

BRIAN SANDOVAL
GOVERNOR



BRIAN L. MITCHELL
DIRECTOR

STATE OF NEVADA
GOVERNOR'S OFFICE OF SCIENCE, INNOVATION AND TECHNOLOGY
100 North Stewart Street, Suite 220
Carson City, Nevada 89701
(775) 687-0987 * Fax: (775) 687-0990

MINUTES

Name of Organization: **Computer Science Subcommittee** of the Science, Technology, Engineering and Mathematics (STEM) Advisory Council

Date and Time of Meeting: January 6, 2017, 9:00 AM

Place of Meeting: Governor's Office of Science Innovation and Technology (OSIT)
100 North Stewart Street, Suite 220
Carson City, NV 89701

Please use the following numbers to join the conference call:

North: 775-687-0999 or
South: 702-486-5260

Access Code: 70987 push #

- I. Call to Order/Roll Call
Mark Newburn, Chair

Chair Newburn called the meeting to order at 9:00 a.m.

Members Present: Mark Newburn; Dave Brancamp; Dr. Kimberly Vidoni; Melissa Scott; Kimberly Moody; Chris Carroll; Dr. Andreas Stefik; Dr. Pavel Solin; Robert Sidford; Frank Matthews.

Members Excused: None, all present.

Staff Present: Brian Mitchell; Debra Petrelli

- II. **Public Comment** (No action may be taken upon a matter raised under public comment period unless the matter itself has been specifically included on an agenda as an action item.)

There was no public comment.

- III. **Welcoming Remarks**
Mark Newburn, Chair

Chair Newburn welcomed everyone to the first formal meeting of the Computer Science Subcommittee. We were previously a collection of people interested in computer science, but with so much going on nationally, we have now become a permanent Subcommittee under the STEM Advisory Council, under the Governor's Office of Science Innovation and Technology, and Director, Brian Mitchell. He pointed out that because the Subcommittee is now official, it will follow the Open Meeting Law, publically posting the agenda and taking public comment. He offered his congratulations to everyone. He said today's meeting is to basically catch everyone up on the most recent happenings with computer science.

- IV. **Overview of ECEP Summit, State Calls and Mini-grant RFP** (For information only)
Mark Newburn, Chair

Chair Newburn said in early fall of 2016, Nevada was invited to join the Expanding Computing Education Pathway (ECEP) alliance. He said Nevada, one of five states, was asked to join the existing ten-state alliance, partially because of this task force of stakeholders assembled here today. The advantages of the alliance are the many doors it will open for us communication-wise and allowing us to better know what other state are doing. He pointed out the alliance has yearly summits as well as Mini-grants, which Nevada can apply for.

Chair Newburn updated the Subcommittee on the October 28, 2016, ECEP Alliance Summit held in Washington DC; 'White House Symposium on State Implementation of CS for All.' Attendees from Nevada included, Melissa Scott from the Department of Education (DOE), Kimberly Moody from Clark County School District (CCSD), Dr. Pavel Solin from the University of Nevada, Reno (UNR) and Chair Mark Newburn, Vice President of the Department of Education (DOE). Chair Newburn said the first day of events were sponsored by the White House Office of Science and Technology Policy, which included discussions about research currently going on with science education followed up by state panels in which Nevada participated. The second day was more orientated towards states discussing where they currently are in the process of expanding computer science, along with various breakout discussions

regarding strategy. Ms. Moody added that a big take-away from this Summit was knowing that Nevada is not very different from any other states' scenarios with their expansion of computer science. She added what Nevada is trying to institute and put into place is very much the same as other states. She said valuable ideas were obtained along with information and facts that will spur us towards what we are trying to achieve with the expansion of computer science in Nevada's education system. Chair Newburn said as we get invited to more of these events he would like to open up the participation to more members of the Subcommittee if they are interested in attending these yearly Summits. It was a great chance to put together all the people in the alliance working on the exact same problems we are working on.

Chair Newburn discussed Expanding Computer Education Pathways (ECEP) "State Calls" and the requirement for membership is to participate in their monthly calls. He added currently he, Melissa Scott and Dave Brancamp participate in these "State Calls." He said a different topic is selected for each call, which gives us a great chance to discuss with other states what they are doing. He pointed out if we have issues or if this Subcommittee has questions about other states and what they are doing about a particular piece, those questions can be passed on to one of us, as members of "State Calls," making this a valuable resource for this Subcommittee.

