

THE 2025 COMPUTER SCIENCE TEACHER LANDSCAPE:

Insights into Teacher Preparedness
for a World Powered by Computing

December 2025

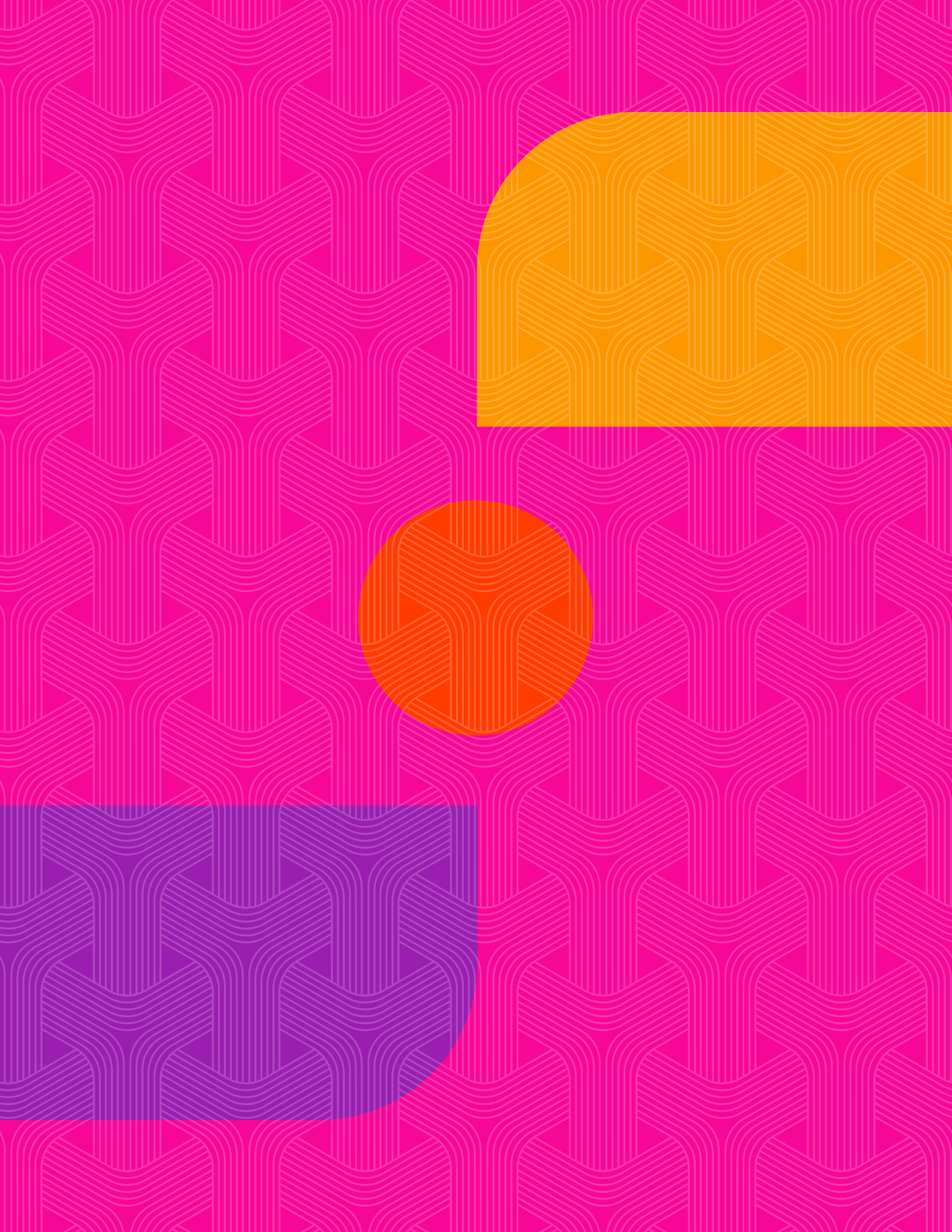
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Executive Summary

The landscape of computer science (CS) education is rapidly evolving. Computing now underpins nearly every aspect of modern life, from how we communicate and learn to how we work, govern, and solve global challenges. As technologies like artificial intelligence, data science, and automation reshape society, the role of CS educators has never been more vital.

Guided by a community-driven, equity-centered, and evidence-aligned development process, the forthcoming CSTA PK–12 Computer Science Standards (2026) reimagine CS as more than technical proficiency. They define CS as a rigorous, creative, and human-centered discipline, where students use data, algorithms, and computing systems to understand and improve their communities. In this vision, computing is both a scientific practice and a civic one—grounded in ethics, inclusion, and social responsibility. Preparing students for this next generation of CS learning therefore requires a teacher workforce ready to bring this vision to life.

This report examines the current state of the CS teaching profession through that lens of readiness, working to answer two essential questions:

- 1. Are educators ready to teach this new vision of computer science education?**
- 2. What supports and conditions will help them succeed?**

Building upon previous landscape surveys (2020, 2022), we explore the knowledge, practices, challenges, and aspirations of nearly 3,000 PK–12 CS teachers across the United States. The findings reveal a professional community deeply committed to and resourceful in serving all of their students, yet still constrained by structural barriers in preparation, time, and support. Understanding these realities is essential to realizing the next chapter of CS education, in which every student is prepared for a world powered by computing.



Key Findings

CS Teaching Workforce

- A national pool of 2,882 PK–12 CS teachers responded to the survey, with 33% serving elementary schools, 36% serving middle schools, and 51% serving high schools. A majority of respondents are white (71%) and women (67%), reflecting the national trend of K–12 educators.
- Elementary school teachers are more likely to integrate CS into other subjects, while most high school teachers teach CS in standalone classes.
- At the elementary and middle school levels, 70% of teachers identify CS instruction as at least partially mandatory. At the high school level, 22% of teachers identify CS as a requirement for graduation.

CS Background and Experience

- Almost three-quarters of teachers have over ten years of experience in the classroom, but 41% have less than five years of experience specifically as a CS teacher.
- The majority of respondents (81%) did not enter CS classrooms with a background in CS or other technical sciences. Elementary teachers are the least likely to have an educational background, license, or industry experience in CS compared to middle and high school teachers.

Community and Professional Development

- Teachers are isolated in their school sites, with half reporting they have no other colleagues and another one-quarter reporting only one additional colleague.
- Despite this, almost two-thirds belong to a community to collaborate and communicate with, such as CSTA chapters and affinity groups. These teachers were more likely to report feeling part of a community and indicate a sustained commitment to teaching CS.
- While 96% of teachers participate in professional development, it is primarily as standalone sessions (78%) or independent curriculum work (80%) rather than sustained, intensive PD like professional learning communities, ongoing coaching, mentoring, or postsecondary courses.
- The greatest identified PD need is to deepen technical expertise in CS knowledge and skills (48%), including emerging technologies and subdisciplines (e.g., AI, cybersecurity). Teachers also prioritized learning within instructional design.

Curriculum

- Teachers across all grade levels prioritized computational thinking as the top priority in their classrooms, followed by programming and algorithms.
- While over one-third of teachers did not know the extent of CS standards coverage, asking about specific foundational content aligned to the forthcoming standards indicated considerable overlap. Seventy-three percent of teachers covered at least four of the five concepts and 66% of teachers covered at least three of the four pillars.
- While 81% of CS teachers believe AI should be included in foundational CS education, less than half feel equipped to teach it.

- Nearly all teachers (97%) indicated they can control how they teach CS, and most (93%) are able to determine their own curriculum through revising or modifying existing curriculum or developing their own.

Challenges and Resiliency

- CS teachers' sentiment reflects a general trend in education in that their greatest challenges are being underpaid (58%) and overworked (46%). A challenge unique to CS teachers is the difficulty in prioritizing their classes as compared to other subjects that have standardized assessments (46%).
- Yet, buy-in from school staff and administrators has incrementally improved since 2020. Only 18% of teachers reported lack of support by administrators as a challenge, and 20% of teachers reported lack of support by counselors as a challenge.
- Only 17% of teachers reported they were able to participate in PD as needed, with almost one-third indicating it was due to the time constraints they face.
- Despite the challenges facing CS teachers, nearly all teachers (96%) reported they truly enjoy teaching CS, and 85% of teachers planned to continue teaching as a CS teacher for at least the next five years.

Equity and Inclusion

- While most teachers are confident in teaching CS concepts (83%), fewer are confident in using culturally relevant pedagogy (68%), teaching multilingual learners (41%), or meeting the needs of students with disabilities (58%).
- Sixty-five percent of teachers reported teaching accessibility in their classrooms, which is a threefold increase since 2022. Yet, accessibility continues to be one of the least covered topics in CS classrooms and ensuring the needs of students with disabilities are met remains a work in progress. In fact, 32% of teachers reported their curricula do not have sufficient options for differentiation and 38% do not have accessible tools and curricula.

Advocacy

- Teachers take on significant roles to advocate for CS, going beyond their assigned teaching responsibilities by increasing CS offerings (61%), expanding learning opportunities at their schools (53%), and conducting targeted outreach to underrepresented students (54%).
- While teachers have remained confident in advocating for CS in their classrooms by introducing CS content and skills into existing courses (68%) and recruiting students to their CS courses (65%), their confidence in being advocates at more systemic levels fell (from 44% to 32% at the state level and from 56% to 51% at the district level).

"We teach because we care about students and about giving them the best opportunities possible."

—Elementary CS specialist from South Carolina

Recommendations

While teachers remain committed and are integral to expanding CS education, broader systemic level policies are critical to supporting the expansion of equitable CS education. We conclude with three key recommendations to better support teachers, driven by the perspectives shared in the survey.



Invest in ongoing, high-quality teacher professional learning.



Provide comprehensive, sustained support to retain teachers.



Prioritize CS as a core subject with universal participation throughout PK–12 education.



Introduction

A Rapidly Evolving Educational Landscape

Since our [last report published in 2022](#), the landscape of computer science education has continued to rapidly change. There are now [more K–12 students learning CS](#) than ever before, and they are also more diverse. States are increasingly adopting policies to support CS education, including [high school graduation requirements](#). Most notably, the adoption of artificial intelligence (AI) tools has led to significant changes across all sectors and industries, from the utility of AI agents in customer service, to automating tasks in manufacturing, to personalizing retail experiences. AI and algorithmic decision-making also underlie a multitude of high-stakes situations such as [home and mortgage loan applications](#), [parole decisions](#), [community surveillance](#), and [insurance claims](#). The rapid advancements in AI necessitate future generations of creators and users of responsible technological innovations that can critically and systematically understand the needs and implications of these tools on broader society.

“AI can change the world. It is important that we understand how important it is and teach students how important it is so that they’re able to use it without abusing it.”

–6th grade CS teacher from Indiana

The pervasiveness of AI globally has led to growing demands for K–12 educational reform to meet the current moment. The federal government, in particular, has [intensified calls for integrating AI education and literacy](#) in a desire to ensure the country’s competitive edge in the growing AI market. Yet, AI education is not novel. Rather, AI education is a portion of the [decade-long computer science \(CS\) education movement](#). With [core overlapping content](#) such as computational thinking, perception, data structures, and algorithms, **building foundational AI competencies cannot exist outside of CS**. Moreover, CS education practitioners have long grappled with balancing classroom design to not only develop students’ abilities to understand the technical backdrop of the technology itself but to also identify, challenge, and rectify potential systemic harms caused by these technologies. The AI education movement would be remiss to ignore current progress and lessons learned in CS education through the billions in investments from the federal government, industry, and philanthropy in efforts to expand access and participation.

