STATE OF WASHINGTON
OFFICE OF THE GOVERNOR

WASHINGTON STUDENT ACHIEVEMENT COUNCIL
EDUCATION · OPPORTUNITY · RESULTS

STEM Education Innovation Alliance
Meeting Notes
July 13, 2016
McKinstry - 5005 3rd Avenue S, Seattle Washington 98134 "Garage Room"

WELCOME & INTRODUCTIONS

Gene Sharratt, Executive Director of the Office of Superintendent of Public Instruction/Association of Educational Service Districts Network and former Executive Director of the Washington Student Achievement Council, welcomed everyone to the meeting.

Mark Jonson, Regional Director for Western Washington Energy at McKinstry, extended a welcome to the group. He explained the mission of McKinstry by illustrating McKinstry as "*an on ramp* opportunity" for students to move into STEM careers. He went on to say McKinstry works with schools and interacts with students, providing access to career planning and staging mock interviews.

WASHINGTON STEM OVERVIEW
Caroline King, Chief Policy Officer, Washington STEM

Caroline said that the heart and soul of Washington STEM is being out in the community. It partners with ten regional networks throughout the state: Spokane, Yakima, Vancouver, and Tri-Cities, to name a few locations. In these networks, business, education and community leaders come together to define common goals for students to achieve their highest ability of success. With so much in the workforce being driven by the science, technology, engineering and mathematics disciplines, Washington STEM's community work also embraces knowledge sharing, innovation and expansion of common practices.

Washington STEM's policy work affords an opportunity for policymakers to execute evidence-based decisions to truly support students in education and the workforce pipeline. Some of its work focuses on cross counting credits which are used as an incentive to ensure student success. Some of its innovative work is in implementing learning labs across the state, re-engaging disengaged students, identifying where students are lacking access to services, ensuring teachers are receiving the support they need, a scaling up of common practices, and a goal to achieve sustainable action through a public/private grant. The upcoming Washington STEM Summit will be held on November 29, 2016, at the Microsoft Conference Center in Redmond. All Alliance members are invited to attend. Yale University scientist Dr. Ramirez will speak about STEM as a reality in everyday practices.

GENERAL DISCUSSION

Hadi Partovi referenced the April 2016 letter which addresses the importance and support of computer science from the Governor, top CEO's, and K-12 classroom teachers.

The study of computer science is unique in that it has the ability to act as both a vocation as well as a foundational field. At the foundational level, computer science bridges equity and diversity gaps by integrating computer science into existing curriculum. It allows all children the same access and exposure to computer science. With equitable access, children have a further opportunity to expand their language capacities, involve parent partnerships, community support, and curriculum expansion.

In terms of employment, Washington State – from a national perspective - has the second largest opportunity for students in computer science fields. California is number one but Washington is the largest (90%) for employment opportunities. Regretfully, job openings and graduates in Washington state do not match and employers are constantly fishing in surrounding ponds to fill the employment gap. Code.org hopes to expand - with continued support from the Governor, the 1813 grant, and all other matching grants including those being matched through Code.org.

Several recommendations emerged to move forward at a State level:

- Fund in-school programs
- Expand funding for teacher training
- Inclusion of certification/re-certification process
- Provide tools and support to educate current teachers on how to teach computer science effectively
- Graduate teachers who are ready to teach science-related curriculum
- Create a pipeline
- Recruit teachers

Recommendations at a legislative level included:

- Professional development
- Pre-Pathway thru advanced placement courses in computer science
- Securing funds for low income students
- Increase expenditures by 3 to 4 billion dollars for K12 education

Overview of needs:

- Grants
- Resources
- Integration of other subjects
- Encourage parental involvement
- To engage kids-creating retention in schools
- Public relations campaign for STEM and computer science career options

The Workforce Board is taking the lead on another National Governors Association grant – focusing on Work- Based Learning. The grant is focused on the 16-29 age range and includes K-12 as well as postsecondary opportunities. The underlying idea behind this NGA project is that a key element to successful transitions and career progress for young people is work-based experience.

