



**INNOVATING THE FUTURE:
THE CAMPAIGN FOR UW CSE**

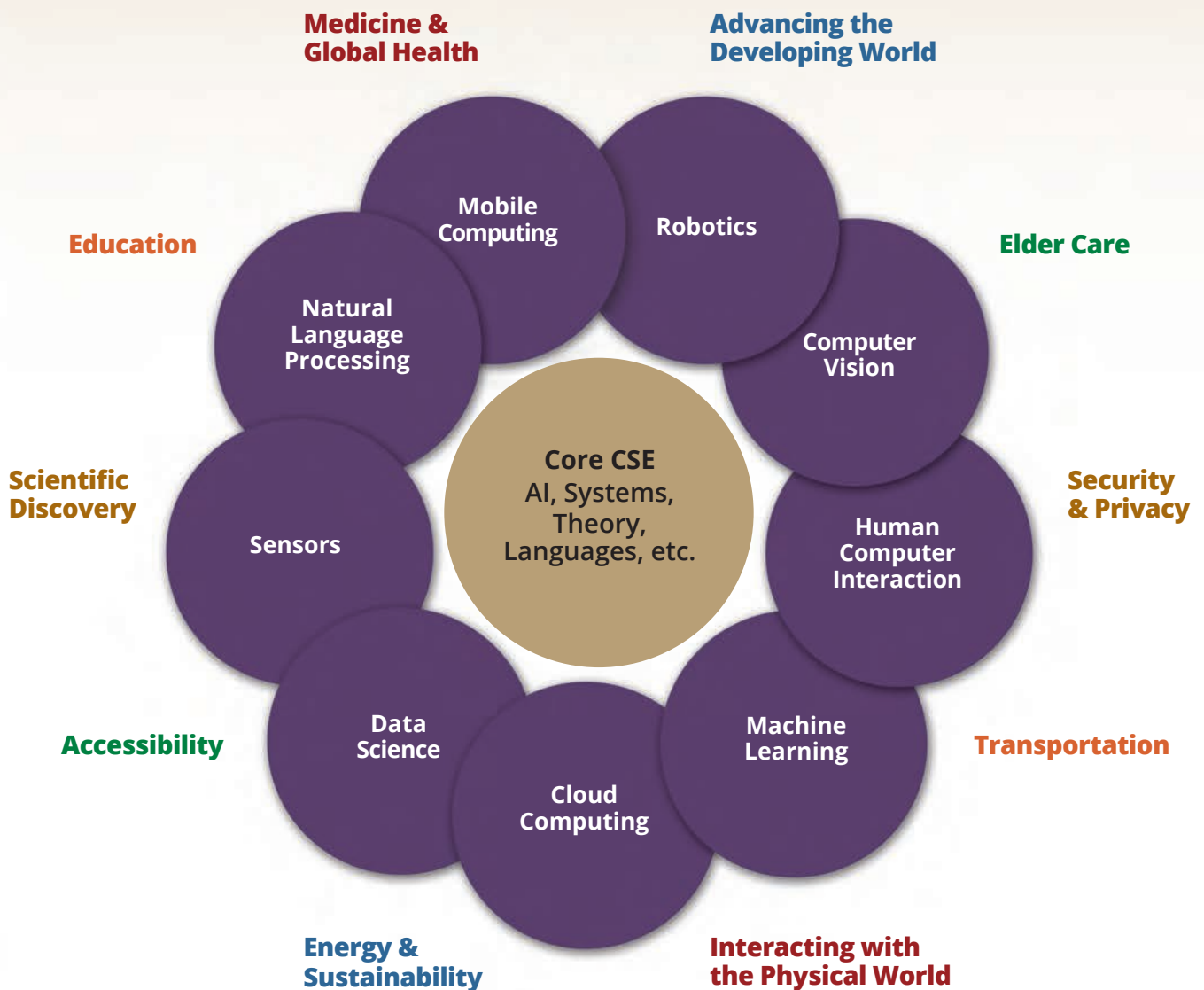
UNIVERSITY *of* WASHINGTON



Computer science and computer engineering will be the driving forces behind solutions to the most important challenges of the 21st century. From education to energy, from global health to scientific discovery, UW CSE is harnessing the power of computing to transform entire industries and improve quality of life for people everywhere.

UW CSE's 21st Century Vision of Computer Science: A Field Unique in Its Societal Impact

UW CSE is a leader in positioning computer science to tackle critical national and global challenges. We have invested our resources strategically to help propel UW to the forefront of the field—we compete only with Stanford, MIT, UC Berkeley and Carnegie Mellon as a leader in computer science teaching, research and entrepreneurship. A new phase of investment and expansion will enable us to leverage this success and position ourselves for the future.



UW CSE: At the Forefront of Computing Innovation

University of Washington Computer Science & Engineering attracts top students from across our state, the nation and the world. Our faculty—committed to mentorship, cross-disciplinary collaboration and strong partnerships with leading technology companies—make UW CSE one of the best places to become a computer scientist or computer engineer and to make lasting contributions to society.

As every field increasingly becomes an information-driven field, computer science has emerged as a cornerstone of the modern university and of the modern world. Our faculty and students continually push the boundaries of our discipline, placing UW CSE at the forefront of computing innovation. UW CSE is poised to dramatically expand our impact...but only with your partnership.





UW CSE and the Allen Center: A Legacy of Transformational Investment

The opening of the Paul G. Allen Center for Computer Science & Engineering in 2003 transformed the trajectory of UW CSE. The new facility changed both the scale and the nature of our program: not only did we expand in size, we expanded in scope, moving into new areas of innovation at the forefront of computer science. Thanks to the generosity of our donors and strategic investments by the state, we have been able to grow UW CSE's leadership in a multitude of ways:

Educating more students for high-impact careers. Since 2003, enrollment in UW CSE's undergraduate and graduate programs has grown by more than 50%. More than three-fourths of our students are Washington residents, and the vast majority remain here after obtaining their degrees. Interest in computer science from students across the campus is on the rise: enrollment in UW CSE's introductory courses now exceeds 5,000 students per year.

Fueling the growth of our region's technology industry. UW CSE is one of the nation's leading suppliers of graduates to Microsoft, Amazon and Google—roughly one-third of our students head for one of these three companies. We are the predominant supplier of graduates to local startups and to growing, young companies, and a key reason that more than 70 major companies headquartered outside of the region have established engineering offices here. The Allen Center has helped to make Seattle the innovation hub that it is today.

