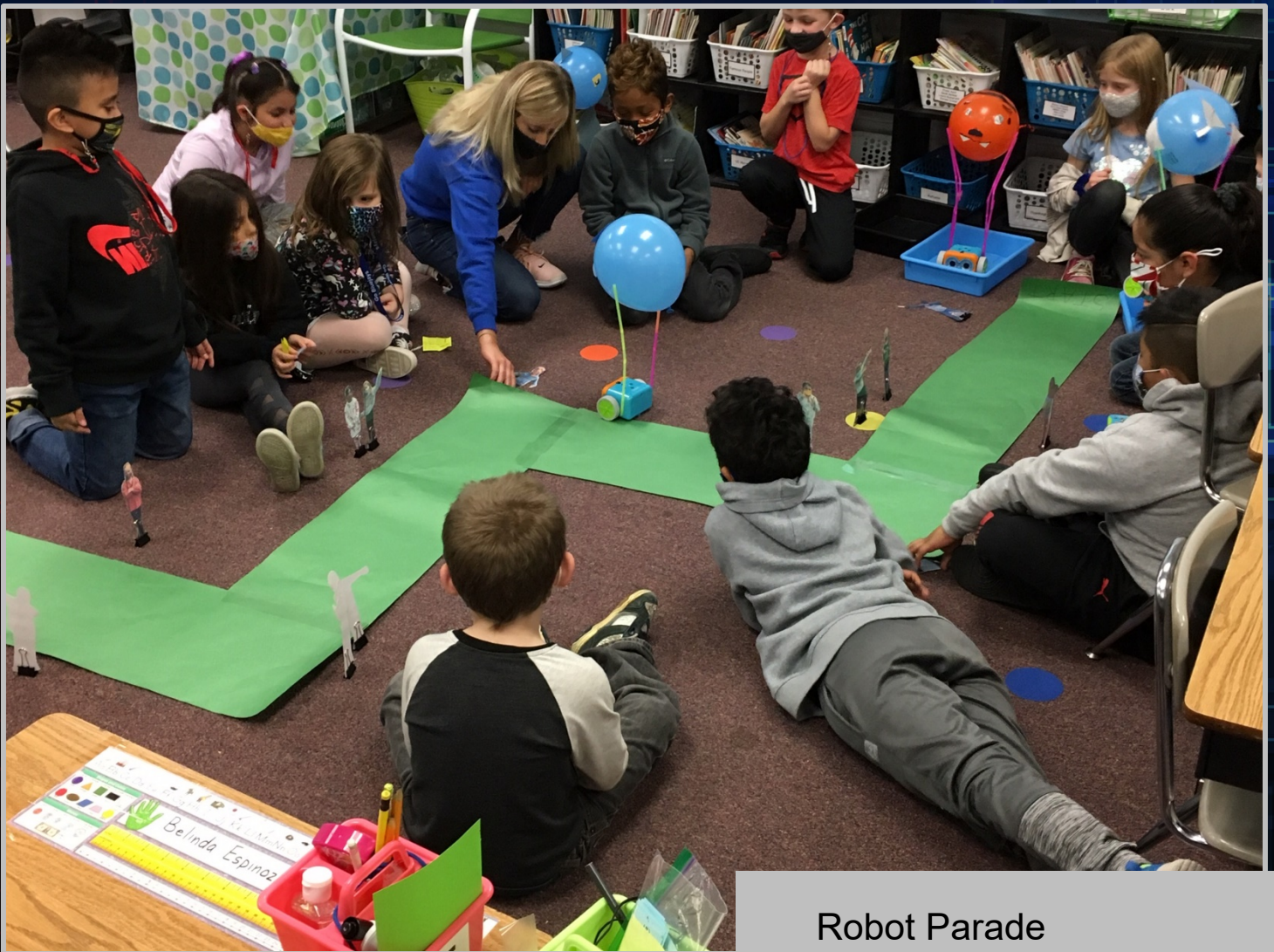# Building on Iowa's Vision
for Computer Science Education

July 1, 2021

Robot Parade
at Perry Elementary School

State of Iowa
Department of Education
Grimes State Office Building
400 E. 14th Street
Des Moines, IA 50319-0146

State Board of Education

Brooke Axiotis, President, Des Moines
Bettie Bolar, Vice President, Marshalltown
Brian J. Kane, Dubuque
Michael L. Knedler, Council Bluffs
Mike May, Spirit Lake
John Robbins, Iowa Falls
Georgia Van Gundy, Waukee
Kimberly Wayne, Des Moines
Hannah Groos, Student Member, Norwalk

Administration

Ann Lebo, Director of the Iowa Department of Education and Executive
Officer of the State Board of Education

For more information, please contact:

Wren Hoffman, Computer Science Consultant and Computer Science Work Group Facilitator, Iowa Department of Education, wren.hoffman@iowa.gov, or 515-981-3306.

Linda Fandel, Governor's Liaison for Future Ready Iowa and Computer Science Work Group Report Editor, Iowa Department of Education, linda.fandel@iowa.gov, or 515-802-0989.

Contents

Cover Photo

Perry Elementary School students coded different robots to go on a "Macy's Day Parade" route prior to Thanksgiving 2020. The students also constructed something to hold a balloon on top of the robots. The pictures standing along the route are cutouts of actual students from the class. A special thank you to Perry Elementary School for sharing the photo for this report.

Other Photos

A special thank you to the Governor's Science, Technology, Engineering and Mathematics Advisory Council for sharing the other photos throughout this report.