The Workforce Board has pulled together a group of 50-60 individuals from various organizations which identified four primary objectives of this work:

- Economic/Environmental Scale of Work Based Learning
  - Regional networks
  - Youth networks
  - Programs
  - Graduate employment positions
- Cost effectiveness/Efficiency with employer matching
  - Locate applicable schools, programs, student's
  - Develop a portal partnering employers with people- referred to as an "eHarmony" approach
- Keeping the system information up to date
  - Thru alliance with business labor community
  - Maintenance of the "eHarmony" system
- Work Based Learning
  - Best practices
  - Early Work Experience = Success

THE HONORABLE STATE OF WASHINGTON GOVERNOR JAY INSLEE

Governor Inslee complimented Washington for its leadership in STEM education and said it is a good time to be working on innovation in the state because we know innovation is working:

- According to *Business Insider*, Washington has the number one economy in the country.
- Washington is the most innovative state in the nation, according to *Bloomberg News*

He expressed appreciation for the STEM Alliance's contributions to these efforts. "This is how we change things." He mentioned that Washington has sector strategies in the aerospace, agriculture and maritime industries and the same strategy is in place to grow innovative talent in STEM. One of the virtues of Washington is that the state welcomes talent from around the world into its workforce. However, he would like to see the growth of company businesses filled by Washingtonian residents.

Governor Inslee listed several successes to celebrate:

- Computer science now counts as a math and science credit
- Next Generation Science Standards are adopted – an important statement of scientific and mathematics rigor
- Access to computer science education has increased – the state has invested over two million dollars in computer science grants to give students equitable access to higher education
- Investment of ten million dollars to increase opportunities for STEM post-secondary degree's awarded to University of Washington, Washington State University and Bellevue College
- Expansion of the state's MESA college program
- Introductory exposure to STEM concepts in early childhood education – a recent visit from the Governor to John Blakely Elementary School (Bainbridge Island) proved to be exciting. He observed first graders applying STEM education to build electrical circuits using playdough.

Governor Inslee is confident in our progress and encourages other governors to adopt the standard to increasing possibilities for coding experience. He would like to see computer science in a real way in every high school. The state has grander ambitions than just meeting the baseline requirement. The

state would like to use this as a springboard to create opportunities for our kids, including opportunities in coding and computer science – not to just replace local levy money, but to actually create opportunities in our schools.

Governor Inslee would like to:

- Reach one million hours of code (Hour of Code program hosted by Code.org).
- Expand the Washington State Opportunity Scholarship to include the mid-level.
- Outreach to minority communities (high priority) to offer coding opportunities.

Washington is behind the curve in reaching minority communities. People born into poverty are twenty to thirty percent more likely to remain living in poverty. The Governor said a high priority is outreach measures for the state to bridge the equity gap and include all children.

He said the McCleary decision offers opportunities to focus resources for the kids who need it most – the kids who are not surrounded by the digital environment – and provide opportunities to close the opportunity gap in coding, computer science and STEM fields.

Questions & Answers & Discussion

How do we reduce time away from the classroom and include metrics that encourage initiative and innovation?

The Governor encourages the STEM Alliance to think about this and present some ideas.

What are key initiatives that can build upon Code.org efforts?

Increasing the number of hours invested and the number of kids that participate in coding is needed to increase scale.

There are only seven states in the nation who are funding computer science and Washington was one of the first. Funding is a key element to get it up to scale. Washington is a leader among states but the dollar amount is small: Arkansas provides $5 million in funding, whereas other states are investing $1 to $2 million which is very little money to get things started.

Funding supports the retraining of current teachers. This training also needs to be integrated into current teacher training programs because they already have the funding.

The Governor offered to convene a discussion with college deans on this topic as he thinks it will bear fruit.

There are two ways to approach this:

1. More kids with some experience
2. Fewer kids with a deeper experience

The Governor asked the group which they would choose. The collective agreement was #1, more kids with a brief experience. The philosophy is, the more the better. In terms of numbers, the exposure alone will increase the number of kids coding because they will fall in love with it and the other kids will come along.

Representatives of the Washington State Opportunity Scholarship (WSOS) are excited about the expansion of the opportunity scholarship and its consequent address to the equity issues. This year there was a large skills gap. WSOS determined they need about 40% of scholarship applicants to be in computer science to help bridge the gap but only 17% applied.