Educators have played a crucial role as practitioners and advocates towards this path. Yet, we stand at a critical juncture in K–12 education. Despite the call for AI education, the current rollbacks in federal educational funding and simultaneous attacks on science are significant threats to the progress that has been made in CS education. The [dismantling of the National Science Foundation](#), [restructuring of student loan forgiveness](#) initiatives for those in public service, and [cancellations](#) of billions of dollars in federal equity-related STEM and CS education research grants are in direct misalignment with building a well-informed, future-ready society. Moreover, the increasing [political hostility towards building safe learning environments](#) for all students, coupled with [attempts to undercut programs to ensure equitable education](#), have left educators struggling to navigate the onslaught of challenges.



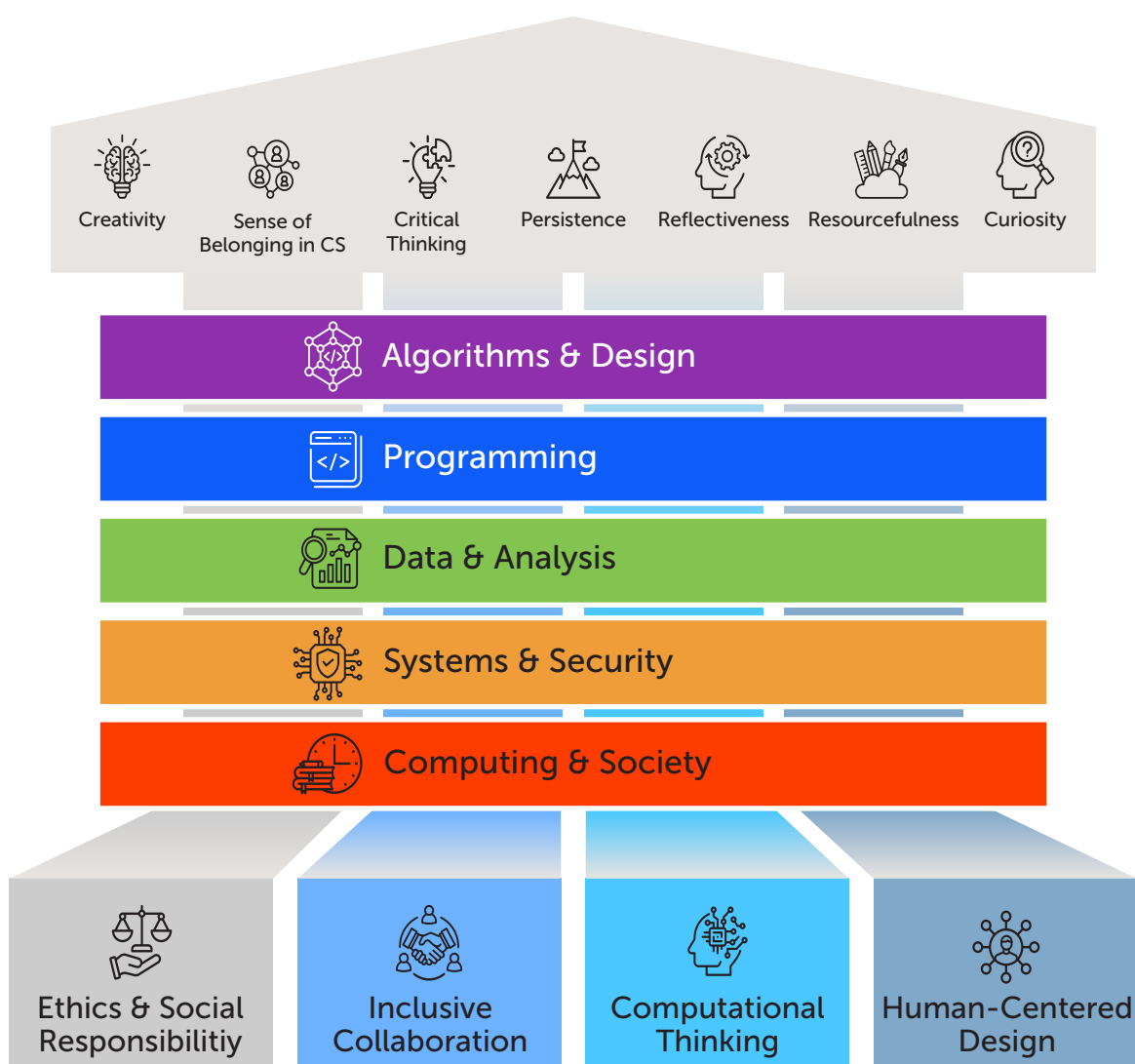
Redefining CS Education

It is in this unprecedented context that CSTA will publish a revised set of PK–12 Computer Science Standards in summer 2026. The standards delineate evidence-aligned learning outcomes for pre-kindergarten to 12th grade based on a [new community definition of foundational CS](#). They organize learning through five concepts (Algorithms & Design, Programming, Data & Analysis, Systems & Security, and Computing & Society) supported by four cross-cutting pillars or collections of practices (Ethics & Social Responsibility, Inclusive Collaboration, Computational Thinking, and Human-Centered Design). While not explicit in this organizational structure, significant [AI learning priorities](#) are integrated across foundational CS knowledge and skills. Through this learning, students develop dispositions (habits of mind) that support lifelong learning and creating with computing: curiosity, creativity, persistence, critical thinking, reflectiveness, resourcefulness, and a sense of belonging. Together, these structures emphasize that **CS is not only about understanding how technologies work but also about how people design and use them to discover ideas, express themselves, solve problems, and improve their communities**. Students learn that not only is CS a powerful medium for expression and innovation, but also a shared responsibility. In a world increasingly powered by computing, CS empowers all learners as informed community members, critical consumers, and responsible creators.

"A good education is the foundation of good democracy."

—High school CS teacher from Washington

Figure 1. Organizational Structure of the PK–12 Computer Science Standards (2026)

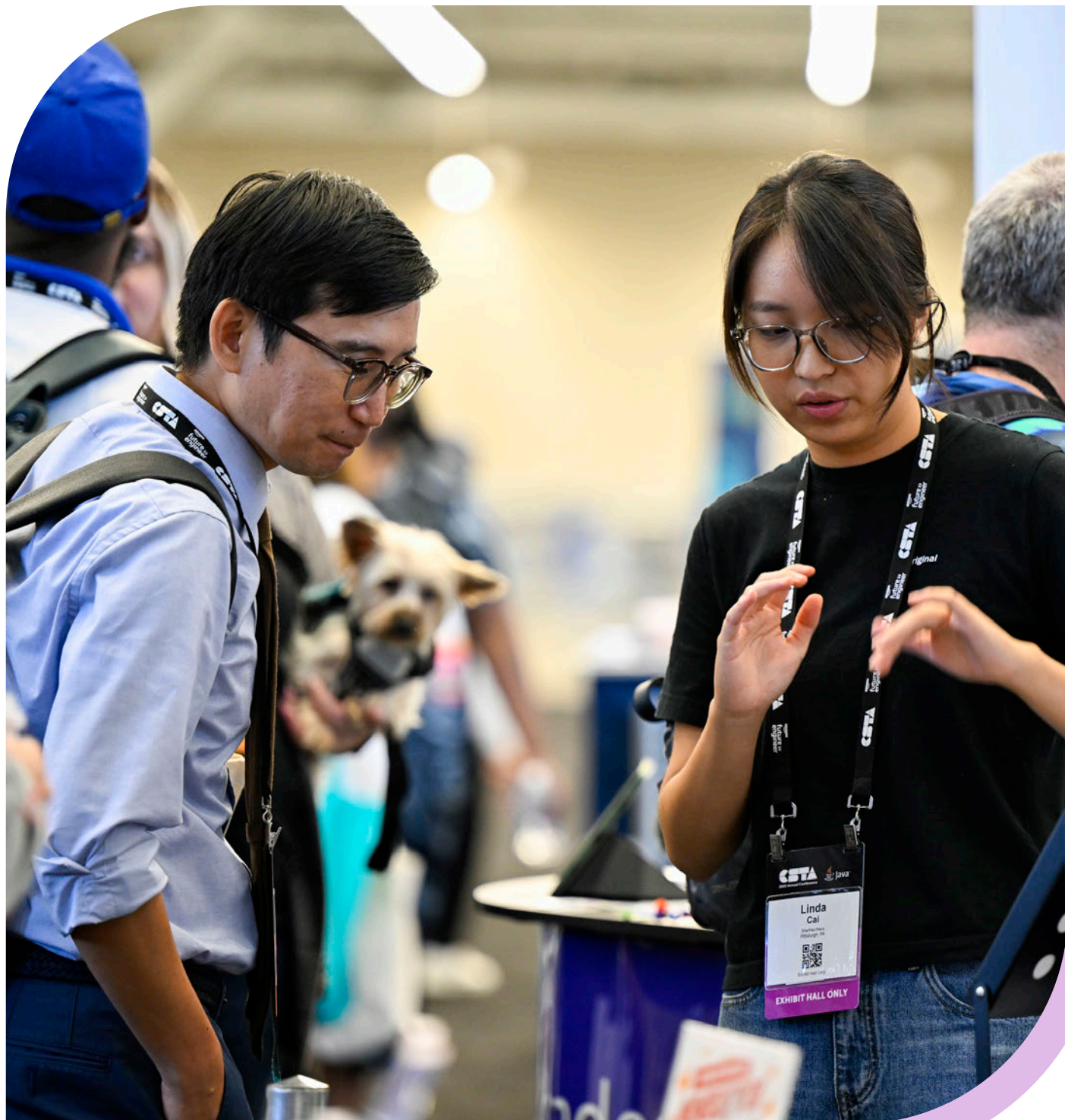


Purpose of the Study

Developing a robust K–12 infrastructure that is equipped to implement this future-forward vision of CS education will require a strong understanding of the current landscape of CS education, including challenges and opportunities to improve classroom experiences. In response, we asked a national sample of CS teachers a series of detailed questions about their backgrounds, schools and teaching contexts, professional learning experiences, significant challenges, and suggested solutions in fall 2024. This study builds upon our previous landscape reports that examined the [backgrounds of K–12 CS teachers](#) and explored [CS teachers' professional development \(PD\) needs and views on creating inclusive CS classrooms](#). In this report, we specifically aim to answer two primary questions:

1. **Are educators ready to teach a new vision of computer science education, as defined in the forthcoming CSTA PK–12 Computer Science Standards, Revised 2026?**
2. **How can education leaders equip teachers to realize this vision in their classrooms?**

By presenting our findings and recommendations in this report, we seek to equip policymakers and educational advocates to identify key policies and practices necessary to support and retain CS teachers in this particularly pivotal moment. This support is crucial for implementing high-quality CS education for the next generation.