Building on Iowa's Vision for Computer Science Education

Iowa leaders agreed in 2020 that all students need a strong foundation in computer science to prepare for college, careers and life. Gov. Kim Reynolds proposed and the Legislature unanimously passed a bill – House File 2629 – that for the first time requires K-12 schools to teach computer science. High schools must offer at least a one-half unit course by the 2022-23 school year. Middle and elementary schools must provide computer science instruction in at least one grade level by 2023-24. But that is just a start. House File 2629 also established a Computer Science Work Group to think bigger about next steps, recognizing that Iowa's economic competitiveness around the nation and the globe depends on the innovation computer science drives. Mindful that Iowans must move forward with urgency, this report presents the work group's top three recommendations for implementation starting July 1, 2022, and the full recommendations of its six subcommittees with target dates for initiating action soon afterward.

Top three recommendations

Recommendation: Create an ongoing Computer Science Work Group with representatives from the nine Area Education Agencies (AEAs) and other advocates to guarantee all teachers have access to cohesive, high-quality computer science professional development, so all students benefit. Under direction of the Iowa Department of Education, the work group will develop an annual plan to deliver teacher training after consultation with K-12 schools, higher education and employers. The work group also will recommend standards for qualifications – like micro-credentials – to count toward earning computer science endorsements. (Please see the full set of Educator Support Subcommittee Recommendations on page 6.)

Recommendation: Bridge any computer science gaps in schools and communities by providing more computer science education for students lacking a strong minimum level. Instruction should be in person rather than remote whenever possible. Partnerships with higher education and school districts should assist when access or resources are limited. (Please see the full set of Underserved Students Subcommittee Recommendations on page 9.)

Recommendation: Each school district should have access to a work-based learning coordinator to ensure students have opportunities to engage in these authentic, professional experiences and that work-based learning integrates increasingly essential knowledge of computer science. This recognizes that computer science and IT jobs are among the fastest-growing and best-paying, but also that most occupations increasingly demand complex digital know-how. (Please see the full set of Work-Based Learning Subcommittee Recommendations on page 10.)

Kathy Kay, Chief Information Officer at Principal Financial Group, and Jeff Weld, Executive Director of the Governor's Science, Technology, Engineering and Mathematics (STEM) Advisory Council, co-chaired the Computer Science Work Group representing business and industry, K-12 and higher education, nonprofits and state agencies. The work group began meeting in December 2020 with a focus on providing all students opportunities for high-quality computer science education inside and outside schools, which in turn will strengthen Iowa's talent pipeline.

The recommendations are intended to accelerate and celebrate computer science education, and close the digital divide. Members know that providing more computer science education by itself won't be enough unless all students see that computer science is for them, which is not the case now. For example, just 10.1% of the class of 2021 took a high-quality computer science course, and girls and many students with diverse backgrounds were underrepresented. A lower percentage of rural students enrolled in those courses than urban students.

Yet some Iowa school districts – like Osage – already make the inspiring case that computer science education is for everyone by ensuring all students have access every year in every grade level. Katelyn Johnston, an Osage High School student considering a career that connects computer science and medicine, explains why learning computer science matters to her: "It really does help you in everyday life with understanding the way things run behind the scenes in everything you do. Anyone can learn computer science and anyone can be good at it."

This report embraces that spirit and builds on Iowa's vision that computer science is for all students. Its recommendations are in keeping with the Future Ready Iowa initiative, which sets the goal of 70% of the state's workforce having education or training beyond high school by 2025. Rapidly expanding computer science education will ensure young people are equipped to thrive in a world that demands increasingly complex digital skills, especially in the workforce in virtually every occupation from advanced manufacturing to health care to IT.

Co-Curricular Programs Subcommittee

Recommendation: Increase the number of tech-focused summer programs for K-12 students offered across the state.

> **Rationale/Next Steps:** Summer programs are a great way to engage students in activities that may seem overwhelming in a typical school-year setting. The Department of Education should convene a work group to develop a framework for the range of summer experiences in technology to be offered equitably across the state, with the goal of introducing more students and adults to computational thinking. Summer programs could be embedded in community events like county fairs, FFA and 4-H that encourage parents and children to learn computer science together. **Target date to initiate:** 2022-23 school year.

Recommendation: Provide more opportunities for students to participate in regional and statewide computer science and technology competitions year-round.

> **Rationale/Next Steps:** Co-curricular activities like competitions provide opportunities for students to work toward goals and interact with peers with the same passions. When competitions are designed to be inclusive and fun they can increase the number of students interested in computing. The Department of Education should create a clearinghouse with information about co-curricular computer science competitions and activities, and propose a funding mechanism to help schools send student teams to participate in these events. Funding should assist with the cost of transportation, substitute teachers, etc. A separate fund should be established to support the growth of technology-focused competitions like IT-Olympics and First Lego League. Emphasis should be placed on programs targeting increasing access and inclusion. **Target date to initiate:** 2022-23 school year.

Recommendation: Invite students to showcase their talents at a statewide virtual Tech Jam.

> **Rationale/Next Steps:** A statewide virtual Iowa Tech Jam for students would enable them to showcase their skills and accomplishments. Students also could see the depth and breadth of opportunities in computing and build their own networks. The Department of Education should convene a work group to develop the Iowa Tech Jam, look for sponsorships and pair the Iowa Tech Jam with other opportunities. This event also would help parents and the general public better understand the field of computing. **Target date to initiate:** 2022-23 school year.

Educator Support Subcommittee

Recommendation: Create an ongoing Computer Science Work Group with representatives from the nine AEAs and other advocates to guarantee all teachers have access to cohesive, high-quality computer science professional development, so all students benefit. Under direction of the Department of Education, the work group will develop an annual plan to deliver teacher training after consultation with K-12 schools, higher education and employers. The work group also will recommend standards for qualifications – like micro-credentials – to count toward earning computer science endorsements.

> **Rationale/Next Steps:** Computer science teacher training in the nine AEAs varies depending on the skill sets of staff. Some AEAs offer a wide variety of professional development on many topics while others focus on a few limited, high-quality opportunities. The work group could ensure all teachers have strong, equivalent training opportunities, deliver consistent messaging about computer science education and serve as a statewide advisory group. It also would be uniquely positioned to recommend additional rigorous ways to prepare computer science teachers, such as how to expand access to earning endorsements more incrementally. **Target date to initiate:** July 1, 2022.