These results show a direct reflection of equity issues in the pipeline because WSOS focuses on rural students who are not as familiar with computer science careers. And, although interest in computer science is skyrocketing at the University of Washington, the interest of lower income students might not be as adequately reflected.

Governor Inslee would like to address this opportunity gap and asserted that funds need to be targeted to these kids. He requested that the STEM Alliance support these initiatives moving forward.

How do we get our local businesses to buy in and offer opportunities for our youth to go to work? As discussed before, success in student development is often predicated by early work experience. Many of our low income, first generation, and rural students experience a lack of opportunity for internships because of the competitiveness from international and national students. How do we encourage our state businesses to invest in our own kids?

Governor Inslee commented on how IT positions are everywhere, not just in Bellevue and surrounding communities. We need to help people understand the importance of investing in homegrown talent and that technology is everywhere. For example, he met a man in Yakima working on a farm that grows cherries and who is the business' IT staff.

This shows that many people have the intelligence and the work experience. They just lack an access point into the industry. This is a tactical issue that could be remedied through the expansion of the WSOS. The expansion will surely close the opportunity gap and address the equity issue as well. Many IT specialists are in two-year education institutions. Expanding WSOS from four year institutions to the two year and technical programs would allow a reach across both issues.

This would require funding coming from both public and private organizations. The good news is that the industry is energized and ready to recruit.

The Governor pointed out some of the upcoming legislative challenges:

The increase of state expenditures by 3 to 4 billion dollars for K-12 education.

He called us to action by reminding the group of the two sequential bienniums that narrowly escaped a governmental shutdown when the request was to increase K-12 spending by only two million dollars.

ROUNDTABLE DICUSSION: STATE OF COMPUTER SCIENCE IN WASHINGTON STATE
Moderator: Andy Shouse, Chief Program Officer, Washington STEM

Andy facilitated a group of leaders in computer science education to comment on the state of computer science in our state.

Hadi Partovi (Founder, Code.org)
Naria Santa Lucia (Executive Director, Washington State Opportunity Scholarship)
Greg Bianchi (K-5 STEM Curriculum Developer, Bellevue Public Schools)

Kevin Wang (Founder, Technology Education and Literacy in Schools)
Vickei Hrdina (STEM Director, Educational Service District 112)
Michael Schutzler (CEO, Washington Technology Industry Association)

Panelist Comments

The Governor is engaged in this discussion on computer science and is a ready recipient for recommendations relating to computer science education.

How can we best make a clear compelling case for what comes next in K-12 computer science?

What are the K-12 computer science standards?

With the expansion of investment in advanced placement computer science courses and we have seen an increase of support from a whole variety of partners, including private and non- profit communities. And though this is important, the critical issue is about creating a pathway across levels through foundational learning in K-12.

Hadi commented: This is a unique moment for our state. We are among the seven leading states on this nationwide mission, and our nation is leading the entire world.

A new advanced placement exam is on the table to broaden the scope of the traditional exam. It expands the knowledge of programming to security, data analysis, and internet safety, propelling computer science beyond just coding and making it accessible to every student.

An investment opportunity lies within the growth of student access and application of skill.

Naria commented, regarding the Opportunity Scholarship: The scholarship itself provides $22,500 over a five year span to low and middle income students who major in STEM disciplines and other high demand skills in Washington state. Our trajectory is to fund 15,000 students by 2021.

One of the measures of success for Opportunity Scholarships is that 83% of graduates are employed or seeking graduate studies within nine months of graduating. This puts Washington state above the national average of 40%.

A larger more amazing statistic is, at the time of enrollment, the average income is $38,000 but 75% of them are in the bracket of $40,000 to $70,000 within four years of completing their degree. This is more than the average income for a family of five. These scholarships are breaking the cycle of poverty.

(Andy) Another important piece in this effort is to use innovative practices to fund the capacity of universities, not just the students in the seats, to produce high demand degrees.

This is made possible by the high tech research and development tax credit that gives employers two options:

1. Get the money back that is owed to them
2. Donate it to the Opportunity Expansion Fund

Though the previous donors' participation has phased out, the time in existence produced $6 million dollars. And, in this year alone, Microsoft has donated $21 million dollars to the Opportunity Expansion fund.

