ALASKA STATE LEGISLATURE
JOINT MEETING
HOUSE LABOR AND COMMERCE STANDING COMMITTEE
HOUSE EDUCATION STANDING COMMITTEE
January 25, 2018
11:48 a.m.

MEMBERS PRESENT

HOUSE LABOR AND COMMERCE STANDING COMMITTEE

Representative Sam Kito, Chair
Representative Adam Wool, Vice Chair
Representative Chris Birch
Representative Gary Knopp
Representative Colleen Sullivan-Leonard

HOUSE EDUCATION STANDING COMMITTEE

Representative Harriet Drummond, Chair
Representative Jennifer Johnston

MEMBERS ABSENT

HOUSE LABOR AND COMMERCE STANDING COMMITTEE

Representative Andy Josephson
Representative Louise Stutes
Representative Mike Chenault (alternate)
Representative Bryce Edgmon (alternate)

HOUSE EDUCATION STANDING COMMITTEE

Representative Justin Parish, Vice Chair
Representative Zach Fansler
Representative Ivy Spohnholz
Representative Chuck Kopp
Representative David Talerico
Representative Lora Reinbold (alternate)
Representative Geran Tarr (alternate)

COMMITTEE CALENDAR

PRESENTATION: WORKFORCE READINESS

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

RYAN HARKINS, Director
Public Policy
Microsoft Corporation
Seattle, Washington
POSITION STATEMENT: Offered a PowerPoint Presentation on Computer Science Education & Workforce Development.

ACTION NARRATIVE

12:01:48 PM

CHAIR SAM KITO called the joint meeting of the House Labor and Commerce Standing Committee and the House Education Standing Committee to order at 11:48 a.m. Representatives Knopp, Sullivan-Leonard, and Kito from the House Labor and Commerce Standing Committee were present at the call to order. Representatives Birch and Wool from the House Labor and Commerce Standing Committee and Representatives Johnston and Drummond from the House Education Standing Committee arrived as the meeting was in progress.

PRESENTATION: Workforce Readiness

12:03:15 PM

CHAIR KITO announced that the only order of business would be a presentation entitled "Workforce Readiness," by Ryan Harkins, Director of Government Affairs, Microsoft Corporation.

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RYAN HARKINS, Director, Public Policy, Microsoft Corporation, offered a PowerPoint Presentation on Computer Science Education & Workforce Development. He said he would talk about trends, challenges, and opportunities in workforce development and the education and skills necessary to secure the jobs that are being created this century. He said he would like to hear what Alaska's challenges are in the workforce, and he invited the committee to ask questions at any point during the presentation. In response to a question from Representative Birch, he said his presentation is not geared toward any product but to provide an

overview of trends and talk about what other states are doing to expand access to computer science education and other training programs.

MR. HARKINS stated that Microsoft Corporation's mission is to empower every person and organization on the planet to achieve more, and the corporation provides the tools to help people accomplish their goals. He said the U.S. is facing a major workforce crisis: there are too few people with the necessary skills to fill industry jobs.

12:08:19 PM

MR. HARKINS talked about the first industrial revolution [1760-1840], as shown on slides 3 and 4 of the PowerPoint, which brought the Transcontinental Railroad, which shortened the time it took to cross the states from over three months to about a week. He said the second industrial revolution [1870-1940], as shown on slide 5, brought the telegraph and telephone and allowed mass production. Slide 6 shows New York City in 1905, when it took 100,000 horses to keep the city moving and 25 percent of the country's agricultural output went just to feed the horses. People had jobs caring for and training the horses, cleaning up after the horses, and driving carriages through city streets. The same intersection in New York City is shown in 1925, on slide 7, which shows that the horses were by then replaced by automobiles. All those equine-related jobs disappeared and were replaced by new jobs. He stated, "Innovation made the economy more dynamic; and so, while there was great upheaval, there was also great opportunity; and it's not all that dissimilar to what we're seeing today." Mr. Harkins said the third industrial revolution [1960-2015], shown on slides 8-10, was brought on by the microprocessor, the personal computer (PC). He said Bill Gates' ambitious goal was to place a PC on every desk in every home; now there are smart phones "in every hand and in every pocket," he said.

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MR. HARKINS said all this has led to what some call "the fourth industrial revolution," as shown on slides 11-18, which is primarily Cloud computing - the use of massive data centers to collect and process huge volumes of information extremely quickly. He said Cloud computing is transforming many aspects of society, including manufacturing, education, finance, government, healthcare, and even agriculture. He said this is also creating a lot of angst, because jobs that used to provide

solid, middleclass incomes have disappeared and other jobs will disappear in the future. For example, he indicated that the use of autonomous vehicles in the future will make jobs such as long-distance truck driving and taxicab driving obsolete.