Recommendation: Make a computer science endorsement a critical and affordable credential for secondary teachers.

> **Rationale/Next Steps:** For computer science education to be consistently and effectively delivered across Iowa, it is important to encourage teachers to have the intensive training suggested by completing endorsement coursework. Within a decade, the state should require all secondary computer science teachers to have earned a computer science endorsement so they have strong content knowledge. Funding targeted solely for this purpose could be added to Iowa's Computer Science Professional Development Incentive Fund, which currently provides limited financial support for endorsements. **Target date to initiate:** 2022-23 school year.

Recommendation: Create and maintain a one-stop, curated website of materials for educators as they develop curricula and computer science plans.

Rationale/Next Steps: K-12 educators report difficulty readily finding computer science resources. A well-designed portal that clearly directs teachers to specific categories of high-quality, user-friendly resources at the state and national levels is needed. A small team of state and local computer science leaders could maintain the website. It should include information about the following: (1) state computer science standards and how to incorporate them into various grade levels and subjects; (2) what should be part of a district's or nonpublic school's required K-12 computer science plan; (3) vetted curricula; (4) professional development; (5) links to professional organizations; (6) links to AEA contacts; (7) and contact information for computer science educators to develop a community of practice. **Target date to initiate:** 2022-23 school year.

Policy Subcommittee

Recommendation: The Department of Education should research best practices around the country so computer science can be used as a flex credit substituting for mathematics, science or other appropriate subjects for high school graduation. Ensure the flex credit meets state standards for any credits the course is allowed to flex.

Rationale/Next Steps: This will free up schedules so high school students could learn more computer science leading to high-demand tech careers. The Department of Education should develop proposed rules to allow flex credits in a way that meets best practices and, if needed, make recommendations to the governor and Legislature to update Iowa law. Students would have a more fully developed option for a computer science career pathway and employers would benefit from a better-prepared future workforce. **Target date to initiate:** 2022-23 school year.

Recommendation: Do more to incentivize elementary, middle and high school teachers to acquire deeper content knowledge by earning computer science endorsements.

Rationale/Next Steps: With a new state law soon requiring schools to deliver engaging computer science education, Iowa will need to greatly increase the number of highly qualified teachers. The Department of Education should propose an incentive program with multiple options, including endorsement credit reimbursement, student loan repayment and stipends, in addition to the existing Computer Science Professional Development Incentive Fund. Schools would be able to more easily hire well-prepared teachers. Teachers would benefit from increasing their expertise. Students would have access to more in-depth computer science courses. **Target date to initiate:** 2022-23 school year.

Recommendation: Encourage computer science industry professionals to become teachers with financial incentives and a streamlined licensure pathway.

Rationale/Next Steps: Recruiting computer science professionals would increase the number of teachers delivering high-quality computer science instruction and bring valuable real-world experience into classrooms. The Department of Education should develop a proposal to cover

the cost of their teacher preparation coursework. The Iowa Board of Educational Examiners should develop alternative licensure requirements for nontraditional computer science teachers at all grade levels that are more streamlined than the existing alternative licensure pathway, enabling swifter, more practice-based completion by candidates. This would address the computer science teacher shortage while students would have more teachers who understand practice as well as theory. Computer science professionals would be attracted to the opportunity to change careers and impact students. **Target date to initiate:** 2022-23 school year.

Promotions Subcommittee

Recommendation: Each fall, the governor should issue an annual "Computing Week" proclamation.

> **Rationale/Next Steps:** A governor's proclamation would instantly promote computer science and generate positive media coverage, K-12 school tours, challenges among schools and other positive outcomes. Designating a week also would provide an ongoing focus on the topic by encouraging build-up and promotion year-round. Care should be taken to establish the right name. It is important to be inclusive of all related fields while destigmatizing a potentially intimidating career pathway. The Department of Education could plan public events statewide to elevate computer science education, training and careers for the proclamation week. Consideration should be given to creating specific themes for each day of the week. Students, parents, schools, business and industry and communities would benefit. **Target date to initiate:** 2022-23 school year.

Recommendation: Create a Computer Science Ambassador Corps.

> **Rationale/Next Steps:** An ambassador corps would organize thought leaders and community advocates to engage in promoting the benefits of computer science education, training and careers. Through a coordinated effort, this volunteer group could post, voice and otherwise share its support for initiatives related to computing and STEM. The Department of Education could recruit individuals willing to serve as ambassadors by reaching out to industry professionals, community leaders and others, and providing them with promotional materials to share with their networks. **Target date to initiate:** 2022-23 school year.

Recommendation: Grow partnerships and synergies with employers.

