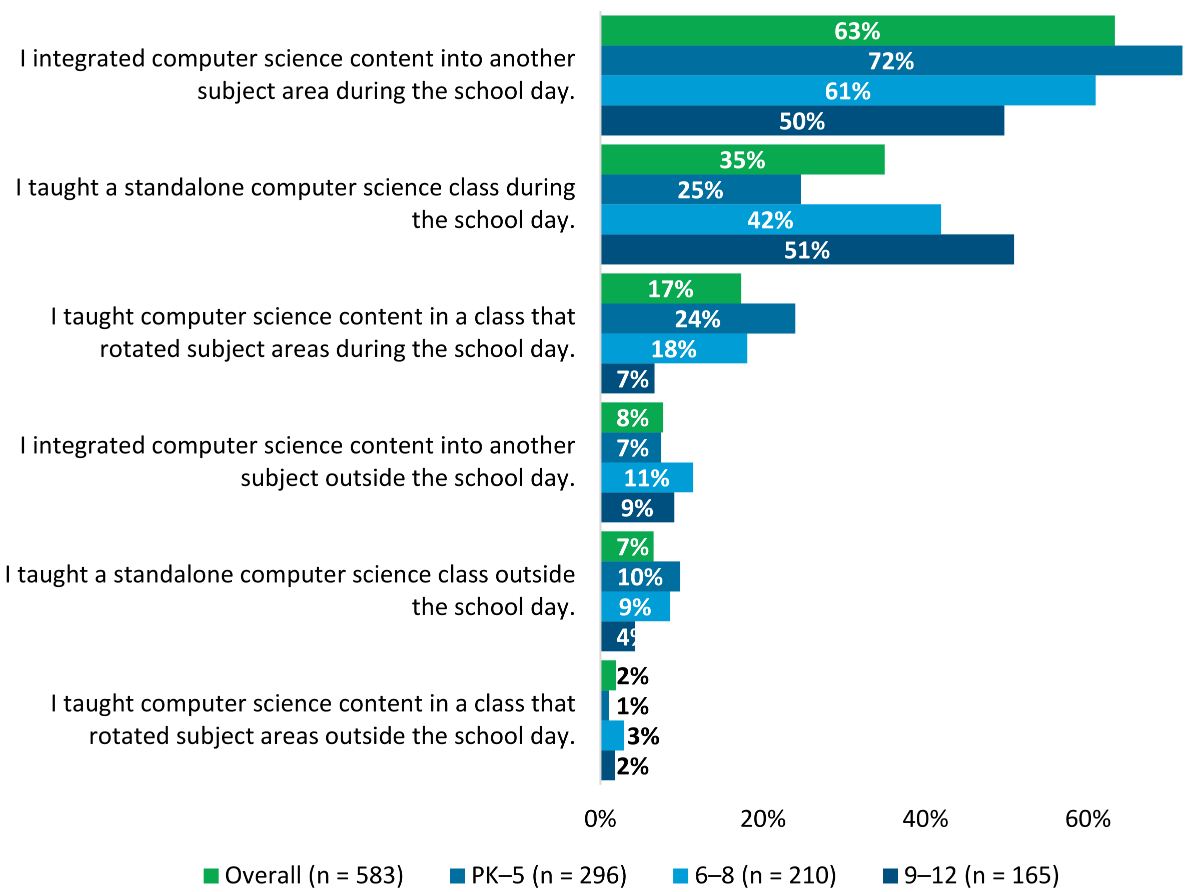
Note. *n* = 583. Totals do not total 100% because this was a check-all-that-apply question. *Source:* Seasons of CS follow-up survey

Format of Computer Science Instruction

Survey responses also offer details about the format of computer science instruction. More than two thirds of respondents indicated that they had integrated computer science content into another subject during the school day, whereas nearly four in 10 reported that they had taught a standalone computer science course during the school day. The teaching format varied by grade band. Nearly three quarters of respondents serving Grades PK–5 indicated that they had taught computer science through integration, but only a quarter of these educators had taught a standalone class. In contrast, comparable percentages of high school educators reported teaching a standalone computer science class and integrating computer science into other subject areas. (See Exhibit 12.)