Recruiting exceptional faculty. Our people have made us a long-standing leader in core areas of the field such as programming languages, software engineering, systems and computer architecture. UW CSE also leads in cutting-edge areas such as computer vision, machine learning, natural language processing, data science, privacy and security, and game science. Since 2012, we have added more than 25 faculty members—established experts and rising stars—reflecting the fact that UW CSE is a preferred destination for some of the top minds in our field.

Cementing entrepreneurship as a core aspect of our culture. UW CSE faculty and students have created more than 25 startup companies that have raised nearly \$400 million in venture funding to support jobs and business activity in our region, and our alumni have gone on to build countless more. A stellar exemplar of this commitment is Professor Shwetak Patel, who develops novel sensor systems and interaction technologies. Patel founded Zensi, a residential energy-monitoring company based in part on technology developed at the UW, which was acquired by Belkin. Patel then worked with UW CSE alum Jeremy Jaech on another startup, SNUPI Technologies, to commercialize a new, low-power home sensing platform; the technology was later acquired by Sears. Both Belkin and Sears opened new engineering offices in Seattle as a result.

Committed to education as well as entrepreneurship, Patel has united the two in his role as lead developer of curriculum for the Global Innovation Exchange (GIX), a partnership between the UW, China's Tsinghua University and Microsoft to educate students in a context that is global, project-based, and integrates technology, design and entrepreneurship.



Becoming a research powerhouse.

The quantity and quality of laboratory space in the Allen Center enabled UW CSE to diversify our research portfolio and triple our annual research grants. This ushered in a new era of partnerships—across campus and with companies and organizations of all sizes—and helped put Washington state on the map as a center for computing innovation.

We spearheaded creation of the eScience Institute to leverage advances in data science to support research in fields from astronomy to urban planning. We helped establish the Center for Sensorimotor Neural Engineering to focus on novel brain-computer interfaces. And we launched a joint effort with Microsoft to develop the next generation of digital data storage using DNA.

UW CSE has been a leader in developing solutions for underserved communities, advancing the state of the art in computer vision, and addressing emerging security and privacy issues—just a few of the ways our research is having a real-world impact. *(Learn more on pages 12-14.)*

Leading the way in diversity.

UW CSE has earned national recognition for our work to promote diversity and close the gender gap in computing. We grant nearly one-third of our computer science bachelor's degrees to women—roughly twice the national average.

UW CSE has achieved this by cultivating a welcoming and supportive community, actively recruiting talented women as students and faculty, and engaging in outreach to K-12 students and educators. For our efforts, we were honored in 2015 with the National Center for Women & Information Technology's inaugural Award for Excellence in Promoting Women in Undergraduate Computing.



Our Next Challenge: Meeting the Growing Demand

The excitement and impact generated by computer science has led to ever-increasing numbers of students clamoring for education in our field. The present limits on our capacity represent an opportunity lost, both for talented students and for our community: while Washington’s information technology sector is one of the most vibrant and innovative in the nation, it also has to contend with the largest gap between employer demand and degrees produced of any sector in our state.

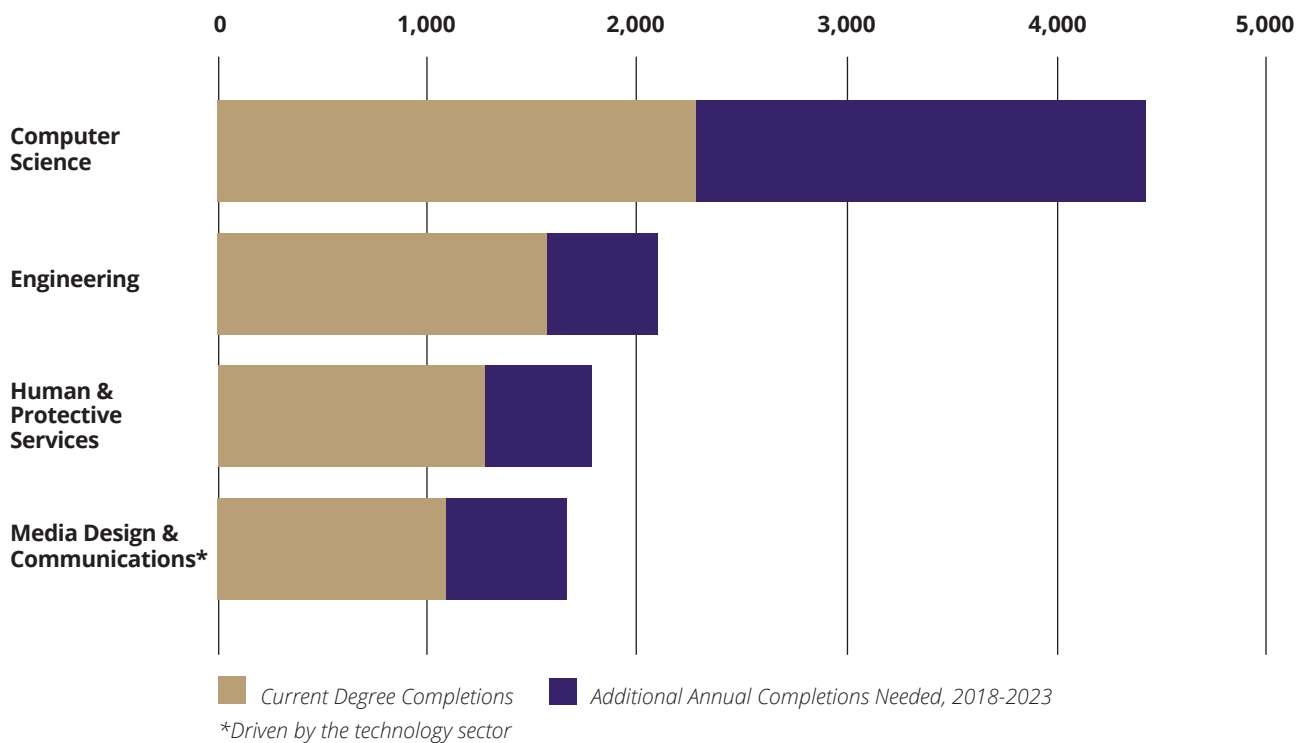
Expanding Economic Opportunity

We continue to see explosive growth in student interest and employer demand for computer science graduates, and all signs point to this as the “new normal.” The opportunity for our citizens is great: the Bureau of Labor Statistics projects that 73% of all newly created jobs in the U.S. this decade in science, technology, engineering and mathematics will be in computing, as will 55% of all available STEM jobs, whether newly created or due to retirements.