The Current CS Teaching Workforce

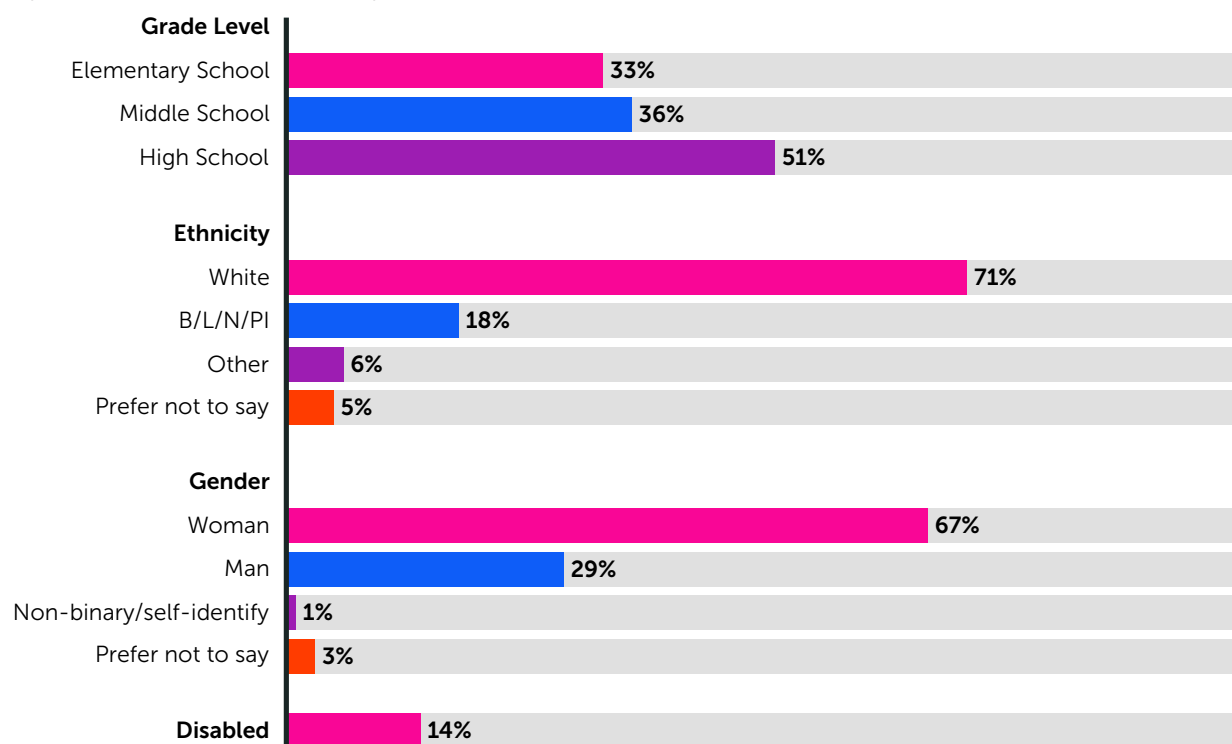
As we look toward a new era of CS education, the readiness of the teaching workforce becomes the linchpin of success. Today's CS teachers come from diverse backgrounds—some newly entering teaching through alternative routes, others transitioning from math, science, or industry roles—and bring a wealth of experience to a rapidly evolving field. Understanding who these teachers are, how they entered the profession, and what they value provides essential context for gauging system-wide readiness. This section explores the demographics, backgrounds, and early indicators of capacity within the current CS teaching community.

Respondent Demographics

This snapshot of the CS teacher workforce mirrors the broader K–12 teacher workforce

Responses were collected from 2,882 PK–12 CS teachers spanning various educational and professional backgrounds as well as school contexts. These teachers spanned all 50 states, Washington, D.C., Guam, Puerto Rico, and the Virgin Islands. One-third (33%) of respondents served elementary school, 36% served middle school, and 51% served high school students. A majority of respondents were white (71%) and women (67%; see Figure 2)¹ – reflecting the broader [K–12 teacher workforce](#), which is 80% white and 77% women.

Figure 2. CS Teacher Demographics



¹ Respondents had the option of selecting multiple race/ethnicity categories. First letters of historically-excluded race/ethnicity groups are used to denote Black, Latine, Native, and Native Hawaiian and Pacific Islanders in the chart due to space constraints and represent those who self-identified as at least one of those options. Of the respondents, 9% self-identified as Black or African American, 7% as Hispanic or Latino/a/x, 2.3% as American Indian or Alaska Native, and 0.4% as Native Hawaiian/Other Pacific Islander.

Teaching Responsibilities

Elementary CS teachers hold more specialist roles, while middle and high school CS teachers hold multi-subject roles

Less than half of teachers were full-time CS teachers

(i.e., 76–100% of their teaching responsibilities), and for a quarter of teachers, teaching CS was a small proportion (<25%) of their role. Teachers are often responsible for teaching one or more other subjects such as math, science, and business.

Indicating more CS specialist roles, elementary teachers taught larger numbers

of students (average of 273) than their middle and high school counterparts (average of 196 and 87, respectively).

“I teach 4–5 DIFFERENT courses each day. When I first started, I had 150 to 180 students every day. Nobody can do a good job with that many students.”

–Middle and high school CS teacher from Pennsylvania

Figure 3. Percent of Teaching Load Allocated to CS

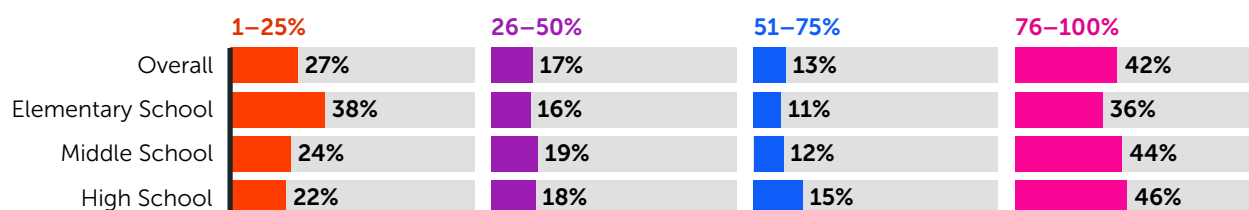


Figure 4. Number of Students Taught CS by Respondents

	Mean	Median
Overall	159	100
Elementary School	273	250
Middle School	196	100
High School	87	70

CS Courseload

Greater adoption of K–12 CS has led to largely integrated instruction in elementary grades and standalone classes in middle and high schools

In elementary schools, teachers were more likely to introduce computing concepts integrated into other subjects as opposed to standalone computing classes (53% versus 47%).²

In middle schools, this pattern shifts to teachers introducing computing concepts largely as standalone classes (61%).

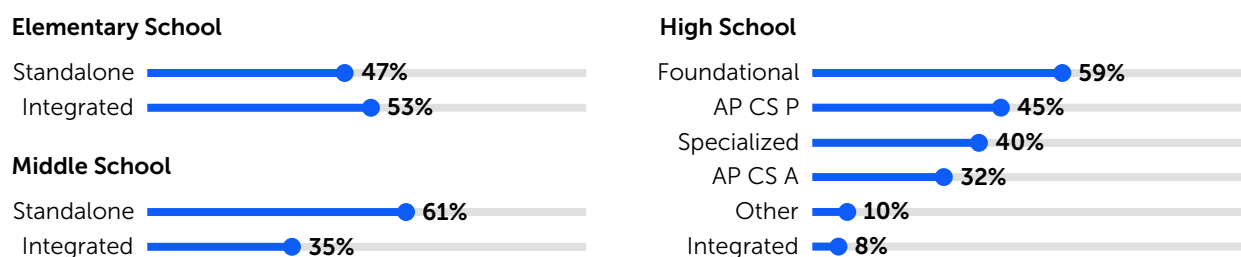
In high schools, all teachers taught standalone CS classes.

Even when teachers taught an integrated high school CS class (8% of respondents), it was taught in addition to a standalone course. Over half of high school teachers (59%) taught foundational computing classes, 40% taught students specialized computing classes (e.g., robotics, game design, cybersecurity), 45% taught AP Computer Science Principles (AP CS P), and 32% taught students AP Computer Science A (AP CS A). Over half of high school teachers (53%) teach one or more courses that count as Career Technical Education (CTE).

"I see every student in my school, so they all have equal access, as long as they come to school."

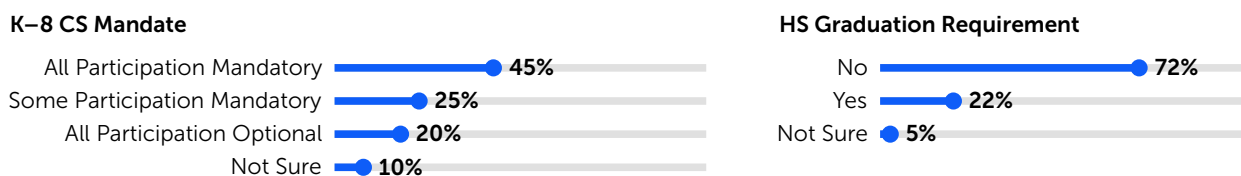
—Elementary STEM specialist from Indiana

Figure 5. CS Classes Taught, by Grade Level



Consistent with [greater policy adoption](#), more teachers report compulsory CS instruction, particularly in the younger grades. **At the elementary and middle school levels, 70% of teachers identified CS instruction as at least partially mandatory.** At the high school level, 22% of teachers identified CS as a requirement for graduation.

Figure 6. CS Mandates, by Grade Level



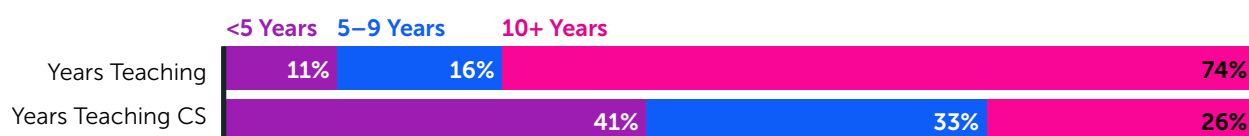
² Integrated instruction in elementary education is likely even more commonplace, which is not reflected in these data due to survey participation communication primarily coming from CSTA-affiliated networks.

Teacher Classroom Experience

The majority of CS teachers are K–12 classroom veterans but early career in CS

Teachers had considerable experience in K–12 classroom settings, yet their experience with CS was less significant. **Overall, 74% of teachers had over ten years of experience in the classroom, but 41% had less than five years of experience as a CS teacher.** This finding was consistent across grade levels. The vast majority (85%) of teachers chose to teach CS at their schools.

Figure 7. Teacher Classroom Experience



Teacher Isolation

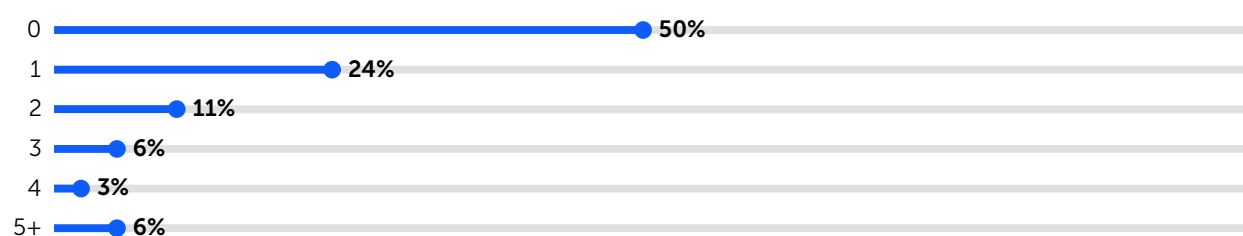
CS teachers are isolated at school sites but highly networked externally

About three-quarters of teachers reported having zero to one CS teaching colleagues at their school sites, with half reporting they have none. This leaves CS teachers far more isolated than teachers of other disciplines and underscores the need for community and professional development outside of traditional support structures (e.g., departments). Despite this, 74% of teachers reported feeling part of a community of CS teachers, 67% reported they have the opportunity to collaborate with other CS teachers, and 62% reported frequently talking to their peers about teaching CS. This indicates that most teachers have communities outside of their schools, such as CSTA chapters and affinity groups (84% of respondents were members of CSTA). Teachers who are CSTA members were more likely to report feeling part of a community and demonstrate a sustained commitment to teaching CS.

“[I need] more community with other computer science teachers, mentors, and advocates. It can be a slightly lonely field, because there are often only 1-2 computer science teachers in a given school, and they are almost always overworked because of how many unique preps that they teach.”

