Computer Science Work Group

January 12, 2021, 3:30-5:00 p.m.
Meeting Notes

Members Present

Kathleen Kay, Jeff Weld, Dan Carver, David Collison, Nicole Crain, Samantha Dahlby, Jacquie Drey, Annette Dunn, Linda Fandel, Dan Greteman, Dee Hamlett, Denise Hoag, Wren Hoffman, Doug Jacobson, Ann Lebo, Joe Murphy, Samuel Padilla, Melissa Pettigrew, Kyle Rector, Ryan Schaap, Ben Schafer, Lance Stonehocker, Robert Stough, Joe Stutting, Beth Townsend, Timothy Urness

Welcome/Opening Remarks

Co-Chair Kathy Kay welcomed everyone to the second work group meeting and provided a preview of the agenda ahead.

Roll Call

Co-Chair Jeff Weld facilitated the roll call of members.

Overview of K-12 Computer Science in Iowa

Jay Pennington, Department of Education, Bureau of Information and Analysis Services, Chief, presented baseline statistics on K-12 computer science in Iowa. The Department of Education has been collaborating with the CTE area around the additional computer science educational requirements. These courses cannot double count to meet the minimum.

Linda Fandel, Department of Education, Governor's Liaison for Future Ready Iowa, presented the new statewide K-12 computer science requirements and funding.

As an overview, Iowa's efforts to expand computer science education took off in 2017, with passage of Senate File 274, a bill encouraging public and nonpublic schools to offer K-12 computer science instruction by July 1, 2019. It required the State Board of Education to adopt computer science standards; the Iowa Board of Educational Examiners to establish computer science endorsements for teachers; and created the Computer Science Professional Development Incentive Fund to prepare Iowa's computer science teacher workforce. Nearly $900,000 was expended under the Incentive Fund. There is Microsoft settlement funds available for investment as well.

The 2020 Legislature passed House File 2629, requiring K-12 computer science instruction over the next several years as follows:

- High schools will offer at least one computer science course by July 1, 2022.
- Elementary and middle schools will provide computer science instruction in at least one grade level each by July 1, 2023.

In addition, to support expansion of K-12 computer science instruction, the bill calls for the following:

- The Department of Education will develop and implement a statewide K-12 computer science plan by July 1, 2022.
- School districts and accredited nonpublic schools will develop and implement their own K-12 computer science plans by July 1, 2022.
- The department will convene a Computer Science Work Group to recommend how to strengthen computer science instruction and how to create a campaign to raise interest among students and parents.

Wren Hoffman, Department of Education, Computer Science Consultant, presented Iowa's draft K-12 statewide computer science plan.

Arkansas' K-12 Computer Science Journey: Most influential steps, challenges overcome/ahead

Anthony Owen, Arkansas Department of Education, State Director of Computer Science Education presented about funding, data, teacher preparation, next steps for Arkansas, advice for Iowa.

Funding -

- First Year (2015-2016) Funding: $5 million with requirement that every high school in Arkansas to make available to students at least one high quality computer science course. Enrollment increased from 1,100 to 4,000 students.
- Annual Appropriation: $2.5 million
- FY22 Annual Appropriation Projected: $3.5 million plus a significant portion of GEARS funding for expansion

Data (percentages of student populations as a whole) -

- 26% of those students taking CS the school year are ninth graders; in the first years of the initiative, overwhelmingly it was juniors and seniors with very few ninth graders.
- 72% of high school enrollees being male and only 28% being female in this current school year, a little bit better that the national average.
- 60% white enrollment in CS courses; white population is as a general population by race at 61.15%.
- For the first time in the Initiative's history, seeing over representation in minority subgroups as a whole. For the first time in Initiative history, Arkansas's African American population is actually over represented.
- Seeing a translation of the increase from Arkansas students being educated about CS and taking at least some post-secondary computer science courses, thus, increasing post-secondary degree program enrollment.

Teacher Preparation -

- Do not require licensure for K-8 teachers to teach embedded CS courses that according to CS standards are required for all students. As long as the teacher has a license that covers that age range and the superintendent says they can teach the content, they do not require a license.
- Licensure required at the high school level. Can be obtained by passing the Praxis, for completing approved training and certifications, or a technical permit.

- The teacher requirement would require every public high school to employ at least one high school computer science certified teacher that would begin with the 2023-24 school year.

Next Steps -

- A new Computer Science Initiative bill [Computer Science Education Advancement Act of 2021] was just filed officially;
- The Arkansas Department of Education will continue to focus on training;
- Just finished revising the CS standards and course adoption cycle with a brand-new grid of courses out that will go into effect this fall;
  Arkansas will require one CS credit for graduation that would begin with the ninth grade class of 2023. They have extensive catalog of over 60 courses that would meet this requirement in Arkansas. They utilize a flex credit system in collaboration with the CTE sector. The flex credit system allows any CS courses to be able to flex in place of 14 math or science or career focus CTE credit. This means that it is accredited under both systems, both our academic and our division of career and technical education systems. The licensure remains the same so there is not a question of whether it is CTE or career. In Arkansas, it is yes to both all the time. They use Perkins funding. They get academic credit for it. They've solved the CTE issue in Arkansas.
- Will review licensure requirements and the technical permits since they are going to start looking at every high school in Arkansas to employ a certified or endorsed teacher.

Advice -

- When encountering an obstacle, ask three questions: Is it in legislation? Is in regulation? Or is it in practice? Take a step back and look at really what is happening in your state with your state implementation plan. If you are running into those roadblocks, look at options. Don't accept the "We've always done it that way" excuse.
- Communicate your initiative directly to communities, don't just go to the schools and expect the schools to communicate to the communities. We did that through targeted social media, the governor's tour, and finding innovative ways to do that.