In Washington, the projected workforce gap in computer science exceeds the next three most in-demand fields combined at the baccalaureate level, with more than 2,100 *additional* degrees needed each year to meet demand. When graduate degrees are factored in, the workforce gap in computer science rises to 3,800 per year—nearly 3x as great as the second most in-demand field.

High Demand Fields in WA State, Baccalaureate Level

Washington Student Achievement Council, State Board for Community & Technical Colleges, Workforce Training & Education Coordinating Board, 2016

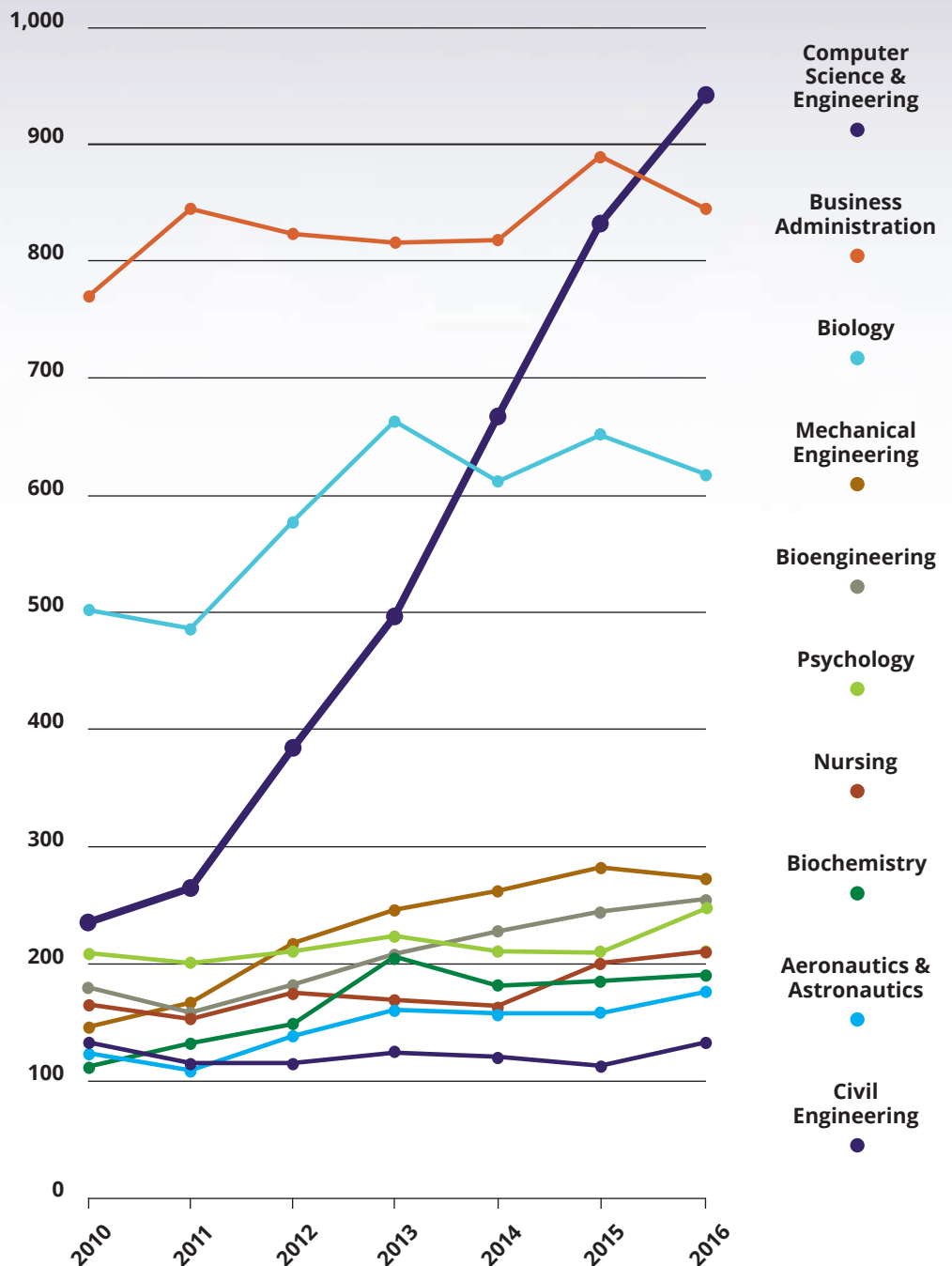


UW CSE has an ambitious vision for our next phase of growth—a vision that will enable us to expand our educational offerings, intensify our impact through research and entrepreneurship, and address the needs of Washington’s students, employers and economy while developing solutions to some of humanity’s most pressing challenges.

Skyrocketing Student Interest

Student interest in computer science has grown dramatically: more incoming UW freshmen select CSE as their first-choice major than any other field. Because of capacity constraints (both physical and financial), UW CSE is able to accommodate only one-third of the qualified students who apply to the major each year. Growth is essential.

Top 10 First-Choice Majors of UW Confirmed Incoming Freshmen





The Campaign for UW CSE: Expanding Our Capacity for Innovation

The Allen Center has been truly transformational, enabling us to grow and to change dramatically. . . but it has already been stretched far beyond its intended capacity. To prepare more students for the opportunities created in our rapidly expanding field and to provide the additional resources that will keep our research and education powering forward, we have launched the Campaign for UW CSE.

Building for Our Future

UW CSE has the vision, the demand, the momentum and the support for growth. Additional space is the missing ingredient. Thus, a critical component of the Campaign for UW CSE is a private-public partnership to raise \$110 million—of which Washington state has committed \$32.5 million and Microsoft, Amazon and Google all have made multi-million-dollar commitments—to construct a second CSE building on the UW Seattle campus. The CSE2 facility will enable us to double our annual degree production, significantly expand educational offerings to non-majors, and accelerate the high-impact research, entrepreneurship and collaboration that are hallmarks of UW CSE.

Seattle-based LMN Architects—designers of the Paul G. Allen Center for Computer Science & Engineering and recipients of the 2016 American Institute of Architects Architecture Firm Award—are designing the 130,000 square-foot building to complement the Allen Center. Located just across the street, the new building will provide types of space that the Allen Center lacks. In particular, CSE2 is designed to enhance the undergraduate student experience by providing the following:

- A tiered 250-person lecture hall for large classes and colloquia.
- Classrooms, educational labs and a sophisticated maker space.
- An undergraduate commons where students can study and collaborate.
- Project rooms for interdisciplinary capstone courses such as computer animation.
- An advising suite and teaching assistant offices for one-on-one consultations with students.
- Interview rooms where industry representatives can meet with students.