–High school CS teacher from Wisconsin

Figure 8. Number of CS Teaching Colleagues

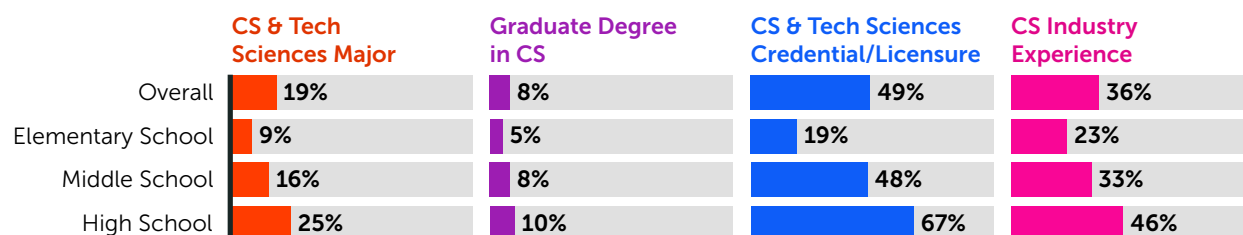


Teachers' Computer Science Backgrounds

A lack of formal CS training is widespread, but is most pronounced in elementary education

Data have indicated that **expanding CS education to younger students** has the potential to reduce issues of equity given the universal design of the master schedule; yet, training the vast number of elementary teachers is a considerable undertaking. Elementary teachers are the least likely to enter the profession with a background in CS. While **the majority (81%) of respondents did not enter CS classrooms with a background in CS** or other technical sciences,³ far fewer elementary teachers have a CS or technical sciences educational background, CS or technical sciences license or credential, or CS industry experience than middle or high school teachers. Specifically, elementary school teachers were half as likely to have a graduate degree in CS or industry experience than high school teachers; they majored in CS or technical sciences at a third of the rate of high school teachers; and they were 3.5x more likely to not have a CS and technical sciences credential or licensure than high school teachers.

Figure 9. Teachers' CS and Technical Sciences Backgrounds



³ Computer and Technical Sciences degrees include: Computer Science, Information & Communications Technology; Information Technology, Engineering, Networking, Cybersecurity.



Professional Learning

The number of teachers who enter the classroom without a strong CS background indicates the critical need for high-quality professional development (PD). **CS teachers consistently describe PD as their greatest lever for growth—and their greatest unmet need.** This is particularly important given the relative isolation of most CS teachers. Readiness for the future of CS education depends on teachers having ongoing, supported opportunities to learn emerging content, apply new pedagogies, and build networks of peers. This section examines teachers' access to professional learning, participation patterns, and the supports they say are most critical to preparing for a reimagined CS education, where AI literacy, ethics, and inclusion are integral to every learning experience.

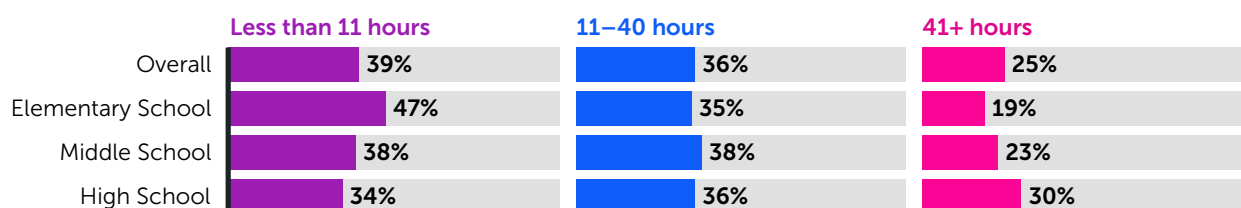


Duration and Type of Professional Development

CS teachers are not afforded the capacity to undertake sustained PD opportunities

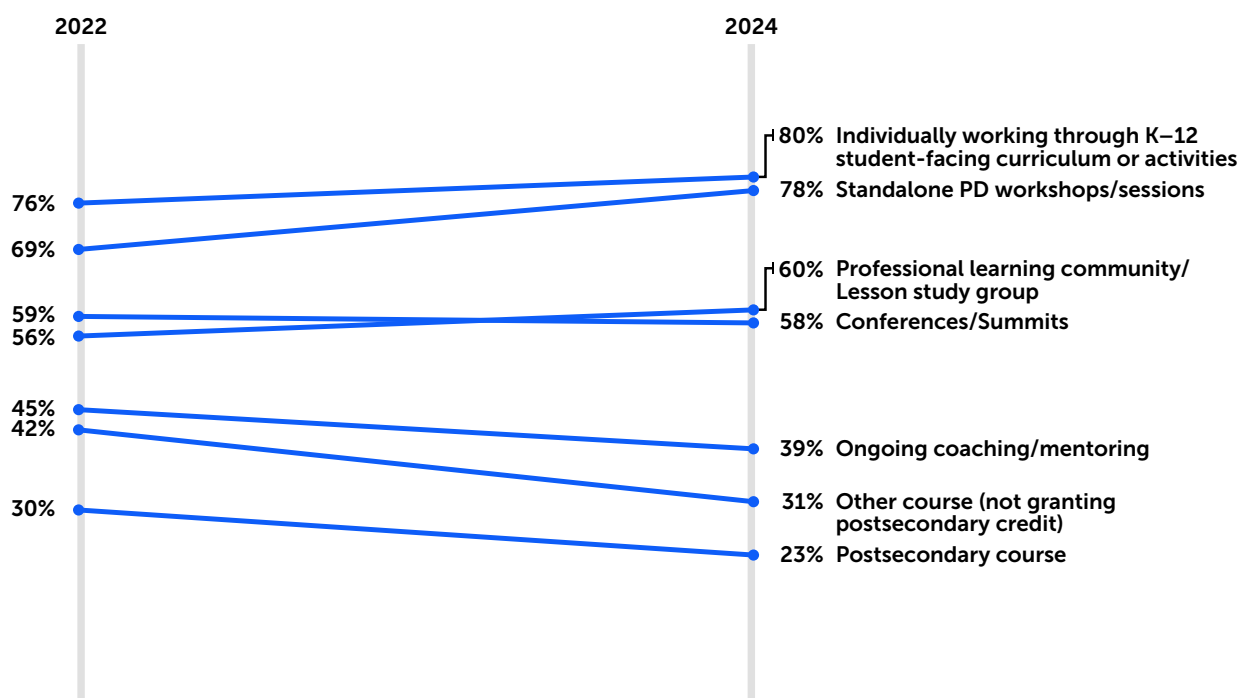
Over the course of a year, 96% of CS teachers report participating in at least one type of PD. Yet, for most teachers, this amounts to relatively little over this timespan. **Over a third of middle and high school teachers participate in less than 11 hours of PD per year, while almost half (47%) of elementary teachers participate in less than 11 hours.** This likely does not afford the **sustained duration** necessary to transform classroom practice.

Figure 10. Number of Professional Development Hours over the Course of One Year



Previous research has shown the benefits of high-quality PD that emphasizes coaching, collaboration, active learning, and opportunities for feedback over a sustained period of time on teaching practices and student outcomes. Unfortunately, the majority of CS teachers still rely on standalone sessions (78%) or independently working through curriculum or activities for the classroom (80%). **Teachers were less likely to participate in more intensive and sustained PD that our data associate with high satisfaction, feeling of community, and commitment to teaching CS, such as professional learning communities (60%) and ongoing coaching or mentoring (39%).** Teachers were also less likely to complete postsecondary courses (23%) and other courses (31%). This fragmented approach has worsened since 2022 and likely does not afford teachers the time and conditions necessary to transform classroom practice.

Figure 11. Professional Development Participation, by Type



Professional Development Needs

CS teachers desire PD to deepen technical expertise, especially in emerging technologies

Teaching a future-ready vision of CS involves several content priorities that are not yet commonplace in [state standards](#), including ethics, AI and emerging technologies, history of computing, and career exploration. Teachers must be supported in learning this content before they can effectively teach it to their students, and thus, these are priorities for ongoing teacher professional learning.

When asked about PD opportunities necessary to be more effective in the classroom, the majority of teachers identified a need that was in alignment with the [Standards for CS Teachers](#).

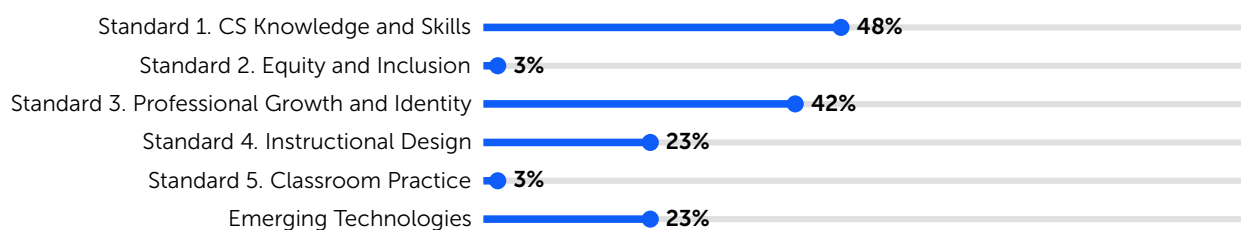
Teachers most often expressed a desire to deepen their technical expertise, in order to bolster their confidence, teach advanced content, and better support students' varied abilities. In fact, 48% of teachers identified a need for greater development in Teacher Standard 1 - CS Knowledge and Skills. Teachers reported needing support in areas such as developing their coding skills, learning a new programming language, interpreting algorithms, and deepening their understanding of computing systems. Plus, **23% of teachers also identified a need to learn more about emerging technologies and subdisciplines**, with AI being the greatest topic identified and cybersecurity, data science, and robotics also frequently listed.

The next most significant trend (42% of teachers) was the request for support in Teacher Standard 3 - Professional Growth and Identity. Specifically, the greatest identified support was in targeted content areas, such as unplugged activities, specific hardware/software knowledge, and tools. Almost one-quarter (23%) of teachers identified greater PD needs in Teacher Standard 4 - Instructional Design, including strategies for teaching CS effectively, with support for building more inclusive experiences, and planning instruction to foster student understanding as the top identified. Many teachers also requested help in developing or refining curriculum that aligns to standards, integrates CS into other subjects, involves meaningful projects, and effectively differentiates for varying abilities, in order to make CS more relevant and accessible. Overall, responses reveal a teaching community eager to evolve in both technical mastery and pedagogical depth.

"Offer continuous professional development opportunities for teachers to stay current with the latest computer science education trends and technologies."

—High school CS teacher from California

Figure 12. Frequency of Teacher-Identified PD Needs



Curriculum and Instructional Priorities

Teachers' classroom practices provide a window into the alignment between current instruction and the next generation of standards. While most teachers continue to emphasize programming and computational thinking, many are also beginning to integrate AI and cybersecurity into their classrooms. This section highlights where instruction already supports the new vision and where gaps remain in preparing students for a world powered by computing. It underscores that true readiness involves both content expansion and pedagogical transformation.

