

Illinois Statewide Computer Science Education Summit Summary

NCSA, University of Illinois Urbana-Champaign, September 20th 2019

Sponsored by Microsoft, University of Illinois and Illinois State University and with the support of other partners, the First Illinois Statewide Computer Science Education Summit created real energy among its 200+ participants with standing room only sessions. Welcoming talks from State and University leaders illustrated the importance and timeliness of the topic for Illinois. A keynote from Brenda Darden Wilkerson, now President of the Anita Borg Institute, set the stage for the day and provided background on CS education in Chicago. The rest of the day was spent in parallel, interactive sessions with panels and working groups - presenting, debating, and planning K-12 CS education in Illinois. Work continues, coordinated through the Summit web page (<https://www.ilcsedsummit.org>), for the community to move forward on the Summit outcomes.

Attendees: 210 attendees plus 24 registered virtual attendees

State Representatives: Deputy Governor Ruiz, Chief Information Officer Guerrier, ISBE Director of Education Matias, Illinois DCEO.

UI Leadership: Chancellor Jones, President Killeen, VPEDI Seidel, College of Education Dean Anderson, NCSA Director Gropp.

Other Organizations: ACT Now, AnitaB.Org, Argonne National Laboratory, BootUp Professional Development, Chicago Public Schools Office of Computer Science, CodeHS, CodeVA, Computer Science Teachers Association, College Board, Code.org, Code Your Dreams, csedresearch.org, CSforALL, CS4IL, Expanding Computing Education Pathways, Fermi National Accelerator Laboratory, Illinois Digital Educators Alliance, Illinois Manufacturers' Association, Joyce Foundation, Learning Technology Centers of Illinois, Lego Education, Microsoft, National Science Foundation, P33 Chicago, Project Lead The Way, SAM Labs Inc., Spencer Foundation, State Farm, Wolfram Research, 25 different K – 12 school districts, 22 different institutions of higher education.

Highlights of Panel Discussions

Best Practices in Computer Science Education: Policies to support CS education should be adopted as needed/beneficial, not in a set order, however, it is highly beneficial to have a State level position to support K-12 CS education efforts. Partnerships, especially with higher education and industry, strengthen and support the development of curricula, pathways, and policies that will most benefit students and employers. Governor support has been key in other State efforts. Broadening participation needs to be a priority from the very beginning

Implementing Computer Science Curricula: Coding and computational thinking (CT) are foundational skills and it is important that *all* students have access to participate. Curricula is needed for a wide range of schools and grade levels, and must be vertically aligned, equitable at a foundational level, engaging for students, have a low entry barrier for teachers, and integrate with already packed schedules. More research is needed on what works and for who. There needs to be a sustainable ecosystem for CS at schools. Need to increase awareness of the need for CS and its associated benefits with school admins and parents.

Developing a 21st Century Workforce: Internships are vital, but a combination of mentoring, internships, and scholarships are particularly effective. Internships need to happen earlier (in

high school) and last longer (throughout the year). It is important to have parents excited about technology opportunities and seeing CS as a career path for their children. Also, ubiquitous bandwidth to end devices for students is important. Industry should be a partner in K-12 CS Education, there is a sense of urgency — we are catching up with the skills gap that exists, but skills keep increasing.

Supporting Research and Implementation of CS Education: Federal and private funders can support policy studies, research on the development of specific interventions, evaluation and impact studies. Don't make policies too far ahead of what the research tells us. Research what happens when you try to make the change. Private funders can work with the field on targeted questions. Federal agencies are working to implement their priorities for improvement, including broadening participation and inclusion, working on measures to identify best practices, and identifying stakeholders. The federal government is working to provide information and resources to help move the needle, but won't solve the issue. This will need to be stakeholder-wide. Industry and state departments of education need to be involved to establish goals and make outcomes worthwhile.

Implementing Computer Science Education in Illinois: Computer science should not be defined so narrowly that it cuts innovation and creativity. It is important to understand what is meant by CS and CT, but also keep a broad understanding of all that CS and CT encompasses. In creating access to computer science courses, opportunity may be key. At the K-8 level CS and CT may be embedded in other subjects and incorporated into the curriculum that way, at the high school level CS courses could start out as an elective and be built into the curriculum in different ways in different schools. Providing qualified teachers is key to achieving CS for All. Various professional development models work well for the introductory courses, but there needs to be consideration on how to entice teachers to go for certification and a CS Education Major needs to be created in Illinois.

Achieving CSforALL - Diversity and Inclusion: Teachers need to continue to be supported in classroom teaching, but also be supported and incentivized to attend courses and professional development. Partnerships between teachers and tech/industry can help create a support network beyond the school. Engaging parents is vital to the success of CS programs. Parents can be engaged through family coding activities, school counselors can provide CS information to both students and parents to inform on resources, courses, etc. There are a variety of existing materials and programs designed to engage parents and families in computer science activities.

Summit Recommendations

Initial short term and actionable activities that will build immediate capacity and support for computer science education include:

- Establish Computer Science undergraduate licensure (e.g. UI, ISBE).
- Create/Publicize the key centers of activity that will support collaborative efforts for building and maintaining partnerships, professional development, pipelines, etc. (e.g. ROEs, IIN, DPI).
- Legislative action around CS Education, including approval of state standards, definition of computer science, development of state level CS Ed position.
- Funding for teachers for additional CS credentialing, professional development
- Continued support and community building for CS teachers, including the role of ROEs.
- Collect and analyze data impacting computer science access and success.

- Build on initial planning sessions of Summit to develop a comprehensive State Plan for CS Education that leads into the 2020 CS Summit.

Longer term activities and recommendations will be expanded through the ongoing post-Summit planning, but include

- Researching and developing integrated curricula for CS/CT from kindergarten to high school.
- Establishing clear career pathways for CTE and CS from school to work as well as school to two or four year higher education options.
- Developing industry connections and opportunities for student and teacher internships, school partnerships, and other opportunities.
- Integration of CS / CT broadly into other teacher training programs, not just CS licensure
- Increasing connectivity in rural areas through improved broadband access, updated hardware, etc.



Dep. Governor Jesse Ruiz addressing a packed auditorium at NCSA



Keynote Brenda Darden Wilkerson, AnitaB.Org



Discussions between sessions, NCSA



Attendees represented many regions of Illinois