With a ROI process from Colleges and Universities afforded an opportunity to focus on three areas:

1. Computer science education
2. Engineering
3. The future education in K-12 education, especially high school focused on stats

The proposals yielded many returns; however, there were only three recipients:

- Central Washington University
  - Adopted new innovative practices
  - Expanded the U-tech model.
- University of Texas Austin
  - Successful in recruiting and retraining diverse populations in science, technology and math.
  - Utilize the U-tech curriculum and create CWU U Teach:
    - CWU U Teach will bridge the certification program requirements between Austin and Central and then network the curriculum and then launch it
    - Goal is to increase by 45 new, diverse teachers per year.
    - Goal to serve rural areas and build the pipeline
    - Creating, computer science teaching endorsement in science and math in addition to the 45 new teachers per year
    - Launch use of funds to develop their plan
- Western Washington University
  - Have succeeded in recruiting women in their computer science department
  - Building partnerships to create a new K-12 teaching endorsement for computer science
    - Goal: to replicate the new endorsement to other schools
    - Increase pipeline

The 40% gap is huge. Because only 17% of students are majoring in computer science, it will take (1) innovative practices and (2) different models of funding to increase the number of teachers and awareness to bring people into the pipeline. Now is the time to let students know what computer science options are available and help them move towards those options. This is our moment to take advantage and do some big things.

There are literally only six faculty members in the entire country who focus on computer science education with new teachers; how can we help get together nationally and support this movement?

With this being a foundational issue we will need to:

- Define K-12 pathways
- Decide baseline jurisdiction
- Share an inclusive mindset
- Framework conforms to standard
- Adopt national level standards

- Provide feedback and a review process
- Develop the next steps

To implement a plan on these next steps, we need assess our largest needs, such as;

- Professional development in both in-service and pre-service/foundational confidence
- Weave a foundational program throughout all teacher education programs
- Resources, curriculum, space
- Funding

Some innovative solutions to lower cost are:

- Developing access points to make this foundational
- Share resources
- Involve parents and community members to cross train per hours of instruction
- Create a central point of access like the Rhode Island site called CS4RI (CS4WA)

The TEALS model is one that embraces the innovative practice of creative solutions. After practicing its approach for six years now, they found an access point to get computer science into schools. They recruit and train from many different companies and professionals co-teach with an in-service teacher. The process takes about 18 months to 2 years, once the teachers learn enough content (service/instructional hours), they are then trained to teach on their own.

The success of this program is measured by a single standard deviation of test scores from advanced placement students who are passing above the national standard average. 85% percent of teachers are on a two-year paid program. The program reach extends to 230 high schools, 75 of which are located in Washington State.

Another measure of success celebrated is the increase in advanced placement computer science exams from 300 to 1700 participants. (2010-2016) Washington State is the only state in the Union to have advanced placement computer science. Not only breaking barriers in test scores but also in equity and opportunity gaps.

Kevin said: TEALS would like to extend our hand to help other schools achieve the same success and implement the same strategies. With industry volunteers and public-private partnerships, all students can have the same opportunities now.

OSPI and National Science Foundation grants are breaching barriers and creating opportunities, helping to bring in, disperse funding and reach kids that otherwise would not be reached.

Vickei commented: there are about 2000 teachers who serve K-5 in this region, of which 1200 kids rotate throughout the system every year. This reaches approximately 6000 kids. Using this mechanism to adapt, integrate and foundationalize STEM, they are able to reach kids even two hundred miles away, presenting these kids with the same opportunities and possibilities.

The science kits begin in pre-K and evolve in three different stages throughout. First, there is an integration of hardware and software probes, which allows an early introduction to collect, analyze and distribute data. Second, bolstering access to STEM Robotics through a Robotics loan program allows teachers to supplement their current science curriculum for a borrowed one which includes robotics

from Lego. And third, with a partnership with Code.org, elementary and middle school kids are engaging with coding because Code.org is weaved directly into the science kits. Basically, this is really incorporating a problem-based learning experiences.

And finally with an assessment we have been able to modify materials at a low cost and with teacher leadership we have developed STEM kits to help hit the integration key point, ensuring teacher support for the next generation which includes computer science.