Teacher Perceptions of Classroom Priorities

CS teachers prioritized computational thinking across grade bands

Teachers' prioritization of CS topics reveal both strong foundations and areas of misalignment, reinforcing the importance of clear, coherent standards to guide future instructional choices and support the scaling of CS education. **As it currently stands, teachers across all grade levels identified computational thinking as the top priority in their classrooms, followed by programming and algorithms.**

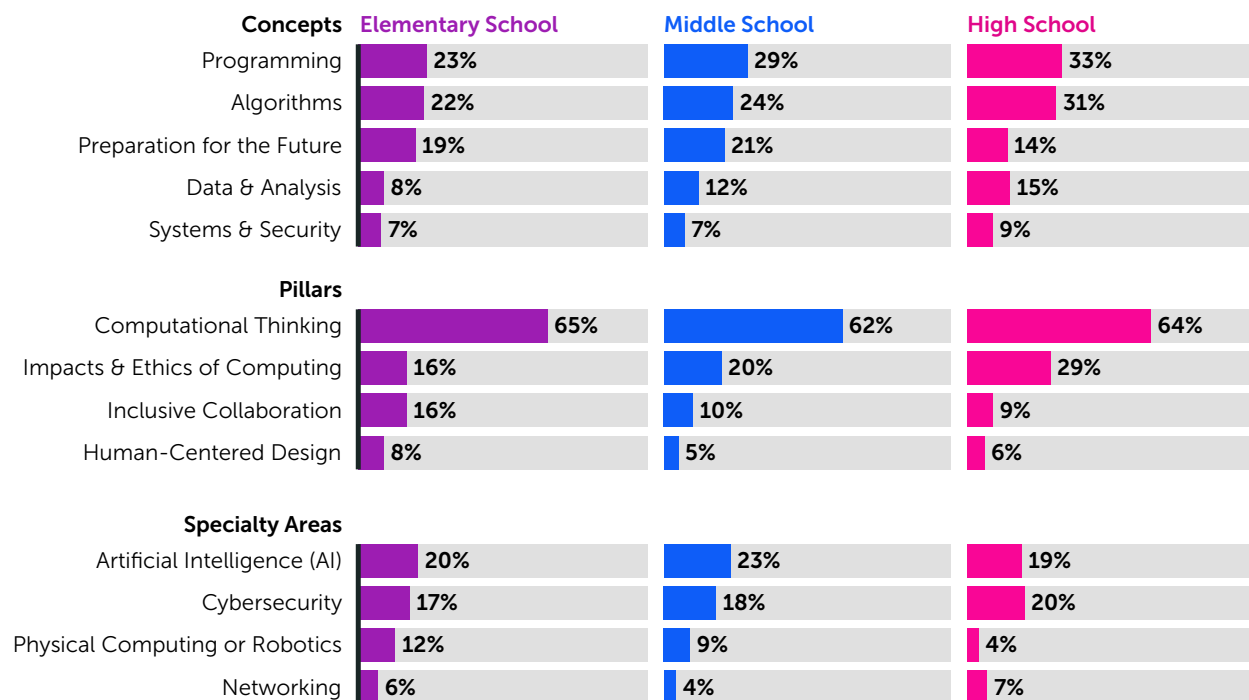
Beyond these key priorities, elementary and middle school teachers also identified AI and [Preparation for the Future](#) as important; meanwhile, high school teachers also prioritized the impacts and ethics of computing and cybersecurity.

"While coding is important, the standards should emphasize broader computational thinking skills, critical thinking, and problem-solving..."

—3rd grade classroom teacher from Florida



Figure 13. Teacher-Ranked Priorities for Classrooms⁴



⁴ The concepts and pillars used to organize content were revised between the administration of the survey in fall 2024 and the publishing of this report in 2025. The landscape survey used the structures and labels defined in the [Reimagining CS Pathways report](#). The updated labels and organizational structure used in the CSTA PK-12 CS Standards, Revised 2026 are shown in Figure 1.



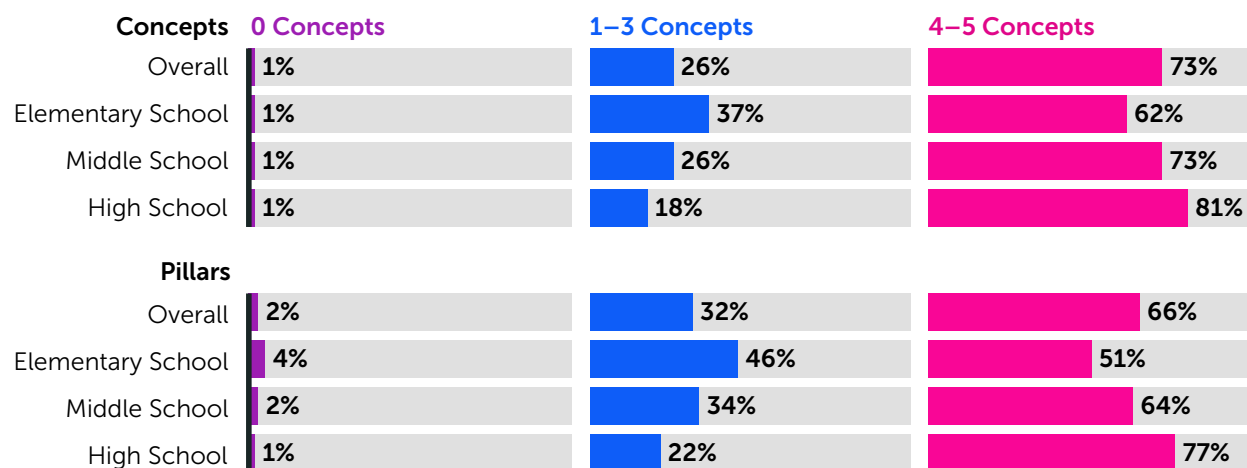
Coverage of Foundational Content

CS teachers covered the majority of the standards content despite an evolving set of priorities

Nearly all U.S. states have adopted K–12 CS standards that are closely aligned to the current CSTA Standards; in fact, **on average, a state's standards cover 97% of CSTA's subconcepts**. When asked the extent to which teachers currently cover the current CSTA K–12 CS Standards, 37% stated they were able to cover most or all of the standards, 9% covered half of the standards, and 17% covered only a few of the standards. Over one-third of teachers (37%) could not definitively identify the alignment to CS standards, either unable to identify the standards themselves or relying upon the curriculum provider's alignment to standards.

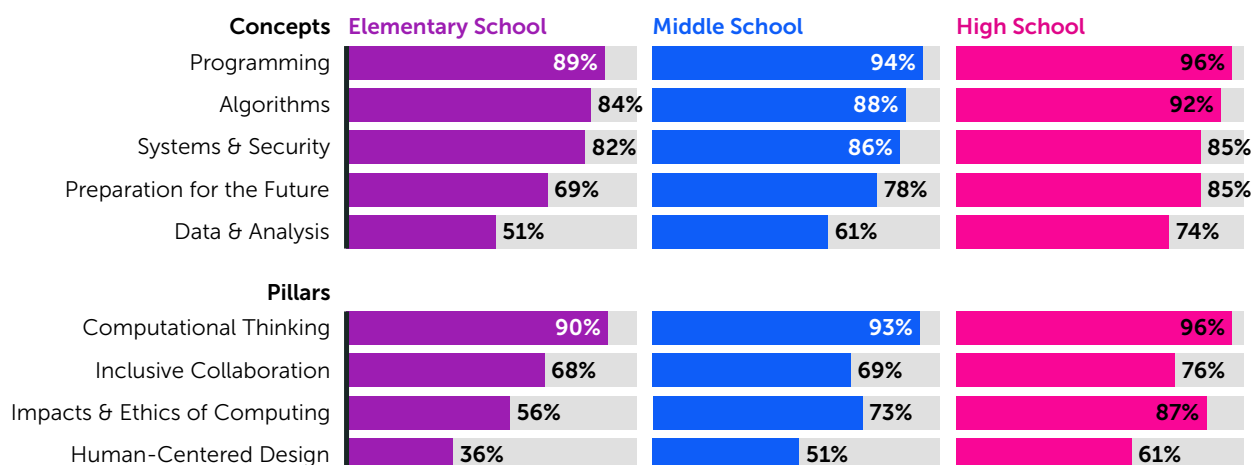
While there may be uncertainty from teachers about the extent of CS standards coverage, asking about specific foundational content aligned to the forthcoming standards indicated considerable overlap. Seventy-three percent of teachers covered at least four of the five concepts and 66% of teachers covered at least three of the four pillars. High school teachers were likely to cover a greater breadth of content. In fact, 81% covered at least four concepts and 77% covered at least three pillars.

Figure 14. Extent of Classroom Coverage of Foundational CS Content



Across grade levels, Programming was the most likely concept to be covered (93%), followed by Algorithms (89%) and Systems & Security (83%). Preparation for the Future and Data & Analysis were less likely to be covered, and these areas had the largest gap in coverage between elementary and high school teachers. In relation to pillars, Computational Thinking was almost universally covered across grade levels (96%). Impacts & Ethics of Computing were more likely to be covered with middle and high school teachers than with elementary school teachers (73%, 87%, and 56%, respectively). Inclusive Collaboration and Human-Centered Design had less coverage across classrooms, but were more likely to be taught at the high school level. This indicates that **despite reprioritizing content in forthcoming standards, most teachers are already teaching a significant amount of this content**.

Figure 15. CS Classroom Coverage of Concepts and Pillars



Coverage of Specialty Areas

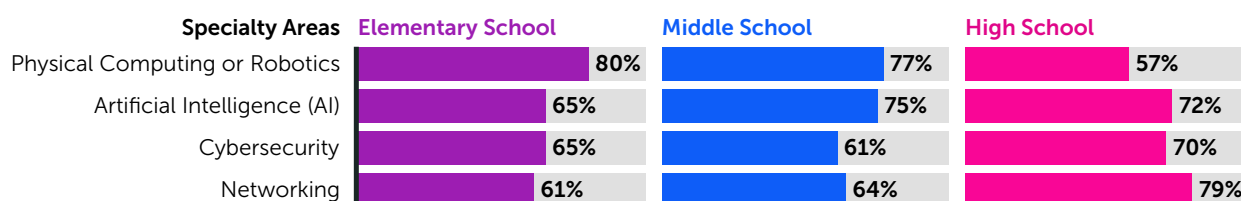
While coverage remains high on emerging technologies, confidence in teaching it lags

A majority of all CS teachers covered AI, networking, physical computing, and cybersecurity in their CS curricula. Cybersecurity and networking were most commonly covered by high school teachers (70% and 79%, respectively). Physical computing and robotics were more likely to be covered by elementary school teachers than by high school teachers (80% vs. 57%, respectively).

“AI is the way of the future. If students don’t understand how it works and how to use it they are at a disadvantage.”

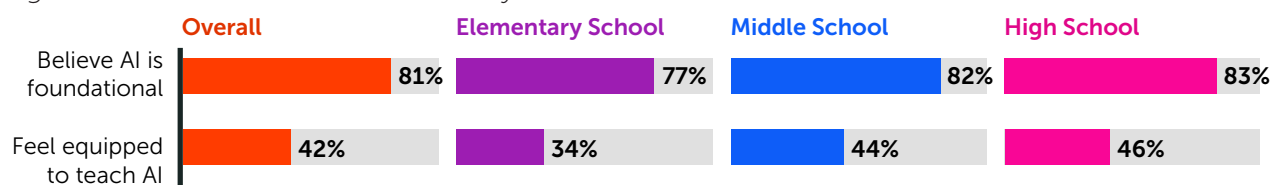
—High school STEM/CS/graphic arts teacher from Washington

Figure 16. Classroom Coverage of CS Specialty Areas



While 81% of CS teachers believe AI should be included in foundational CS education, less than half feel equipped to teach it—46% in high school, 44% in middle school, and just 34% in elementary school.

Figure 17. AI Beliefs and Confidence by Grade Level



Thus far, **70% of CS teachers covered AI despite the lack of explicit definition in most existing CS standards.** An even greater percentage (87%) discussed the societal and ethical impacts of AI with their students. However, coverage was limited – the majority of teachers (85%) spent less than five hours on the topic of AI. Yet, this finding may not account for the time spent on subcomponents of AI, such as algorithms, computing systems, computational thinking, and programming.