> **Key Finding #8**
>
> **The primary format of computer science instruction was the integration of content into another subject area; this was especially true in the elementary grades.**

Exhibit 12. Computer Science Formats for Respondents Who Reported Teaching Computer Science by Grade Band

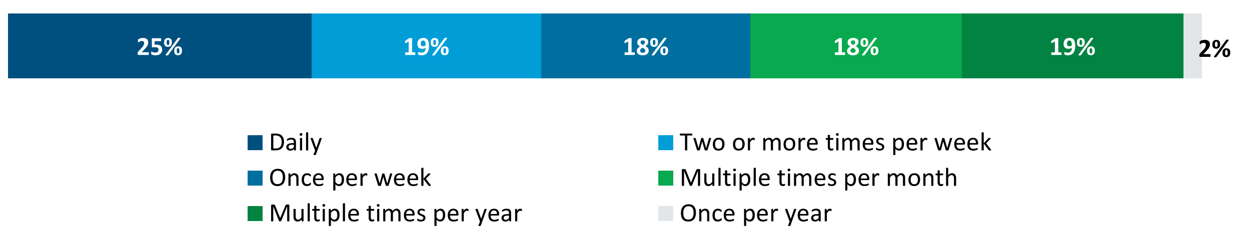


Note. Totals do not add up to 100% because teaching format and grade levels taught were check-all-that-apply questions.
Source: Seasons of CS follow-up survey

Dosage of Computer Science Instruction

Additional survey items revealed details about the frequency with which computer science instruction took place for workshop participants. Overall, one quarter of survey respondents reported teaching computer science daily in 2024–25, and nearly two thirds reported teaching computer science at least weekly (see Exhibit 13). However, frequency varied across several respondent characteristics. For example, 43% of respondents who had taught computer science to high school students did so on a daily basis, whereas only 11% of educators serving students in Grades PK–5 taught computer science every day.

Exhibit 13. Frequency of Computer Science Instruction



Note. n = 582. *Source:* Seasons of CS follow-up survey

In addition to measuring dosage through frequency, the survey also asked respondents to report their total hours of computer science instruction during the 2024–25 school year. As part of the workshop registration process, Summer of CS participants and an administrator in their organization signed a participant agreement stipulating that participating teachers and paraprofessionals would "implement CS instruction using curriculum and pedagogical strategies provided through this workshop during the school year" for 30 hours in Grades PK–5, 50 hours in Grades 6–8, and 75 hours in Grades 9–12. Exhibit 14 displays the number of self-reported instructional hours from the 2025 follow-up survey. These educators taught an average of 145 hours over the course of the school year, with higher average hours in higher grade bands. The exhibit also demonstrates that more than half of educators in each grade band, including nearly two thirds of respondents in Grades 6–8, had met or exceeded the commitment in their participant agreement.

Exhibit 14. Hours of Computer Science Instructional Time by Grade Band and Workshop Participation

Grade band	Average hours	Grade band's expected hours	Percentage of respondents who met or exceeded expectation
Overall (*n* = 557)	145	N/A	N/A
PK–5 (*n* = 283)	87	30	55%
6–8 (*n* = 199)	199	50	62%
9–12 (*n* = 159)	227	75	55%

Note. Grade levels taught was a check-all-that-apply question. *Source:* Seasons of CS follow-up survey

The preceding text and tables provide promising evidence that participants in Summer of CS workshops go on to deliver computer science instruction to students when they return to their schools. However, our study methods do not permit us to determine whether an increase in computer science teaching is caused by workshop participation. In addition, because factors like recall bias might have impaired our ability to capture data accurately, we did not attempt to measure the hours of instruction delivered in the year *before* workshop participation. Nevertheless, the survey did ask participants to indicate whether the number of hours taught in 2024–25 was greater than, similar to, or less than the hours in the year before they had first participated in a Summer of CS workshop. Nearly two thirds of respondents (65%) indicated that they had taught more hours of computer science after Summer of CS than they had before. More than a quarter of respondents (29%) indicated the number of hours was similar between the 2 years, and only 6% reported that they taught fewer hours of computer science in 2024–25 than before their first Summer of CS workshop.

Changes in Student Access to Computer Science Education

Findings about changes in educator capacity and behaviors speak to the promise of the EWIG: CS investment, but the ultimate outcomes of interest are improved opportunities and experiences for students with computer science. Unfortunately, statewide data about course availability and enrollment are not available to examine changes over the period of the EWIG: CS program. Therefore, we developed a set of case studies to explore efforts to promote computer science in six California districts. See Exhibit 15 for a list of these districts and their student demographics.

