Learning From the Swiss About Apprenticeship

Suzi LeVine, *Former United States Ambassador to Switzerland and Liechtenstein*
Eric LeVine, *CEO of CellarTracker*

12s in Bern!

Close Comparison

7.3 million	**Residents**	8.2 million
$423 billion	**GDP**	$664 billion
684K - Seattle	**Top City Size**	381K /1.1M - Zurich
Direct + Representative	**Political Structure**	Direct + Representative
75% Hydro - Rivers	**Energy Mix**	56% Hydro - Lakes
ICT, Global Health/Life Science, Aerospace, Defense, Clean Tech, …	**Key Industries**	Manufacturing, Financial Services, ICT, Pharma/ BioTech, Food Sciences

Overview of the Swiss Dual-Education System

MILACRON
EXTRUSION

Keys to Success for the Swiss

Sergio Ermotti
UBS CEO
$2.6 Trillion under management

Banking apprentice

Guy Parmelin
Federal Councilor & Defense Minister

Farming apprentice

Markus Bucher
Pilatus Aircraft CEO

Mechanic apprentice

Ursula Renold
Former Education Secretary & Apprenticeship Researcher

Commercial apprentice

Business Leads & Business Benefits

Businesses Do:

- Collaborate to reach critical mass & grow the pie & the ecosystem
- Pay their fair share: Business 60%, State 30%, Federal 10%
- Participate in associations that nimbly define skills & curriculum

Businesses Get:

- ROI of 7-10%
- Loyalty and pre-evaluation of staff AND employer
- Great skilled workers & life entrepreneurs

Bringing This Model to the United States

Swiss-US Agreements

Swiss-Style Apprenticeship

Colorado's Apprenticeship Progress Timeline	
June, 2015	Key business leader and school district attend CEMETS summer institute with Dr. Ursula Renold in Zurich
Nov, 2015	1st Business Experiential Learning (BEL) Commission meeting held – chaired by the business leader who attended CEMETS
Dec, 2015	Gov. Hickenlooper commits to delegation
Jan, 2016	CO Delegation visits Switzerland
May, 2016	CO State legislation passed to evaluate barriers to employing youth
Sept, 2016	CareerWise Colorado launches as a nonprofit with funding from Bloomberg, JP Morgan Chase Foundation, and Daniels Fund
Feb, 2017	LinkedIn Youth Apprenticeship Marketplace opens for students with over 175 apprenticeship positions at 50 companies
2027	Goal = 20,000 apprenticeships which is 10% of high school juniors and seniors in Colorado.

Imagine the Swiss Model Here…

$4.2 Billion

The amount invested by companies in apprenticeship if WA companies spent 1% of GDP on apprenticeship

$668 Million

The amount the State might save annually if 2/3 of 10th/11th/12th graders did apprenticeship

These numbers are calculated based on the state data on Washington State GDP, student enrollment, and estimated cost per student

And More Importantly, Imagine:

- 100% of Washingtonians being Lifelong Career Ready
- Washington State Becoming the #1 Investment Destination Because of the Quality & Quantity of the Labor Force
- Lower Talent Import Costs Because We So Effectively Grow Local Talent
- Improved Quality of Life, Life-Span, and Overall Satisfaction
- Full Employment
- Declines in Crime Because People Are Skilled & Employed

Proposed Next Steps:
Seeing is Believing

- March 6-7, 2017 – Seattle Delegation visit to Colorado
- October, 2017 - Governor-Inslee Led Delegation to Switzerland

Discussion & Questions?

The Path to Success Has Many Beginnings: *Insights into Swiss Apprenticeship*

A Synthesis by Suzi LeVine , U.S. Ambassador to Switzerland and Liechtenstein, Ret.

Key Swiss Metrics

3.3% /2.9% Regular/Youth Unemployment
Source: The State Secretariat for Economic Affairs

Apprentices cost the Cantons 38% less than a High Schooler
Source: Swiss Federal Government Statistic

Swiss companies spend almost 1% of GDP/year on apprenticeship
Source: Professor Stefan Wolter

70% of students choose apprenticeship

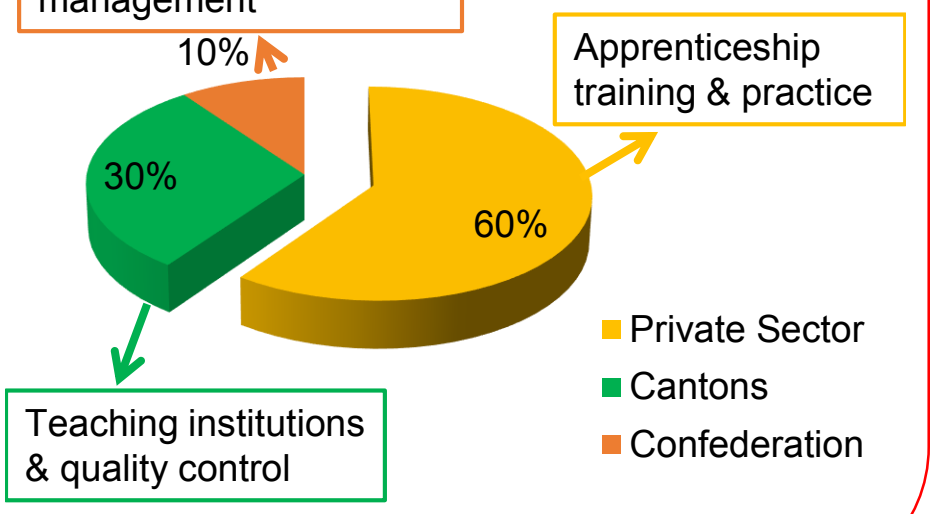
The Characteristics Within the Swiss System That Make it Work

- **Ecosystem** – A critical mass of companies participate and create either a geographic or industry ecosystem
- **Permeability** – Apprenticeship is a path, not an end – so apprentices can still get undergraduate and advanced degrees
- **Cost benefit** – Even at a cost of $50K-$150K over 3-4 years, the businesses get a full return on their investment
- **Prestige** – Especially since many CEOs started as apprentices, people of all socio-economic strata see it as a viable path
- **Position Diversity** – There are 250 registered apprenticeship types ranging from hairdresser to IT professional
- **Certification** – Apprentices know that their certification will be recognized and respected by other employers
- **Loyalty** – Among companies with whom I've spoken, there is a 50-80% retention rate among apprentices

A View on Apprenticeship Costs

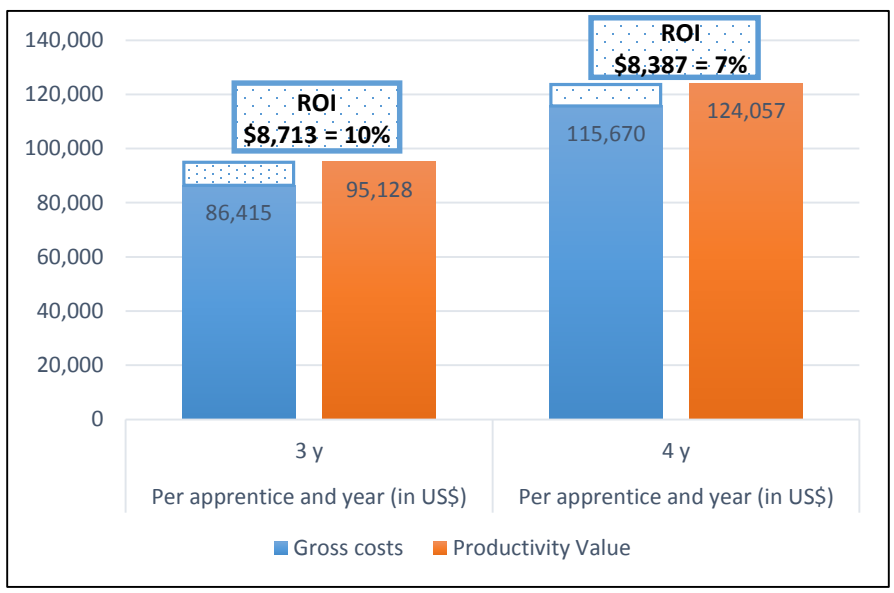
Funding breakout

<u>Cantons save money: costs/year/person</u>
High Schooler = CHF 24K; Apprentice = CHF 15K



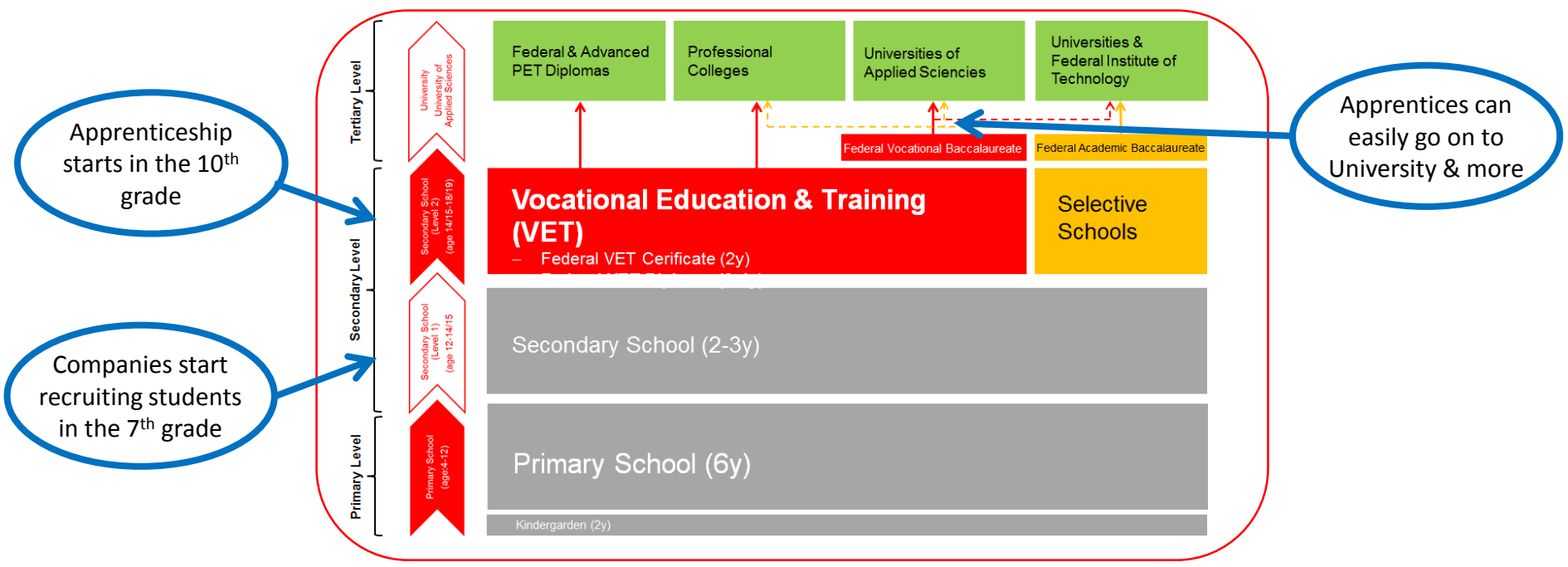
Source: SERI (Secretariat for Education Research and Innovation) & Roche

Average cost and benefit per apprentice for training firms in Switzerland (2009)