Chair Newburn gave an overview of ECEP Mini-grant RFP. He said he included the RFP as part of the back-up material in today's meeting, "Call for Proposals." He said these are grants that can be used for various activities to expand education for statewide reform. He added the current RFP deadline is January 20, 2017, for funding up to \$25,000. He added this grant would be used to fund the development of state standards in computer science. He explained these standards basically are what we expect every student to know and be able to do, and in this case for computer science. This is different than curriculum or textbooks, which are geared towards how students learn. He added the first driver in the development of computer science is a set of state standards.

Chair Newburn said part of what was worked on last spring was called the K12 Computer Science Framework, which is basically a high-level standards guide. The Association for Computing Machinery (ACM), Computer Science Teachers Association (CSTA), and Code.org worked jointly with more than 100 advisors within the computing community (higher education faculty, researchers, K-12 teachers, etc.) to steer a process to build a framework for K-12 Computer Science Education. This Framework has been approved. He said the discussion amongst states is to now move from that framework to adopting state standards. He added that a cost is involved, which would be for teachers and various others to write the standards as well as transportation costs to get them all together to write and review. He said the \$25,000 Mini-grant would be used to defer this cost so we can start the development of draft state standards for Nevada right away.

Ms. Scott asked for clarification of the cost involved in the development of these standards and what the process and timeframe would be. Chair Newburn replied these standards are one of the pivotal goals states are currently striving for. He said these standards will lay the foundation for what we expect every student to be taught in computer science. He said the first thing we need to do is to develop a draft set of standards. We are looking at using the Mini-grant to fund that development. He added one of the requirements of the Mini-grant is there is an over-sight committee. He asked for participation from anyone interested in being a member of this committee from the Subcommittee.

V. Overview of the Governor's K-12 CS Partnership and the Partnership with Code.org and College Board (For information only)
Mark Newburn, Chair

Chair Newburn referred the Subcommittee to the handout Item V, "Governor's Partnerships - Governor Sandoval's press release." Mr. Mitchell discussed the K-12 CS Partnership," which is being driven by Code.org along with other groups. He said the purpose of the partnership is to engage Governors in this work. He added Governor Sandoval was the fifth Governor to join the partnership. He pointed out the partnership has three objectives; 1) Enable all high schools to offer at least one rigorous computer science course; 2) Fund professional learning opportunities so teachers can be prepared to teach these courses; and, 3) Create a set of high-quality academic K12 computer science standards to guide local implementation of courses. He said there is a website with more information on this partnership at: www.governorsforcs.org/. He pointed out this partnership has been keep very bipartisan with very even representation among both parties when it comes to the members.

Chair Newburn pointed out this represents we have the Governors support in these activities this Subcommittee is currently engaged in. He asked Mr. Mitchell to elaborate on the involvement of the College Board. Mr. Mitchell responded that both of these partnerships started quite independently. He said we have been able to weave them together to work as a common strategy in our overall goal. He pointed out one of the Governor's goals is to get computer science into every high school in Nevada, and as a first step towards this goal, Code.org and the College Board reached out to us. This began the partnership, which includes the Department of Education (DOE), Southern Nevada Regional Planning Development Program (RPDP), and the Governor's office. He said this partnership will facilitate the offering of two new computer science classes in every school district in Nevada, beginning in the 2017 -2018 school year. He added the two new classes included are AP Computer Science Principals and Computer Science Discoveries. He pointed out AP Computer Science Principals is more geared towards high school and is more of an introductory class, and Computer Science Discoveries is more of a middle school level class. He said Code.org and the College Board will facilitate training and professional development in connection with RPDP for teachers in

every school district in Nevada. So rather than focusing on just one or two districts, this is a great opportunity because it is a statewide program that will help build capacity in every school district and allow for equity between urban and rural to allow students in every school district statewide to take these classes. Mr. Mitchell said this partnership will take place over the next couple of years which will include training. At that point, hopefully, we will be able to show positive results. He added there are different avenues we can take to increase and scale-up what we are doing in terms of training more teachers and using state funding for that purpose.

Ms. Scott asked whether the partnership will include funding for travel for rural teachers to participate in training as well as cover the cost of trainers and what the timelines would be for this implementation. Mr. Matthews responded they have already contacted the lower east and south regions of the state, which currently includes 12 high schools confirmed for requested participation. The goal is to bring people in from northern Nevada to Las Vegas the week of June 12, 2017. He said funding will cover housing and meals for teachers and trainers. This is statewide. Ms. Scott asked how schools have been requested to register or sign up for the training. Mr. Matthews responded he has reached out to the Regional Professional Development Program (RPDP) and via teleconference and visits to high schools, he talked to school principals to explain the program. Ms. Scott offered to submit out to her CTE administrators as a second avenue of marketing. She said many administrators are interested and have put their state e-funding towards evolving computer science study at the high school level. Mr. Matthews agreed this is a good idea. Mr. Mitchell stated the goal is to do this training in the next six months because these classes will begin next school year (2017-2018), which is when we will offer these classes to students.