Exhibit 15. Case Study District Student Population, 2023–24

Student body	California	Jurupa USD	Oakland USD	Shasta Union HSD	Tracy USD	Turlock USD	Upland USD
American Indian/Alaska Native	0%	0%	0%	4%	0%	1%	0%
Asian	10%	1%	9%	3%	16%	6%	5%
Black/African American	5%	2%	20%	2%	6%	2%	8%
Filipino	2%	1%	1%	0%	6%	0%	2%
Hispanic	56%	88%	50%	16%	50%	61%	64%
White	20%	6%	10%	68%	17%	27%	17%
Multiple races	5%	1%	6%	4%	5%	1%	2%
Total number of students	**5,837,690**	**14,906**	**45,086**	**2,415**	**10,020**	**9,543**	**6,829**

Source: CALPADS, DataQuest

Drawing from demographic and course data from CALPADS, as well as semistructured interviews with district administrators and teachers, the text that follows offers a system-level picture of computer science implementation in a range of California districts. Together, these findings deepen the evidence base on how the EWIG: CS initiative is influencing local capacity and highlight conditions that can facilitate or constrain equitable expansion of computer science opportunities across California.

Patterns in Computer Science Course Offerings

Case studies revealed a consistent decrease in computer science availability and enrollment that aligned with the periods of greatest disruption from the COVID-19 pandemic, the 2019–20 and 2020–21 school years, and otherwise found inconsistent patterns of growth over a 6-year period ending in 2023–24 (see Exhibit 16).

Exhibit 16. Number of Standalone Computer Science Courses by District, 2018–2024

Year	Jurupa USD	Oakland USD	Shasta Union HSD	Tracy USD	Turlock USD	Upland USD
2018–19	18	92	5	3	2	4
2019–20	5	96	4	5	7	2
2020–21	6	54	3	2	11	4
2021–22	12	97	1	3	2	2
2022–23	7	83	1	5	12	2
2023–24	8	83	2	6	14	4

Source: CALPADS

Key Finding #9

Case studies revealed a consistent decrease in computer science availability and enrollment that aligned with the COVID-19 pandemic and otherwise found inconsistent patterns of growth.

Interview respondents identified key contributing factors that influenced computer science growth. Across districts, teacher knowledge, skills, and interest played a central role in determining course availability. District representatives also consistently reported that course offerings had been constrained by demands from outside the computer science content area, particularly after the pandemic. As a result, course offerings remained sensitive to staffing shifts, funding limitations, and scheduling pressures that restricted how many students can access computer science.

Finally, across all districts, an important limitation of this analysis emerged: Counting standalone computer science courses and enrollment numbers does not fully capture how many students are truly exposed to computer science. Districts reported efforts to integrate computer concepts into STEM electives, engineering courses, digital technology classes, or grade-level STEM units. This kind of exposure can represent a vital strategy for exposing a larger number of students to computer science material and to demonstrate its relevance in a wide range of domains. However, these opportunities will not appear in CALPADS course codes or course-count metrics. As a result, the quantitative patterns uncovered through this research understate the extent to which students access computer science content.

Patterns in Computer Science Course Enrollment

Case studies also suggested that long-standing disparities in computer science participation will require persistent attention to open doors for all students.

Integration of Computer Science Into Other Subject Areas Expanded Access

Incorporating computer science into other academic classes can be an effective tool for promoting computational thinking skills to a range of students (Yeni et al., 2024, Mabie et al., 2023). All six districts described progress with respect to computer science integration, but efforts remained uneven across grades and were often shaped by teacher initiative, staffing capacity, and schedule availability. The emphasis in elementary and middle grades was often on providing early exposure through integrated instruction, followed by efforts to expand consistently available courses as part of high school pathways. Districts such as Tracy and Upland had explicit K–12 integration goals, embedding computer science into existing content to provide exposure to more students regardless of their elective options. Other districts were in earlier phases of their journeys, working to rebuild or expand offerings after pandemic declines, strengthen vertical alignment, and address disparities in enrollment.

> **Key Finding #10**
>
> **Integration of computer science into other subject areas was a key strategy for expanding access to more students.**

Students in Upper Grades Participated at Higher Levels

Across districts, enrollment patterns reflected the traditional structure of secondary schedules: Because middle schoolers had varied access to electives based on their school or district and underclassmen had limited room for electives due to required coursework, most computer science participation was clustered in Grades 11 and 12. Nevertheless, we saw exceptions, in which counselors actively placed ninth graders into introductory electives or when middle school exposure built early interest that carried over into high school. Indeed, district interview respondents often shared their belief that students who encounter computer science concepts before high school (through integrated STEM units, robotics, or technology electives) are more likely to enroll in high school computer science courses. Consistent with this perspective, respondents in every district described efforts to expand elementary and middle school exposure to ensure students enter high school better prepared and familiarized with computer science concepts.