> **Rationale/Next Steps:** Expanding partnerships that promote computer science through school-business collaboration is key. Meanwhile, many organizations have existing programs that the Department of Education and local schools could take advantage of now. It's important to build on these assets with more deliberate, specific outreach. The Statewide Work-Based Learning Intermediary Network could play a role
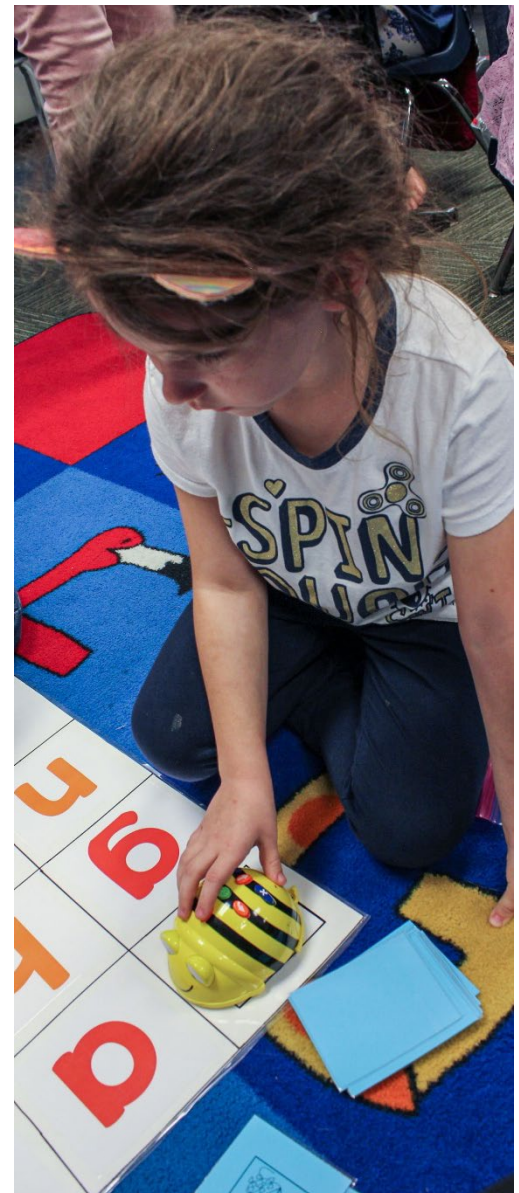
in this endeavor along with local school and AEA work-based learning contacts. To highlight computer science education, training and careers, advocates could populate advisory boards, encourage teacher externship opportunities and host business check-ins. The Department of Education could convene an industry board to offer advice about potential interactions and needs of the business community. **Target date to initiate:** 2022-23 school year.

Underserved Students Subcommittee

Recommendation: Bridge any computer science gaps in schools and communities by providing more computer science education for students lacking a strong minimum level. Instruction should be in person rather than remote whenever possible. Partnerships with higher education and school districts should assist when access or resources are limited.

Rationale/Next Steps:
Expanding access to high-quality computer science instruction for underfunded and underserved students and communities eventually should include training all K-8 teachers so they can integrate computer science into other subjects and reach all students. This is a step some school districts already have taken. Prioritize in-person instruction, which also would mean hiring more K-12 instructors. If remote instruction is the only option, partnerships with school districts and higher education should be pursued, and instruction should take place during the school day to avoid negatively impacting family schedules. Schools whose students receive virtual instruction need to provide sufficient equipment. **Target date to initiate:** July 1, 2022.

Recommendation: Train technology teachers and technology specialists employed in schools to teach computer science. Expand this training to instructional aides, teachers of the visually impaired and interpreters for the deaf and hard of hearing to make student learning experiences more cohesive. Recruit computer science mentors reflecting the broad range of student backgrounds.

Rationale/Next Steps: Training technology teachers and technology specialists who currently maintain the school computing infrastructure to teach could quickly expand the computer science teacher workforce. Students will have more consistent conversations in class about computational thinking and other computer science concepts if educators assisting with instruction are knowledgeable about content. Connecting students to relatable mentors would be motivating and could lead to more diversity among computer science professionals. In addition, connect mentors and students with STEM peer organizations and connect school counselors with national networks aligned to the population needs of schools. Develop a state directory of computer science school-based contacts. Examine whether higher pay is needed to attract and retain computer science teachers. The Department of Education could facilitate all of these efforts. **Target date to initiate:** 2022-23 school year.

Recommendation: Provide accessible, approachable computer science curricula, delivery and platforms that meet the needs of students with diverse backgrounds, including students with disabilities.

Rationale/Next Steps: Offer culturally responsible computer science curricula that first emphasize inquiry-based learning, problem solving and critical thinking through studies including robotics, cybersecurity and logic development to reach a broader group of individuals. Coding also should be taught, but as a secondary priority. This approach will introduce students to learning paradigms proven to improve outcomes. The Department of Education should identify top programs and techniques used by high-performing schools reflecting knowledge of how humans and computers interact. Curricula should be compatible with flexibility in input (desktop computer, tablet, mobile), output (visual, auditory, tactile) and expression (storytelling, music, etc.). This will make computing more user-friendly and inclusive for students of diverse backgrounds and abilities as well as better aligned to their values and interests. **Target date to initiate:** 2022-23 school year.

Work-Based Learning Subcommittee

Recommendation: Each school district should have access to a work-based learning coordinator to ensure students have opportunities to engage in these authentic, professional experiences and that work-based learning integrates increasingly essential knowledge of computer science. This recognizes that computer science and IT jobs are among the fastest-growing and best-paying, but also that most occupations increasingly demand complex digital know-how.

Rationale/Next Steps: With Governor Reynolds calling for all high school students to participate in at least one work-based learning experience by 2024 as they prepare for college and career training, it is important to expand access to these options and include how computer science is redefining virtually all occupations. Coordinators can grow the relationships that make work-based learning possible by serving as dependable points of contact who break down barriers between employers and educators. That includes facilitating programming, enrollment and transportation in rural and urban communities. Not all schools are large enough to support a full-time coordinator, but sharing would add the benefit of developing regional initiatives beyond local communities. The Department of Education, working with schools, employers and the Board of Educational Examiners, could establish requirements for coordinators. **Target date to initiate:** July 1, 2022.

Recommendation: Create an Iowa Work-Based Learning Playbook to ensure employers and educators know the full range of engaging work-based learning options and how easy it is to collaborate.

Rationale/Next Steps: Understanding the value of work-based learning is key to expanding school-business partnerships. The playbook should dispel myths while showcasing outstanding existing work-based learning models – from K-12 classroom projects developed by educators and employers to internships and Registered Apprenticeships in high school. Often, fear of the unknown prevents educators and employers from getting involved in work-based learning because they believe the process is too complicated, expensive or prohibited by child labor laws or liability issues. Educating all parties about the ease with which these programs can be created would reduce obstacles to generating more work-based learning opportunities. The playbook also would increase awareness of the importance of computer science education by highlighting how computer science impacts every workplace. **Target date to initiate:** 2022-23 school year.