Brainstorming

Co-Chair Kathy Kay facilitated a brainstorming session on ideas for meeting the working group's charges to (1) develop recommendations to strengthen computer science instruction and (2) design a campaign promoting computer science to students and parents.

Several ideas were submitted to the Work Group ahead of the meeting for consideration with suggested categories to seed the brainstorming session.

Member contributions included

- Like the idea of a flex credit, a simpler certification process for teachers, and the idea of competitive or fun programs at the state level, modeled after such successful programs as the robotics programs and some of the Lego programs that exist in the state to get more interest from students.
  Linda Fandel contributed context – Arkansas requires four years of math and three years of science, where Iowa only requires three years of math. Arkansas has that fourth year of math to play with. Without that fourth year of math or fourth year of science, how does

Iowa get students all the math and science they need, as well as all the computer science they need?

- Could community college or state college instructors be available to conduct classes remotely for smaller districts or underrepresented districts or districts that are economically challenged? Could some of the nonprofits that are currently doing such courses provide services to elementary, middle and high schools in those underserved areas? Are there larger school districts that are using some of these courses or are providing some of these courses remotely now due to COVID-19 willing to also provide those to smaller school districts?
- Since it can be five course credits for teacher endorsement, rather than a full computer science degree, what about looking at the micro credentials to help teachers focus on an area from year to year for ongoing learning and deepening content knowledge. In terms of messaging, in addition to a campaign that relates CS to jobs and careers, emphasize the advantage of all students having that CS background and making sure that even if they don't go into a coding specific career that they are still building those skills for any and all jobs in our state.
- Likes the idea a sponsored annual culminating event that combines competition and fun to get more youth interested in technology and computer skills that could be modeled after such events as the IT Adventures/IT Olympics program operated by Doug Jacobson at Iowa State University. Doug Jacobson described the IT Adventures/IT Olympics event.
- Only 11% of Iowa's high school students are getting a high-quality computer science course before they graduate from high school. Currently, Iowa is so far behind the workforce that we are going to have to go a long way to catch up in K-12. There really aren't jobs today that don't have computer science and IT aspects to them, no matter the occupation or industry. The focus should be about how we need to help our kids be in a position to even participate in the workforce and catch up with the workforce so that they are not so far behind when they do go on to post-secondary training and education for the jobs of today.
- Concur with emphasizing the importance and benefits no matter what career someone goes into, even to the point of detailing that just learning coding can help them with logical and process thinking. Also on a personal level, understanding about cyber security with day-to-day living is helpful in how to protect yourself, as well as those times and places where you need to be thinking, "What should I do with this data or should I not say this or should I be careful of what I do." Also like the idea of promoting within the community, not necessarily just targeting the schools and then trying to go to the community from there.
- Encourage the Work Group to be sensitive to and mindful of unique challenges faced by the rural areas, especially in light of the fact that technology doesn't stay stagnant. We have to make sure that the curriculum is fresh enough and teachers are updated as needed. Otherwise, students in rural areas risk walling away with information that was from 10 years ago or five years ago, which is a lifetime in technology.
  Linda Fandel contributed context – These last five or six years, the Arkansas Department of Education has revised, recommended or required CS curriculum offerings and strands in the high school, and, as noted in the presentation, they are yet proposing something new in the coming year. Iowa's Department of Education does not provide curriculum to districts. Districts (including rural districts) choose their own curriculum, but

they have clearly updated over and over and over again. But as part of this Work Group effort, we can recommend changes.

- We need to recognize what is happening in industry now. It is important that those teachers get up to speed during the summer and do externships with business so that they can walk back into the school with a more comprehensive understanding of what is current, not what was happening 10 years ago.
- There is an opportunity for businesses to share and help people see the types of jobs, how interesting those jobs are and how people can have a very successful career in technology that is going to be ever changing and fun. This is a supply and demand situation, and you know you have businesses with the demand and education with the supply. Look at what we can do to collaborate, integrate and help each other.
- These pieces from the Arkansas playbook can be the tide that rises the boat that increases demand for teachers which increases demand for higher education which increases the supply of students. We can require high schools to have a computer science endorsed teacher in it and require high school students to take a computer science class whether they take it from math or science or however we want to flex that.
- How can this Work Group support school districts (often rural districts) which struggle with having a certified high school computer science teacher and their curriculum offering? Is it with grants? Is it something that comes from the state because financially these districts might not have the funding?
- Being from a high poverty rural community, teacher externships opportunities are limited. After school CS programming or just a great summer program might be something these communities could do to promote CS.
- With such pullout clubs and programs, how is the equity going to be distributed because a lot of these clubs are capped number wise, along with supplies and time constraints?
- Regarding diversity and equity, including domain experts to consult in the design of these sorts of things like teacher trainings or generating how to provide access would help us along.

Key Ideas and Final Remarks

Co-Chair Jeff Weld declared mission accomplished. Today, he said, we had three missions and checked them all off: (1) we got a great baseline on the current status of Iowa, (2) we have a crystal ball of a specific brand of a certain future being defined by Arkansas, perhaps that's our future and (3) now, we have six potential buckets of ideas that have floated up.

They are:

- computer science PD and in-service preservice, which preexisted;
- computer science education and the underserved, which preexisted;
- computer science education work-based learning through business partnerships; and
- computer science promotion and campaign.

Ideas added based upon today’s brainstorming discussion are:

- a policy and computer science bucket that looks at things like teacher certification, flex crediting and funding; and
- youth programming summer opportunities with fun competitions and so on.

A signup form will be setup for members to select which subcommittee they want to work on. Then the February, March and April meetings will feature what is brought forth by the subcommittees.

Co-Chair Weld thanked everyone for their fabulous contributions and looks forward to next month's meeting.

Next meeting

February 9, 2021, 3:30-5:00 p.m.