New Business Item 21-55
Introduced April 29, 2022
Approved April 29, 2022

TITLE: Adoption of Computer Science Standards for Licensure and Hawaii Educator Preparation Program Verification of Content Knowledge of Teacher Candidates

The Hawaii Teacher Standards Board (HTSB) adopts the following 2020 Computer Science Teachers Association (CSTA) Standards for Computer Science Teachers.

These Computer Science Standards were designed for both novice and experienced Computer Science teachers. These standards are intended to provide guidance regarding the effective and equitable delivery of Computer Science instruction for K-12 students.

2020 Computer Science Teachers Association (CSTA) Standards for Computer Science Teachers attached.

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Referred to: Teacher Education Committee

These Standards are aspirational and dependent on sustained professional development (PD) and learning. We intend to provide a level of specificity that both offers sufficient guidance to novice CS teachers while allowing experienced CS teachers space for professional growth. This is critical because CS teachers enter the field from many different areas of specialization, and their preparation varies significantly. Each indicator is not an expectation of current knowledge, but instead a roadmap to help teachers from multiple entry points identify strengths and areas of need. We hope teachers use this information to seek out targeted professional development opportunities to increase their mastery.

Audience

These Standards are designed for both novice and experienced teachers who primarily teach computer science. While we anticipate that many in the CS education community will find value in these Standards, we designed them for a few specific audiences:

- **Schools of education** will use these Standards to develop new or refine existing *pre-service* programs.
- **PD providers** will use these Standards to develop new or refine existing *in-service* professional learning programs.
- **State, district, and site leaders** will use these Standards to develop pathways for certification and support their CS teachers in setting and meeting professional learning goals.
- **K-12 CS teachers** will use these Standards to reflect on their own strengths and areas of growth, set professional goals, and identify targeted PD opportunities to meet these goals.

Development

The *CSTA Standards for CS Teachers* are written and maintained by teacher members of the Computer Science Teachers Association (CSTA), a nonprofit organization dedicated to empowering, engaging, and advocating for K-12 CS teachers worldwide. These Standards were first created and published by the International Society for Technology in Education (ISTE) in 2003 as the *Standards for CS Educators*, last updated in 2011, and rewritten in 2019 in partnership with ISTE, for release in 2020.

2020 CSTA Standards for Computer Science Teachers

The field of computer science (CS) education has rapidly accelerated over the past two decades. Throughout this movement, we have learned a great deal about effective K-12 CS instruction. By publishing this new version of *Standards for CS Teachers*, we aim to complement the universal outcomes for student learning delineated in the *K-12 CS Framework* and *CSTA K-12 CS Standards*. The *Standards for CS Teachers* establish robust benchmarks for the teachers who prepare their students to meet these learning outcomes.

Purpose

These Standards are designed to provide clear guidance around effective and equitable CS instruction in support of rigorous CS education for all K-12 students. The purpose is to:

- explain what CS teachers should know and be able to do in the classroom,
- provide aspirational goals to guide teachers' professional learning and to continuously develop their teaching practice from novice to master CS teacher, and
- establish benchmarks for professional development (PD) providers as they craft CS PD experiences.

Vision

Effective CS teachers must have thorough content knowledge and skills in computer science and understand the student learning progression.* They must also continuously refine their pedagogical content knowledge (PCK) and skills to support all students in meeting learning outcomes.

* These Standards do not attempt to define all content knowledge and skills that CS teachers should have. Rather, they reference the *K-12 CS Framework* and *CSTA K-12 CS Standards*, which provide curricular guidance on CS learning objectives and outline the foundation for a complete CS curriculum and its implementation at the K-12 level.

Suggested citation: Computer Science Teachers Association (2020). *CSTA Standards for Computer Science Teachers*. Retrieved from **https://csteachers.org/teacherstandards**.

A full version of these Standards, with supplementary information and resources, is available online at **http://csteachers.org/teacherstandards**

CSTA Standards for Computer Science Teachers

Standard 1. CS Knowledge & Skills

Effective CS teachers demonstrate and continuously develop thorough knowledge of CS content. They demonstrate proficiency with the CS concepts of the grade bands they teach, and they integrate these concepts with CS practices, including computational thinking. They also understand the progression of content before and after the grade bands they teach.

1a. Apply CS practices

Apply CS and computational thinking practices in flexible and appropriate ways. Practices include: Fostering an Inclusive Computing Culture, Collaborating Around Computing, Communicating About Computing, Recognizing and Defining Computational Problems, Developing and Using Abstractions, Creating Computational Artifacts, and Testing and Refining Computational Artifacts.

1b. Apply knowledge of computing systems

Apply knowledge of how hardware and software function to input, process, store, and output information within computing systems by analyzing interactions, designing projects, and troubleshooting problems.

1c. Model networks and the Internet

Model how computing devices connect via networks and the Internet to facilitate communication, and explain tradeoffs between usability and security.