Recommendation: Provide additional financial incentives for employers to participate in work-based learning, which will provide more students with these extraordinary opportunities and strengthen Iowa's early talent pipeline.

Rationale/Next Steps: Cost often is a barrier blocking employers, particularly small and mid-size businesses, from participating in work-based learning. Expenses they incur include the time and attention their employees must devote to training and mentoring students and sometimes initial equipment purchases. Iowa Workforce Development and the Iowa Economic Development Authority have provided several grant opportunities to defray such costs in the past, and they have been well received. **Target date to initiate:** 2022-23 school year.

Conclusion

Computer science education should be considered essential – like math, science, English and social studies – to prepare students for the future of work and to successfully navigate the dynamic digital landscape. Quickly expanding high-quality computer science education for all K-12 students is a responsibility that educators, parents, employers, community advocates and elected officials must meet together, which will enhance Iowa's reputation as a leader in STEM. Iowa already has been recognized by Code.org as groundbreaking for the new state law requiring school districts and nonpublic schools to develop their own K-12 computer science plans.

Pursuing ambitious strategies for expanding computer science education at state and local levels acknowledges that the concepts and skills computer science teaches – like computational thinking and coding – are crucial. It is important for Iowa students to understand that learning computer science is not just a necessity but an incredible opportunity that leads to rewarding careers in many fields. It is important for Iowa adults to deliver that message while scaling up computer science instruction to ensure that Iowa does not fall behind.

To reach all students, three important objectives must be met: (1) rapidly training Iowa's computer science teacher workforce; (2) making engaging programming available in all schools, including embedded work-based learning; and (3) fostering excitement among all students about the power of computer science to solve problems and change the world. A significant additional investment of state dollars will be needed. But some of this work already is in motion. By making an unprecedented commitment to advance this effort over the next several years, Iowans have an extraordinary path forward to ensure our children are future ready.

Iowa Computer Science by the Numbers

High-quality computer science: Computer science is understanding how and why technologies work, exploring whether and how technology could solve real-life problems, investigating procedures, creating solutions, and learning about computing systems, programming, data, networks, and the effects on society and the individual. Computer science is learning how to create new technologies, rather than simply using them.

Percent of Students Taking High-Quality Computer Science
Class of 2017 to 2021
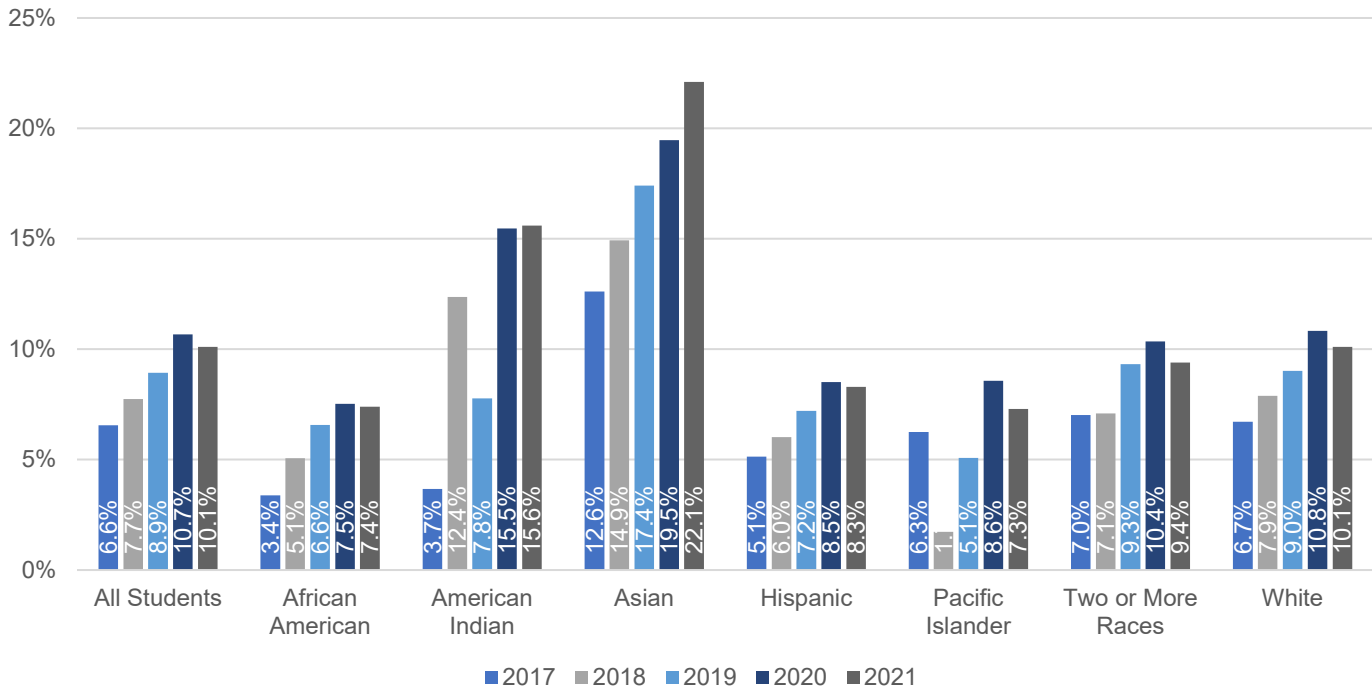
Group	2017	2018	2019	2020	2021
All Students	6.6%	7.7%	8.9%	10.7%	10.1%
African American	3.4%	5.1%	6.6%	7.5%	7.4%
American Indian	3.7%	12.4%	7.8%	15.5%	15.6%
Asian	12.6%	14.9%	17.4%	19.5%	22.1%
Hispanic	5.1%	6.0%	7.2%	8.5%	8.3%
Pacific Islander	6.3%	1.1%	5.1%	8.6%	7.3%
Two or More Races	7.0%	7.1%	9.3%	10.4%	9.4%
White	6.7%	7.9%	9.0%	10.8%	10.1%