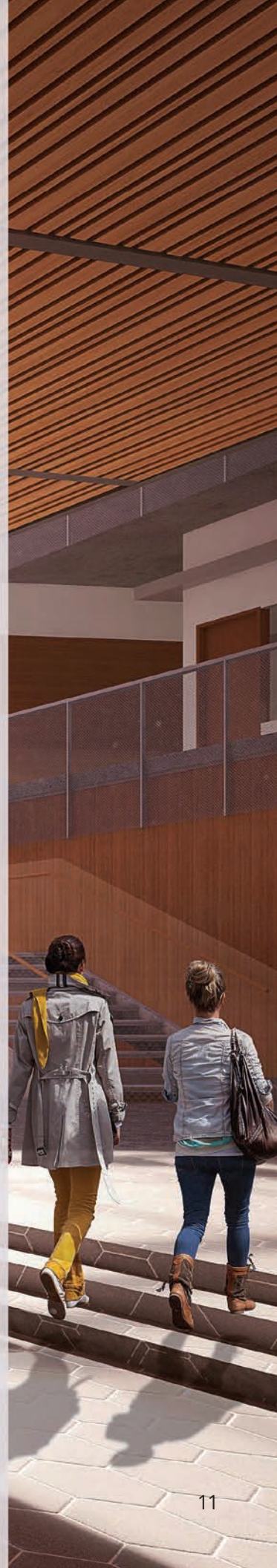
CSE2 also will enable us to expand our research enterprise and remain at the forefront of our field through:

- Research labs to support Ph.D. students, postdocs and research support staff.
- A 3,000-square-foot robotics lab.
- Graduate student offices.
- A wide range of collaboration spaces and seminar rooms.
- A design that encourages the chance encounters where sparks fly.

Finally, as we have now outgrown the Allen Center's Bill & Melinda Gates Commons for many important functions, CSE2 will include a 3,000 square-foot events center. It will be used for faculty meetings, industry recruiting events, seminars, department gatherings, workshops and conferences, and meetings of our increasingly large and interdisciplinary cross-campus research efforts, which are a critical strength of UW CSE and of UW as a whole.

Investing in Our Future

In addition to growing our physical footprint, we aim to grow our endowment to \$150 million (an increase of \$100 million over the current level). The \$6 million annually that will be generated by this endowment will enable us to recruit and retain the best faculty, attract the most promising graduate students and postdoctoral researchers, and keep a UW CSE education accessible to Washington students regardless of their means.



Leveraging the Power of Computing for Real-World Impact



Changing the World, One Data Set at a Time

The Open Data Kit (ODK) is a suite of open-source, customizable tools developed by UW CSE, in collaboration with Google, to aid mobile data collection and analysis in low-resource settings. ODK has been used to monitor elections in Afghanistan, track deforestation of the Amazon, fight AIDS and infant mortality in Africa, measure crop yields in Haiti, and respond to natural disasters in Pakistan. To date, ODK has been deployed in more than 40 countries and on the International Space Station—and UW CSE continues to build upon ODK to improve the quality of life for people around the globe.



**Picture This:
Advancing the
State of the Art in
Computer Vision**

UW CSE professor and computer vision expert Ira Kemelmacher-Shlizerman specializes in developing computational tools for modeling people, using the vast amounts of visual data available on the Internet. With her age progression software, Kemelmacher-Shlizerman has devised a way to accurately depict what a young child will look like at different ages from just a single photograph. Beyond satisfying people's curiosity about their future selves, the technology could change the face of missing child cases: by providing a more accurate representation of a child's current appearance even years later, UW CSE's age progression software could help law enforcement reunite more families.

Power to the People: Security and Privacy in a Connected World

UW CSE professor and Ph.D. alumna Franziska Roesner is on a mission to empower people with the knowledge and tools to take charge of their privacy and security in our increasingly connected, always-on world. As co-director of UW CSE's Security & Privacy Research Laboratory, Roesner has led the development of new tools that counteract unwanted third-party tracking on the Internet and improve user control over what information is shared with smartphone applications. A thought leader on a variety of issues related to privacy and security, Roesner is also a member of the UW's Tech Policy Lab, a collaboration between UW CSE, the School of Law, and the Information School that aims to inform and improve policies governing emerging technologies.





Join Us: Impact on Our Students, Impact on Our Region

Computer science and computer engineering are changing the world. UW CSE and Washington state are at the center of this revolution.

The Campaign for UW CSE will enable us to dramatically expand our research to address society's greatest challenges while preparing more of Washington's students for leading-edge jobs in a broadening array of fields. With your investment, we can leverage our momentum to create a CSE program that is the envy of all others, right here in Seattle.



**PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING**

Thank you for your interest in the Campaign for UW CSE.

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BE BOUNDLESS
FOR WASHINGTON

FOR THE WORLD

Computer Science Survey
Needs Assessment
May-June 2017

Summary

Rationale for Survey - Computer Science Inseparable from the Future of Our Society

Students, parents, educators, and industry all have a vested interest in better integrating computer science into the K-12 experience. Our economic stability and national security depend on a population with solid computer science skills and coding literacy. As such, the future of education must focus on making computer science an integral part of every child's education to ensure that students of all genders and backgrounds have a chance to pursue these opportunities.

Survey Background

Purpose: To determine “need” for expansion of current computer science training
Process: Survey conducted May 2017
Participants: ESD, OSPI, school district, ESD Coordinator, and computer science leadership (n=40 completed surveys)

Survey question 1. Describe the current efforts within your ESD for providing CS professional learning?

Summary:

- Wide array of offerings to include: code.org, teals, Game Salad, Ozobots, CS Principles, AP Computer Science, PLTW Launch, CS Discoveries, K-12 Leaders meetings, digital learning workshops, Minecraft & LEGO, Makerspaces, Scratch, Makey Makey, Arduinos, CS Algebra, Code.org for Exploring CS and CS Principles, CS for Girls, training on CT as a practice of NGSS in K-5, Microsoft Imagine Academy, Hacker Camp, Cyber Security, “Sphero” for math and science coordinators, and a number of associated CS programs/initiatives.
- Opportunities for computer science training is geographically diverse, with some areas/regions providing a comprehensive array of opportunities, while others are struggling to provide some CS learning experiences. Large opportunity gaps exist within some regions and the state.
- On-line learning could be a useful delivery and learning system for computer science professional development.
- Interest is strong for expansion of current efforts. Wide diversity of classroom, building, and district needs relative to CS program offerings. Any expansion effort must take into account context of school, district and region.

