Illinois Computer Science Education Task Force Meeting Minutes

Meeting Summary by Task Force Members

Monday, March 13, 2017
1:00 p.m.–4:00 p.m.

- Illinois State Board of Education, Videoconference Room (3rd Floor), 100 N. First St., Springfield, Illinois
- Illinois State Board of Education, Videoconference Room (14th Floor), 100 W. Randolph St., Suite 14-300, Chicago, Illinois

Attendees

Task Force Members

Chicago
Jenna Garcia, Code.org
Ali Karbassi, CoderDojoChi
Brenda Wilkerson, Chicago Public Schools
Don Yanek, Computer Science Teachers Association
Wayne Bevis, Lindblom Math & Science Academy

Springfield
Steve Svetlik (chair), Computer Science Association
Austin Betz, Illinois Federation of Teachers
Jerry Weinberg, Southern Illinois University
Representative Mike Fortner, Illinois House of Representatives

Illinois State Board of Education (ISBE) Staff
Amy Cosgriff, Educator Licensure
Brian Houser, College & Career Readiness
Steve Parrott, Technology and Engineering Education
Shuwan Chiu, Data Analysis

Midwest Comprehensive Center (MWCC) Staff
Nicol Christie
Jeremy Rasmussen

Meeting Objectives

- To reach consensus on a working definition of computer science education.
- To review available state course enrollment data.
- To learn about Illinois state licensure requirements for computer science.
- To review best practices, challenges and recommendations made in other jurisdictions.

Computer Science (CS) Task Force Meeting 2

Mr. Svetlik asked whether everyone on the task force had had a chance to look at the member directory. He then asked whether the member directory will be made public.

Mr. Houser said that no, the member directory will be more for task force use, but that if they decided they would like to make the member directory public, they could do so.

Ms. Christie pointed out that the names and roles of task force members will be reflected in the meeting minutes, which will be made public.

The task force agreed to keep the directory an internal document.

The task force then went over the previous meeting's minutes and made a few minor amendments.

Mr. Karbassi asked if it was possible to get the meeting minutes on Google Drive as a Word document (as opposed to a PDF) so the task force can make comments; he was told that would not be a problem.

Mr. Svetlik made a motion to approve the minutes as amended. Mr. Betz seconded the motion.

Mr. Houser said he sent FY2015 and FY2016 school-reported data for AP computer science (CS) courses along with some of the demographic information and total number of students for the FY15 and FY16 year. He said he also sent a FY16 data piece that shows the number of teachers actively employed by school districts in the state that hold a CS endorsement. He said some of these "endorsement holders" teach high school and others teach K–8.

Shuwan Chiu explained how CS data are collected. She discussed the fact that the data are self-reported, and discussed the limitations of the data (e.g., the data only show AP CS courses).

Representative Fortner asked whether the data show how many CS sessions a school offers; he said that he assumes that schools offer more than one session throughout the academic year.

Ms. Chiu reported that it depends on the school. She said some schools have a full-term CS course where others might have a spring-term course.

Mr. Karbassi said the data seemed "rolled up" and expressed a preference for more granular data showing course ID, course name, what semester, ethnicity of students, etc.

Steve Parrott from ISBE said the data being presented are strictly for the state AP CS course, and that some courses that might be similar (e.g., a computer networking course) would not be included.

Ms. Wilkerson responded that if the task force is supposed to investigate the state of CS in Illinois, these data do not provide a complete enough picture to make that investigation easy. She asked how the task force can access data that show "CS-like" courses as well, which would be important to fully understanding the CS activity in the state.

Mr. Karbassi asked if the data source ISBE is pulling from is public, and was told that it was not publicly available (and not even to the task force). Mr. Karbassi then asked if it was possible to get a list of all the data columns available regarding CS data.

Ms. Garcia added that in order for the task force to make an educated request for useful data, it would be helpful to know what data are being tracked and therefore available.