Dr. Stefik asked what role universities will play in the training of teachers as we move forward with training for teachers statewide. Will teachers only take classes from these schools and will computer science professors be getting involved with the training or training sessions, as well? It was discussed that RPDP has an agreement with UNLV, offering application endorsement. RPDP offers professional development focused on the content teachers teach, how they teach it, student performance and changes in instructional strategies that result in increased student achievement. Ms. Scott referred the Subcommittee to the endorsement piece and asked whether licensure requirements would be required at a different level for the K-9 teacher and if training is enough, and would we need to require a certificate to show they participated in RPDP training in order to teach the Discoveries course. The Subcommittee discussed the different aspects of computer science training, introductory courses and what should be required, as well as possible evaluations to determine the outcome of classes for teachers.

It was pointed out that Computer Science Principals is not only introductory, but the College Board has asked universities to provide college credit in that class, which is ultimately up to the individual universities. Whereas Computer Science Discoveries is only introductory. The Subcommittee further discussed the differences between Computer Science Principals and Computer Science Discoveries and necessary licensures. They continued to discuss how to evaluate what teachers already know and whether the evaluation is effective.

Chair Newburn said there is currently an RPF from the National Science Foundation, "CS for All", which if UNLV actually gets the award, do we actually put a research overlay on what we are doing to start asking these questions? He said no one in the country knows the answers to this, and this is the reason they are going to spend \$20 million for these grants just to start the research. Dr. Stefic said even if the university does not get the grant, he recommends we run a pilot test that is adaptable at the state level, because it will be more effective that way. By getting hard data would even be better. He said even if we do it on a small scale, it might be helpful to make sure the Governor's initiative actually succeeds. Chair Newburn said we are hoping UNLV and their team wins this grant so we can actually start doing this type of research to answer these questions. Currently there is not necessarily the research that backs up what everybody is doing and at this point the nation is trying to gather that research. He said this actually creates another opportunity for us, as a Subcommittee, to work on and do the research overlays that ultimately ask the question, "Can you take a PE teacher, give them a week of training and turn them into someone that can teach computer science?" The Subcommittee agreed, at this point, no one knows the answer to this question.

Dr. Vidoni said Nevada Ready 21 has partnered with Dr. Solin and his group doing labs in which they have done a fantastic job developing the Code.org lab. She asked whether any attention has been given to Dr. Solin and his research group at University of Nevada, Reno to become part of this partnership. Chair Newburn said we definitely need to look at this. He pointed out the initial partnership had more of a high school focus as opposed to a middle school, Nevada Ready 21 focus. He said he does not believe this issue has been address as of yet. Chair Newburn turned the attention of the Subcommittee back to the Governor's goal, "Create a set of high-quality academic K12 computer science standards to guide local implantation of courses," and said until the state actually has standards on what middle school students should get in computer science, it becomes difficult. Until we get the standards in place, this is a good question. He said this is a question we will have to ask once we pivot down to middle school.

Dr. Stefik said until then he does not want to promote his software or services, because he does not have as much money as Code.org, and cannot compete with them in any way. But on the other hand, his group has been doing this in Nevada for the last five years and have trained literally hundreds of teachers

and also public librarians. We are trying to improve the computer science education in both formal education in schools and informal education in public libraries. He said the Nevada Ready 21 program has ordered results and teachers are being trained. There are other programs under Nevada Ready 21, and we should look at what the Nevada Ready 21 program has already achieved and how it can be leveraged. He said this way Code.org does not have to start from scratch with teachers that have already been trained. Ms. Scott said there is opportunity for teachers already trained and there may be opportunities for further training of teachers who are already Nevada Ready 21 teachers, no matter what your platforms are for teaching computer science at the middle school level. She said maybe this is a two-pronged approach: Nevada Ready 21 teachers are working on one kind of software and teaching with that methodology and others will be using the Discoveries class. Maybe there is a comparison that could be made in looking at that research element. She said it is a positive we already have some things in place at some middle schools, and some training has already begun. She added Clark County has been doing some co-training in the last couple of years. She said leveraging is already taking place and building on it is something this Subcommittee can help pull together.

Ms. Moody said there are already schools offering ECS and AP Computer Science courses this year and will be continuing in the years to come, and agrees we need to get some of these questions answered and do more research. She said she believes this Subcommittee is now in a position to define what some of those things mean for Nevada and what direction we are going to take. She added because this has already started in Clark County, teachers and principals are looking for guidance and clarification on the level of classes, as well as the licensure piece and types of training that will be provided and are available.