Source: Strupler & Wolter, 2012

The Swiss School Progression



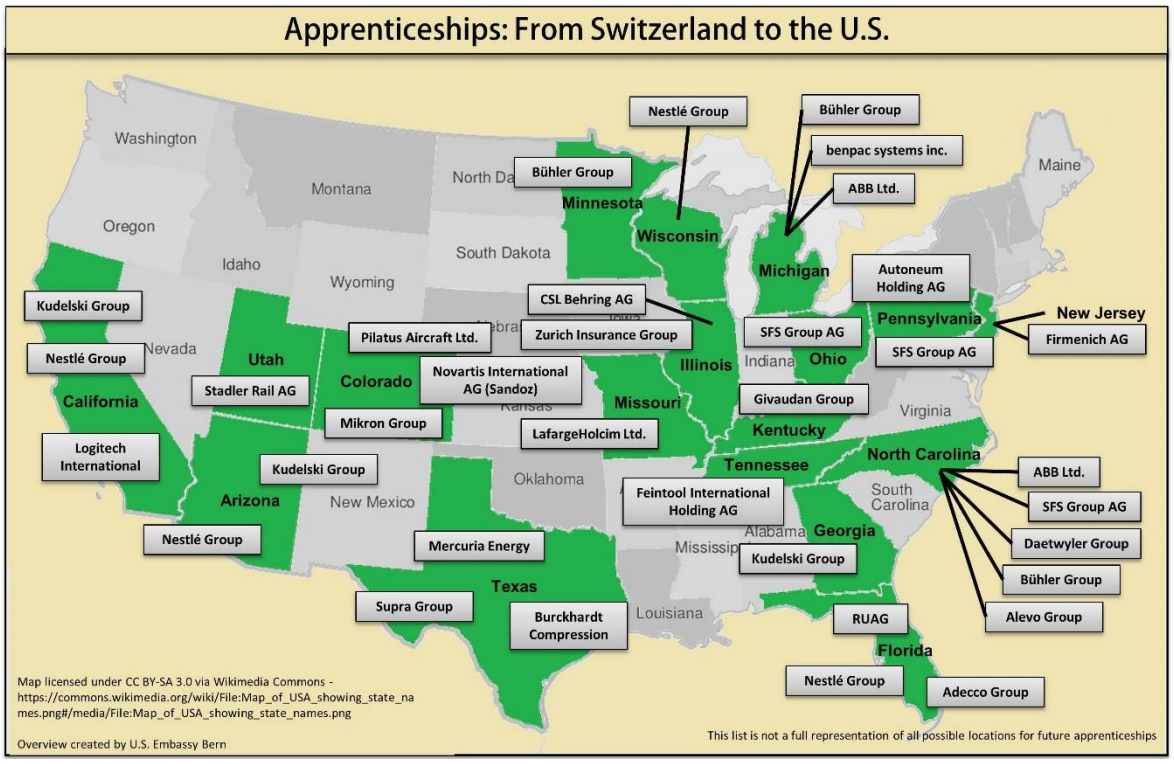
Graph credits: SFS Group

U.S.- Swiss Collaboration and Corporate Commitments as of January 2017

Companies, Locations and Types of Apprenticeships Rolling Out

Aviation

Machining



IT & Software

Insurance

Note: Companies such as Nestlé and LafargeHolcim have locations all across the U.S.

Welding

Chemistry

Logistics/ Transportation

ABB Ltd.	Logitech International
Adecco Group AG	Mercuria Energy
Alevo Group	Mikron Group
Autoneum Holding AG	Nestlé Group
Benpac systems inc.	Novartis International (Sandoz)
Bühler Group	Pilatus Aircraft Ltd.
Burkhardt Compression	PwC
CSL Behring AG	RUAG
Daetwyler Group	SFS Group AG
Feintool International Holding AG	Schindler Holding
Firmenich AG	Stadler Rail AG
Franke Group, Franke Management AG	Supra Group
Givaudan Group	Wicor Group (Weidmann Int'l Corporation)
Kudelski Group	Zurich Insurance Group
LafargeHolcim Ltd.	And many others…

Thoughts on Making This Work in the U.S.

- **Build ecosystems** – Engage international companies to mentor domestic companies to create ecosystems
- **Establish permeability** – Ensure that degrees and certifications are recognized sector-wide, and establish a path not an end
- **Triangulate** – Enlist companies, states, and the federal government in this , because all are required to make it work
- **Rebuild prestige** – Emphasize that modern apprenticeships expose people to the 21st century skills that all workers need
- **Focus on ALL students** – Position apprenticeship for all students, not just disadvantaged or distressed students
- **Diversify the registered apprenticeships** – Incorporate and create registered apprenticeships in a wide range of fields

This document last updated January, 2017

Career Connected Learning in Washington State: Learnings and Recommendations

Executive Summary

There are great jobs in Washington but too many of our youth are unaware, uninspired and unprepared to compete for them. Most of these great jobs require a postsecondary credential and/or advanced training beyond high school. But the education and training pathways to those great jobs are not transparent to students and families, well-aligned to employer needs, nor easy to navigate. As our state's youth lose out on these pathways to economic opportunity, businesses spend time, money and resources to recruit talent from elsewhere, and ultimately our community prosperity and vitality suffers.

Washington urgently needs a systemic approach for developing, promoting and implementing education, apprenticeship and training pathways aligned to the great jobs the state's employers are creating.

This document provides historical and situational context about career-connected learning in Washington's education system so that we can better understand the landscape and build from the strengths and opportunities that currently exist. It highlights a few programs in state and out of state that can serve as sources of information and case studies. In particular, it summarizes the key learnings from Microsoft's recent visit to Switzerland where the team spent a day and a half learning about the highly successful Swiss youth apprenticeship model that included meetings with employers, educators, policy makers, parents and apprentices. And finally, it offers recommendations for immediate next steps including a visit to Colorado to learn how they are now adopting the Swiss youth apprenticeship model in their state, a public-private partnership to define targets, invest in high-impact models such as youth apprenticeships here in Washington and catalyze systemic changes throughout the education system.

Preparing People for Great Jobs, Across the State

We have the opportunity to build on current education and workforce systems to ensure that individuals can better prepare themselves for the great jobs in Washington State's evolving economy.

For more than a decade, Washington state and the country as a whole have been on a mission to modernize their education system to shift from one that was expected to prepare *some* young people for education beyond high school college to a system that was expected to prepare *all* young people for some form of post-secondary education or training. The opportunities for young people with high school diplomas or less continue to shrink while those for young people with two- or four- year degrees are increasing. The goal of these efforts has been to eliminate the systematic "tracking" of students into separate college or vocational education pathways. Such tracking would often along racial, gender, geographic and income-level lines, and could pre-determine future job opportunities and earning potential for those students. The vocational track was overproducing students for lower-wage, declining job market while the college track was under-producing students prepared for family-wage, growing job markets.

While this focus has led to more students *overall*, as well as more students from underserved and underrepresented backgrounds, graduating from high school prepared for post-secondary success, it has also led to some unintended consequences:

- Investments and updates in vocational, career-technical education (CTE) in our schools declined, resulting in many of the programs being reduced in size and scope and unable to keep up with current labor market demands. Educators may be less aware of how what they are teaching applies to the real-world job expectations and experiences of today. Young people are too often expected to make decisions about their future without sufficient exposure to careers or college experiences.

- As the economy changed and vocational education fell in disfavor, the dynamic between K-12 vocational offerings and actual and projected growth across sectors diminished. Currently career education's link to the market is broken and what is offered is poorly aligned with compelling, high growth sectors and careers.

- Young people that aren't interested in or ready for college can become discouraged in high school because they don't see a path forward for themselves. Some believe this perpetuates the decision by some of these students to drop out of high school. In Washington State the four-year high school completion rate for the class of 2015, the most recent year for which data are available, was 78.1 percent. But for students of color it was much lower, including 69.6 percent for Hispanic students, 68.8 percent for African American students, and 56.4 percent for Native American students.[1]

- The academic requirements for students to graduate from high school prepared for college, often limit their ability to participate in hands-on, work-based, life-skills learning opportunities which can be very valuable in preparing for the workforce. And if students have dropped out of high school, without these life skills, their ability to attain and progress on the job is limited.

- And now, our economy has many high-skilled jobs - that don't require a college degree but do require a post-secondary credential that are going unfilled.

Washington state is producing more middle-wage and high-wage jobs than it can fill. In fact, a recent report by Boston Consulting Group states that Washington will have 740,000 job openings over the next five years, a number that exceeds our historic growth rate and that will be triple the national average over that period. This job growth is happening across the state and across many different job sectors including healthcare, construction, carpentry, freight processing, utilities, accounting, sales, shipbuilding, computer science, IT services and many others. The faster growing "pathway" middle-wage and "career" high-wage jobs increasingly will require a post-secondary degree, certificate or other credential. About two-thirds of those in the pathway jobs will have such a credential and more than 90 percent of those in career jobs, the ones that provide the greatest compensation and upward mobility, will have one. But today, only 31 percent of Washington high school graduates earn such a credential by their 26th birthday[2].

Our system needs to enable all young people to fulfill their full potential and reach their goals – to obtain and keep the great jobs our local employers are producing. It needs to be more aligned to what the economy requires. And it needs to better help young people discover the right opportunities for them and the pathways that prepare them. While the economy and the job market constantly evolve, there are a few things most employers agree on:

[1] http://www.k12.wa.us/dataadmin/pubdocs/GradDropout/14-15/2014-15GraduationDropoutStatisticsAnnualReport.pdf

[2] http://www.waroundtable.com/wa-kids-wa-jobs/

1. The uniquely human skills of problem solving, lifelong learning, empathy, communication, collaboration, critical thinking and reasoning are critical for hiring and job success.

2. Digital fluency is a basic requirement for almost any job.

3. Post-secondary credentials or degrees are increasingly required for family-wage jobs.

4. Backgrounds and skills in STEM and healthcare fields are in very high demand across Washington state, and will continue to be well into the future.

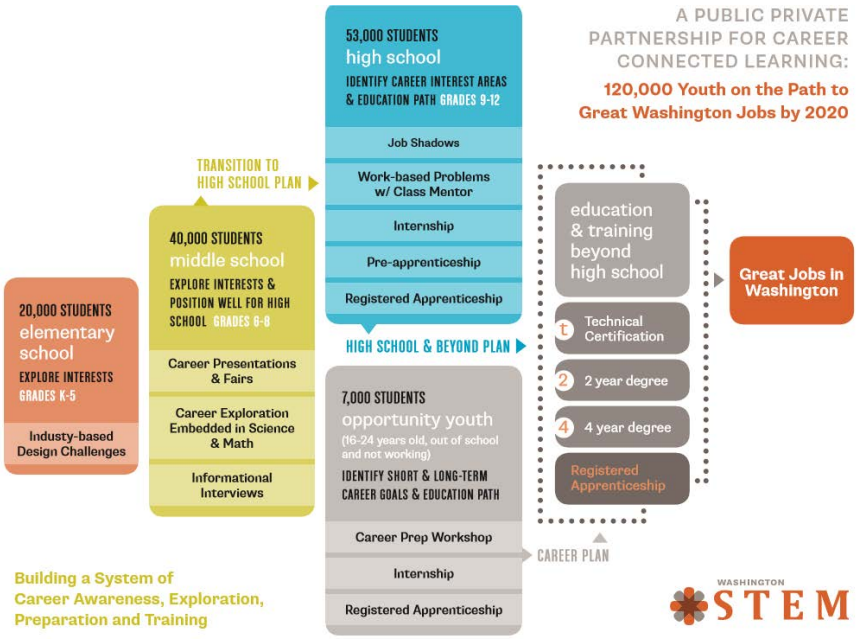
5. There are multiple pathways to great jobs – and many of them are underutilized, such as apprenticeships.