Survey question 2. For the above ESD offered efforts, please describe where these are taking place.

Summary:

- Much of the training is either occurring at the ESD or district level. For district training, much of that training is facilitated through the local ESD.
- Some University, online, and national training taking place.
- Collaboration between ESD regions is helping fill some of the demand for additional CS professional learning opportunities.

Survey question 3. Describe the current efforts in school districts within your ESD region regarding CS courses and programs.

Summary:

- Current efforts include: programming, coding, Code.org, TEALS, Microsoft training by CTE Department, MS Tech with LEGO's/robotics/drones, Project Lead the Way CS at elementary and middle schools, AP-CS, Game Salad, and CTE/STEM Consortium.

Survey question 4. What resources and need to you feel are necessary to provide professional learning across all CS content areas in your ESD?

Summary:

- Current efforts cannot be expanded without additional capacity in the form of fiscal, personnel, equipment, infrastructure, bandwidth, and associated professional learning.
- A CS Coordinator was role most often mentioned for each ESD, with complementary resources would be needed for regional expansion.
- Leadership support, distance learning, CS instructional alignment, hardware, software purchases, and statewide strategic plan were often mentioned as “needed” resources for CS program training and expansion.
- Overwhelmingly, the survey participants strongly endorsed the need for greater fiscal and personnel capacity in order to move forward to any expansion of current CS efforts.

Survey question 5. List any potential public/private funding partners?

Summary:

- Bill & Melinda Gates Foundation, Whitman County Library, Microsoft, Facebook, Amazon, Vulcan. WA STEM Boeing Foundation, Hagan Foundation, CenturyLink Foundation, Project Lead the Way, Code.org, TEALS, Teach for America, local businesses, Ports, Economic Development Councils, PNNL, HP, Intel, SEH America, Silicon Forest, Kaiser Permanente, Providence Health, Google, Google CS4HS, Battelle, Mid-Columbia STEM Network, Facebook, Concur, Expedia, Microsoft Data Center, legislature, private and public partnerships, and WA TECH Alliance.

Survey question 6. What questions still need to be addressed, or are on your mind?

Summary:

- A need exists to develop a current regional and statewide computer science asset map/needs assessment to determine: professional learning opportunities, equipment, broadband capacity, infrastructure, teacher and student interests, and associated factors.
- Expanding capacity will only work with complementary funding.
- How does this work fit into the larger statewide CS Advisory Team's work and goals?
- Would a “Train the trainer” model be appropriate?

- Time? Responsibility? Would a Coordinator at each ESD be the most effective model?
- How does not work align with the national computer standards?
- How do we serve our most remote schools? What is the best model? Online learning?
- Would the LASER model be an appropriate delivery vehicle? District teams building their plan and seeking funding from state/ESD/partnership grant funding
- Maintain a focus on equity of service, student populations, and resources.
- Start CS early and maintain focus throughout students' school years.
- A lot of details to be worked out, but interest is strong, great start, thanks for exploring this initiative and extremely important issue. We must increase capacity across the state! Time is running out for our students, staff, and communities. We are rapidly falling behind in Washington.

Survey question 7. Next Steps?

Summary:

- Gene will summarize the survey and send out draft summary for edits on June 5/6/2017, requesting any edits by Friday, June 9. He will send out edited version to larger audience (ESD Supts. and ESD Assistant Supts, OSPI leadership, Initiative Coordinators, state computer science advisory committee, and other interested audiences.
- Gene will prepare and present to ESD and OSPI leadership at upcoming meeting already planned for June 2017.
- Gene/team will begin discussions with potential funders a summary of survey and encourage other members of the team to share information and seek potential funders.
- Team will work to identify legislative "Champions" in Olympia who would be interested in supporting expansion of current CS efforts/capacity.
- Team will work with Shannon/OSPI leadership on the coordination of CS National Standards and presentation at next state computer science leadership meeting.
- Tammie and team will explore the possibility of a statewide computer science conference to highlight this work/need, hear from CS experts, plan relevant breakout sessions, and coordinate with OSPI/AESD Network and others on strong conference design and implementation.
- Gene will share with John Aultman, Governor Inslee's Senior Education Policy Advisor results of survey.
- Small core group of interested team members (to be determined) will be formed (Ad Hoc) to discuss implications of the survey and plan next full committee meeting in late June or early July.

Summary Statement and Imperative

Economic Imperative for Computer Science

According to the U.S. Bureau of Labor Statistics, by 2020 there will be 1.4 million new computer science jobs. However, between current professionals and university students, we will only have 400,000 computer scientists trained to fill those roles.

Since it can take as many as 25 years to create a computer scientist, and since computer science skills are becoming increasingly integral for jobs in all industries, this skills gap is on track to emerge as a formidable economic, security, and social justice challenge in the next few years. Teachers, schools,

parents, and industry must act on multiple fronts to address student readiness, expand access to computer science curriculum and opportunities, and help foster interest in computer science to ensure that it becomes a core component of every child's education.

Tackling the Challenges

Even though computer science skills are becoming increasingly important in the competitive global economy, there are some significant roadblocks that prevent schools from incorporating computer science into the curriculum and exposing more students to the subject.

Currently, very few schools make computer science available to students. According to the College Board, in 2013, only 9 percent of schools offered the AP computer science exam. This lack of course offerings is compounded by the fact that there is a significant lack of teachers who are qualified to engage students in computer science -- those who have a deep knowledge of the topic often take jobs in industry -- and a lack of student interest in taking these advanced courses, at least partly due to a misconception that computing experts are boring, male, and always in front of their computers.

Overall student engagement numbers are low even relative to other STEM fields, and female and minority students in particular are vastly underrepresented in existing computer science courses. Of the 30,000 students that took the AP computer science exam, fewer than 20 percent were female, only three percent were African American, and approximately eight percent were Hispanic, according to the College Board.

These issues stunt the expansion of computer science, and prevent students from gaining the basic technology literacy that will be imperative for future workers in all fields. Communities, schools, and industry must work together to integrate computer science in schools from a young age to help both encourage diversity in technology-related fields and ensure that students of all ethnicities, genders, and socioeconomic backgrounds have the opportunity to learn these skills.