Percent of Students Taking High-Quality Computer Science
Class of 2017 to 2021

Group	2017	2018	2019	2020	2021
All Students	6.6%	7.7%	8.9%	10.7%	10.1%
Disability	3.5%	4.7%	5.1%	7.0%	7.1%
EL	3.7%	4.0%	3.9%	6.1%	5.3%
Low SES	5.3%	6.7%	7.5%	8.9%	8.6%
Female	2.3%	2.8%	3.3%	4.5%	3.7%
Male	10.6%	12.4%	14.3%	16.5%	16.1%
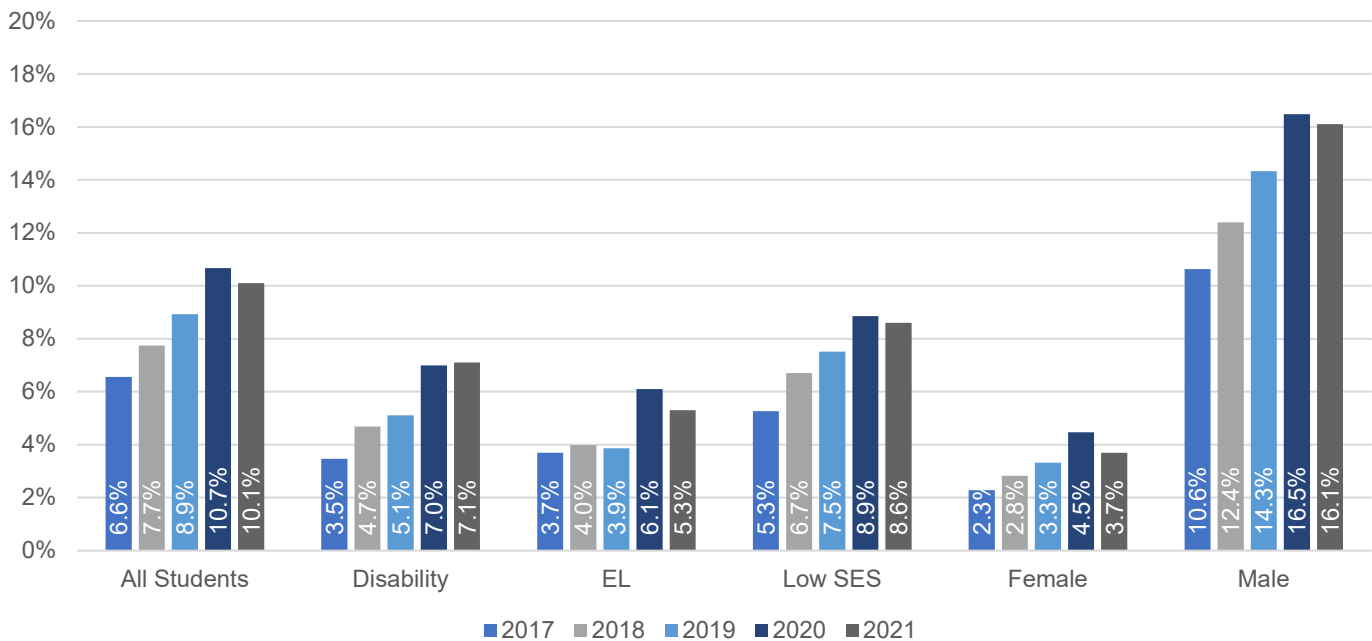
Percent of Students Taking High-Quality Computer Science by School Size
Class of 2017 to 2021

School Size	2017	2018	2019	2020	2021
<300	4.8%	8.7%	9.2%	10.5%	15.6%
300-599	3.2%	4.6%	7.1%	9.1%	8.6%
600-999	4.1%	7.1%	7.1%	8.7%	8.6%
1,000-2,499	4.4%	6.3%	7.2%	8.8%	8.5%
2,500-7,499	8.8%	8.7%	9.8%	12.9%	8.7%
7,500+	9.5%	9.9%	11.4%	12.1%	13.1%
State	6.6%	7.7%	8.9%	10.7%	10.1%
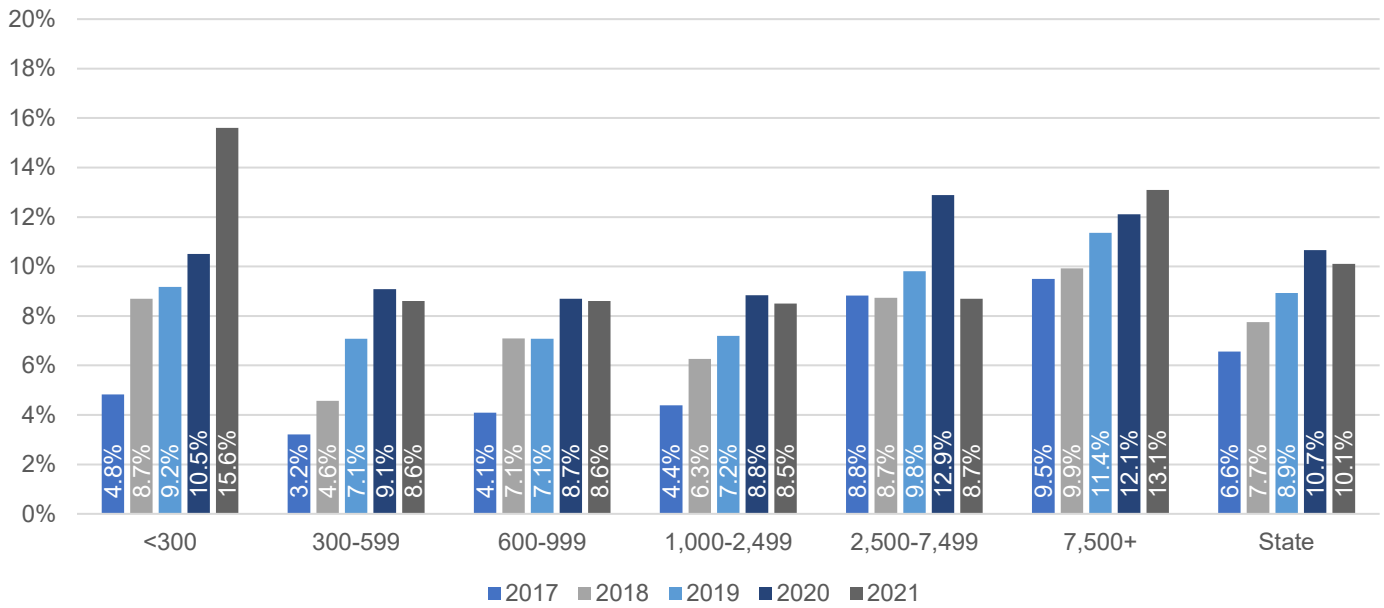
Percent of School Districts with High School Students Taking High-Quality Computer Science