We can build on the strengths and minimize the weaknesses associated with both the education and workforce system – to build a career- connected learning system that prepares people for great jobs.

Components of Career-Connected Learning – program rich, but systems poor

Washington STEM has made career-connected learning one of their top priorities. They embarked on a learning tour to understand what was happening across the state. They found programs happening in every region – at every level, for every sector. But they also found significant variation among these programs – emerging and established; low-cost and high- cost; rigorous and not rigorous; well-established and newly formed; grassroots driven and centrally administered; aligned to labor needs and not aligned; in-school and out-of-school, etc. At the end of the process, the concluded that Washington state's career-connected learning opportunities is program rich, but systems poor.

By working with program and policy leaders throughout their 10 regional networks, Washington STEM has produced a set of definitions and a roadmap for a more seamless system for career awareness, exploration, preparation and training - everything from in-school career talks to registered apprenticeships to university degrees.



The opportunity now is to inventory existing programs and identify gaps in quality, accessibility, capacity and relevancy across the roadmap. And then to develop a coherent strategy for how the state can create a seamless system.

Washington's rich history of apprenticeships intersecting with today's economy

Today there are over 12,000 people in *registered* apprenticeships within 200 occupational tracks in our state. The majority of these registered programs are run or associated with trade unions. These are highly regulated by the state's Labor & Industries agency and all employer participants must become registered training agents with the state. Most participants are over 18 – with the average being 27 – and have a high school diploma or a GED. Upon completion of the required supplemental classroom instruction and the required structured on-the-job training, apprentices earn a nationally recognized certification.

The supplemental classroom instruction is mostly provided by labor-operated training councils while the on-the-job training occurs at union job sites. There are some employers that team with community colleges or technical colleges to deliver apprenticeship programs.

Registered apprenticeship programs are a deeply entrenched, highly coveted, and a significant source of pride to the trades – here in our state, but also nationally. It is a decades-old system that has prepared generations of talent and secured generations of union membership. It is in their best interest to maintain the current system.

In part because of the success of this model (and other successful models outside the US), there is growing interest in expanding the apprenticeship model to more students and in more employment sectors like advanced manufacturing, healthcare and information technology. The benefits make it very attractive for young people – especially those that simply aren't interested in or don't feel ready for attending college:

1. Students are put into a work setting with adults and often receive direct coaching, support and mentorship on job skills and life skills.

2. Many students are more successful in assimilated learning that is more hands-on and applied versus theoretical and academic.

3. Students are paid while they learn.

4. Upon completion, they have a credential that is recognized regionally or nationally and serves as a springboard to a family-wage job.

5. Lowering the age of entry into a family-wage job can provide many young people a strong, stable economic start.

The US Department of Labor has recognized Washington state as a prime place to further grow and test innovative pre/apprentice models. It has awarded the state five grants in King County over the past two years to push models into new sectors or to reach new audiences. The funding source for many of these grants are from the H1B Visa fees. The grants include:

Program Name	**Industry Partners**	**Training partner**	**Requirements**	**Sector**	**Reach**	**Funding**
Apprenti IT Apprenticeships	WTIA, MSFT	Apprenti, Microsoft	GED, HS diploma	IT	600 over 4 years	$3.5M
TechHire	n/a	LaunchCode, Ada Developer Academy and others	Various – some open to all ages	IT, coding	2,000	$3.8M
MechaWA Partnership Project	Boeing, AJAC	Everett Community College	GED, HS diploma	Aerospace Manufacturing		$3.8M
Partnership for Advanced Technology Apprenticeships in Manufacturing and Marine Engineering	Vigor Shipyard	South Seattle College	GED, HS diploma	Advanced Manufacturing and Maritime	1,000	$4.8M
Manufacturing Academy - PreApprenticeship	AJAC	Bates College/Tacoma Public Schools (will expend to 5 more regions)	High School students	Aerospace Manufacturing	75	n/a

There will be work to do – in collaboration workforce development councils and industry – to define the name, certification, standards, processes and criteria – for models that are similar in approach to existing pre/apprenticeship models.

Learning from Others: The Swiss Vocational Education and Training (VET) Program [3]

In the United States most apprenticeship programs require students to be 18 years old and with a high school diploma or GED and are designed to provide some form of post-secondary credential to students who most likely won't pursue a college or university education. In Switzerland, the apprenticeship program starts in high school and prepares students for both a credential and further studies at a college or university.

In Switzerland, 70 percent of young people choose to pursue their education through the Vocational Education and Training (VET) apprenticeship pathway, with the remaining 30 percent choosing a more traditional university pathway. The VET program offers 230 occupational apprenticeship pathways that include further education leading to a credential but often also leading the students to college or university

[3] Gold Standard: The Swiss Vocational Education and Training System, March 2015; Center on International Benchmarking

degrees. The country's education, training and labor system is built to support this national model – each pathway's accessibility and capacity, funding and resource investment, social acceptance and prestige are widely recognized and understood by students and employers alike. The VET system within the Swiss Education System is collectively governed by the Confederation (federal government), the Cantons (the regional governments) and Professional Organizations (business and labor) as set forth in federal legislation.

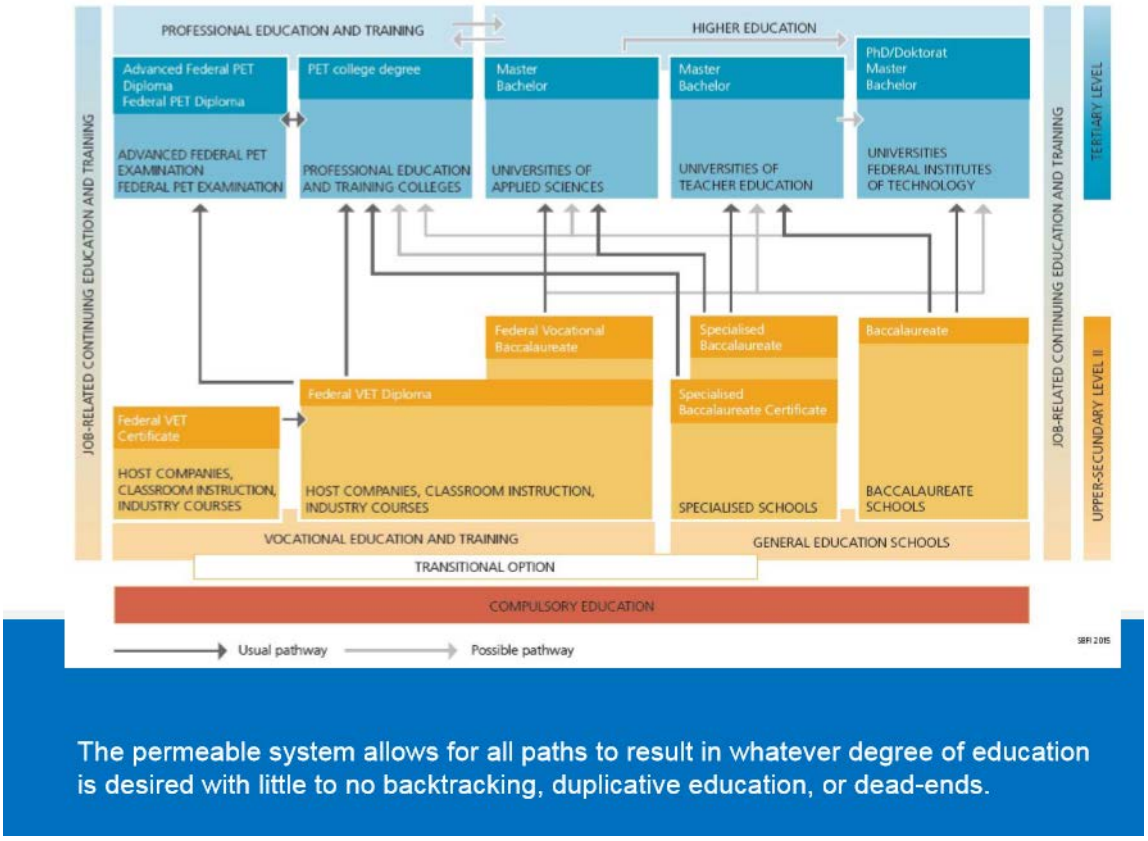
Based on testing, aptitude and interest, students make their initial choice to pursue the VET pathway during 7th grade and then, between the ages of 13 and 16 they choose their desired occupation and search for their apprenticeship.

Most Swiss employers actively participate in this process, hosting career exploration visits that reach nearly every 8th grader in Switzerland and offering three to four year, paid apprenticeships. Some 58,000 Swiss companies provide opportunities to more than 190,000 VET students – impressive figures in a country of 8 million.

While in the apprenticeship path, students' education takes place in three places, in three ways: in traditional classrooms learning core academic subjects (schools); in regional hubs learning sector-specific content and skills (professional skills-centers); and in on-the-job settings learning company-specific content and skills (job-site).

The public sector is responsible for approximately 40 percent of the cost of the VET program – the development and delivery of the school-based curricula and training. The private sector is responsible of approximately 60 percent of the cost – the development and delivery of the industry specific skills-center-based curricula and training, the job-site learning and the apprenticeships' wages.

This diagram illustrates the various pathways Swiss students follow:



The permeable system allows for all paths to result in whatever degree of education is desired with little to no backtracking, duplicative education, or dead-ends.

There are clear strengths of the Swiss VET model, including:

1. It is employer- and labor-market-driven, system-wide: Professional organizations representing 230 occupational categories determine quantity, focus, standards and certifications for all apprenticeships. The process is dynamic and continually adapted to meet changing needs of the economy and workforce– each year the number of apprenticeships offered within each occupational category is established based on the projected needs of the job market. These professional organizations and employers create the career-connected learning opportunities offered to all middle school students to help them discover the paths that most interest them.

2. There is a long-standing, effective partnership between the federal government (confederation), local government (cantons) and professional organizations that oversees the quality and outcomes of the system and adjusts it to best meet the needs of students and employers. The responsibilities and costs for both the public sector and the private sector are well known and expected.

3. Each apprenticeship delivers a well-balanced mix between academic and professional skills by trained professionals.

4. Perhaps the hallmark of the Swiss model is the "permeability", accessibility and quality of their entire education system. The choice of a given path is not a permanent decision. Instead, people move between apprenticeship programs and formal education with little friction and little risk. *Professional & technical schools and universities are free in Switzerland for anyone admitted under the age of 48.* Many young people who don't feel ready for college as teenagers pursue the VET pathway before they ultimately pursue college, university or advanced degree programs.

5. The is a high degree of prestige in the VET model – people of all socio-economic backgrounds see it as a viable model to reach their full employment potential. In fact, many c-suite leaders of Swiss companies initially pursued the VET pathway.

6. The shared cost of the model between the public and private sectors creates powerful incentives to ensure businesses see a full return on their investment. Companies cite the VET program as a cost-effective process for recruiting, training and retaining talent. Retention rates are higher for employees that join companies through the VET program.

7. Students are succeeding in the program. Over 95 percent of young people in Switzerland earn a high school diploma. Students that participate in the apprenticeship program earn a starting average wage of $600-700 per month, rising to about $1,100-1,200 per month in their third year.