Mr. Svetlik indicated that he had looked up the CS data at his own school and compared them to ISBE's data and found discrepancies. He said he was curious how the data were collected and how they were being shared with schools. He then asked Mr. Yanek to check whether the CS data at his school match what ISBE has provided.

Mr. Bevis indicated that for his school, the AP numbers were slightly higher than those reflected in the ISBE data. He said since the ISBE data only show AP courses, there are many CS students not being captured at his school.

Ms. Wilkerson added that there are several CPS high schools that are not on this list that have been teaching AP Computer Science A for years.

Mr. Karbassi reiterated his question regarding whether the task force can get all possible data columns.

Ms. Chiu said that the task force can go to www.ISBE.net, where there is a scroll-down menu available that provides a student information system that might have the data the task force is looking for.

Mr. Svetlik mentioned that Barbara Ericson is known nationwide as an expert in CS for statewide data that the College Board publishes, which might be useful data to review. He indicated he would like to see data other than the AP CS data.

Ms. Wilkerson said she is excited to see data that show what is happening in the state, but cautioned that data were missing from the sample, therefore members may not have the most accurate view of what true CS course utilization looks like in the state.

Ms. Chiu reported that the ISBE data are from schools, and that all schools are required to self-report the data. She said that though there are specific guidelines for what must be included in the CS data that the schools send, there is no one checking for completeness.

Mr. Svetlik suggested that one of the task force's recommendations should be how ISBE collects CS data to get something more trackable.

Mr. Svetlik then made the motion to recommend to the general assembly that the data collection process be reviewed to ensure that there are no gaps or interpretive data delivered from the schools to ISBE. The task force was unanimously in favor of the motion.

Mr. Karbassi suggested that the kinds of data that should be reported to ISBE should be a topic for another meeting—either by this task force or a subsequent task force.

Mr. Yanek pointed out that there are only three more meetings. He said that although the data that ISBE have provided are incomplete, there is still useful information (e.g., information showing that African-American students are being underserved in CS) that the task force can act on.

Mr. Svetlik agreed with Mr. Yanek, and reiterated his suggestion to look at the Barbara Erickson CS data that is verifiable by the College Board. Mr. Yanek pointed out that Barbara Erickson's data are based on students who took the test, which means it is limited. Mr. Svetlik agreed, but felt that the data were another piece of the larger picture.

Ms. Wilkerson stressed the importance of acknowledging the limitations of the data. She argued that the ISBE data were definitely worth looking at, but not a strong enough basis for any definitive conclusions.

Professor Weinberg noted that there was no effort to clean up the data with the Illinois Longitudinal Data System. Ms. Chiu responded that she did not think the data were a topic in the meetings regarding the Illinois Longitudinal Data System.

Mr. Svetlik said he still wished to make a recommendation (for long-term purposes) to analyze how ISBE's data collection process works. He asked the task force for a show of hands; all were in favor.

Mr. Pat Yongpradit from Code.org then fielded questions from the task force. He introduced himself and described his involvement in state-level CS policy and in national strategies on a number of topics, including CS standards, certification, etc.

Mr. Svetlik asked Mr. Yongpradit how Code.org defines success with regard to a state achieving expanded CS access for K-12 students.

Mr. Yongpradit replied that Code.org categorizes goals into two buckets: implementation-related goals and policy-related goals. He cited as an example of a policy-related goal adopting K-12 CS standards, or requiring that all high school at least offer CS. An example of an implementation-related goal would be establishing at least one teacher teaching CS in every single K-12 school. He said there are a number of goals, but they are all bucketed into those two main categories.