Hispanic and Black Students Participated at Lower Levels

Patterns of computer science enrollment by race and ethnicity in the case study districts matched nationwide findings of underrepresentation among Hispanic and Black students (Code.org, 2025; U.S. Department of Education, 2024; Gangas, 2024). Although most districts did not identify explicit recruitment plans for underrepresented racial groups, some interview respondents described strategies like including culturally relevant material and exposing students to role models from underrepresented groups that aimed to make computer science feel more accessible. Representation improved in some sites and remained aligned with overall demographics in others, yet these district experiences suggest that equitable participation requires a deliberate strategy to achieve progress.

Women Participated at Lower Levels

Female students were underrepresented in computer science courses across nearly all districts, reflecting national trends and the stigma that computer science is male dominated (Code.org, 2025; Miller et al., 2024). Teachers noted that girls often feel like the "odd ones out" in classes. To overcome this trend, districts have used strategies such as establishing Girls Who Code clubs, highlighting women in computing, and targeting recruitment efforts. As result, one district received a College Board Female Diversity Award for achieving at least 50% female exam taker representation in AP Computer Science Principles. Districts continued to emphasize intentional recruitment, representation in classroom examples, and scheduling practices that reduce barriers for girls interested in computer science.

> **Key Finding #11**
>
> **Hispanic and Black students and women were underrepresented in computer science courses relative to their population in the district.**

EWIG: CS Supports for Computer Science

Interview respondents described ways in which EWIG: CS provided opportunities for teachers to build capacity that would otherwise not have been available to them, but they also noted that knowledge and skills alone are insufficient for computer science to take hold in districts and schools.

Summer of CS Created Learning Opportunities Not Otherwise Available

Representatives from all six districts described ways in which professional development opportunities made possible by EWIG: CS played a critical role in expanding computer science capacity by exposing teachers—many without prior computer science experience—to computer science concepts, tools, and instructional materials. During the summers of 2024 and 2025, 94 educators across the six districts attended a

> **Key Finding #12**
>
> **Interview respondents described EWIG: CS as playing a vital role in building computer science capacity by exposing teachers to concepts, tools, and instructional materials.**

multiday Summer of CS workshop to build skills needed to integrate computer science into existing subjects, design new elective courses, and align instruction with California's computer science standards. Just as important, these workshops created collaborative spaces in which often-isolated teachers could share resources and troubleshoot challenges while building a professional community. Interview respondents consistently described EWIG: CS as filling a major training gap that districts could not address independently because of budget constraints and limited internal expertise.

Professional Development Alone Leaves Important Challenges Unresolved

Despite its perceived usefulness, professional development alone could not overcome structural barriers that most districts faced. Staffing shortages driven by limited funding, recruitment challenges, and turnover restricted course availability. Even when more teachers gained computer science skills, packed student and teacher schedules left little room for additional computer science sections. These perspectives suggest that EWIG: CS played a valuable role in strengthening teacher capacity and enthusiasm, but it needs to be one of multiple strategies to address the systemic issues that can enable computer science expansion districtwide.

Areas for Continued Attention

Although this report highlights positive findings from California's EWIG: CS investment, data collected for this evaluation underscored the reality that educator professional learning by itself is not sufficient to expand computer science learning opportunities across the state and in a sustainable way. Here we highlight some of the areas for continued attention that emerged across multiple data sources.

Funding

EWIG: CS funding allowed for the development and delivery of workshops to educators throughout the state and for stipends that aimed to incentivize participation and honor educators for their time. Educators from the six case study districts emphasized the ways in which Summer of CS addressed a training gap that would not otherwise fit within many district budgets. Similarly, CS champions identified funding as one of the barriers that EWIG: CS was most effective at addressing. However, Summer of CS focus group participants in 2025 named insufficient funding as an obstacle to progress, and respondents to the follow-up survey administered in fall 2025 also highlighted that many of the supports necessary for computer science to gain traction—including instructional materials and pay for professional development offered outside contract time—fall short of their perceived need. Perhaps more importantly, there are no current plans to continue funding the services provided by EWIG: CS once the grant expires. Therefore, open questions remain about whether and how the state can foster sustainability of these efforts through the provision of financial resources.