Curricular Agency

CS teachers' classroom and curricular agency remains high

Teachers expressed they have significant agency in how they teach CS. **Nearly all teachers (97%) indicated they can control how they teach CS, and most (93%) are able to determine their own curriculum** through revising or modifying existing curriculum or developing their own. This high degree of agency likely explains the variance between teachers' content coverage and standards adoption. It is also a promising sign indicating that, with the appropriate guidance, training, and support, teachers are likely able to adjust their curriculum to include new priorities.



Teachers' Greatest Challenges

In the past decade, educational policy advocates have pushed for legislation to improve access to CS education. These efforts have resulted in [greater access to foundational CS courses](#) on a national scale. However, national trends can obscure the disparate approaches that schools take with CS education, particularly at different grade levels. Despite the growing recognition of the importance of CS and AI education (including a growing number of states mandating CS as a high school requirement), teachers still report feeling under-supported in their endeavors. This is exacerbated by the **widely held belief that the teaching profession is not valued in society** (57% reported this). This section details how teachers reported their greatest challenges to teaching CS, including notable shifts over time.

Barriers to Thriving in the Educator Workforce

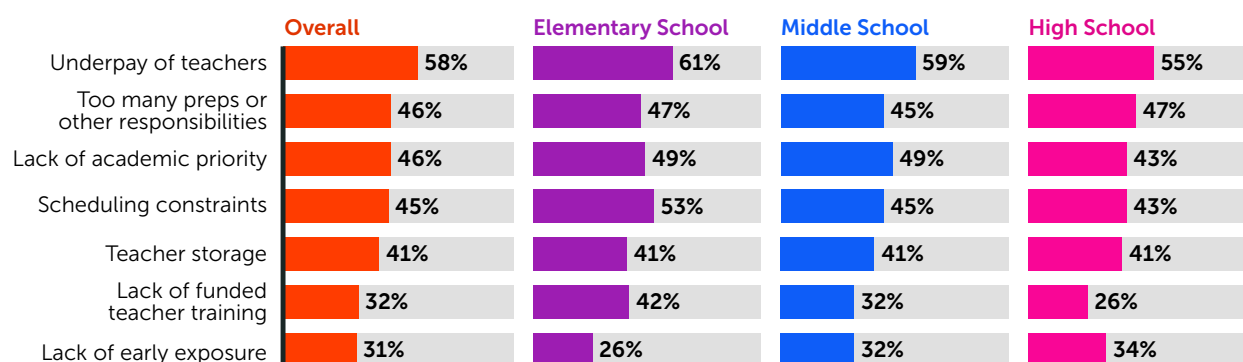
Teachers are overworked and underpaid

While 96% of teachers reported they truly enjoy teaching CS, other responses indicate just how challenging it is for teachers working in schools today. As a primary concern, **teachers reported challenges with being underpaid (58%) and overworked (46%)**. They called for more time and manageable workloads, citing many preps, multiple subject areas, large class sizes, and competing duties (e.g., managing technology, developing curriculum). Many sought curriculum and instructional resources—especially turnkey, standards-aligned, and equity-focused materials that reduce planning burden.

"[My biggest challenge is] teacher pay. The low pay of teaching does not provide a living wage."

—Middle school CS teacher from Indiana

Figure 18. Teachers' Perceptions of the Greatest Challenges to CS Education



Barriers to Prioritizing CS

CS has a lack of academic priority in school systems

Furthermore, despite the decade-long advocacy for CS education and the numerous ways in which CS and technology permeate our daily lives, **teachers still find it challenging for CS to be prioritized (46%)** when other subjects directly tied to standardized assessments are looming. This aligns to the most commonly cited type of equity issue that prevents students from fully participating or succeeding in CS classrooms, **structural barriers within schools.**

In open-ended responses, many teachers noted that CS courses remain marginalized in scheduling and staffing decisions, with counselors or administrators sometimes discouraging enrollment or prioritizing other subjects. Others cited time-related barriers, such as conflicts with other electives, insufficient class periods, or limited instructional time. Teachers addressed these issues through advocacy and outreach to school leadership, promotional events to elevate the status of CS, and flexible scheduling options like after-school, lunch, or independent-study opportunities.

“Treat computer science as an academic subject instead of elective.”

–High school CS teacher from Georgia

Barriers to Professional Development Participation

Participation in PD is limited by teachers’ time constraints

Nearly all teachers expressed a strong desire to participate in quality and ongoing professional development. This was teachers’ most frequently requested support in response to key challenges, emphasizing the need for sustained, relevant learning opportunities that move beyond one-off sessions. Unfortunately, **only 17% of teachers reported they were able to participate in PD as needed.**

By far, the most common barrier identified is time constraints (34%).

Many teachers are assigned several preps, other subject areas, and other responsibilities

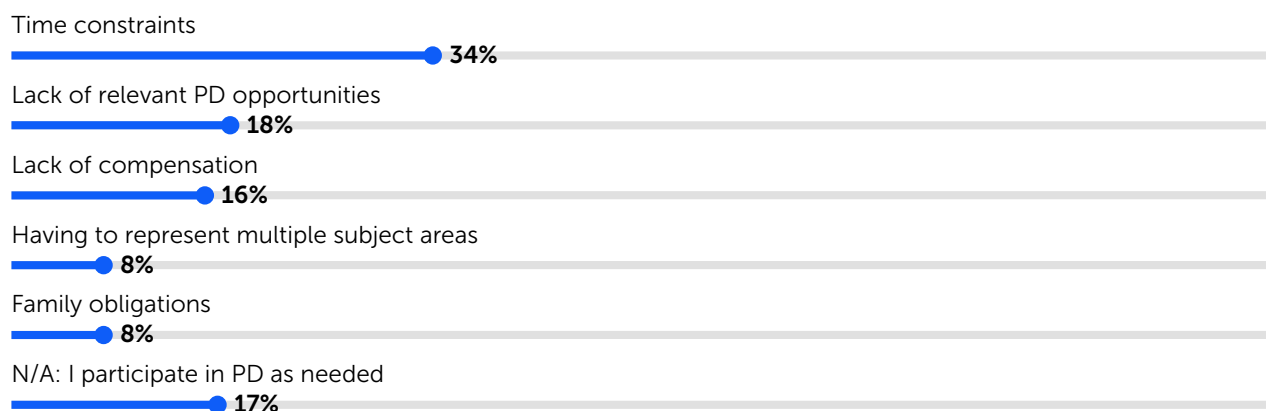
(e.g., managing tech at the school), further reducing the very limited time any teacher has for professional learning. Next, many teachers reported a lack of relevant PD opportunities (18%). Unfortunately, CS-focused PD is very limited in most school districts, pushing most teachers to seek outside learning opportunities. In line with previous sections identifying the need for

“I teach 4 different preps every day. It’s hard to prepare lessons for each one. I need to constantly differentiate, and by the time I finish planning, there is no time left for PD. I would love more training, but I can’t add anything else to my schedule.”

–Middle and high school CS teacher from California

elementary PD opportunities, elementary teachers were most likely to identify a lack of funded teacher training as a challenge in comparison to middle and high school teachers (42%, 32%, and 26%, respectively). Finally, a significant portion of teachers reported compensation (e.g., stipend, participating during contracted hours) as a key barrier to PD participation. In fact, 71% of teachers reported that receiving compensation is critical to their participation in teacher PD.

Figure 19. Greatest Barriers to PD Participation



Support by School Staff

Support by administrators and colleagues has improved but remains a challenge

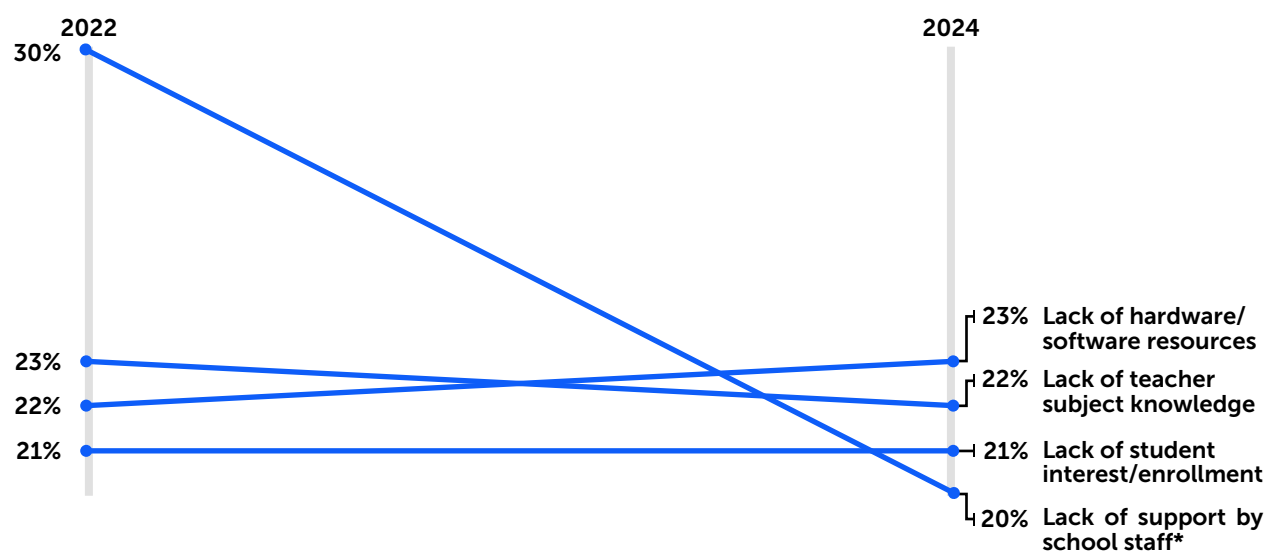
A notable change from the previous landscape report is the extent of the challenge posed by lack of buy-in from administrators and school staff. In 2020, **30% of teachers** reported lack of buy-in as a challenge. In 2024, lack of buy-in dropped considerably. **Only 18% of teachers reported lack of support by administrators as a challenge, and 20% of teachers reported lack of support by counselors as a challenge. Nevertheless, many teachers continue to emphasize the need for strong administrative and school-level support,**

including recognition of CS within scheduling, resource allocation, counseling, and leadership decisions. The ongoing efforts to develop PD inclusive of administrators and counselors will continue to play a pivotal role in ensuring a collective and cohesive CS education vision at the district and school level.

“Counselors have misconceptions about CS so they don’t represent it fairly when students enroll. Admin doesn’t come into classrooms so they also have misconceptions about the material and what type of students can/do succeed in these classes.”

–High school CS teacher from California

Figure 20. Challenges to Teaching CS, Year-over-Year



*In 2024, this reporting was an aggregate of teachers who reported a lack of support by administrators and/or counselors as a "high" challenge.



Equity and Inclusion

Equity is not just a value; it's a measure of readiness in preparing every student for a world powered by computing. Teachers repeatedly named inequities in access, resources, and representation as central challenges that limit students' participation and success. Yet, their responses also demonstrate creativity and persistence in addressing these barriers—from advocating for devices and scheduling access to creating inclusive, identity-affirming classrooms. This section examines equity as both a condition for readiness and an indicator of how well the education system supports all students in learning CS.

Inclusive Practices in the Classroom

Teachers are committed to belonging, but confidence gaps persist

Most teachers (83%) reported confidence in teaching CS concepts. **Significantly fewer felt similarly confident with inclusive teaching practices, even though teachers consistently believe in the need to have diverse CS classes and ensure everyone feels they belong (94% and 99%, respectively).** In fact, 68% felt confident using culturally relevant pedagogy, despite the vast majority (92%) believing effective instruction should incorporate diverse cultures and experiences into classroom lessons and discussions. Even fewer—just 41% of teachers—felt confident teaching multilingual learners, and 58% felt confident teaching students with disabilities.