While there are some elements of the Swiss system that will be nearly impossible to replicate – such as free higher education – there is much our state can learn from Switzerland to improve our career- connected learning system.

Colorado: How One State Is Adopting the SWISS VET Model (see appendix for full paper on Colorado's program)

Like Washington, Colorado is facing a skills gap and an education & workforce training system that isn't keeping pace with economic and workforce needs. A group of Colorado's business, education and policy leaders came together to study the Switzerland apprenticeship model as a potential solution and then proposed a strategy for building a similar model in their state. By September 2016, Gov. John Hickenlooper, the State of Colorado, Bloomberg Philanthropies, JPMorgan Chase & Co., the Markle Foundation and others committed $11 million to build a new statewide apprenticeship and career exploration system for high school

students. CareerWise[4] was formed as a non-profit organization to develop and implement a strategy and to serve as the intermediary between businesses, educators, and students. The organization will be responsible for recruiting employers to participate; helping employers to build the human resources functions necessary; developing sector-specific learning curricula, required competencies and training centers; training and developing the employees who will serve as on-the-job mentors; and interfacing with the schools, colleges and universities to build interconnected pathways. In the Fall of 2017, the program will start with 250 apprenticeships in three sectors. By 2026, the goal is to grow to over 20,000 apprenticeships in 500 high demand fields – which is 10% of Colorado's high school juniors and seniors.

The program is being designed but key elements include:

1. 9th and 10th graders will complete a career exploration curriculum.
2. 11th and 12th graders then may choose to pursue a paid, part-time apprenticeship that consist of 2-3 days of paid on the job training and 2-3 days of classroom learning each week.
3. Students may complete a post-high school training year to receive a certified journeyman status, while obtaining higher education credits
4. After program completion, students may continue to work in industry, pursue additional technical training, or continue on to a 4-year degree program

There is much our state can gain by visiting Colorado and learning about their program's strategy and plans.

Progress in Washington: Youth Apprenticeships through AJAC (Aerospace Joint Apprenticeship Committee)[5]

AJAC is a statewide, nonprofit organization, created by the State of Washington in 2008, to address challenges within the aerospace workforce such as increases in worker retirements, the rapid innovation of technology, and a growing production demand. AJAC's mission is build the next generation of highly skilled and trained aerospace and advanced manufacturing workers by providing exceptional and responsive apprenticeships, innovative training programs with cutting-edge curriculum and highly effective trades trainers. Most of their programs are geared towards people over eighteen and with a high school diploma or GED. In recent years, they have ventured into youth and pre apprenticeship pilot programs.

One such program is the Production Technician Youth Apprenticeship for high school juniors and seniors in Tacoma. It combines 2,000 hours paid on-the-job training at an AJAC employer and 150 hours of college-level classroom instruction. It leads to high school diploma, journey-level card and short-term college certificate for the aerospace and advanced manufacturing industries. Here's how the program works:

- Available to high school juniors and seniors in Tacoma Public Schools, minimum 2.0 GPA and completed, passed Algebra 1.
- Apprentices will work 10-20 hours per week during the school year and full-time during the summer. Pay varies by employer and number of hours worked.
- Each apprentice is paired with a mentor from the employing company and is evaluated on a quarterly basis.
- Apprentices attend class one night a week at Lincoln High School to learn advanced manufacturing theory. Additionally, the apprentices will earn 15 total college credits, tuition-free from Bates Technical College.
- AJAC covers the costs to run the program and school credits while the employer covers the wages.

[4] http://www.careerwisecolorado.org/
[5] http://www.ajactraining.org/

This program is very small in size and scope now with one high school and 15 apprentices, but it has the funding to scale into 4 more high schools and 60 more apprentices starting in the Fall 2017. This diagram illustrates the student pathway through the program:

AJAC is a leader in the state delivering aerospace apprenticeship programs. The IT sector can explore opportunities to create a similar industry-supported structure and program design. Perhaps there is an opportunity to develop one of the four new programs around an IT oriented youth apprenticeship.

Systematizing Washington's career exploration, mentorship, and apprenticeship opportunities for WA State students

While Washington is a leader in job creation, most of our young people are not currently on a path that will prepare them to compete for the great jobs being created across our state. Many students in Washington State either aren't aware, encouraged or interested in pursuing the needed post-secondary credentials, due to a lack of exposure, opportunity, and support. Employers, youth agencies and school districts are tackling the challenge but often in uncoordinated ways, leading to limited reach and unsustainable impacts. The challenges are particularly acute when it comes to STEM and healthcare, which fuels many of the fastest-growing and best-paying jobs in the state.

In collaboration with the Governor's office, Washington STEM has prepared recommendations for ensuring that every Washington student graduates from high school with a career goal and prepared for success by providing education and training pathways that are informed and supported by frequent, high-quality career-connected learning experiences. Milestones in such a system would include:

Elementary School students: By fifth grade, students will have engaged in three industry-based design challenges that support career awareness and learning consistent with standards in relevant content areas.

Middle School Students: By eighth grade, students will have engaged in one industry-based mentorship or job shadow experience that supports career exploration and learning consistent with standards in relevant content areas.

High School Students: At the end of twelfth grade, students will graduate with one industry-based internship or pre-apprenticeships/apprenticeship experience that supports career preparation consistent with standards in relevant content areas.

Out of School Youth: Every re-engaged youth will have one 90-hour industry-based internship or job experience that supports a desired career pathway or pre-apprenticeship/apprenticeship.

With leadership from the private and public sector over the next year, Washington state can take steps to develop a long-term plan that better connects Washington's young people with the jobs of tomorrow.

Opportunities for Washington State:

Washington state is well-positioned to become a national leader in career-connected learning that prepares its young people for the great jobs of tomorrow. Recognizing Washington State has an extensive registered apprenticeship network and an emerging youth/pre-apprenticeship network, the State isn't immune to the challenges creating opportunity for all its youth. Only one in three students today is on their way to a middle- or high-wage job that require a post-secondary degree or credential.

We should challenge ourselves to not leave two-thirds of our youth behind. We should build on the momentum and the many efforts currently underway by taking a more systemic and scalable approach to these programs. This will require formalizing the state's leadership; building a coalition among educators, employers and organized labor; investing in deep, immersive learning of best practices from around the state, across the country and around the world; and establishing a set of governance, policy and financial requirements. There are steps we can begin now to get started:

Build and fund a strong public-private partnership to define targets and study the most effective youth apprenticeship systems across the globe. By September 2017, the partnership will propose recommendations for building a high impact and sustainable career-connected learning system that prepares students from across Washington State for middle- and high-wage jobs.

1. **Establish a youth apprenticeship core planning team** that will participate in organized learning tours to Colorado's CareerWise, New York's P-Tech and the Swiss VET Summit (all completed by July 2017). The group will include leaders from business, education, philanthropy, labor unions, government and subject matter experts. (Lead TBD)
2. **Support Governor Inslee's initiative for Career-Connected Learning**, including a possible 2017 Legislative funding proposal to engage in-and-out-of-school youth in career-connected learning opportunities, including youth pre/apprenticeships, across the K12 and youth development sectors. Efforts will initially focus on low income, rural youth and youth from populations underrepresented in high-demand fields such as IT, healthcare, aerospace, manufacturing, construction and maritime. Specific and measurable targets will be defined and tracked, such as increasing the number of youth apprenticeship completers, internships and job shadows. State and private matching funds will be invested to seed or scale up high-impact models that support

youth to explore and prepare for high-demand jobs. The robust industry-education partnerships and enabling policies that must be created to support effective implementation will drive systemic change, with the goal of creating more transparent, aligned and permeable pathways to great jobs for Washington students. (Washington STEM lead)

3. **Learn from current youth apprenticeship programs *in state*** and understand applicability to IT and other sector programs: In the last two years, the US Department of Labor has awarded Washington state's King County five grants to pilot/grow apprenticeship programs (see above). Two of these programs are focused on IT, but targeted at people over the age of 18, often with significant job experience and/or college degrees. The other three programs are focused on manufacturing but are targeting youth in high school and community college. As these programs are being built, programed and assessed, we can learn important lessons that can help us develop better plans for future pre/apprenticeships in other sectors. (MSFT, WTIA leads)

Here's who is interested in working in partnership with us in this effort:

Employers	Boeing, JPMorgan Chase, Swedish-Providence
Associations	WTIA, TechAlliance
Nonprofits	WA STEM, WSOS, AJAC
Existing Collaborations	Seattle Regional Partnership – Middle Wage Jobs (Chamber, Seattle Foundation) Challenge Seattle Reconnecting Youth (UWKC, Starbucks, Seattle Foundation)
Governments	Governor Inslee's Office, King County, City of Seattle
Advocacy	League of Education Voters

Conclusion

Washington has the opportunity to provide thousands of young people access to middle- and high-wage jobs and career mobility. But, it needs a systemic approach for developing, promoting and implementing education and training pathways that meet labor market demands and meet student needs. Many organizations such as the Washington Roundtable, Challenge Seattle, the Seattle Regional Partnership, Washington STEM are eager to work with individual businesses and government leaders to advance the effort. To get started we need leadership in the state to explore apprenticeship models to provide greater choice and opportunity for students in fulfilling their future career goals, while at the same time addressing the critical skills gap in business and industry. In 2017, we can get started by learning from successful systems such as Switzerland's VET program and emerging programs like Colorado's CareerWise, by advocating for funding in the upcoming legislative session and by building the public-private partnership. This memo serves as a starting point.

Appendix and Key Readings

1. A great overview of the Swiss VET system is called "Gold Standard: The Swiss Vocational Education and Training System", March 2015; Center on International Benchmarking
2. A recent analysis of Colorado's readiness and progress for a youth apprenticeship program by the VET team: "From Bright Spots to a System: Measuring education-employment linkage in Colorado career and technical education", November 2016, KOF Swiss Economic Institute, ETH Zurich (PAPER IS COMING BY 11/18)

The Seattle Times

seattletimes.com/localnews | FEBRUARY 15, 2017 B

NW WEDNESDAY

OLYMPIA>SENATE DEMS OFFER MCCLEARY SCHOOLS-FUNDING PLAN>B2

Seattle 'Dreamer,' detained by ICE, sues for release

MEXICAN IMMIGRANT HAS U.S. WORK PERMIT

Feds say he's gang member, risk to public safety

By MIKE CARTER
Seattle Times staff reporter

Immigrants and civil-rights attorneys have filed a petition in federal court in Seattle seeking the release of a 23-year-old Mexican immigrant brought illegally into the United States as a child but given a work permit under the Obama administration.

The petition challenges the immigration detention and seeks the release of Daniel Ramirez Medina, who his attorneys say was detained by Immigration and Customs Enforcement (ICE) agents Friday. The agents were conducting an action at his father's house and Medina was detained, according to the news service Reuters and a news release by the attorneys in his case.

ICE countered in an email Tuesday night that Medina — whom they identify as "Mr. Ramirez" — was a "self-admitted gang member" encountered during the arrest of a felon who had previously been deported.

He is in custody at the Northwest Detention Center in Tacoma "to await the outcome of removal proceedings," said ICE Northwest spokeswoman Rose Richeson.

"ICE officers took Mr. Ramirez into custody based on his admitted gang affiliation and risk to public safety," Richeson said.