Chair Newburn said these should not be viewed as the only partnerships. He added he will continue to push to make things as generic as possible to open up the possibilities for the different programs to coexist, based on what each individual school district, school or teacher prefers.

VI. Recap of the Code.org meeting in Phoenix, Arizona on December 11, 2016 (For information only)

Mark Newburn, Chair

Chair Newburn said this meeting was a follow-up on the work done for the framework, which has become the basis for states to develop their standards. He added this was the discussion of that meeting, which included approximately 22 states. He added the agenda to that meeting has been posted (see attachment). The emphasis of the meeting was around this next step, which is the move from frameworks to states developing their own state standards in computer science. He pointed out that Washington, Massachusetts, Indiana and Arkansas have already adopted standards, all

were adopted pre-computer science framework. He added approximately 24 states are now looking at adopting standards in computer science. Ms. Scott commented it was invigorating that we are in there with the lead states in this movement and we are not falling behind. Chair Newburn said one of the things the Governor has committed us to do is to develop state standards in computer science. He added this meeting was basically all around the strategies. They had people from the frameworks teams talking about the process of going from framework to state standards. The framework consists of concept and practices and combining those to produce various standards. He said the Computer Science Teacher Association is developing their set of state standards and they should become official in Summer 2017. Currently, their draft of the state standards is out.

Chair Newburn said state standards will be one of this Subcommittee's major efforts with the hope that the Mini-grant will fund associated costs. He said we are on the agenda for January 17, 2017 at 1:00 pm with the Academic Standards Council. He said we are claiming that with the Governor's partnership it has given this Subcommittee the permission to develop state standards. We will be asking the Academic Standards Council to give us the initial 'green-light' to build the draft standards and hoping to use the Mini-grant to fund that. He said if this goes through, it will give this Subcommittee the opportunity to ask what students at each grade level should be exposed to in computer science.

Dr. Stefik, Assistant Professor of Computer Science at the University of Nevada, Las Vegas, commented they have been studying standards in middle schools in various states and studies show Nevada needs to expand into middle schools as well. Chair Newburn replied the framework, CFT Standards as well as other state standards will all be reviewed. He said he was recently invited to a Google group which was informally organized for people working on state standards in computer science. This will give us the ability to track what other states are doing.

VII. Completing the Planning Framework from Code.org (For possible action)
Mark Newburn, Chair

Chair Newburn discussed the Governors for CS + K-12 Computer Science Framework Convening Planning Worksheet that was presented by Code.org. (See Attachment). He added this will be another item for this Subcommittee to work on along with our state standards in computer science. He requested that all members of the Subcommittee review this document for input at the next Subcommittee meeting. He added Expanding Computer Education pathways (ECEP) has also requested the same information and are beginning to ask many of the same questions as are outlined in the Governors for CS + K-12 Computer Science Framework Convening Planning Worksheet. Mr. Mitchell asked what would be expected from the members for the next meeting. Chair Newburn suggested everyone review the planning framework document and

make notes with ideas and suggestions and pass them along to Mr. Mitchell via email so he can compile everyone's comments for presentation at the next meeting. Chair Newburn reiterated that ECEP is starting to ask us questions about what we are planning to do as a state plan and are conducting state surveys as part of their evaluation.

Chair Newburn said another item is "Planning," which will possibly be a third task for the Subcommittee. He added, one is the "Standards," the second is the "State Plan." Again, and in conjunction with the State Plan, he said the National Science Foundation has release a major grant RFP for "Computer Science for All". Dr. Stefik gave his overview of this grant which provides all U.S. students the opportunity to participate in computer science (CS) and computational thinking (CT) education in their schools at the K-12 levels. With this solicitation, the National Science Foundation (NSF) focuses on researcher-practitioner partnerships (RPPs) that foster the research and development needed to bring CS/CT to all schools. Specifically, this solicitation aims to provide high school teachers with the preparation, professional development (PD) and ongoing support that they need to teach rigorous computer science courses, and K-8 teachers with the instructional materials and preparation they need to integrate CS/CT into their teaching. He said the National Science Foundation (NSF) has released several grants, up to approximately \$2 million. This particular grant is called a research practitioner partnership. Chair Newburn said the idea is while this Subcommittee continues with our tasks there is still research on the effectiveness of the plan occurring simultaneously, so we can answer questions. He pointed out many questions are being asked and at this time, and nobody has the answers on what the right way is to accomplish our goals. He said computer science just does not have the background like the fields of science or mathematics. It gives us a chance to engage with universities to get research questions answered simultaneously. He said while we are laying out the state plan, we can be working simultaneously on the research questions needed to simultaneously answer our questions.