Michael Schutzler commented on WTIA: WTIA is a trade association that works to solve problems that the sector cannot solve on its own. It provides recruiting, chart programming, and public policy. They solve problems by identifying the leverage points and advancing tactically.

WTIA has developed the first registered national apprenticeship program. It borrowed and rewrote the structure of previous apprenticeship programs by fusing the idea of advancement (i.e., start out as an apprentice then move to journeyman) with an opportunity at the end of the program to earn a certification in that field. The standard set forth for this is, after one year of on the job training, a person will have the opportunity to be certified by a peer professional and peer company, and the certificate will be transferable across the country.

By reaching out to veterans and two-year programs, the opportunity equity gap can be decreased, as opportunities are increased for diverse populations. The largest hurdle to this success is distributing the stipend at a rate that will convince people they can afford to quit their jobs and take this apprenticeship. With many jobs going to residents outside of Washington, this is the most effective and quickest way to fill positions now with the diversity of people from Washington State.

POLICY RECOMMENDATIONS AND ALLIANCE DISCUSSION

Building the parent-student-teacher pipeline is another opportunity to foster engagement and lower costs. Now that everyone is thinking in different ways how to develop a framework, we need to figure out a way to make the learning objectives hit the same points with the right people. At some point, there will be crosswalks for certification, for credit, apprenticeships. Is it too early to get there? Or is there a plan of action to start there and build it out together?

Will the learning standards match the industry wants? The framework process is a very high level, working closely with the CSGA standards. The general standard is, if you like the high level framework, you could update the CSGA standards or create similar standards that are exemplar. The process for the framework involves K-12 and postsecondary educators and industry leaders. It involves top tech companies getting involved in the process to make a framework that meets student needs.

Jane Broom Davidson is impressed with the collaboration and agency involvement and progress so far. She is encouraged to see the state progress from small-scale efforts to being a leader in this area.

Opportunities with stipends for our targeted populations - single parents, veterans, and minorities - would allow opportunities for scholarship programs that would result in an increase of applications from diverse populations. By taking all the existing curricula and integrating them into specific tracks that the industries have asked us to develop opportunities in, it could be further developed. Funding is being sought for a pre-apprenticeship program.

Options for credentialing could include:

- Community colleges
- Coding school
- PMI
- Training facility

There is a concern about veterans being able to keep their benefits in the event they engage in these opportunities. Washington is a veteran-ready state being the first state to pass a law that every veteran is a resident and making them eligible for academic credits via Prior Learning Assessment.

The Governor said "the state is poised to make millions of new investments in K-12 basic education. The goal of basic education is to help kids thrive in the economy and improve everyday lives." What is the measureable outcome of these new dollars in terms of the impact of STEM on the equity issue?

There will be a decrease in remediation, increase in job readiness, and access to computer science, a stepping stone foundation from setting kids up for success to post-secondary education and into jobs. The diversity issue will be addressed in the K-12 basic education, policy, and funding strategies.

With a huge need for computer science, where should the policy options be? What does Washington need to do in the next biennium? For more flexible credentialing and re-tooling to enable and enhance teacher certifications? What are the short term and long term options for increasing capacity in computer science and weaving connective learning? What are the standards and mechanisms to meet these standards?

A larger issue is that this is not just about computer science and diversifying the credential process but making sure that alternate routes are streamlined routes. The recommendation is to keep this a high priority.

The retention and recruitment of teachers is in crisis. It is now time for transitions for professionals, especially teachers. Now is the time to make a difference in how we approach public education. It is a chance for our state to become a leader for our kids and for the country.

Making computer science a foundational program is a new approach and Washington would be the first in the state to put this stake in the ground. There is a need for new money, new innovations, and new participants, such as parents.

The political issue is new funding. The crafted recommendations will be the legislative issue. Our legislature needs the courage to go fix these issues.

Kevin Wang offered to put together a menu like TEALS, to build collaboration between industry, academia, professional development providers and OSPI. Brian Teppner supported this idea and offered to contribute. Outlining the big goals and ideas going forward will allow for effective collaboration.