ICE did not respond when asked whether Medina has a criminal history. His attorneys said the Department of Homeland Security, which oversees ICE, considered him to be "lawfully present and is legally authorized to work in the

See > LAWSUIT, B3

FEELING THE LOVE

ALAN BERNER / THE SEATTLE TIMES

Mount Vernon Officer Mike "Mick" McClaughry acknowledges the hundreds who gathered and cheered Tuesday in front of the police department to welcome him home after two months of rehabilitation at Harborview Medical Center in Seattle.

MOUNT VERNON

After brush with death, officer thanks supporters he can't see

By ERIK LACITIS
Seattle Times staff reporter

MOUNT VERNON — He couldn't see them, but he could feel them, the crowd of several hundred — maybe 500 — who greeted police Officer Mike McClaughry Tuesday afternoon as he arrived at the police station after 61 days at Harborview Medical Center.

Well-wishers held up American flags, cheered and spontaneously began chanting "Welcome home! Welcome home!"

Walking with a long, white cane and needing some help, "Mick," 61, as his fellow cops and friends know him, waved back.

"Thank you all for being here," said McClaughry, who had staged a remarkable recovery after being near brain death when he was shot in the head in December. "I wish I could see all of you."

But all the officer can see, he said earlier when released from the Seattle hospital, "is variances in brightness. I can see some color, not much."

ALAN BERNER / THE SEATTLE TIMES

Mike "Mick" McClaughry gets ready to leave Harborview Medical Center on Tuesday, he and his wife's 39th wedding anniversary.

His story has been a staple of the news and social media since the evening of Dec. 15, when he was shot in the head while responding to reports of a shooting outside a Mount Vernon home.

"He's the first officer that's been shot in our police department's history," said Lt. Greg Booth, one of the officers who greeted McClaughry. He said about the community response in this town of 32,000, "It's wonderful."

A GoFundMe page in the officer's name now is at $71,615.

A Facebook page for him has 7,578 followers, and his daughter, April McClaughry, posts regular updates: "Dad's feeding tube was removed." "Dad is talking." "Dad's outside the hospital with a friend."

> **"If we have faith, it provides that comfort that keeps us straight to get to the other side."**
>
> MIKE "MICK" MCCLAUGHRY
> *Mount Vernon police officer who was shot in the head*

Erica Mindt was one of the locals who came to greet the officer. She was there with two co-workers.

"It's just overwhelming gratitude for our police force, what with the recent violence, we've had multiple shootings," she said.

She said about her perceived increase in violent crimes, "I don't know why it's happening."

A 44-year-old man and two teens, ages 16 and 15, have each been charged with one count of first-degree attempted murder in McClaughry's shoot-

See > OFFICER, B4

Safety review requested for dams in King County

DAMAGE ASSESSMENT

California crisis causes official to ask for analysis of what could happen in case of failure

By SANDI DOUGHTON
Seattle Times science reporter

The unfolding crisis at California's Oroville Dam is prompting local officials to take a closer look at dams in King County.

King County Councilmember Reagan Dunn is calling for a detailed analysis of existing evacuation plans, as well as a review of the risks of dam failure caused by heavy storms and earthquakes.

"On virtually every major river system in King County, you've got a dam, most of them built in the 1960s," Dunn said. "There's a lot of people who live in those valleys ... all of which are potentially at risk."

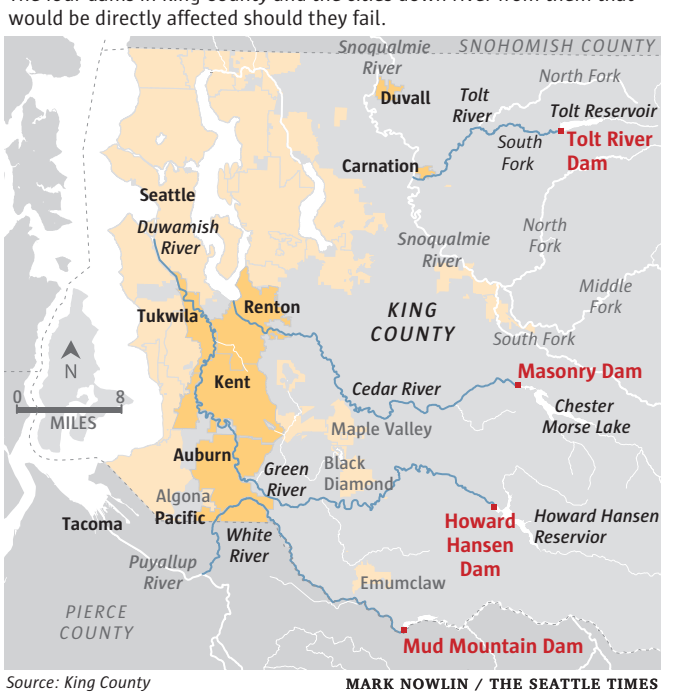
According to King County's Regional Hazard Mitigation Plan, there are 122 dams in the county that hold at least 10 acre-feet of water. The four with the potential to cause countywide emergencies if they fail are: Howard Hanson Dam on the Green River; Tolt River Dam, above Carnation; Masonry Dam on the Cedar River; and Mud Mountain Dam on the White River.

Other dams that could cause significant damage include Lake Youngs Outlet Dam, near Covington and Culmback Dam, which is on the Sultan River in Snohomish County, but sits upstream

See > DAM, B2

Finding safe ground if a dam breaks

The four dams in King County and the cities down river from them that would be directly affected should they fail.



Source: King County

MARK NOWLIN / THE SEATTLE TIMES

IF ONLY CITY HAD BUILT 1,000 TINY HOUSES

Danny Westneat
Seattle Times staff columnist

One year ago, Seattle was three months into its declared homelessness emergency, but it was already obvious the city wasn't going to treat it as an actual emergency.

So last February, this newspaper devoted part of its front page to a column, written by me, about a city-floated plan to dramatically ramp up the urgency to get people off the streets.

As explained by Sally Bagshaw, the chairwoman of the city's committee overseeing homelessness, the premise was: "What would we do in the event of a disaster like an earthquake? How would we house people who need help?"

The proposed answer: Spread 1,000 "tiny houses" — 96-square-foot insulated huts built by volunteers — across the city in camps located in all seven council districts. The premise was for Seattle neighborhoods to act as the European Union had in response to the Syrian refugee crisis.

In return, the city would begin enforcing the no-camping law and start cleaning up the garbage-strewn sites under bridges and in greenbelts. Move to a tiny house, or move along.

I don't have to tell you this if you live in Seattle, but none of this happened.

Instead of 1,000 tiny houses — a scale that could have made a serious dent in Seattle's street homelessness — we have added, since last February, just 28.

What's most vexing about the snail's pace is that these 28 units, on vacant land behind a gas station in Rainier Valley, have generated incredible bang for the buck.

In its first nine months, this

See > WESTNEAT, B9

Group aims to cover cost of test fees for students

By PAIGE CORNWELL
Seattle Times staff reporter

Thousands of low-income students in Washington who lost federal financial help to take college-level exams will get assistance this spring from a new fundraising initiative.

A group of Washington public agencies, businesses and education nonprofits is working to try to raise $800,000, enough to ensure that any high-school student in Advanced Placement (AP) or International Baccalaureate (IB) classes can afford the end-of-course exams they must pass to earn college credit. The fees for those exams range from $53 to $116 per exam.

For nearly two decades, a grant from the federal government has helped cover much of the exam costs. Last year, for example, students who qualified for the federal free- or reduced-lunch program paid just $15 per AP exam.

The federal grant ended in late 2016, when Congress passed the Every Student Succeeds Act. Because the new education law goes into effect in the 2017-18 school year, there's a one-year funding gap.

Though the state and the nonprofit College Board, which administers AP exams, still pay a portion of the fees, low-income students were facing a minimum of $53 per exam.

If the fundraising initiative succeeds, however, their price would go back down to $15.

Microsoft has pledged $100,000, and JPMorgan Chase and Nordstrom have each

See > FUNDING, B3

REACH THE EDITORS | Matt Kreamer, 206-464-2453 *mkreamer@seattletimes.com* | Doreen Marchionni, 206-464-3110 *dmarchionni@seattletimes.com* | News Tips *newstips@seattletimes.com*

< Lawsuit

FROM B1

United States," a status that would usually preclude a serious criminal history.

Medina's attorney, Mark Rosenbaum, said his client "unequivocally denies being in a gang" and said "he was repeatedly pressured" by ICE to "falsely admit affiliation." Richeson's statement, he said, "is inaccurate."

Lawyers allege that Medina is the first immigration action taken by the Trump administration against someone who has been allowed to stay in the country under the Obama administration's 2012 "Deferred Action for Childhood Arrivals" (DACA) program, which deferred deportation or other adverse immigration actions against individuals who entered the U.S. illegally as children.

The lawsuit alleges Medina has been in the United States since he was 7 years old.

Sen. Maria Cantwell said Tuesday that she is "looking into this troubling situation," and U.S. Rep. Pramila Jayapal, blaming the Trump administration's "deportation force," demanded Medina's immediate release.

"Trust in our government depends upon the executive branch keeping its word," said Rosenbaum, director of the Public Counsel Law Center in Los Angeles. He accused the federal government of a "bait and switch," by having people register for the DACA program and then trying to deport them.

The lawsuit prompted a quick response by the court. U.S. Magistrate Judge James Donohue in Seattle late Tuesday issued an order requiring the government to respond to the petition by Thursday and set a hearing for Friday.

The judge ordered the government to reveal whether Medina is still detained and why, "given that he has been granted deferred action under the Deferred Action for Childhood Arrivals program?"

The judge is demanding immigration officials say whether he has been placed in "removal proceedings" to deport him as the result of ICE's initial custody determination. If not, he asks the government to explain why he is still being held. Donohue also asks whether Medina has asked for or received a bond hearing.

The lawsuit alleges the government has violated Medina's due-process rights, according to a joint news release by the Public Counsel Law Center, the Barrera Legal Group and the firm of Gibson Gunn & Crutcher, a firm with offices in Los Angeles.

It seeks his immediate release and an order barring ICE from any further actions.

The detention comes on the heels of controversial ICE immigration raids following the election of President Trump and his promise to deport illegal and criminal immigrants.

DACA was created by Obama and provided a reprieve from deportation for those who qualify along with renewable work permits. The lawsuit alleges Medina twice had his permit renewed before his detention. It's estimated that as many as 750,000 young people — called Dreamers — have taken advantage of the program.

Mike Carter: mcarter@seattletimes.com or 206-464-3706

Armed teen shot by Arlington police, in critical condition

By LYNDA V. MAPES
Seattle Times staff reporter

A 17-year-old girl armed with a knife was shot by Arlington police Tuesday morning, authorities said.

She was airlifted to Harborview Medical Center, said Aaron Snell, who is a spokesman with the Everett Police Department and for the interagency team assembled to investigate the shooting.

She is in critical condition, said Susan Gregg, a spokeswoman for the hospital.

The incident began just before 5 a.m. in the gravel parking lot near the Triple Shot espresso stand in the 500 block of Olympic Avenue. Officers responded to a complaint of a disturbance between a male and female, who were shouting at each other, Snell said.

The two are boyfriend and girlfriend, Snell said.

Two officers responded to the call and separated the pair. The officers discovered the girl had a knife, and both fired on her, Snell said.

The officers have been placed on administrative leave, a standard procedure. It was not immediately known how many shots were fired or how many struck the girl.

One officer has 12 years of experience on the force; the other has two.

Other details had not yet emerged, but witnesses as well as the officers involved are being interviewed, Snell said.