1d. Use and analyze data

Collect, store, transform, and analyze digital data to better understand the world and make more accurate predictions.

1e. Develop programs and interpret algorithms

Design, implement, debug, and review programs in an iterative process using appropriate CS tools and technologies. Interpret algorithms, and explain tradeoffs associated with different algorithms.

1f. Analyze impacts of computing

Analyze how people influence computing through their behaviors, cultural norms, and social interactions, as well as how computing impacts society in both positive and negative ways.

Standard 2. Equity and Inclusion

Effective CS teachers proactively advocate for equity and inclusion in the CS classroom. They work towards an intentional, equity-focused vision to improve access, engagement, and achievement for all of their students in CS.

2a. Examine issues of equity in CS

Examine how structural barriers and social and psychological factors contribute to inequitable access, engagement, and achievement in CS among marginalized groups. Reflect on how issues of equity manifest in their own CS teaching context.

2b. Minimize threats to inclusion

Develop purposeful strategies to proactively challenge unconscious bias and minimize stereotype threat in CS.

2c. Represent diverse perspectives

Incorporate diverse perspectives and experiences of individuals from marginalized groups in curricular materials and instruction.

2d. Use data for decision-making to improve equity

Create and implement a plan to improve access, engagement, and full participation in CS using classroom data to inform decision-making.

2e. Use accessible instructional materials

Evaluate tools and curricula and leverage resources to improve accessibility for all students.

Standard 3. Professional Growth and Identity

Effective CS teachers continuously develop their knowledge, practice, and professional identity to keep pace with the rapidly evolving discipline. They participate in the larger CS education community and collaborate with others to develop the skills that enable all students to succeed in their classes.

3a. Pursue targeted professional development

Develop and implement a plan for targeted professional development to continuously deepen their CS content and pedagogical knowledge and skills.

3b. Model continuous learning

Model willingness to learn from others and to continuously develop new skills. Demonstrate comfort in problem solving and perseverance when encountering new or challenging content.

3c. Examine and counteract personal bias

Examine how their personal perspective, privilege, and power impact student success and classroom culture, and continuously work to counteract biases.

3d. Commit to the mission of CS for all students

Develop a personal teaching philosophy reflecting that all students can and should learn CS.

3e. Leverage community resources

Identify and connect resources in the local community and broader CS ecosystem to support student learning in CS.

3f. Participate in CS professional learning communities

Participate in CS professional learning communities (PLCs) to collaborate with peers, celebrate successes, share lessons learned, and address challenges.

Standard 4. Instructional Design

Effective CS teachers design learning experiences that engage students in problem solving and creative expression through CS, using pedagogical content knowledge (PCK). They plan to meet the varied learning, cultural, linguistic, and motivational needs of individual students in order to build student self-efficacy and capacity in CS.

4a. Analyze CS curricula

Analyze CS curricula for implementation in their classrooms in terms of CS standards alignment, accuracy, completeness of content, cultural relevance, and accessibility.

4b. Develop standards-aligned learning experiences

Design and adapt learning experiences that align to comprehensive K-12 computer science standards.

4c. Design inclusive learning experiences

Use Universal Design for Learning (UDL), Culturally Relevant Pedagogy (CRP), and other techniques to support all students in successfully accessing and engaging with content.

4d. Build connections between CS and other disciplines

Design learning experiences that make connections to other disciplines and real-world contexts.

4e. Plan projects that have personal meaning to students

Plan opportunities for students to create and share open-ended and personally meaningful projects.

4f. Plan instruction to foster student understanding

Plan activities that use evidence-based, CS-specific teaching strategies to develop students' conceptual understanding and proactively address student misconceptions in CS.

4g. Inform instruction through assessment

Develop multiple forms and modalities of assessment to provide feedback and support. Use resulting data for instructional decision-making and differentiation.

Standard 5. Classroom Practice

Effective CS teachers are responsive classroom practitioners who implement evidence-based pedagogy to facilitate meaningful experiences and produce empowered learners of CS.

5a. Use inquiry to facilitate student learning

Use inquiry-based learning to enhance student understanding of CS content.

5b. Cultivate a positive classroom climate

Cultivate a positive classroom climate that values and amplifies varied perspectives, abilities, approaches, and solutions.

5c. Promote student self-efficacy

Promote student self-efficacy by facilitating student creativity, choice in product and process, and self-directed learning.

5d. Support student collaboration

Provide structured opportunities for students to collaborate in CS. Develop students' ability to provide, receive, and respond to constructive feedback in the design, implementation, and review of computational artifacts.

5e. Encourage student communication

Create and scaffold meaningful opportunities for students to discuss, read, and write about CS concepts and how they integrate CS practices.

5f. Guide students' use of feedback

Use formative assessments to provide timely, specific, and actionable feedback to students and to adjust instruction. Develop students' ability to interpret and use feedback from computers, teachers, peers, and community.