Competing Priorities

Computer science educators often face an uphill battle when trying to gain traction for their efforts. There is no requirement for schools and districts to offer computer science or for students to take it, and there are no widely available statewide data tracking access, participation, and student performance through which educators and the general public can monitor progress over time. At the school level, computer science is one of many elective options available to students, and teachers typically need the knowledge, skills, and desire to teach computer science content while also fulfilling teaching demands in other content areas. As one case study district leader explained, "In order for [students] to take computer science, they have to not take something else." At the district level, administrators face ongoing expectations for academic performance while also preparing for new requirements to teach ethnic studies and financial literacy, considering whether and how to pursue funding for initiatives like community schools and extended learning opportunities, and navigating the financial realities of declining enrollment. In county offices of education, a fee-for-service model of operation complicates efforts to maintain priorities in academic areas without dedicated funding streams. Insights from county office administrators and district- and school-based educators suggest that in many places, these challenges are likely to increase with the loss of financial support from EWIG: CS.

Educator Availability

EWIG: CS fundamentally sought to expand the pool of teachers and administrators with the knowledge, skills, and interest to teach computer science effectively, and evidence of participation in Summer of CS and changes in confidence and beliefs suggest that the program achieved some success in this arena. Nevertheless, CS Champions and case study districts alike underscored the degree to which limited educator availability shapes the opportunities to open access for students. Despite a district-level commitment to computer science in the six case study districts, we found uneven patterns of course availability that interview respondents attributed, in part, to the reliance on a small number of teachers to build and maintain the momentum for computer science. An administrator in one case study district explained, “You need to have a teacher that has a passion for computer science and then they need to promote it to students.” Without a sustained commitment to building teacher capacity, we anticipate that wide variation is likely to persist across schools and districts in their ability to offer learning opportunities to students.

District and School Leadership

Even when individual teachers bring a commitment to computer science into the school building, their ability to apply their knowledge and skills relies on the support from leaders and at the school and district levels. Focus group participants from Summer of CS in 2025 expressed frustration with what they saw as a common misunderstanding among administrators about what computer science entails or why it is valuable. According to these educators, the result is too often limited support for the integration of computer science into other coursework or to prioritize computer science at all. “When we have conversations with our teachers,” one focus group participant explained, “They’re constantly saying, ‘Yeah, I’m not getting support from my admin.’” Respondents to the Summer of CS follow-up survey similarly identified gaps between the importance of district and school administrator support for computer science and the availability of that support. For computer science to gain traction in a sustainable way, attention to individual educator capacity may need to be paired with education and support for the decision-makers who can enable it to take hold.

Conclusion

Between two grants for EWIG: CS that totaled $20 million, the state of California made a substantial investment in building educator capacity to teach computer science to students across grade levels throughout the state. This financial commitment built on important policy developments over the preceding decade that sought to make computer science a priority in K–12 schools.

Evidence from an independent evaluation of the 2023 EWIG: CS program points to promising outcomes that have emerged from this investment. A network of county office of education administrators known as CS Champions provided direct support to districts and schools, designed and delivered workshops, and created connections with one another that helped to build an infrastructure of support across the state. Nearly 1,400 unique educators participated in a Summer of CS workshop between 2023 and 2025, many of whom had never taught computer science before. Participants rated their experiences highly, and survey responses show evidence of improved confidence and beliefs with respect to computer science. Perhaps more importantly, reports of teaching activity in the year(s) after participants attended Summer of CS suggest that the knowledge and skills gained through the workshop experience translated to the delivery of computer science content in classrooms.

There are questions that remain unanswered. Our study design did not enable us to support claims that EWIG: CS programming *caused* the positive outcomes we observed. The lack of easily accessible statewide data on course availability and enrollment prevented us from examining patterns over time, although our examination of these data in six case study districts illuminated some of the factors that shape computer science learning opportunities. Furthermore, although we grounded our evaluation in the CAPE framework, we did not meaningfully capture the final component of that framework, student experiences with computer science learning. Further research in these areas can provide vital new insights about places in which capacity-building efforts are gaining traction and where opportunities for improvement remain.

We close with final reflections on the context in which this work takes place. As with so many state-level investments in education improvement, support for EWIG: CS has taken the form of one-time expenditures that, as of this writing, show no signs of continuation. Through several data sources, we see signs of promise that Summer of CS and the infrastructure built to support it have contributed to positive changes in the computer science education landscape. An optimistic reading of the evidence generated through this evaluation is that EWIG: CS has planted a seed that can help to propel the state into the next stages of its computer science journey. There is, however, a more cynical interpretation: Just as momentum was beginning to build, the vital sources of financial support that enabled important work to take hold will complicate efforts to carry the state's computer science movement forward. The path ahead for computer science education in California may depend not only on the efforts of educators to build on a strong foundation of capacity building but also on a constituency of advocates to build the political will to make computer science a priority at the state, regional, and local levels.

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