The incident is the third officer-involved shooting in Snohomish County since the end of January.

On Jan. 30, a man was fatally shot by Lynnwood police as he darted out of traffic on Highway 99. Police said the man had advanced on officers while holding a knife and ignored repeated commands to drop the weapon.

On Feb. 9, a Lake Stevens man was shot to death by a police officer after he threatened to "kill cops," according to investigators. The man was also armed with a knife and was advancing on officers when he was killed, police said.

< Funding

FROM B1

pledged $25,000, Lt. Gov. Cyrus Habib said Tuesday.

The lieutenant governor's and state superintendent's offices, along with the nonprofit College Success Foundation hope to raise the rest by March 7, which is the deadline for students to register for AP exams.

Across the state, AP and IB coordinators have worried that some students wouldn't be able to take the tests this spring because they couldn't afford the fees.

Habib said he and other state leaders considered going to the Legislature for help but realized that wouldn't guarantee any money for this spring's test takers. So they worked with the College Success Foundation to figure out a way to help this year's test-takers.

"It was very important to me that we would be able to make a commitment quickly," Habib said. "If somebody is telling you that an exam is going to cost a lot of money, then you might not start studying in time. It's important that teachers and students have that knowledge and that predictability."

Some districts, like Highline, had already pledged to cover costs through grants. Seattle's Rainier Beach High School, which offers an IB program, had planned to pay, but IB fee costs would have totaled as much as $40,000, said IB coordinator Colin Pierce.

News of the fundraising effort is "a huge relief," Pierce said.

"There's a million ways our students are going to struggle, but this shouldn't be one of them," he said.

Rainier Beach senior Emily Au, 17, said she has friends at other schools who wanted to be in a full IB program but told her they didn't enroll because of the costs of exams.

She and classmate Justin Jones will take several exams this spring, in hopes of earning IB diplomas that are recognized at universities worldwide.

"I think it's really good for the students, because when prices are so high, it really deters students who are low-income," Jones said.

Paige Cornwell: 206-464-2530 or pcornwell@seattletimes.com

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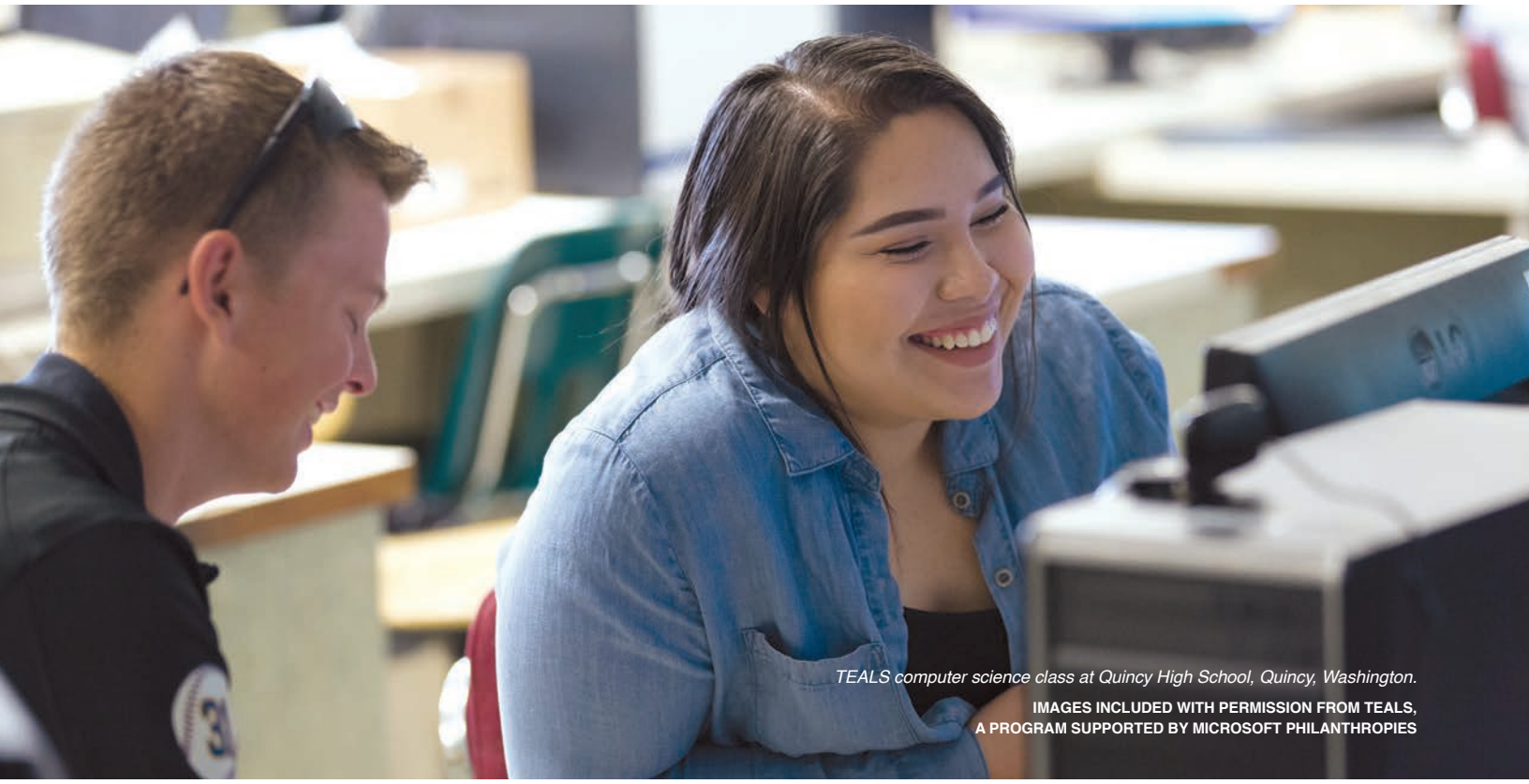
WASHINGTON STATE STEM EDUCATION INNOVATION ALLIANCE

2017 STEM Education Report Card



TEALS computer science class at Quincy High School, Quincy, Washington.

IMAGES INCLUDED WITH PERMISSION FROM TEALS, A PROGRAM SUPPORTED BY MICROSOFT PHILANTHROPIES

Additional information on STEM educational achievement and workforce needs in the state can be found in Washington's STEM Talent Supply and Demand Dashboard **(stem.wa.gov).**

WASHINGTON STUDENT ACHIEVEMENT COUNCIL
EDUCATION · OPPORTUNITY · RESULTS

Student in the mathematics lab at Pacific Lutheran University.

IMAGE COURTESY OF PACIFIC LUTHERAN UNIVERSITY/JOHN FROSCHAUER

THE STEM IMPERATIVE

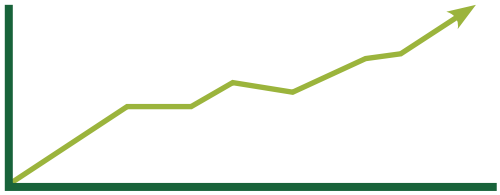
Washington has one of the most dynamic economies in the nation, propelled by explosive growth in our STEM -driven technology sector. Allowing the vital, innovative companies in this sector to grow and thrive will require continued investment in the state's Science, Technology, Engineering, and Math (STEM) education system to meet expanding and evolving workforce needs. At all levels, we need to foster creativity and collaboration among students as they develop flexible problem solving skills and technical proficiencies. **While moderate progress has been made in some areas in recent years, overall improvement in the STEM pipeline remains a statewide imperative.**

The **STEM Education Innovation Alliance,** created in 2013, represents a broad range of business, education, government, labor, and nonprofit organizations, with the role of advising the Governor and Legislature on strategic planning and the formation of effective partnerships in support of STEM education initiatives.

Overarching Goals:

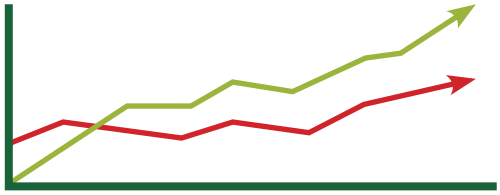
- Inspire youth through **career connected and real-world STEM** learning opportunities.
- Provide every K-12 student **access to computer science** education.
- Prepare Washington's future workforce by increasing attainment of technical credentials, 2 and 4-year degrees and contributing to **Washington's 70% attainment goal.**
- Improve equity by implementing interventions to **close educational opportunity gaps from cradle to career,** providing world-class preparation and support for STEM teachers and improving workforce diversity.
- Raise public awareness and **support for STEM.**

THE CHALLENGE



Our technology and innovation sector employers have a critical need for STEM-educated workers. Washington state ranks:

- **#1 nationally** in the concentration of STEM related jobs.
- **#3 in STEM job growth.**
- **#1 for Tech Innovation Capacity**.



But STEM training and degree production in Washington is not keeping pace with demand.

- **Washington ranks low** in the production of computer science, engineering and health degrees relative to job openings in those fields.
- **Ranks 47th in the nation** and **last** among the top fifteen high-tech-intensive states in the proportion of high school graduates who go directly to college.

Thus employers are forced to import STEM-educated workers trained in other states.

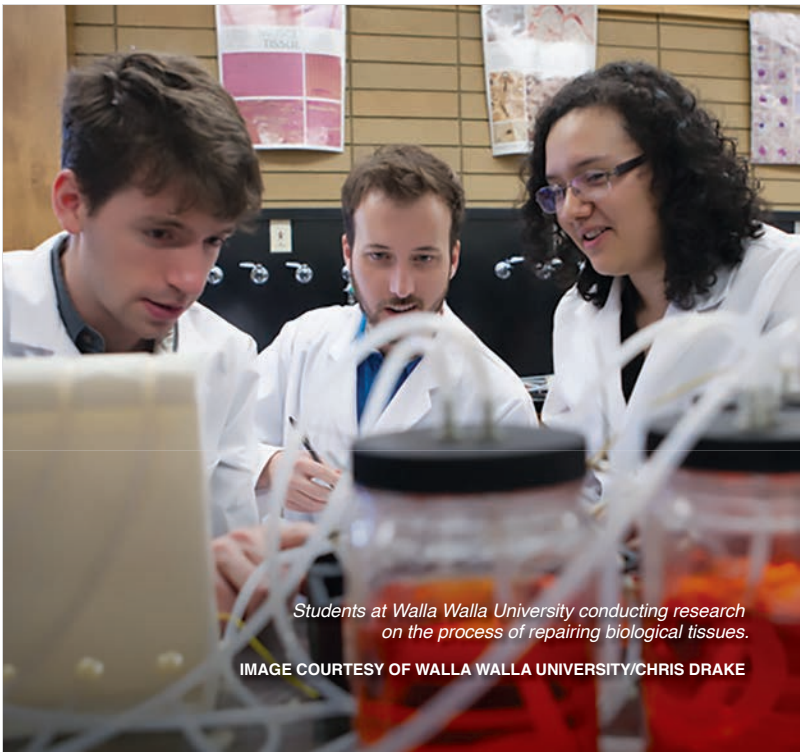
- Washington is the **2nd largest importer** of degrees among tech states, and
- **1st among all 50 states** as a proportion of population.

TEALS computer science class at Woodinville High School, Woodinville, Washington.

IMAGES INCLUDED WITH PERMISSION FROM TEALS, A PROGRAM SUPPORTEDBY MICROSOFT PHILANTHROPIES

Chemistry student at Olympic College.