MR. HARKINS said the good news is that many new jobs are coming available. The number one source of new jobs today is in the computer field. He clarified that these jobs are not only in the technology industry but in every industry across the country, because "every organization today has a need for people with computing skills." The ability to use PowerPoint and Excel are skills that are in demand, he said. Further, jobs are being created for those who can write software and develop hardware, for instance.

12:14:49 PM

REPRESENTATIVE SULLIVAN-LEONARD asked how Alaska compares to other states in meeting the demands Mr. Harkins spoke about, as well as "being computer-savvy."

MR. HARKINS indicated that the answer is on slide 19, which shows a line graph depicting job growth in the U.S. economy. As shown on slide 23, he relayed that currently there are over 500,000 [unfilled] computer jobs, yet each year there are only about 43,000 graduates with the requisite degree or credentials necessary to fill those positions. He said this information is available on Code.org, a website he described as a nonprofit advocacy organization whose mission is to expand access to computer science education. As shown on slide 24, he informed the committee that currently in Alaska there are over 655 open computing jobs, which is almost two and a half times the state's average demand, yet on average Alaska is producing only 25 computer science graduates each year. He said computer-related jobs in Alaska pay, on average, $85,000. He said just about every other state is also facing the same gap.

MR. HARKINS referred to slide 25 and said the information on it was sourced from the Brookings Institute. He said it is clear that computer science education pays off in the long run. As shown on the slide, the average high school graduate will earn about $580,000 in his/her lifetime; college graduates will earn about double that in their lives; and computer science graduates will earn incomes 40 percent higher than the average incomes of college graduates.

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MR. HARKINS addressed the issue of the gap [slide 26] and, as shown on slide 27, stated that the majority of schools don't teach computer science. He stated that 90 percent of parents want their children to study computer science but only 40 percent of schools teach computer programming. Part of the challenge is that there are not enough qualified teachers to teach computer science. He then covered information on slides 28-33, regarding advanced placement (AP) Computer Science exam participation. He said the trend for taking the exam is increasing. Last year, countrywide, there were just under 100,000 [students] that took the exam, which is a huge increase over where it was in previous years. He noted that while the numbers are not optimal, they are increasing: in 2017, just over 20,000 underrepresented minorities and 26,000 females took the exam. In Alaska, 68 students took the exam, five of which were underrepresented minorities, and 17 females in Alaska took the exam.

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REPRESENTATIVE KNOPP questioned whether not only the lack of computer science classes in kindergarten through twelfth grade (K-12) but also the cost of attaining a four-year degree may be detrimental to the goal of producing more workers skilled in computer science.

MR. HARKINS said that is correct that traditionally computer science skills have not been taught in K-12. He said access to college education should be expanded to those who need it; however, not everyone goes to college, and there are other things that can be done, such as post-secondary training, so that people can acquire the necessary skills to fill the jobs being created. Nevertheless, he said the numbers show that getting a post-graduate degree in computer science does "pay off."

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REPRESENTATIVE DRUMMOND asked Mr. Harkins to bridge the gap between the charts on the slides that show the numbers of people who have taken AP computer science exams and those earning computer science degrees in college.

MR. HARKINS responded that data shows when children are exposed to computer science in high school, if not earlier, they are more likely to major in computer science in college; this is

especially true for underrepresented minorities and females. The number of AP exams being taken connects the two. He said there is also a need to provide skills to those not going to college, and that can be through high school curriculum and programs that provide additional training and certification after high school. He stated Microsoft Corporation would like to see all the above.

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REPRESENTATIVE WOOL related that his daughter learned some coding while participating in robotics in elementary school. He asked Mr. Harkins if he thinks subjects, such as traditional mathematics or others, that are rarely applied post-high school, are overemphasized. He then asked Mr. Harkins to comment on how the rapidly changing field of computer science may affect those studying it.

MR. HARKINS said it is fun to be around children who are learning computer science skills for the first time, and he expressed hope that the experiences would encourage more females to enter the field of computer science. He said he would not suggest replacing traditional mathematics instruction with computer science but rather to add additional computer science instruction to science, technology, engineering, and mathematics (STEM) instruction. He allowed that perhaps there is always a need to provide practical application of knowledge to the workplace experience, and he thinks computer science education can be a part of that. Mr. Harkins said Microsoft Corporation encourages states to develop computer science standards in a curriculum. He reported that Arkansas was the first state in the country to adopt K-12 computer science standards, and as a result has seen a 350 percent increase in the number of students taking computer science. He said there are 12 states that have adopted computer science standards and several other states that are working to do so. There is a model available for states to use that was developed by the national Computer Science Teachers Association (CSTA), Code.org, and others. He related that Virginia has become the first state in the Union to require all K-12 teachers to incorporate computer science into their classrooms. To Representative Wool's last comment, he said learning languages, such as Java and C++, is relevant to the marketplace today.