Operating Budget Comparison for STEM Investments: 2017-19

STEM Alliance Agenda	Governor's Budget Proposal HB 1067	Final Operating Budget SSB 5883
Inspire youth through career connected and real-world STEM learning opportunities	\$6 M for work-based learning and industry-approved apprenticeships to middle and high school students - integrating academic and occupational curricula and train teachers. Matched by private sector.	
Provide every K-12 student access to computer science education	\$6 M for Computer Science and Education grants for early learning and K-12 curriculum development, teacher training, technology purchases and digital access for historically underserved groups, including girls and students from low-income, rural and ethnic minority communities. Must be equally matched by private sources. \$15 M for STEM laboratories and classrooms in K-12. (Capital budget)	\$2 M to OSPI for Computer Science and Education grants for early learning and K-12 curriculum development, teacher training, technology purchases and digital access for historically underserved groups, including girls and students from low-income, rural and ethnic minority communities. Must be equally matched by private sources. No Capital budget yet. . .
Prepare WA's future workforce by increasing attainment of technical credentials , 2 and 4-year degrees and contributing to WA's 70% attainment goal	\$14.73 M to match private donations for Opportunity Scholarship . And \$3 M to expand students in workforce training programs. \$4 M to Labor and Industries to expand Tech Apprenticeship program (Apprenti).	\$14.73 M to match private donations for Opportunity Scholarship . Does not include \$3M to expand to students in workforce programs. \$4 M to Labor and Industries to expand Tech Apprenticeship program (Apprenti). \$2 M is provided to the UW to increase resident undergraduate enrollment of students majoring in science, technology, engineering, and mathematics (STEM). The university is expected to increase enrollment by approximately 60 full-time equivalent (FTE) students. And \$8M (\$2M above previous biennium) to expand CS and engineering at UW — Seattle Campus. \$2.74 M to WSU to create a software engineering/data analytics program at Everett.

STEM Alliance Agenda	Governor’s Budget Proposal HB 1067	Final Operating Budget SSB 5883
<p>Improve equity by implementing interventions to close the educational opportunity gaps, providing world-class preparation and support for STEM teachers and improving workforce diversity</p>	<p>\$1.5 M to SBCTC to expand (Math, Engineering, Science Achievement) MESA program by 750 slots at six new sites, supporting secondary students in math/science and engineering.</p>	<p>\$1.5 M to SBCTC to expand (Math, Engineering, Science Achievement) MESA program by 750 slots at six new sites, supporting secondary students in math/science and engineering.</p>
<p>Other Postsecondary: Affordability and Student Success</p>	<p>\$45 M for expected caseload in the College Bound Scholarship. \$30 M to maintain 2015-17 State Need Grant service levels. \$116 M to serve an additional 14,000 eligible students in each year of the 17-19 biennium in the State Need Grant. Freezes tuition at public institutions. Provides backfill for the public baccalaureate institutions and for SBCTC under the College Affordability Program. \$8.5 M for Guided Pathways initiative.</p>	<p>\$45 M for expected caseload in the College Bound Scholarship. \$38 M to maintain 2015-17 State Need Grant service levels and increase grants to cover anticipated tuition increase. \$12 M to serve more of the eligible, unserved student in SNG. Will serve an additional 875 students. Follows current tuition policy, tuition increases of 2.2% and 2.0% for FY 18 and 19, respectively. Provides backfill for the public baccalaureate institutions and for SBCTC under the College Affordability Program. \$3 M for Guided Pathways initiative.</p>

STEM = FUTURE READY: WASHINGTON STEM LEGISLATIVE PRIORITIES 2017-2019

Washington legislators have a historic opportunity to prioritize the investments that matter most – closing opportunity gaps, bolstering student opportunity and success, and building the robust next generation talent pool urgently demanded by employers. STEM (science, technology, engineering, and math) is at the heart of these solutions. 2013's HB 1872 authorized a comprehensive initiative to improve educational outcomes in STEM: now is the time to fund this initiative. The nonprofit Washington STEM recommends catalytic investments to improve STEM capacity and opportunity for youth cradle to career.



EXPAND ACCESS TO COMPUTER SCIENCE EDUCATION

Need: Computer science—the ability to code, create algorithms, and analyze big data—is a core component of many of our state's hottest jobs. It is foundational to many other fields, both analytical and artistic.

The \$2 million 2015 state investment in computer science education matched with a \$2 million private investment provided computer science education access to 11 percent (118,524) of Washington students. The other 89 percent of Washington students deserve state funded computer science learning opportunities.

Solution:

- Triple the K-12 computer science education 1:1 public-private grant program (\$6M in Governor's budget proposal)
- Washington STEM commits to secure and align matching funds to double state investments
- Focus on access for underrepresented, low-income, and rural students
- Provide technical assistance and training for grantees
- Evaluate and share best practices; create models for scale

Impact: Allow 50 percent (500,000+) of Washington students to access computer science education, while accelerating the path to 100 percent access statewide.



CONNECT STUDENTS WITH CAREER GOALS AND PATHWAYS

Need: Most young people in Washington, especially youth of color and from low income or rural communities, do not have access to the career connected learning experiences that foster engagement in school and interest and preparation for high-demand careers. Employers, educators, and community organizations need support to deliver at scale high-quality internships, job shadows, design challenges, youth apprenticeships, expanded learning opportunities, and technical training.

Solution:

- Create a 1: 1 public-private career connected learning fund to engage and connect students with the new economy (\$6M in Governor's budget proposal)
- Washington STEM commits to secure and align matching funds to double state investments
- Focus on access for underrepresented, low-income, and rural students
- Support educators with professional learning and industry and environmental design challenges aligned to science standards
- Incubate and expand successful regional programs; create models for scale

Impact: 50,000 students across the state will benefit, with success measured by increased interest in high-demand careers, increased high school graduation rates, and increased completion of training credentials such as youth apprenticeships and internships. Aligned regional efforts and scalable best practice models will create a systemic approach for fostering career interest and preparation among youth statewide.