IMAGE COURTESY OF OLYMPIC COLLEGE



Students at Walla Walla University conducting research on the process of repairing biological tissues.

IMAGE COURTESY OF WALLA WALLA UNIVERSITY/CHRIS DRAKE

KEY STEM PROGRESS INDICATORS

STEM awareness.

In 2015, approximately **50%** of Washington voters had heard of STEM, an increase from **32%** in 2013.

Interest in STEM studies among high school students.

In 2016, approximately **31%** of Washington SAT-takers indicated an intention to pursue a degree in a STEM major, an increase from **25%** in 2010.

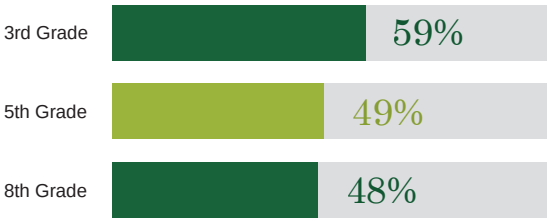
STEM achievement: Pre-school through K-12.

Kindergarten readiness in math

About **61%** of incoming kindergarteners demonstrated "kindergarten readiness" in math among students assessed by WaKIDS, 2015-16.

Smarter Balanced Assessment math scores, 2015-2016:

- At the 3rd grade level, more than one-half **(59%)** of students met the math standard.
- At the 5th grade level, **49%** met the standard.
- At the 8th grade level, **48%** met the standard.



Student readiness for College-Level studies in STEM subjects:

Advanced Placement (AP) Computer Science:

- The number of high schools offering AP Computer Science in Washington has grown substantially from 14 schools in 2011 to 93 schools in 2017.
- Simultaneously, the number of students taking the AP Computer Science exam has grown from 439 in 2011 to 1,945 students in 2016. Among those **66%** earned a score consistent with college credit in 2016.

Yet, despite this progress less than 10% of high schools currently offer AP computer science. Alignment of STEM education programs with workforce demand in key economic sectors.

We have made progress in raising the number of Washington higher education graduates earning degrees in STEM fields, but the percentage is still too low to meet workforce needs. More than one-fourth **(29%)** of undergraduate degrees awarded at Washington public baccalaureate institutions in 2015 were in STEM subjects, up from **21%** in 2010.

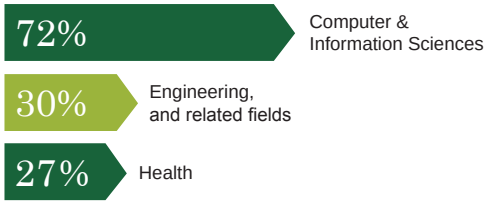
STEM degree completions have shown steady increases in recent years (2011–2015).

At the Associate Level:

- Degree completions in STEM fields increased by **20%**.

At the Baccalaureate Level:

- Degree completions in Computer and Information Sciences grew by **72%**, in Engineering and Related Fields by **30%**, and in Health by **27%**.



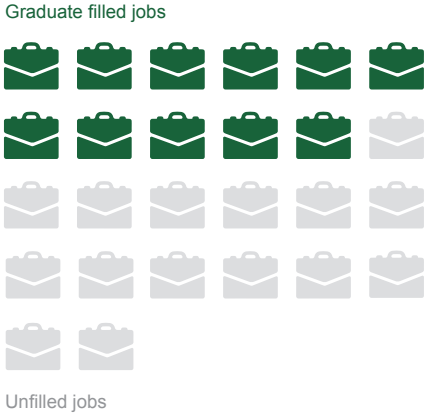
At the Graduate Level:

- Degree completions in Computer and Information Sciences grew by **140%**, in Health by **17%** and in Engineering and Architecture by **23%**.

However, many STEM programs remain highly selective and limited enrollment capacity remains a barrier in some fields, particularly in computer science.

And rapidly growing workforce demand is still outpacing STEM degree production.

- There is a widening gap between projected annual job openings for computer scientists and the number of graduates in Washington prepared to fill them.
- Projections for the years 2018–2023 estimate that:
  - Out of a total of about 6,500 annual job openings, there will be **3,800 more openings** in Computer Science than there are graduates completing degree programs and prepared to take them.



  - Out of a total of about 2,750 annual job openings, there will be **660 more openings** in Engineering than there are graduates completing degree programs.

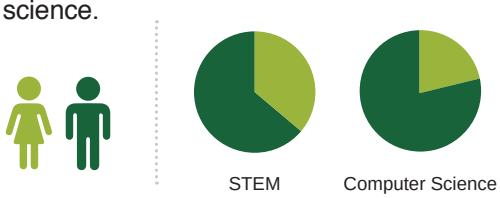
Underrepresented populations in STEM.

A gender imbalance in STEM achievement tends to widen as students move through the pipeline.

- Among pre-K students, girls tend to do as well as boys in math, with about **60%** demonstrating "kindergarten readiness" in the 2015-2016 WaKIDS assessment.

- As they move through the education pipeline, however, interest and achievement in STEM tends to fade for female students. In 2015, only **22%** of students completing AP Computer Science were female.

- Male students also complete STEM degrees in greater numbers than female students. In 2015, only **34%** of students completing associate degrees or bachelor's degrees in STEM were female and only **22%** completed degrees in computer science.



Students from low income families are disadvantaged at all stages in the STEM pipeline.

- Among low-income pre-K students, only **49%** demonstrated "kindergarten readiness" in math in 2015-16.

- In 2014, among students completing AP Computer Science courses only **14%** were from low-income families.

POLICY RECOMMENDATIONS

The STEM Education Innovation Alliance is committed to devising innovative policies that will enhance STEM education and career pathways, advance economic development, meet our state's urgent workforce demands, incentivize regional public and private partnerships, and provide opportunities for more Washingtonians to compete for jobs in this vital high-wage sector.

Increase support for underrepresented populations in STEM fields.

- Expand opportunities to study math, science, and technology, such as those offered by Technology Access Foundation (TAF) courses.
- Invest in MESA to make it available at every Community College.
- Expand support for the Washington State Opportunity Scholarship.
- Provide greater access to advanced coursework, including dual credit programs, necessary for success in STEM majors.

Ensure our education system is STEM ready by providing resources to schools and teachers to provide a rich STEM experience for students, including quality computer science instruction.

Early Learning and Elementary

- Provide toolkits that link preschool and K-12 mathematics, support intensive teacher learning, and identify effective parent/family engagement resources.
- Enhance teacher learning supports to encourage implementation of engineering practices and design challenges related to local industries.
- Create incentives to expand opportunities for students to develop computational thinking skills.

Middle and High School

- Make rigorous computer science instruction, such as AP Computer Science, available to students in every high school.
- Expand professional learning opportunities in computer science, including innovative programs like TEALS, Code.org, TechStart, and the Pacific Education Institute.
- Increase opportunities for middle school students to enroll in STEM courses and earn high school credit.
- Broaden professional learning opportunities in STEM for educators and school leaders.
- Increase availability of computer science and other STEM-related endorsements for pre-service and in-service teachers.

Postsecondary

- Fund additional enrollments in high quality programs in Computer Science and other high employer demand STEM disciplines.
- Maintain stable and predictable tuition and support state aid programs that address access and completion challenges for low-income students.
- Provide equitable opportunities for low-income students and improve completion rates by fully funding the State Need Grant program to support all eligible students.

Expand opportunities for career-connected learning.

- Provide stipends or student aid for pre-apprenticeship students entering innovative programs like Apprenti, the registered apprenticeship program developed by Washington Technology Industry Association.
- Expand apprenticeship opportunities into other high demand technology fields.
- Provide industry standard equipment and connectivity in all classrooms that use computer technology.
- Enhance career guidance and support through High School and Beyond planning, advisory courses, and work integrated learning opportunities.
- Increase funding for State Work Study and encourage colleges to create new mentor partnerships with K-12 schools.

These policy recommendations align with a new five-year statewide STEM plan, "Vision 2021: Investing in a Future Ready Washington" that can be found at **stem.wa.gov.**

Please Join Washington STEM

March 1, 2017 - 5:00 to 7:00 p.m.

Columbia Room, Legislative Building, State Capitol Campus Olympia

Join us for a great chance to network with others in the state. We invite you to come and learn about the state and local efforts to improve STEM education and the STEM career pipeline. We look forward to meeting you and introducing you to our local STEM Networks!

- Apple (Wenatchee)
- Capital Region
- Mid-Columbia (Tri-Cities)
- Skagit
- Snohomish
- South Central (Yakima)
- South King County (South Seattle)
- Southwest Washington (Vancouver)
- Spokane
- Tacoma
- West Sound (Bremerton)

Please RSVP to megan@washingtonstem.org

Light hors d'oeuvres and beverages will be served.

WASHINGTON STEM
REIMAGINING SCIENCE, TECHNOLOGY, ENGINEERING + MATH EDUCATION

STATE OF WASHINGTON
OFFICE OF THE GOVERNOR

WASHINGTON STUDENT ACHIEVEMENT COUNCIL
EDUCATION · OPPORTUNITY · RESULTS

STEM Education Innovation Alliance Meeting

November 29, 2016

Microsoft Conference Center
16070 NE 36th Way, Redmond, Washington 98052

Meeting Notes

Gene Sharratt welcomed the STEM Alliance members and led introductions. He also announced that *Jeff Charbonneau* and *Susan Enfield* will be participating in a Seattle Times LiveWire panel discussion at Town Hall on the evening of November 30, 2016, on *K-12 Visions and Outcomes: Solving the Education Problems Money Can't Fix.*

John Aultman presented an overview of recent progress in advancing apprenticeships in the state:

- Department of Labor grants – the state was awarded a $2.7 M grant to expand apprenticeships for youth, diversity and emerging fields.
- The Aerospace Joint Apprenticeship Committee has approved a set of standards for apprenticeships aimed at increasing the numbers of females and minorities in the aerospace and advanced manufacturing trades.
- The Apprenti program has been generating a lot of interest. *Michael Schutzler* noted a federal grant funded the original pilot, which is being ramped up nationwide.
    - The program collaborates with large employers such as Microsoft and AT&T.
    - It was designated as a national intermediary for apprenticeships across the country.

Eleni Papadakis gave an update on Washington's NGA Work-Based Learning Policy Academy project:

- Progress was made on several items addressing barriers to scale opportunities.
    - We now have a plan for tracking progress and performance assessment (kudos to *Daryl Monear* for development).
    - We are making progress in development of an online portal to connect students to industry and career connected learning experiences.

- We are in the process of taking a close look at 21 leading programs in the state as part of our Work-Based Learning Laboratories project, funded through the Governor's discretionary funds.
- The Governor's Summit on Work-Based Learning is scheduled for the end of May in Tacoma. We are reaching out to employers to participate and are partnering with WSU to provide virtual sites statewide and are looking for co-sponsors (*Jane BroomDavidson* noted that Microsoft is interested). *Nova Gattman* is lead on the event.