Year	Percent
2016-17	49.3%
2017-18	59.9%
2018-19	61.7%
2019-20	68.9%
2020-21	68.9%
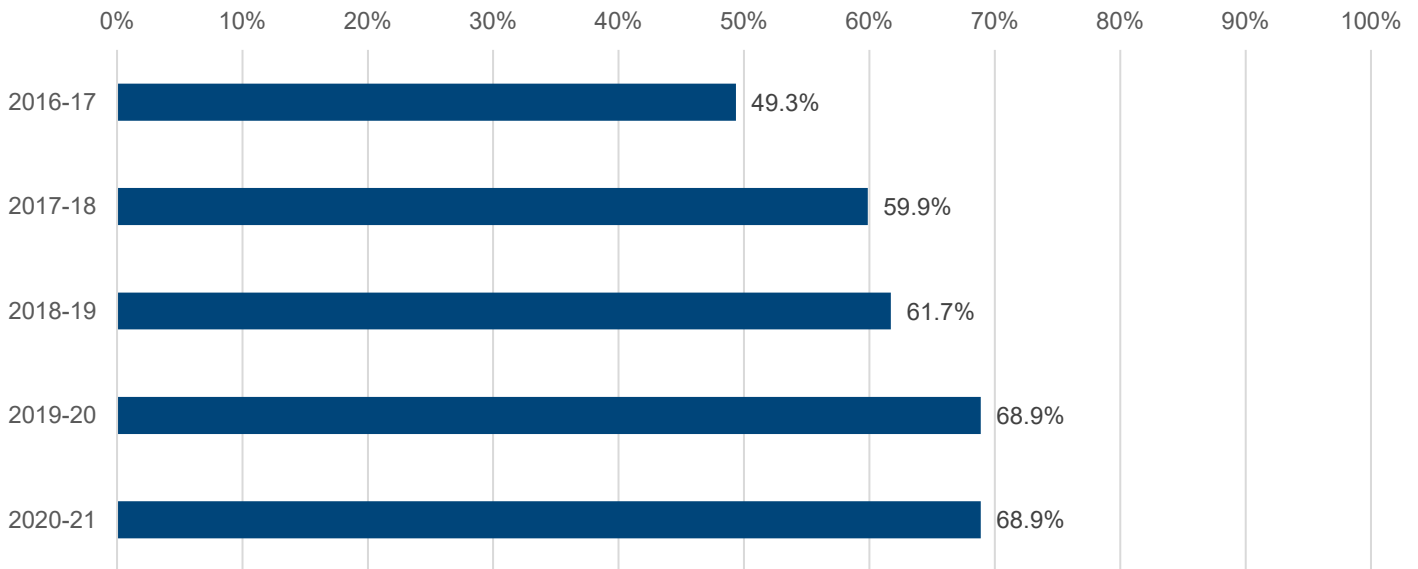
Most Frequently Taken Computer Science Courses

Course Name	2016-17	2017-18	2018-19	2019-20	2020-21
Computing Systems	25	70	31	25	34
Computer Science Principles	194	356	904	956	1,052
Exploring Computer Science	10	30	191	298	356
PLTW Computer Science Essentials	208	393	437	633	443
PLTW Computer Science A	76	90	129	155	137
PLTW Computer Science Principles	483	902	963	637	452
PLTW Cybersecurity	0	0	15	72	108
AP Computer Science Principles	0	98	207	551	436
Cybersecurity	0	0	0	1	36
Network Technology	79	62	78	55	61
Networking Systems	65	34	34	45	48
Area Network Design and Protocols	3	12	39	50	29
Router Basics	2	4	7	5	1
NetWare Routing	0	0	0	0	0
Wide Area Telecommunications and Networking	0	1	1	0	0
Wireless Networks	1	1	0	0	0
Network Security	40	28	19	14	14
Essentials of Network Operating Systems	18	21	12	14	7
Microsoft Certified Professional (MCP)	17	31	1	58	32
Local Area Networking	0	0	4	0	0
Business Programming	36	55	51	82	83
Computer Programming	1,322	1,302	1,435	1,292	1,424
Visual Basic (VB) Programming	299	360	226	177	379
C++ Programming	143	226	130	85	92
Java Programming	197	149	189	154	169
Computer Programming—Other Language	311	347	317	545	332
AP Computer Science A	508	574	675	714	594
IB Computer Science	0	1	0	0	0
Particular Topics in Computer Programming	509	217	215	207	116
Computer Programming—Independent Study	12	10	4	18	17
Computer Programming—Workplace Experience	2	9	5	6	5
Computer Gaming and Design	73	89	126	199	156
Mobile Applications	8	19	13	17	18
Computer Forensics	0	0	1	1	3
Cyber Crime	0	1	35	29	27
Robotics	641	745	504	536	405
All Computer Science Courses	5,282	6,237	6,998	7,631	7,066