Dr. Vidoni commented the United States (U.S.) is behind in this area. She said the United Kingdom (UK) has looked at effective ways of teaching computer science, as well as Scandinavia and other locations outside of the U.S. Dr. Solin agreed a number of other countries have started computer science, however, these countries don't necessarily have a research overlay in place. Mr. Carroll commented part of the problem is there is not a framework being applied as an overlay for what computer science looks like. As previously said, there are not standards that are fully operational in a wide-range of areas. He added studying something that has not been completely defined in the sense of what you are looking for sounds like more of the problem.

Chair Newburn said there is a group putting together the framework for computer science, similar to what the National Research Council did for NGSS. Currently computer science is following the NGSS model.

Achieve.org is part of the consortium to help build the framework. He added the framework is most likely the best starting place. There are two questions; 1) What every student needs to know; versus 2) How to teach them. He added the 'what' they need to know is much more solid than the "how." He said the right steps are being made in starting with the framework and getting all the groups behind it. He said the realization is, we are in new territory. This is a new core subject being developed. It is recognition that a lot is happening and is a good opportunity to put this research overlay over everything so we can start answering the questions, (i.e. what is the right licensing? The right set of courses? Is one language better than another at certain age ranges?) Everyone is being very careful not to have national, multi-state standards. Mr. Carroll replied the framework is really solid, it defines many of the boundaries that are important in computer science.

VIII. Legislative Session Update (For information only)
Mark Newburn, Chair

Mr. Newburn said we as a group have developed a set of bullet points that were presented to Senator Woodhouse, which she in turn put into a Bill Draft Request (BDR). He added we have achieved one of those bullet points by getting moved under the Governor's Office of Science, Innovation and Technology (OSIT). As this BDR goes forward and as that transitions into legislation, this Subcommittee may be called upon to testify before the legislature.

Senator Woodhouse updated the Subcommittee on BDR 34-655. She anticipates that the BDR will be drafted in early February 2017. She added at legislative hearings, it would be very helpful if any of this Subcommittee can give testimony by tying it into the items talked about today. She commented on another BDR in progress to establish a state seal to recognize high school graduates who have attained a high proficiency in subjects commonly referred to as STEM or STEAM, and that BDR will most likely be coming out in February 2017, as well. Ms. Scott mentioned as a reminder, Career and Technical Education (CTE) currently has a seal that recognizes student CTE completion, but does realize that STEM and STEAM possibly go beyond this recognition. Perhaps some students would have dual seals.

Chair Newburn reiterated this group should expect to be called upon to offer testimony on behalf of Senator Woodhouse's BDR's and we should all review and be familiar with the wording in this draft legislation.

IX. Next Steps (For information only)
Mark Newburn, Chair

Chair Newburn said there will most likely be a meeting in February 2017 and by then we should know whether we have been awarded the Mini-grant and we will know if we have been given the approval by the Council on Academic Standards to move forward with the Computer Science Standards. He said a big next step will be starting the work on the standards. He added he will keep everyone up to date on the development of these items. Another key element will be the framework planning document which starts the layout for Nevada's State Plan in Computer Science.

- X. Consider Agenda Items for the Next Meeting (For possible action)
Mark Newburn, Chair

Chair Newburn said members could email any items they would be interested in putting on the agenda for the next meeting. Dr. Solin asked if the next meeting could be conducted using Google Hangouts (<https://hangouts.google.com/>) as he will be on sabbatical in South Africa and will be very difficult to join the meeting by telephone. Chair Newburn asked if the Office of Science, Innovation and Technology (OSIT) could support this. Mr. Mitchell responded he would have to look into this matter and get back to him. Using Go-To-Meeting (<https://www.gotomeeting.com/>) was also suggested, as well as Skype (<https://www.skype.com/en/>).

Dr. Stefic, of the University of Nevada, Las Vegas, offered assistance to any member of the Subcommittee with any questions they may have regarding any items from today.

- XI. Next Meeting Date will be determined at this meeting.
Mark Newburn, Chair

Chair Newburn asked Mr. Mitchell if he could send out a Doodle Pole to the Subcommittee with preferences on dates for next month's meeting. Mr. Mitchell responded he will send out the Doodle Pool and get everyone's schedules aligned.

- XII. Public Comment (No action may be taken upon a matter raised under public comment period unless the matter itself has been specifically included on an agenda as an action item.)

There was no public comment. Chair Newburn again welcomed everyone to the new permanent Subcommittee on Computer Science.

- XIII. Adjournment

Chair Newburn adjourned the meeting at 10:28 A.M.