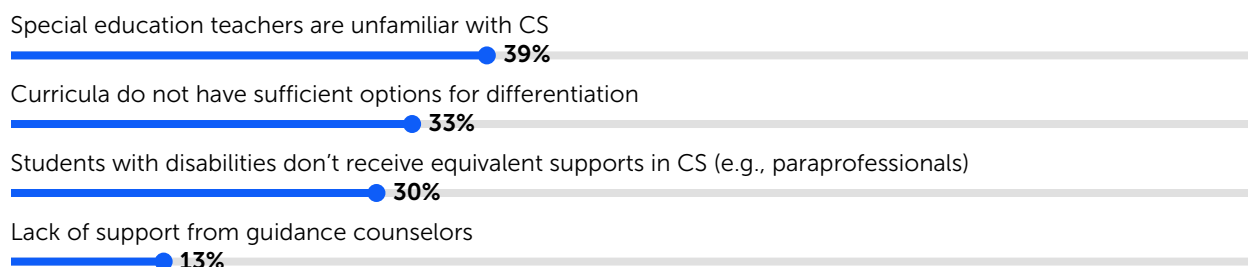
Since the previous report, there has been significant progress in the coverage of accessibility in CS classrooms. **Sixty-five percent of teachers reported teaching accessibility in their classrooms, which is a threefold increase since 2022.** Yet, accessibility continues to be one of the least covered topics in CS classrooms. And while accessibility is critical to the building of inclusive classrooms, **only 62% of teachers reported using accessible tools and curricula.** According to their teachers, students with disabilities face a number of other barriers, too. Most significant among these is a lack of support from school-based colleagues: special education teachers are unfamiliar with CS, students with disabilities don't receive equivalent supports in CS (e.g., paraprofessionals), and they also don't receive adequate support from guidance counselors. Additionally, 33% of teachers reported that their curricula do not have sufficient options for differentiation. Many noted that students entered CS courses with varying levels of experience and that instruction often lacked differentiation for students

"To strengthen my CS teaching practice, I'd most want to focus on mastering differentiation in CS education to cater to a wide range of student abilities and learning how to create a more inclusive CS environment, especially for girls, students of color, and other underrepresented groups."

—Elementary and middle school CS teacher from New Jersey

with disabilities or neurodiverse learners. This coincides with one of the most requested PD topics around designing inclusive instruction (e.g., using [Universal Design for Learning in CS](#)). Teachers responded with introductory units, differentiated instruction, and UDL-aligned supports, along with efforts to implement assistive technologies and accommodations tied to students' individualized education programs (IEPs).

Figure 21. Barriers for Students with Disabilities



Persistent Inequities

Longstanding barriers limit access for girls, multilingual learners, and students with disabilities

Teachers cited other persistent equity issues, namely impacting girls and multilingual students.

Teachers most frequently described gender disparities, particularly the underrepresentation of girls and the persistence of stereotypes about who belongs in computing. They also commonly highlighted barriers for multilingual learners, including language-heavy curricula and limited access to translated or scaffolded materials. Common strategies included intentional recruitment and encouragement of girls, highlighting diverse role models, forming clubs and mentorship programs, and using visuals, scaffolds, translation, and peer support to make CS instruction more accessible. **Other teachers described how some students, especially those from low-income households, lack access to resources and technology.** In response, teachers frequently sought creative solutions such as applying for grants or donations, establishing device loaner programs, and leveraging free online tools to ensure participation.

"From what I've seen, my female students feel discouraged to go into CS because they already believe from a young age that boys go on computers more, or that boys are more tech savvy. In addition to this, there isn't language compatible curriculum to help [multilingual students] better understand CS."

—2nd grade classroom teacher from Florida

Teacher Advocacy

Educators push for equitable learning opportunities within their schools and beyond

Even as half of teachers still felt as if CS was not prioritized in their schools, teachers have the potential to use their classroom expertise to shape policies and influence school strategy to expand CS education efforts, including the development of recruitment strategies, shaping curricula, and prioritizing inclusive and accessible practices. They are uniquely able to leverage their relationships with both students and families to promote the importance of CS education.

Teachers take on significant roles to advocate for CS, going beyond their assigned teaching responsibilities.

This year, teachers reported a greater role as advocates within the classroom itself as opposed to being advocates at more systemic levels at the school, or even state or district levels. Sixty-eight percent of CS teachers stated they introduced CS content and skills into existing courses, and 65% have actively recruited students to their CS courses. A majority of teachers report having increased CS offerings and extended learning opportunities (e.g., after-school club) at their schools, as well as conducting targeted outreach to underrepresented students. However, fewer teachers reported advocating for shifts in counseling practices or master schedules that may impact CS pathways beyond individual CS courses. At the state level, teachers reported less confidence in being advocates for CS education between 2022 and 2024. Despite existing efforts to build CS teachers' efficacy in becoming policy advocates, greater support and targeted efforts may be required at the state level.

"When I first started teaching CS in 2021 I would never be given a multilingual (ML) student because they were automatically placed in Tech Ed. I would get a few IEP students but many would just take Tech Ed. To address these concerns, I have gone to admin and asked that more IEP and ML students be placed in my class in hopes that I can reach more students but also show them other possibilities for careers or in college."

—High school CS teacher from Maryland

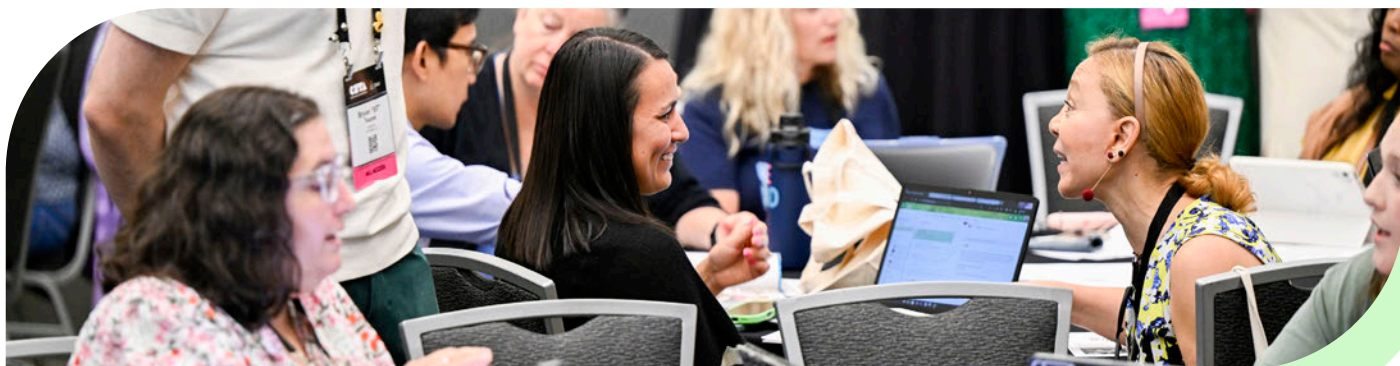


Figure 22. Confidence in Advocacy, by Level

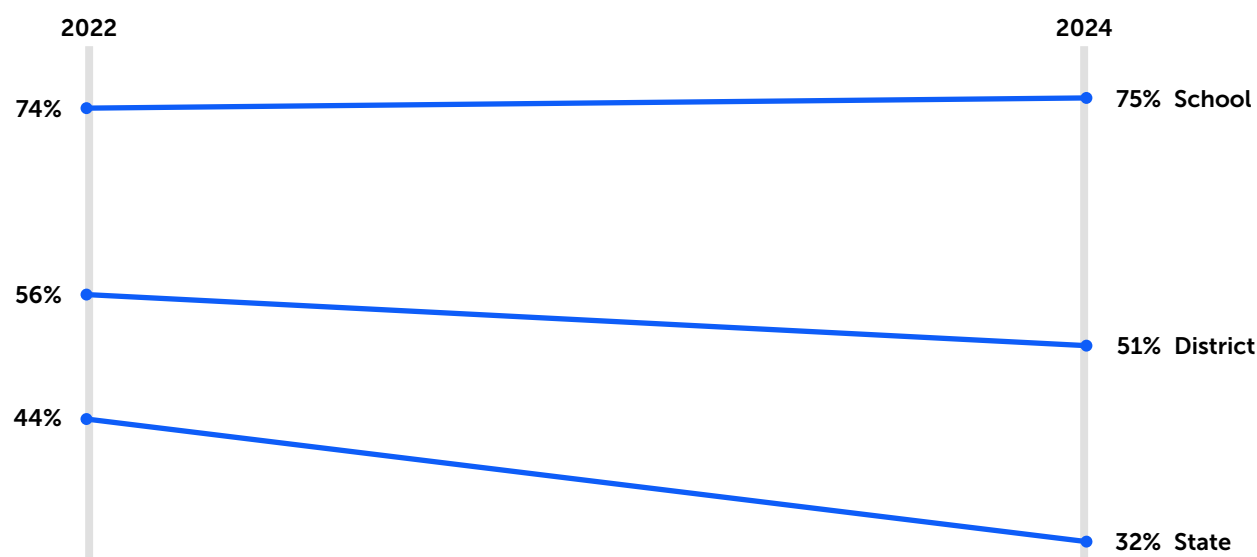
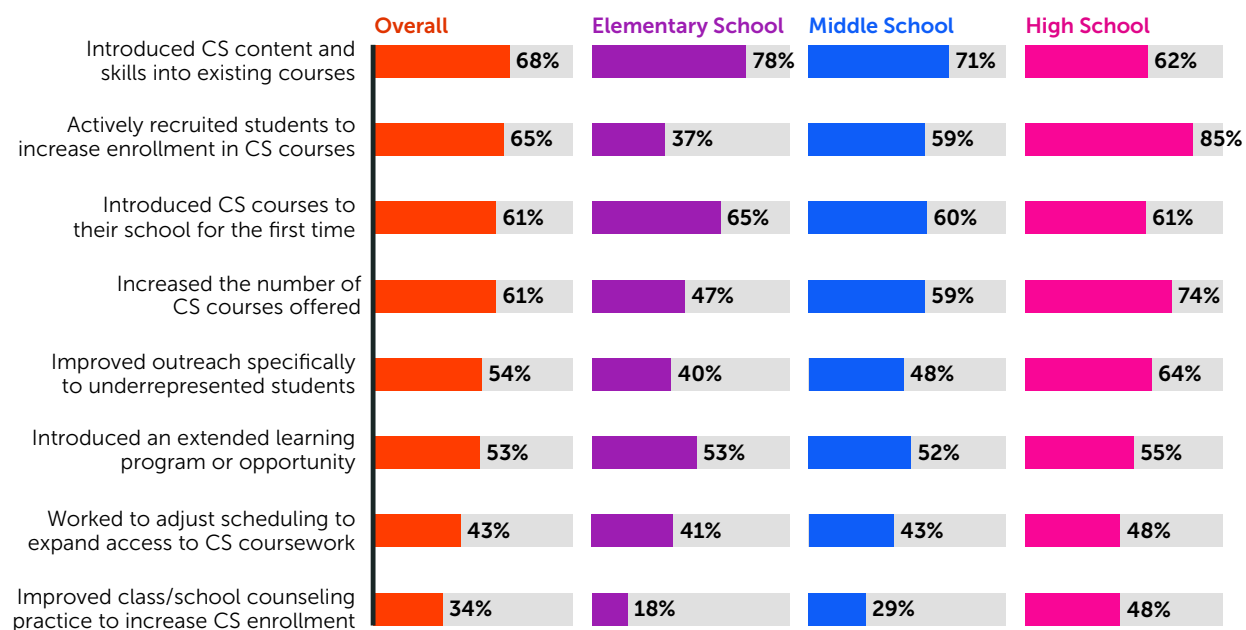


Figure 23. Teachers' Advocacy Efforts



Across all themes, teachers demonstrated strong initiative and commitment to inclusion, often compensating for systemic shortcomings through personal effort and innovation. While these actions made tangible differences at the classroom level, individual teacher efforts alone cannot achieve systemic readiness. The findings reveal the continued need for broader institutional and policy-level support to sustain equitable access and participation in CS education.