Mr. Svetlik asked Mr. Yongpradit, among the states in which he worked, whether there were any in particular that have made a commitment to funding CS. Mr. Yongpradit responded that recommendations won't go far without funding attached to them. He said he has seen many states experiencing little success in using unfunded mandates for things like ensuring all schools at least offer CS. He said both West Virginia and New Hampshire have CS requirements without funding behind them, which has resulted in the implementation being all over the place. He said

that Arkansas is a model state. He said the Governor of Arkansas allocated $5 million in 2016/2017 that came from discretionary funds. He said that Arizona just passed an allocation of $200,000 for a standards training initiative that is supposed to lead to CS implementation. He mentioned that Idaho just passed funding of $2 million for FY18 for a variety of CS standards. He went on to point out, though, that it is not just about money, but how the money is structured as well. He said he would be willing to make a chart in regard to CS and funding in many states.

Mr. Yongpradit related that Connecticut had not had any funding attached to its CS strategic planning, so the state invited people from its tech talent fund, which is a fund of $10 million coming out of the economic development workforce. He said a commissioner from that development workforce as well industrial partners sat down with the CS Connecticut task force, which led to a state summit. He said this had created a relationship between the two bodies in which more money could be requested. He said that Illinois likely has something similar to Connecticut's tech talent fund. Mr. Yongpradit also said another state created a grant program (without money attached to it) that allows for private entities and individuals to give money toward CS.

Mr. Yongpradit then talked about the elements that make for a good CS state plan. He said having a clear vision, being holistic, identifying responsible parties, and having start and end dates are important. He said two things that are characteristic of successful state plans are: 1) when recommending funding, make sure to include other state models that have worked as examples; and 2) there needs to be a clear driver for the work to move forward – an actual position at the state education agency that can oversee and advocate for CS in the state. He said he is only aware of five states that actually have a dedicated CS position at the state level. He said getting legislators and people from the industry to the table is important in advancing CS education in the state.

Mr. Svetlik asked: 1) how can we ensure that teachers with a CS endorsement have sensible pathways to renew their endorsement? and 2) for teachers seeking a CS endorsement, how do we ensure sensible pathways for them to obtain the endorsement?

Mr. Yongpradit replied that a number of states have taken innovative approaches to certification that allow and inspire growth in CS. For example, Utah allows a teacher to teach CS after receiving one to two weeks of professional development, rather than having to take 15 credits at a university. He said Utah's approach is much more about micro-credentialing, and described Utah's three levels of CS certification:

- The first level requires a teacher to attend a workshop or online professional development
- The second level requires non-credit hours of specified coursework
- The third level entails 15 credits of specified course work

Mr. Yongpradit noted that other states that have similar CS leveling systems require teachers to move through the different levels year by year. He pointed out that this has the advantage of tracking, right from the beginning, who is teaching CS.

Ms. Wilkerson responded that micro credentialing doesn't count for anything. She argued that in order for micro-credentialing to be effective, it needs to be supported by the state, especially in terms of funding. In reply, Mr. Yongpradit said some of the states that use CS micro-credentialing offer reimbursements and some even cover the entire cost of the credits.

Mr. Parrott from ISBE asked how these other states Mr. Yongpradit has been discussing define CS. Mr. Yongpradit offered two definitions of CS:

- Computer Science Teachers Association (CSTA) and Association for Computing Machinery (ACM) define CS as the study of computers and their processes, including their principles, hardware and software design, applications, and impact on society.
- The Federal Civil Rights Database definition of CS includes computer programming and coding to create software and manipulate electronics and to manage large amounts of information. (The Federal Civil Rights Database definition of CS also includes what CS is not.)

Mr. Karbassi asked if the Federal Civil Rights Database define the kinds of data being collected. Mr. Yongpradit answered that schools have to report the number of CS classes, and the number of students taking those classes, including ethnicity information, and the number of students in the classes who are classified as having disabilities.

Ms. Wilkerson asked Mr. Yongpradit to clarify what the Federal Civil Rights Database means for the collection of data in the states. Mr. Yongpradit indicated that nothing changes right now. He said that schools have to report on these data every few years, and that the next report will be two years from now.

Mr. Yongpradit concluded by highlighting two Code.org resources that he feels are immensely helpful in helping states craft CS state plans: 1) Code.org's state planning toolkit, and 2) Code.org's CS framework.