WILL BE UPDATED FOR 2018 SESSION

CRADLE TO CAREER STEM PRIORITIES



START STRONG

Washington should ensure every student starts strong by investing in high-quality early learning

- Expand access to high-quality preschool for low-income three and four year olds (ECEAP)



**GRADUATE HIGH SCHOOL
INSPIRED AND PREPARED**

As Washington steps up to fully fund K-12 basic education, targeted and equity-focused investments will ensure new state dollars drive better outcomes: closing opportunity gaps and preparing students for a successful future

- Triple the K-12 computer science education grant program through a 1:1 public private matching fund
- Create a 1:1 public-private career connected learning fund to expose and connect students to the new economy
- Fund Career and Technical Education with priority for high-demand fields of study
- Continue capital investments to provide students access to cutting edge STEM classrooms and labs
- Expand allowable uses of learning assistance funds to support STEM
- Sustain and increase expanded learning opportunities (ELO)
- Direct basic education funds to drive equity



**COMPLETE A FUTURE READY
DEGREE OR CREDENTIAL**

Washington should also focus on increasing opportunity and attainment for students seeking postsecondary and training credentials in high-demand STEM fields

- Expand successful MESA community college pilot
- Allow students seeking two-year degrees and credentials in high-demand STEM fields to utilize Washington State Opportunity Scholarships (WSOS)
- Increase capacity and support for technical, two- and four-year high-demand STEM degrees and credentials, including the Washington Technology Industry Association (WTIA) Apprenti Registered Tech Partnership Apprenticeship
- Fund the State Need Grant

2017-2018

Computer Science Education Grant

Bulletin 061-17
iGrant 769

Designations

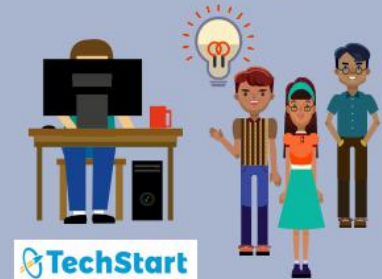
Teacher Training



Technology Upgrades



Engaging Students



Must have...

Private source match documented in writing (e.g., by a letter of support). Includes gifts, grants, endowments, and in-kind services (which can be quantified).

Must be...

Aligned to Washington State Computer Science K-12 Learning Standards.

Promotion

Think creatively about the most effective means of advancing student knowledge and skills in computer science.

Advance

Provide an inspiring and inclusive K-12 computer science experience that empowers students at every age level, appeals to students of diverse backgrounds, and challenges them to solve real-world problems.

Inspire

Consider and demonstrate how their proposal supports the integration of computer science in other content areas.

Support

Priorities

Develop K-12 computer science pathways, providing a seamless multi-year pathway of computer science learning experiences at every grade level.

Create professional learning that supports the integration of authentic computer science experiences into academic instruction.

Support the integration of computer science with core content areas. Establish how the program will be sustained and scaled.

Engage and serve students from groups of non-traditional and historically underrepresented students to computer science.

Address the needs of rural districts. Focus on a K-5 computer science pathway. Grounded in rigorous computer science knowledge and skills.

Timeline

when  clicked

open August 28

closed October 16

award October 31

Eligibility

broadcast Eligibility

applicant = Public schools

applicant = Private schools

applicant = Tribal compact schools

applicant = Tribal schools

applicant = School districts

applicant = Skill centers

applicant = Educational Service Districts

applicant = Non-profit organizations in partnership with a school district, school, or ESD

applicant = Institutions of higher education in partnership with a school district, school, or ESD

TechStart
Virtual Reality



Participation

TechStart is offering to each eligible school one kit (computer, camera, Oculus Rift equipment (3-D headset)), curriculum support, and professional development for educators. To be eligible, high schools are required to have 60 percent or greater percentage of students receiving free or reduced-price lunch.

All grantees will abide by TechStart Program Terms

Requirements

Show how the award impacts student and/or teacher growth. Impacts should include targeting special populations.

Prepare to present or demonstrate projects at the conclusion of the grant to computer science education stakeholders.

Work with OSPI staff to schedule a one-day site visit and as needed, to assess progress towards project goals, and provide technical assistance for project challenges.

Attend and/or review an online webinar to discuss Computer Science K-12 Learning Standards, open licensing requirements, and effective resource distribution.

Provide baseline, midterm and final reports that document project achievements, deliverables, and impact. Reports will include measurable data at each point along the grant timeline.

Shannon L. Thissen
Computer Science Program Supervisor
Learning and Teaching
Office of Superintendent of Public Instruction
P.O. Box 47200, Olympia, WA 98504-7200
shannon.thissen@k12.wa.us





TechStart, a Facebook education initiative in collaboration with high schools, helps students explore computer science through technology.

STUDENTS AT THE CORE

INSPIRE

Spark curiosity for computer science through creative use of new technology.

TEACH

Allow students to explore being technology creators through project-based experiences.

CELEBRATE

Acknowledge and showcase student accomplishments through recognition.

THE KEY BENEFITS

TechStart delivers 3 major benefits to students and teachers:



EXPERIENCES

Give high schools approachable and educational tech projects, free virtual reality hardware and software and ongoing classroom/technical support.



COMMUNITY

Encourage shared community experiences for both students and educators through online communities and in-person events, such as hackathons.



RECOGNITION

Acknowledge students and educators through awards, and support local educational groups through Facebook ad credits and expertise.



It all starts with *you!*

To learn more visit TechStart.fb.com

Subject: Join the Facebook TechStart Program

Explore this wonderful opportunity for your school to receive **FREE** equipment and resources as a part of our partnership with Facebook!

Who is eligible?

All schools in Washington state that have 60 percent of the student body qualifying for free or reduced lunch.

Through the Facebook TechStart program, you can sign up to receive **FREE** Virtual Reality Equipment, curriculum, resources, and experiences for your school, totaling **\$5,200!** The program provides students with year-round authentic and enriching computer science learning opportunities.

How do I apply?

A participating teacher for each school must be selected and the TechStart Participation Agreement must be signed and uploaded. If you would like to be a part of this **FREE** program, please sign up at <http://bit.ly/2wzBgD8>. You will receive additional information as we coordinate the next steps.

What is TechStart?

TechStart is a Facebook education initiative in collaboration with high schools and helps students explore computer science through technology.

It focuses on inspiring, teaching, and celebrating students and educators through the following channels:

- Experiences—Provides high schools with approachable and educational tech projects, FREE virtual reality hardware and software, as well as ongoing classroom and technical support.
- Community—Encourages shared community experiences for both students and educators through online communities and in-person events, such as hackathons.
- Recognition—Acknowledges student and educator achievements through awards, and supports local educational groups through Facebook ad credits and expertise.