Recommendations

CS teachers are central to expanding equitable access, implementing new learning priorities such as AI, and ensuring that students develop the skills, confidence, and critical capacities needed in a computing-powered world. This message echoes findings from our [2022 landscape report](#), underscoring that the field has made progress but still has far to go. Many of the foundational needs identified then—sustained professional learning, dedicated instructional time, stronger administrative support, and greater recognition of teachers’ expertise—remain just as urgent today.

At the same time, the rapid rise of AI has heightened the importance of a robust CS foundation. Existing CS standards already lay essential groundwork for AI literacy through topics such as perception, data structures, ethics, and algorithms. **Preparing students for high-quality AI learning experiences depends on strong CS teaching: teachers who are supported, prepared, and empowered to help students navigate and shape emerging technologies.**

Yet teachers cannot meet these expectations without systems that recognize, value, and meaningfully support their work. The findings of this report show that teachers are committed and optimistic, but navigating structural challenges: limited PD time, uneven preparation, heavy workloads, isolation, insufficient resources, and inconsistent recognition for the expertise they bring. To realize the full vision of the revised CSTA standards, and to ensure students experience high-quality CS instruction across PK–12, communities must invest in teachers’ professional growth, well-being, and long-term stability.

The following recommendations outline the actions needed across roles to strengthen the CS workforce and elevate teachers as essential contributors to students’ futures.

**“Listen to the teachers.
They know what they need.”**

—High school CS teacher from Georgia





Invest in ongoing, high-quality teacher professional learning.

Teachers want to deepen their skills, but current professional development systems do not match the complexity of what CS educators are expected to teach, especially with new emphasis on AI, ethics, data, accessibility, and human-centered design. Many teachers receive only short workshops or rely on independent curriculum work, and elementary teachers face the steepest preparation gaps. Teachers also need support with inclusive pedagogy and accessibility practices to serve multilingual learners and students with disabilities. **High-quality CS instruction depends on sustained, differentiated professional learning that respects teachers' time, builds on their expertise, and gives them the opportunity to learn alongside peers.** Investing in this type of learning is one of the strongest signals that we value teachers as professionals.

"I come from industry, so I need help with the education aspect of the classroom. I feel like most education PD focuses on core subjects, and I would love for PD that is specifically focused for CS education. I need that extra step to show me how an instructional strategy or pedagogy can be applied specifically to a CS classroom, as many times things need to be tweaked or modified. Give me access to quality CS educators! Give me a PLC that includes CS educators, as I am the singleton at my school."

—High school CS teacher from California



Take Action

Counselors	Participate in introductory CS training to develop familiarity and bolster ability to guide students and their families.
School Leadership	- Provide dedicated time for CS professional development within the contract day, and protect it from competing duties. - Offer stipends, substitute coverage, or release time so teachers can attend PD without personal cost.
District Leadership	- Create districtwide CS learning plans that include coaching or mentoring and job-embedded development. - Partner with universities, industry, and nonprofits to deliver sustained PD. - Fund teachers' PD time, travel, substitutes, and micro-credentials.
State Leadership	- Expand CS certification and endorsement pathways. - Fund statewide CS training programs.
Curriculum & PD Providers	- Deliver differentiated, culturally responsive CS professional learning and AI integration modules. - Expand PD focused on emerging priorities in CS education, such as AI, ethics, and human-centered design. - Create PD tailored to the needs of elementary educators new to CS. - Offer sustained coaching, not just one-time workshops.
Researchers	- Track and share best practices for CS teacher readiness. - Study PD models that effectively support elementary teachers in teaching CS.



Provide comprehensive, sustained support to retain teachers.

CS teachers are remarkably committed. Most enjoy teaching CS and plan to continue teaching for years to come. Yet they do so despite heavy workloads, limited planning time, role ambiguity (e.g., being assigned school tech support), and uneven administrative backing. Many are also the only CS teacher in their building, limiting opportunities for peer collaboration and increasing stress. **Retention is not only about preventing turnover; it is about cultivating environments where teachers feel valued, respected, and supported in the day-to-day realities of their work.** Improving retention strengthens instructional quality, supports program continuity, and affirms that teachers' contributions matter.

"Students have no support in my class, while they have it in all of their other classes."

—Middle school CS teacher from New Jersey

“[The most helpful support to me is] more financial compensation for the number of preps I have. I have 5 different preps and get paid the same as teachers who have 1-2 preps. The amount of work I do outside of my contracted hours is not sustainable and has led me to consider leaving the teaching profession and finding a 9-5 job where I can clock out at the end of the day and achieve a better work/life balance.”

–High school CS teacher from Nebraska

Take Action

Counselors	Advocate for CS access and actively recruit underrepresented students to reduce teacher burden.
School Leadership	- Recognize teachers’ contributions publicly and privately. - Provide protected planning time and reduce non-CS duties such as tech support or excessive preps. - Protect CS programs during scheduling and budget decisions.
District Leadership	- Offer retention incentives and advanced roles for CS teachers. - Provide mentors and professional learning communities to CS teachers who are often isolated at their school sites.
State Leadership	- Fund multi-year CS programs. - Support statewide networks for coaching and community building (e.g., through regional CS specialists, connecting to local CSTA Chapters). - Expand loan-forgiveness, retention bonuses, and salary differentiation (e.g., hard-to-staff subject area designation) for CS teachers.
Curriculum & PD Providers	- Provide communities of practice and ongoing support for CS teachers. - Offer resource libraries and tools that reduce teachers’ planning burden.
Researchers	Study the factors influencing teacher retention, as well as models for effective professional support.



Prioritize CS as a core subject with universal participation throughout PK–12 education.

Despite growing national attention on AI literacy, the subject that makes AI education possible remains marginalized in many schools. CS is treated as an elective, offered irregularly, or limited to students with prior experience. Participation gaps persist, especially for girls, multilingual learners, students with disabilities, and students from low-income communities. Teachers consistently identify the lack of academic priority as a major barrier to delivering high-quality instruction. In fact, **88% of respondents reported that CS should be a high school graduation requirement**, underscoring the field’s readiness for a more prominent place in the curriculum. **Treating CS as a core subject, starting in elementary school and continuing through graduation, creates the conditions necessary for equitable access: dedicated time, stable funding, aligned pathways, and visibility for teachers’ work.** Prioritizing CS is also an act of valuing teachers, positioning their subject area as integral to every student’s education and future.

“Make [CS] a core subject. We live in a tech world; it needs to be part of [everyone’s] education.”

–High school
CS teacher from
Louisiana

Take Action

Counselors	• Include CS in all academic and college/career plans. • Track equity in enrollment and intervene early to recruit historically marginalized students. • Engage families by sharing CS learning opportunities and addressing misconceptions.
School Leadership	• Schedule CS courses with protected instructional time. • Ensure equitable access for students with disabilities and multilingual learners. • Integrate CS across subjects, especially in elementary grades. • Hold family information nights on CS pathways, careers, and AI literacy.
District Leadership	• Create coherent PK–12 CS pathways aligned with the revised CSTA Standards. • Establish sustainable funding and staffing structures. • Adopt procurement policies requiring accessible, inclusive digital tools and curricula.
State Leadership	• Adopt policies to ensure all students learn foundational PK–12 CS. • Provide funding to support implementation of CS instruction. • Disseminate model curricula aligned with updated standards and AI learning priorities.
Curriculum & PD Providers	• Develop age-appropriate, inclusive CS curricula and resources—for both standalone and integrated CS instruction. • Ensure all tools and materials meet accessibility guidelines.
Researchers	• Study PK–12 CS implementation, equity, pathways, and student outcomes. • Conduct research on elementary CS expansion and accessibility practices.
Community Members	• Sponsor clubs, events, and real-world learning opportunities. • Advocate for local funding and equitable access across schools.

Conclusion

The Future of CS Education Depends on Teachers

CS teachers are both the foundation and the future of high-quality computer science education. Their experiences, insights, and daily efforts are what bring the nation's vision for a world powered by computing to life. This year's survey reflects a profession that is deeply committed to students, increasingly confident in core CS instruction, and eager to grow in new areas such as AI, data science, cybersecurity, accessibility, and ethics. **Teachers overwhelmingly enjoy teaching CS (96%) and plan to continue doing so (85%), even amid mounting pressures.**

The added demands on CS educators are unmistakable. Teachers are expected to deliver advanced and rapidly evolving content; differentiate for linguistically diverse learners and students with disabilities; manage complex scheduling and enrollment barriers; build and revise their own curricula; participate in ongoing professional learning; and, for many, serve as their school's de facto tech support, CS recruiter, club sponsor, curriculum lead, and community advocate—all often without adequate time, compensation, or recognition. These expanded responsibilities illustrate a clear truth: **teachers are already doing the work of advancing the next generation of CS education, but they cannot and should not be expected to do it alone.**

As the revised CSTA PK–12 Standards expand to include emerging topics and deepen expectations for inclusive, human-centered instruction, teacher readiness must be understood as multidimensional. It requires continuous technical learning, strong pedagogical preparation, confidence with accessibility and UDL practices, and the ability to help students navigate the societal and ethical implications of computing. Meeting this bar is not a matter of will, as teachers have more than demonstrated that. Rather, it is a matter of having the sustained support, time, and system-level conditions that respect the complexity of the work.

"Invest in the teachers [you already] have."

—High school CS teacher from Virginia

This moment presents both urgency and opportunity. The future of CS education depends on whether we invest in teachers not only as implementers of curriculum, but as professionals whose expertise, judgment, and leadership shape students' pathways and possibilities. **Valuing CS teachers means investing in the learning, time, recognition, and working conditions that allow them to continue doing what they do best: helping students thrive in a world powered by computing.** By doing so, we ensure that CS education remains not just about technology, but about human potential and creativity. The readiness of the CS teaching workforce today will determine the opportunities available to every student tomorrow.

About Us



The **Computer Science Teachers Association (CSTA)** is a global membership organization that unites, supports, and empowers educators to enhance the quality, accessibility, and inclusivity of computer science education. With the vision that every student should be prepared for a world powered by computing, CSTA advocates for K–12 computer science teachers worldwide, providing professional development, curriculum resources, and a community of practice dedicated to advancing CS education for all students. For more information on CSTA, visit <https://csteachers.org>.



The **Kapor Foundation** works at the intersection of racial equity and technology to expand access to K–12 computer science and postsecondary tech pathways, improve tech accountability and worker protections, and increase investments in infrastructure and gap-closing innovation. We advocate for policy changes, build the capacity of partners, conduct research, support partners through grant making, and invest in entrepreneurship. For more information on the Kapor Foundation, visit www.kaporfoundation.org.



The **Alliance for Interdisciplinary Innovation in Computing Education (AiiCE)** is a national cross-sector partnership working to enhance high school and postsecondary computing education. AiiCE creates supportive learning environments and expands opportunities for students and educators across all backgrounds in computing. For more information on AiiCE, visit <https://aiiceinnovates.org/>.

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Explore the Data & Take Action

Explore our interactive data dashboard to dive deeper into the findings from this report. You can also access previous landscape studies and find actionable steps to support CS teachers and advance CS education.

landscape.csteachers.org