Most Frequently Taken Computer Science Courses by Category

Course Name	2016-17	2017-18	2018-19	2019-20	2020-21
Computer Systems	70	70	31	25	34
Foundational	1,779	1,779	2,702	3,075	2,739
Gaming	89	89	126	199	156
Mobile	19	19	13	17	18
Networking	194	194	195	241	192
Programming	3,340	3,340	3,376	3,435	3,348
Robotics	745	745	504	536	405
Security	1	1	51	103	174
All Computer Science Courses	6,237	6,237	6,998	7,631	7,066

Computer Science Staffing Trends – All Schools

Computer Science Teachers (K-12)

Year	Number of CS teachers	CS Teacher FTE CS
2016-17	1,510	1,378
2017-18	1,623	1,421
2018-19	1,767	1,566
2019-20	1,706	1,522
2020-21	1,607	1,457
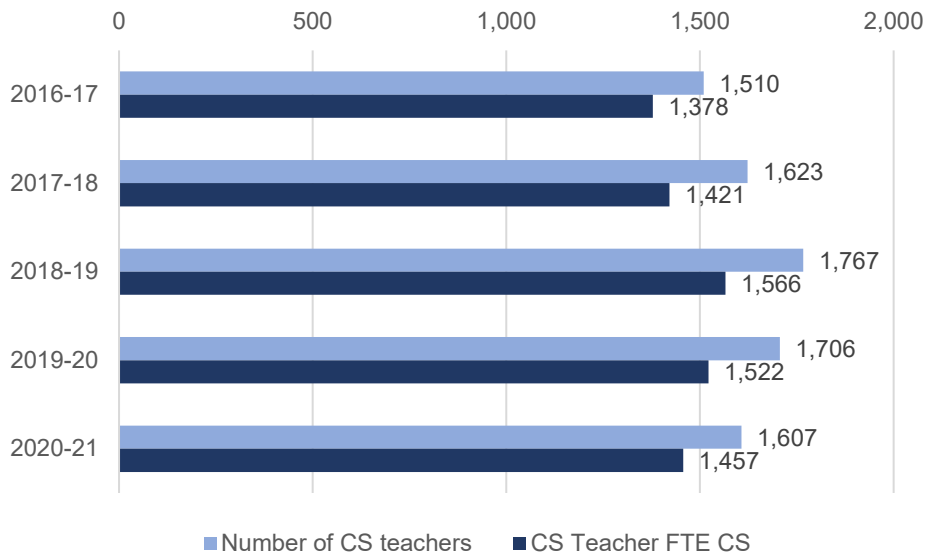
Source: Iowa Department of Education Bureau of Information and Analysis Services

Staff data: Data come from Department of Education's fall Basic Education Data Survey (BEDS) collection. Computer science teachers do not need a specific endorsement or licensure requirement outside of a standard license to teach computer science courses unless they are career and technical education courses. This report includes all K-12 educators employed in Iowa school districts who teach computer science.

Computer Science Work Group Members

Kathy Kay, Chief Information Officer at Principal Financial in Des Moines, and **Jeff Weld**, Executive Director of the Governor's Science, Technology, Engineering and Mathematics Advisory Council, are the work group co-chairs. Other members are:

Wendy Batchelder	Chief Data Officer, VMware, Des Moines
Dan Carver	K-5 Computer Science Teacher, Carlisle Elementary School/Hartford Upper Elementary School, Carlisle Community School District
David Collison	Senior Vice President, Applications Development ITS, Inc./SHAZAM, Johnston
Nicole Crain	Executive Vice President, Iowa Association of Business and Industry
Samantha Dahlby	Director, K-12 Education, NewBoCo, Cedar Rapids
Jacquie Drey	K-4 STEM Teacher, Storm Lake Elementary School, Storm Lake Community School District
Annette Dunn	Director, Office of the Chief Information Officer, State of Iowa
Debi Durham	Director, Iowa Economic Development Authority, Iowa Finance Authority
Linda Fandel	Governor's Liaison for Future Ready Iowa, Iowa Department of Education
Dan Greteman	Vice President and Chief Information Officer, Ruan Transportation Management Systems, Des Moines
Dee Hamlett	Computer Science Technology Teacher, St. Joseph Catholic School, Marion
Denise Hoag	Computer Science Teacher, Thomas Jefferson High School, Council Bluffs Community School District
Wren Hoffman	Computer Science Consultant and Work Group Facilitator, Iowa Department of Education
Doug Jacobson	Electrical and Computer Engineering Professor, Iowa State University, Ames
Ann Lebo	Director, Iowa Department of Education
Joe Murphy	Executive Director, Iowa Business Council
Samuel Padilla	Morningside College Senior and Co-Founder of Steven Mentor, a tech company that helps international students transition into the American job market, and incoming cloud technical resident at Google, Sioux City
Melissa Pettigrew	Software Engineer, Principal Financial, Des Moines
Kyle Rector	Computer Science Assistant Professor, University of Iowa, Iowa City
Ryan Schaap	Chief Information Officer, Wells Enterprises, Inc., Le Mars
J. Ben Schafer	Computer Science Associate Professor, University of Northern Iowa, Cedar Falls
Lance Stonehocker	Information Technology Systems Networking Instructor, Southwestern Community College, Creston
Robert Stough	Computer Science Teacher, Clear Lake High School, Clear Lake Community School District
Joe Stutting	Superintendent, North Scott Community School District, Eldridge
Beth Townsend	Director, Iowa Workforce Development
Timothy Urness	Computer Science Professor, Drake University, Des Moines
Brian Waller	President, Technology Association of Iowa

Thank you to Kari Britain, Senior Program Manager, Governor's STEM Advisory Council, for staffing the Computer Science Work Group.