12:32:45 PM

MR. HARKINS returned to his PowerPoint presentation, to slides 35 and 36, and said one thing states can do to close the gap is to make computer science count as a core math or science high school graduation credit rather than being just an elective. Pointing to slide 37, he noted that as of today, 36 states have made computer science count. As shown on slide 37, the remaining states to make computer science count are Alaska, [Hawai'i, Montana, Wyoming, South Dakota, Nebraska, Kansas, Iowa, Missouri, Mississippi, Pennsylvania, Connecticut, Massachusetts, and Maine]. As shown on slide 38, Mr. Harkins said another way to close the gap is to expand the supply of computer science teachers. He relayed that Microsoft Corporation has a program called "Technology, Education, and Literacy in Schools" (TEALS), which places software engineers into the classroom with high school teachers to co-teach computer science. As shown on slide 40, Mr. Harkins said the program started with one TEAL volunteer and 12 students, in one school, in 2009-10, and in 2017-18 [has 1,050 TEALS volunteers and] 12,000 students, [in 349 schools,] in 29 states and Washington, D.C. The volunteers come not only from Microsoft Corporation but also from many other technological companies. He said the goal is to bring teachers to the point where they can teach computer science on their own. The best volunteers are from the community, but for those communities that lack resources, Microsoft Corporation has found a way for volunteers to connect to the classrooms using Skype.

12:38:16 PM

MR. HARKINS directed attention to slides 41 and 42 and said other ways to close the gap are to create teacher certification pathways and computer science standards. Slide 43 shows a map of the U.S., with 12 states depicted in purple as those with K-12 computer science standards and the remaining states without the standards depicted in gray. He showed slide 44, which highlights the need to invest in career connected learning. He said Arkansas combined traditional vocational training and academic pathways into the same standards to help all students whether they continue to college or not. As shown on slide 45, he noted that Microsoft Corporation has a program called "Imagine Academy," in which students and adults can gain new skills and earn industry certification to demonstrate they have those skills. He said the corporation is also developing another track to teach people how to use and manipulate data. He offered his understanding that Imagine Academy is now in 21 states and works with state and local governments to ensure the program meets with their priorities.

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MR. HARKINS noted that Microsoft Corporation acquired LinkedIn, which is a social networking website for professionals. LinkedIn has resources that allow users to identify within a community what jobs are available and what skills are needed to qualify for the jobs. LinkedIn also has "a ton of workforce data" related to jobs posted, profiles of users, and skill sets, and the company put together an economic graph, which can help provide a snapshot of the kinds of job opportunities that are available in a particular community, which can be helpful information for policy makers trying to figure out where to direct resources.

MR. HARKINS talked about Microsoft Software & Systems Academy, which is shown on slide 48. He said it is a technology boot camp for those who are soon leaving military service. It is a five-week program teaching skills in Cloud application development, cyber security, [database and business intelligence administration, and server and Cloud administration], and there are mentors involved. He said there are 240 companies, in addition to Microsoft Corporation, that hire graduates from this program.

12:45:21 PM

MR. HARKINS, bringing attention to slides 49-54, said another issue Microsoft Corporation has been working on is world broadband gap. He reported that 34 million Americans today lack access to broadband, 23 million of those live in rural communities. What may have been an inconvenience 10 years ago is now "a huge opportunity gap." He said it is prohibitively expensive to bring broadband to an area; putting fiber in the ground costs $30-$40 grand per mile. He surmised it would not even be possible in some communities in Alaska. He said Microsoft Corporation launched a new rural broadband initiative [last] summer, which uses television (TV) "white spaces." He explained that there is a base station consisting of a radio tower among other things, and that is connected to the Internet, and then a signal can be broadcast over an area of about a 10-mile radius. The advantage of this system is that it's much less expensive to get broadband up and running. The signals travel further and go through obstacles much better than higher frequency signals like cellular companies use. He added, "And so, literally, if you're in a home or a school or a small business on the other end, you have a radio, which can receive

the signal from the radio antenna, translate it into Wi-Fi in your house, and you simply open your laptop and connect to the Internet the way folks in Anchorage do."