Mr. Yanek said he endorses the idea of micro credentialing and said it is a topic worth investigating. The task force agreed.

Amy Cosgriff, Principal Consultant from ISBE then shared information on CS licensure in the state of Illinois. She said a teacher has to apply for a CS endorsement for the middle school and high school levels. She said the areas of coursework involved in attaining a CS endorsement are:

- Algorithms and data structures
- Principles and methods of computing
- Problem solving in computing
- Programming techniques
- Programming computer languages

Mr. Svetlik asked if there is a list of courses that meet the criteria of those areas; Ms. Cosgriff replied that no list currently exists and that those areas are largely interpretive. Mr. Svetlik said he knows a number of teachers in the state who are teaching CS with a mathematics

endorsement, but not a CS endorsement, which conflicts with whether a teacher needs to hold a CS endorsement to teach CS. Ms. Cosgriff replied that a lot of this comes down to assignability and major and minor teaching assignments.

Mr. Svetlik reported he has heard that there is nothing in Illinois laws and rules that states an individual qualified to teach math is qualified to teach CS. However, House Bill 3695 was passed to allow either AP CS A or AP CS principles to count toward the three requisite years of high school math graduation requirements. He said that this seems contradictory, or that it suggests that someone other than a mathematics teacher can teach a course where math credit is received. He then referenced a math class where the description says it is intended for students to obtain the objectives of computer, math, and Algebra 1–level courses that includes the study of computer systems and programming and using a computer to solve math problems. He pointed out that this description includes a lot of things that are done in CS courses. He asked what is there to stop a school from having a math teacher teaching what is essentially a CS course.

Mr. Parrott said in order to teach the class that Mr. Svetlik referenced, a teacher would need to have a CS endorsement as well as a math qualification. He reported that it is up to the ROEs and the ISCs to make sure teachers are properly licensed in terms of the classes they teach.

Mr. Yanek asked if there is a methods-course requirement for teachers wanting an endorsement in CS; Ms. Cosgriff responded no.

Mr. Yanek then asked if it would be feasible that a CS endorsement require a teaching methods course. He argued that, given the inequity in CS, it is imperative that teachers know how to teach to equity, which is not an inherent skill. Mr. Parrott said a potential problem with requiring a teaching methods course is that not all colleges or universities are able to offer such a course.

Mr. Yanek said he was assuming that if there is going to be a pathway for CS teachers in the state of Illinois then there will have to be an accompanying teaching methods course for preservice teachers. Mr. Svetlik said he agrees with Mr. Yanek's statement, and noted that it is not necessarily about the number of credits required for a CS endorsement, but more about the kinds of classes taken.

Ms. Wilkerson expressed concern about the potential for the task force to just go through the motions and ultimately offer up something that really doesn't solve the problem—the lack of CS being taught equitably across the state. She emphasized that the task force needs to make sure that the CS credential meets the requirements of CS as it exists now and into the short-term future.

Responding to Mr. Yanek's perspective, Mr. Svetlik said the task force could potentially make the following recommendation: instructors that are able to teach a CS methods course be made available to post-secondary institutions that do not already offer such a course.

Professor Weinberg agreed that teaching equity is important, but felt that it speaks more to keeping CS interest and building the pipeline. He noted that you still have to build that pipeline and the cultural attitudes that move it forward, whether it be for women or minorities. He said

the numbers the data reveal are not because students entered and then dropped out; they are because the students never took the class in the first place.

Ms. Wilkerson pointed out that the task force does not have knowledge of what schools are actually offering in classes that have CS course codes. She argued that it would be useful to capture these data and be able to analyze them at some point to be able to see what is really being offered in terms of CS—especially regarding the CS courses other than AP CS. She added that another thing to consider is how the task force could offer another layer of CS than what exists now.