CLOSING REMARKS

We want to craft recommendations to be picked up as part of new legislation. We can do this by our organizations drawing from the work of the STEM Alliance. There will be a survey sent out that focuses on what was discussed today. The results of the survey will then be applied to prioritize and then leverage and align our goals.

We will determine the financial obligation of goals both large and small to prioritize spending. How do we all work together to identify overlaps and work together more efficiently?

There is support of the recommendation to institute a ten-day professional development plan.

There is a strategic action plan to increase education, where partners will be asked to bring forward possible endorsements.

What levers will help achieve our goals? Which ones can we pull? Next year will yield a difficult budget. One strategy would be to focus on the smaller important items and then move toward the larger action items.

The Department of Commerce supports the Governor's lead to accelerate the growth of our state and offers its helpful support.

How can we coordinate commitment to take things to the next level of development?

The STEM Alliance shows a strong desire and willingness to help coordinate with others and legislation. They would like to help with policy panels, committees to help everyone get behind each other to create a solid network.

Meeting notes compiled by staff at the Washington Student Achievement Council.

STEM Education Innovation Alliance - Meeting Participants - July 13, 2016

ALLIANCE MEMBERS

First Name	Last Name	Position Title	Organization
John	Aultman	Executive Policy Advisor for Higher Education and Workforce Development	Washington State Office of the Governor
Marty	Brown	Executive Director	State Board for Community and Technical Colleges
Caroline	King	Chief Policy Officer	Washington STEM
Marcie	Maxwell	Citizen Member	Former State Representative
Eleni	Papadakis	Executive Director	Workforce Training and Education Coordinating Board
Naria	Santa Lucia	Executive Director	Washington State Opportunity Scholarship
Gene	Sharratt	Former Executive Director	Washington Student Achievement Council
Brian	Teppner	Principal, McKnight Middle School	Renton School District
Nancy	Truitt Pierce	Director, School Board	Monroe Public Schools
Margaret	Tudor	Executive Director	Pacific Education Institute
Yolanda	Watson Spiva	President & CEO	College Success Foundation

ALTERNATE ALLIANCE MEMBERS

First Name	Last Name	Position Title	Organization
Jane	Broom Davidson	Community Affairs Director	Microsoft Corporation

OTHERS

First Name	Last Name	Position Title	Organization
Chadd	Bennett	Assistant Director of Digital Information for Policy and Government Relations	Washington Student Achievement Council
Cherie	Berthon	Budget Assistant to the Governor	Office of the Governor
Greg	Bianchi	K-5 STEM Curriclum Director	Bellevue Public Schools
Amy	Buck	Administrative Assistant	Washington Student Achievement Council
Patrick	D'Amelio	CEO	Washington STEM
Clarence	Dancer	STEM Program Supervisor	Office of Superintendent of Public Instruction
Cody	Eccles	Associate Director	Council of Presidents
Nova	Gattman	Legislative Director	Workforce Training and Education Coordinating Board
Kimberly	Hauge	Policy Analyst, Economic, Human Services & Workforce Program Division	National Governors Association, Center for Best Practices
Leah	Hausman	Director of Fund Development	Thrive Washington
Vickei	Hrdina	STEM Director	ESD 112
Jay	Inslee	Governor	State of Washington Office of the Governor
Maura	Little	Director of Life Science and Global Health Development	Washington State Department of Commerce
Ellen	Matheny	Assistant Director of Operations	Washington Student Achievement Council
Daryl	Monear	Associate Director for Academic Affairs and Policy	Washington Student Achievement Council
Hadi	Partovi	Founder	Code.org
Tanya	Roscorla	Staff Writer	Government Technology Magazine
Juliet	Schindler Kelly	Government Liason	College Success Foundation
Michael	Schutzler	CEO	Washington Technology Industry Association
Andy	Shouse	Chief Program Officer	Washington STEM
Randy	Spaulding	Director of Academic Affairs and Policy	Washington Student Achievement Council
Maddy	Thompson	Director of Policy & Government Relations	Washington Student Achievement Council
Natalie	Truong	Policy Analyst, Education Division	National Governors Association, Center for Best Practices
Kevin	Wang	Founder	Technology Education and Literacy in Schools