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MR. HARKINS, in response to a question from Chair Kito, said the Internet speed resulting from TV white space is what Microsoft Corporation calls "good enough." The Federal Communication Commission's (FCC's) definition of broadband is "25 megabits per second down and 3 megabits per second up." He explained that while it does not compare to fiber or 5G, a person who uses TV white space can stream a movie. Some exceptionally remote areas use satellite, he noted. He said that TV white space is the most cost-efficient way to reach those in certain areas. Bringing fiber to every house in the U.S. would cost $65 billion; reaching every house with long-term evolution (LTE) technologies could cost $25 billion; using a combination of fiber, LTE, satellite, and TV white spaces could solve the broadband gap for perhaps $8-$12 billion. In response to Representative Wool, he confirmed that TV white space operates "just like the broadband you have today."

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MR. HARKINS, bringing attention to slide 56, stated that over the course of nine years, Microsoft Corporation has launched nearly 40 rural broadband [shown as "airband" on slide 56] initiative pilots across the world, including those in mountainous terrain. He said the corporation's goal is to convince the government and the private sector to get involved and start their own projects. He explained that Microsoft Corporation partners with local Internet service providers; it pours analytics and money into projects by investing capital for the infrastructure, and when the corporation earns back its investment, plus some earnings, it pulls out of the project and leaves it to the Internet provider to run. This process is repeated to expand the network, with the goal of reaching [in five years] 2 million of the 23 million Americans that don't currently have broadband; the corporation's bolder and more ambitious goal is to reach all 23 million in that amount of time.

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CHAIR KITO asked if Microsoft Corporation has considered "utilization of immigration to help solve some of that dearth of computer science employees."

MR. HARKINS answered yes. He said Microsoft Corporation and other technology companies have used the H-1B visa program that allows them to bring in workers highly skilled in computer science from other countries. For example, Microsoft Corporation's CEO, Satya Nadella, is from India. He noted that the H-1B visa program is criticized by some. He said Microsoft had proposed a program that would have allowed technological companies to continue bringing in H-1B visa holders to fill the current need in the U.S. while also requiring those companies to donate money, perhaps $15,000 for each individual brought in under the H-1B visa, to help expand access to computer science education for children in the U.S. He said that is still a project that Microsoft Corporation would support, because if more were done to increase the number of U.S. citizens who become proficient in computer science, then less people from outside the U.S. would be needed to fill the gap, which he opined would be a good thing for communities.

12:55:45 PM

REPRESENTATIVE JOHNSTON asked how many other computer science programs there are besides Code.org and Imagine Academy. She said she knows Google Inc. is one of the investors in Code.org, and she asked if Microsoft Corporation is also one of the investors.

MR. HARKINS answered that Microsoft Corporation is a supporter of Code.org, as are a number of other companies and institutions. The corporation's philanthropy arm has education policy employees who work closely with Code.org on projects such as helping states create K-12 computer science standards.

CHAIR KITO expressed appreciation for Mr. Harkins presentation. He said he is especially interested in the opportunities for Alaska regarding the white space initiative. He expressed further interest in ensuring that computer science education is made relevant to the communities in which the students live.

12:57:45 PM

REPRESENTATIVE DRUMMOND stated that she found the presentation valuable in terms of pointing "us" in the right direction. She asked if Microsoft Corporation has worked with the federal

Department of Education on getting standards on the Every Student Succeeds Act (ESSA). She said Alaska's Department of Education is in the process of getting its ESSA plans approved and is "kind of far along in that process." She said she would like to provide Mr. Harkins a better map that illustrates how difficult it is to provide broadband to all of Alaska. She questioned what exists, in terms of TV white spaces, in Shishmaref, Alaska, for example. She said Alaska's accessibility issues make it probably the most difficult and expensive place in the world to deliver broadband.

MR. HARKINS admitted that during a Western Governors' Association Meeting, Governor Bill Walker of Alaska pointed out to him that Alaska was not even on the map; therefore, he suggested that "a movement in the right direction" had been made [since Alaska is shown on the map on slide 57].

REPRESENTATIVE DRUMMOND agreed, but she observed that on the map Alaska and Hawai'i had been relegated to the lower left corner.

MR. HARKINS, to Representative Drummond's mention of ESSA, said he knows people from Microsoft Corporation's education policy team were engaged with ESSA and in trying to ensure funds under that law would be available for STEM and computer science education. He told Representative Drummond that that team would welcome conversation regarding the details of ESSA and computer science standards related to the law.

1:01:22 PM

ADJOURNMENT

There being no further business before the committees, the joint meeting of the House Labor and Commerce Standing Committee and House Education Standing Committee was adjourned at 1:01 p.m.