Mr. Parrott asked if Ms. Wilkerson could share what CPS considers a CS course. He reported he has heard that some of CPS's CTE courses are being allowed to double as a CS course. Ms. Wilkerson responded that CPS had to shoehorn courses into the sparse framework that existed around technology courses, which had to do with funding. She said these CS courses are labeled CTE because that's where the funding is. Ms. Wilkerson went on to say that many schools have done what they needed to do to get CS to their students. She stressed that in order for this task force to know what is happening in Illinois around CS, they need to know how those schools are making that happen given the current restraints.

Mr. Yanek said that his hometown high school offer two CS courses, but has no teachers with a CS endorsement; it seems this school has figured out a way to offer CS in the absence of a teacher with an endorsement. Ms. Garcia expressed a desire that there be no negative retribution for schools finding ways around the current restraints in the state to offer CS.

Mr. Svetlik asked, if the question is what has worked, and where in the state CS is available, whether that should be the focal point for the next meeting. He then opened the floor for public comment; there were no public comments.

Mr. Svetlik said he would like to have a concrete definition of CS before the meeting ends. Mr. Yanek suggested, since there wasn't much time left, to instead agree on a working definition that will be a starting point, with the understanding that it will change as the task force accumulates information.

Mr. Yanek went over the CS definition from *Stuck in the Shallow End*, which used the same definition from the ACM framework, but also included a blurb from Stanford that is relatively basic: "CS is the science of solving problems with the aid of a computer." He also cited the paper *Computational Thinking* by Jeannette Wing, which brings up a lot of other ideas in terms of what CS is. He then referenced Henry Walker, a CS professor at Grinnell, who conducted an experiment that showed how two different names for the exact same CS course can attract different groups of students (i.e., one course name appealed to more women than men). He said that sometimes course names and descriptions get too technical and can scare prospective students away. He said when coming up with or modifying a CS definition, they need to make sure to use non-technical language. Mr. Yanek said he likes the idea of having a definition that revolves around the use of a computer as a problem-solving tool, but worries that this might be too broad.

Mr. Svetlik asked how the task force can get a multitude of stakeholders involved in the conversation, and said he sees getting stakeholders involved as a meaningful task for the task force. Mr. Yanek said that maybe a good homework assignment would be to give the ACM task force definition of CS to the task force members' spouses, parents, and neighbors and ask them what they think it means. Mr. Karbassi suggested putting the ACM task force definition out on members' social media networks for feedback.

Mr. Bevis said that one thing he notices as lacking in that definition is the collaborative nature of CS. There was, for the most part, agreement regarding Mr. Bevis's point.

Mr. Svetlik asked whether, for the meantime, the task force agrees to use the ACM task force definition as a working definition.

Mr. Houser asked the task force to consider, when defining CS, whether or not the intention is that everything included in the definition has to be accomplished in the CS course.

Professor Weinberg pointed out the importance of the application side—courses focused purely on web design should not fall under CS. He then asked if the definition has to be concise and simple, or if there could be tiers to it. Mr. Karbassi suggested making a long description of CS for things like classes and policy makers, as well as a short description that gets kids in the door. Mr. Svetlik said his gut reaction is less is more, but doesn't want something so narrow that they are boxed in—there has to be a happy medium. Ms. Garcia argued that it was important to also add, in the longer CS definition, what is not CS.

Mr. Svetlik asked if it was a reasonable goal for the next meeting that the task force crowdsource a definition of CS. Mr. Karbassi said that if all of the members pushed a one-item Google survey asking "what is CS to you?" out to all of their social networks, they would garner a good variety of definitions. The task force agreed that this was a good idea.

Mr. Svetlik asked that the task force to collectively research state CS licensure models, particularly that of Utah. He also proposed the creation of a CS summit that would involve industry stakeholders. Ms. Wilkerson said CPS had held a CS summit this past summer and that a white paper from STEMConnector should be coming out shortly.

There was a discussion about expanding the number of meetings of the CS Task Force; this would have to be approved by ISBE, which is unlikely due to the time constraints for the legislated task force meetings.

Meeting adjourned at 4:05.