Jane Broom Davidson described her recent visit to Switzerland to learn about their apprenticeship model:

- The visit was coordinated by *Suzan LeVine*, US Ambassador to Switzerland and Liechtenstein. She also formerly worked for Microsoft as their Director of Strategic Partnerships for Student Developers and Director of Communications for Education. Jane visited with several others to observe and learn about Switzerland's innovative approach to supporting apprenticeships.
- Jane shared a paper she authored on career-connected learning, which presents an overview of Switzerland's system as well as Colorado's approach that was based on the Swiss model. In Switzerland, 70 percent of young people choose to pursue their education through the Vocational Education and Training (VET) apprenticeship pathway, with the remaining 30 percent choosing a more traditional university pathway. The VET program offers 230 occupational apprenticeship pathways that include further education leading to a credential but often also leading students to college or university degrees.
- Colorado has adopted parts of this model in the approach. They attended Switzerland's summer institute for strategic planning for ten days. Based on ideas gained from this experience, the Governor, the legislature, Bloomberg Philanthropies, JPMorgan Chase, the Markle Foundation and others committed $11M to start CareerWise to develop and implement a strategy and serve as the intermediary between businesses, educators, and students. The focus is on youth and pre-apprenticeships not registered apprenticeships. The goal is to start with 250 apprenticeships in three sectors and grow to over 20,000 apprenticeships by 2026, representing 10% of Colorado's high school juniors and seniors. – 23 apprentices in three sectors. In ten years will have 25,000 apprentices – 20% of juniors and seniors.
- Washington has much to learn from these approaches. The common theme is that education, workforce, and labor are making decisions collaboratively, maintaining quality and setting standards together, with an interest in a broad range of family wage jobs for our kids, not just in IT. *Maud Daudon* pointed out recent efforts by the Chamber to connect students through the pipeline in health care, computer tech, maritime and manufacturing and more. Apprenticeships is clearly an area needing more

attention. *Marcie Maxwell* noted *Suzi LeVine* will return to Washington and should be invited to share with the STEM Alliance.

Randy Spaulding presented an overview of the 2017 STEM Education Report Card draft:

- He noted that this year's Report Card was successfully reduced by *Daryl Monear* from the roughly 20 pages used in previous versions to about 4. The goal was to produce a Report Card that is simultaneously direct and easily readable with a more visual approach.
- The report focuses on highlighting key points and progress, indicators, and areas in need of improvement. In essence, it is a form of executive summary of STEM dashboard. At this point, we are looking for feedback to put together the final version to present to the Governor's office and legislators before session.
- *Jane Broom Davidson* asked to include recognition of capacity issues in higher education in the section outlining trends in degree production.
    - Randy noted that the higher cost of STEM degrees plays a part in this as well.
- *Vi Boyer* suggested we should mention the need to move from 30% to 70% in postsecondary degree credentialing, as specified in WSAC's Roadmap, and the need to highlight the role the State Need Grant plays.
- *Yolanda Watson Spiva* suggested moving the imperative to the first page.
- *Nancy Truitt Pierce* suggested the high cost of higher education needs to be addressed as well.
- *Ben Rarick* suggested including the importance of the High School and Beyond plan in the recommendations.
- *Caroline King* appreciated the document and called for emphasizing the need for providing regional incentives for employers to tackle the problem as an overarching recommendation.
- *Eleni Papadakis* thought the visuals were very good but noted the lack of one for kindergartener readiness. She also suggested that we include professional development as a category.
- *Dana Riley Black* asked why advanced manufacturing is not highlighted, since this is a sector that has serious workforce needs. Perhaps this is due to lack of data. Randy suggested a follow-up to identify the data availability.
- *Nova Gattman* would like to see more than computer science and references to other industries, especially in the policy recommendations.
- *Michael Schutzler* noted that the focus on computer science may be appropriate, since this field by far shows the largest mismatch between supply and demand. The non-CS jobs all together do not equal the CS jobs. A focus on CS provides focus for the legislature.

- *Kevin Wang* agreed, noting that computer science jobs are spread across industries and companies.
- *Alan Cohen* suggested that imagery in the section on early math would help to highlight its importance.
- *Jeff Charbonneau* would like to see photos of Washington State students with names rather than anonymous students from other places. Randy requested photos with releases.
- In the recommendations section, *Gil Mendoza* would like to broaden the language to make clear that we are including all classrooms that use computer science for learning (not just for computer courses specifically) and use "career" guidance to leverage systems and focus guidance on career development.
- *Randy Spaulding* added that we have recently received updates to some of the metrics in the draft, which will be included in the final version.
- *Gene Sharratt* requested that any additional suggestions for changes be provided to Randy.

- *Eleni Papadakis* introduced a motion to approve the Report Card. The Report Card, with further revisions to be added, was unanimously approved by the STEM Alliance members in attendance.

Gene Sharratt presented an overview of the STEM Alliance Strategic Plan:

- *Gene Sharratt* extended appreciation to *Janet Frost* and others on the committee for helping develop and improve the plan.
- *Caroline King* noted the plan will provide a Roadmap and checklist for policymakers. An inventory of current efforts in Washington and other states informed the development of the goals. The actions are not comprehensive but are targeted on the priorities to move the needle.
- There is a feedback form included to ensure all members can provide feedback to *Gene Sharratt* by Friday. *Ellen Matheny* will send two messages with directions.
- *Naria Santa Lucia* suggested the broad Strategic Action goals be included as an insert in the Report Card. Gene noted the two are intended to align.
- *Kevin Wang* asked whether rural schools should be called out with unique needs.
- *Brian Teppner* reminded the members that when the Alliance started there was agreement on including support for promoting skills in problem solving and critical thinking among the areas we should focus on. He agreed that in general the focus on computer science is justified but worries that we have lost those principles.
- *Heather Sisson* agreed and noted that the elementary perspective would be advanced as well with support for promoting problem solving and critical thinking.
- *Margaret Tudor* suggest that we also emphasize the need for environmental education.

- *Leah Hausman* noted that the need for support for early learning seems to be missing from the Action Plan.

Chadd Bennett presented an overview of new developments in the STEM Dashboard

- Several years ago work began on a dashboard to measure and evaluate STEM progress in the state. The WA STEM framework was used and the dashboard was developed. We are now working to take it to the next level using Tableau software. Several data providers are currently being used, including College Board, ERDC, ESD, OSPI, and WSAC. We are also working to develop more indicators to give a more complete picture of progress and gaps remaining. The site will include links to the Report Card and Strategic Action Plan. We are waiting for data from OSPI to update the first two AP measures, but they should be available before the launch in January. Next step for updates is to work with data providers on their preferences for contributing to the dashboard. Options include submitting precompiled statistics/narrative (method for original dashboard), having WSAC create dashboards from raw data files (current method), or having the providers create Tableau dashboards for us to integrate in.
- It is still on a development site for now but will be on stem.wa.gov soon.
- The new dashboard will provide the ability for viewers to dig deeper into specific areas of interest to them by hovering over the data. For example, viewers will be able to dive deeper into issues associated with gender and income inequities. This will add a key interactive element to the site. If anyone has feedback for usability, let Chadd know.
- Question: Are there efforts to include information on all courses, not just AP? Yes, that is in the works. Chadd said expansion of AP to include other STEM subjects already on the books for early 2017 release and other STEM courses can be discussed by the dashboard workgroup in 2017.
- *Caroline King* asked about data availability by region. Chadd said if the source data is collected at school/institution/local level, it can be rolled up, and can be assessed by the workgroup for 2017. For instance, much of the data from OSPI, ESD, IPEDS, and the WA-STEM survey can be cut different ways, but College Board is generally statewide. Randy said the regional analysis that we are currently working, which is broader than STEM, will provide a more nuanced look at economic and education needs.
- *Jeff Charbonneau* suggested that we include text that provides an interpretation of the data displayed to help viewers better understand what they are looking at. For example, we could include a headline under each one that explains both progress being made as well as the distance to our overall goals. Chadd explained that basic explanations are currently in subheaders above the charts but visibility could be improved. As the content was copied (nearly) verbatim from existing site, updating and aligning the contextual and interpretive narrative with the Report Card is pending the latter's finalization. Expanding/improving the text is a major point of the content review process, in the shared GoogleDoc and in the future. Body text can easily be modified by

AAP staff or invited editors using the in the WordPress "what-you-see is what-you-get" (WYSIWYG) interface, which has version control and review workflow. This was one major reason the text is natively in WordPress rather than embedded into Tableau (accessibility and mobile responsiveness were the other considerations)

Announcements

- WOSP application opens January 22 and will provide scholarships and mentoring for 1,850 students.
- Seattle University recently received a $2.3M National Science Foundation grant to diversify faculty and leadership in STEM disciplines.
- *Dana Riley Black* noted the Everett school district recently received Board of Distinction and Superintendent of the Year awards

Next Steps

Please send any further thoughts you might have on the STEM Education Report Card to Randy Spaulding or on the Strategic Action Plan to Gene Sharratt by Friday, December 2nd.

We will need to arrive at final drafts of these documents soon in order to have them ready for final formatting and submission to the legislature in January.

Meeting Notes summarized by staff at Washington Student Achievement Council.

STEM EDUCATION INNOVATION ALLIANCE - November 29, 2016			
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
Violet	Boyer	President and CEO	Independent Colleges of Washington
Jeff	Charbonneau	2013 National Teacher of the Year	Zillah High School
Alan	Cohen	President & CEO	Thrive Washington
Maud	Daudon	Director & CEO	Seattle Metropolitan Chamber of Commerce
James	Dorsey	Executive Director	Washington Mathematics Engineering and Science Achievement (MESA)
Susan	Enfield	Superintendent	Highline School District
Jeff	Estes	Director, Office of STEM Education	Pacific Northwest National Laboratory
Janet	Frost	Director	WSU Spokane Health Science STEM Education Research Center
Caroline	King	Chief Policy Officer	Washington STEM
Glenn	Malone	Executive Director	Puyallup School District - Assessment, Accountability & Student Success
Marcie	Maxwell	Citizen Member	Former State Representative
Eleni	Papadakis	Executive Director	Workforce Training and Education Coordinating Board
Dana	Riley Black	Executive Director STEM, Legislation & Partnerships	Everett Public Schools
Naria	Santa Lucia	Executive Director	Washington State Opportunity Scholarship
Michael	Schutzler	CEO	Washington Technology Industry Association
Rachelle	Sharpe	Interim Executive Director	Washington Student Achievement Council
Gene	Sharratt	Executive Director, OSPI/AESD Professional Learning Network	Office of Superintendent of Public Instruction/Association of Educational Service Districts Network
Ron	Sisson	Director of Principal Support and Elementary Programs	Association of Washington School Principals
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 MEMBERS			
First Name	**Last Name**	**Position Title**	**Organization**
Jane	Broom Davidson	Community Affairs Director	Microsoft Corporation
Amy	Hirotaka	Director, State Government Affairs	Code.org
Gil	Mendoza	Deputy Superintendent	Office of Superintendent of Public Instruction
Randy	Spaulding	Director, Academic Affairs & Policy	Washington Student Achievement Council
OTHERS			
First Name	**Last Name**	**Position Title**	**Organization**
Chadd	Bennett	Asst. Director, Digital Information	Washington Student Achievement Council
Nova	Gattman	Legislative Director	Workforce Training and Education Coordinating Board
Leah	Hausman	Director of Fund Development	Thrive Washington
Ellen	Matheny	Assistant Director of Operations, Policy Planning & Research Division	Washington Student Achievement Council
Daryl	Monear	Associate Director for Academic Affairs and Policy	Washington Student Achievement Council
Ben	Rarick	Executive Director	Washington State Board of Education
Juliette	Schindler Kelly	Director, Government Relations and Advocacy	College Success Foundation
Heather	Sisson	Elementary Science Instructional Specialist	North Thurston Public Schools
Kevin	Wang	Founder && Ringleader	Technology Education and Literacy in Schools