What's in it for me and my students?

As a participating school, you and your students will get:

- Free equipment
- Technology projects
- Groups community
- Various awards and incentives
- In-region events
- Mentorship
- Tech and program support
- Classroom support

What is the timeline?

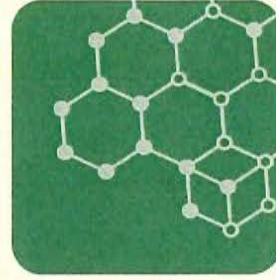
Apply for TechStart in the fall of 2017 (deadline: **Oct 16, 2017**). Equipment will arrive by 2018. Program will start in schools in January 2018.

For more information:

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Computer Science Program Supervisor
Learning and Teaching
Office of Superintendent of Public Instruction (OSPI)
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shannon.thissen@k12.wa.us
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ADVANCING COHERENT AND EQUITABLE
SYSTEMS OF SCIENCE EDUCATION



Washington State ACESSE Team Convening

Meeting 1 • September 19, 2017 • 11am to 2pm

Institute for Science & Math Education, College of Education
304 Miller Hall, University of Washington Seattle ([directions](#))

PROJECT BACKGROUND: With funding from NSF, the [Advancing Coherent and Equitable Systems of Science Education \(ACESSE, or “access”\) project](#) brings together partners from educational research and practice to improve equity by building coherence in science education. The project is a collaboration between the University of Colorado Boulder, the Council of State Science Supervisors (CSSS), and the University of Washington. Thirteen states are closely collaborating on the project. OSPI is one of the collaborating state agencies.

The project is developing shared implementation strategies and teacher learning resources that can support the improvement of K-12 science education broadly through a concerted focus on classroom formative assessment. The resources are grounded in the consensus vision of the [NRC Framework for K-12 Education](#), and they are being shared through [the STEM Teaching Tools initiative](#).

MEETING PURPOSE: This meeting will bring together individuals representing Washington state organizations and constituencies who are in a strong position to support and contribute to the ACESSE mission and work. This first meeting is focused on developing a shared understanding of the ACESSE effort, exploring ways to participate in the project, and to formulate relevant short- and long-term actions that individuals and organizations may want to take.

SOCIAL MEDIA: To track the progress of the ACESSE project, follow the [ACESSE Twitter account \(@ACESSEproject\)](#). To learn about ACESSE and other NGSS-related resources, follow the [STEM Teaching Tools Twitter account \(@STEMTeachTools\)](#) and/or sign up for the low-volume newsletter at the bottom of the web site: <http://stemteachingtools.org/>

MATHEMATICS, ENGINEERING SCIENCE ACHIEVEMENT (MESA)

“When I told my friends and family that I wanted to be an electrical engineer, they laughed at me, because they had never seen a Hawaiian engineer...I had the drive and determination, I just didn't have the guidance to go to the university...When I went to Highline I joined MESA and that was the life-changing event...MESA helped me and pushed me to go to higher levels than I ever expected.”

– Kalani Plunkett, Highline College MESA electrical engineering student accepted into Washington State University and University of Michigan¹



MESA summer math scholars, courtesy of Washington STEM

Growing STEM talent

Washington MESA – Mathematics Engineering Science Achievement – helps under-represented community college students excel in school and ultimately earn STEM² bachelor's degrees. The timing couldn't be better.

Here in the home of Amazon, Microsoft, Boeing and hundreds of other tech-based companies, 25,000 jobs are unfilled because of a mismatch between the skills people have and those employers need.³ Eighty percent of those jobs are in high-demand STEM and health-care fields.⁴

MESA creates a wider, deeper talent pool that taps the potential of our diverse population. It opens doors to good jobs and a higher standard of living.

Support and inspiration

MESA has two key programs: one for K-12 students, and the other for community and technical college students. The K-12 program helps students at middle and high schools (and some elementary schools) succeed in math and science and become competitively eligible for college. The community college program takes it one step further by helping students move ahead and ultimately earn a STEM bachelor's degree.

The community college program offers:

- An orientation course that introduces students to STEM careers, learning strategies, and other tools for success.
- Academic Excellence Workshops to help students succeed in STEM courses.
- Academic advising to keep students on track.
- A designated study center where students do homework and establish a learning community.
- Personal help in transferring to a university.
- Direct administrative support for students, which includes a director, faculty, and advisor support.

Legislative request: more MESA

The State Board for Community and Technical Colleges is seeking \$7.3 million in the 2017-19 operating budget to expand the current six MESA pilot colleges⁵ to all 34 colleges across the state.

Proven results

MESA serves students who are traditionally underrepresented in STEM fields, including African Americans, Native Americans, Hispanic/Latinos, Pacific Islanders and women.

Most MESA students are the first in their families to attend college, are low-income, and have not been exposed to STEM curricula and career choices. MESA changes that equation.

At participating community colleges, MESA students were more likely to persist, transfer to a university, and earn a STEM-related bachelor's degree than other under-represented students pursuing STEM studies at those colleges.⁶

Compared to the rest of the community college system, MESA colleges produce a greater share of Associate of Science-Transfer degrees (AS-T) with more diverse graduates.

- **Increased degree production:** Preliminary research results of MESA show 52 percent of students entering the MESA program between 2011 and 2013 went on to earn a two-year degree by 2016. Nearly half earned a STEM degree.⁷
- **Graduates became more diverse:** MESA colleges produced more AS-T degrees between 2010 and 2015 by graduating a greater share of under-represented students who might otherwise have chosen a non-STEM path. The colleges increased the share of STEM degrees by 5 percent for Black/African-American, Hispanic/Latino, Alaska Native/Native Americans and Pacific Islanders compared to the rest of the college system. MESA graduates are also more likely to be first generation college students (47 percent compared to 43 percent), and they are more likely to be women (30 percent compared to 26 percent).⁸

In the first MESA graduating class of 2011-12, 100 percent of the students who earned bachelor's degrees majored in STEM fields.⁹

National recognition

Started in California, MESA has been named one of the most innovative programs in the nation by Innovations in American Government, a project of the Kennedy School of Government at Harvard University.¹⁰ MESA is also a winner of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.¹¹

MESA answers a call from the National Academy of Sciences for our nation to “draw on the minds and talents of all Americans, including minorities who are underrepresented in science and engineering and currently embody an underused resource and a lost opportunity.”¹²

MESA provides a life-changing experience for talented students to develop their skills, succeed in college, and experience a fulfilling STEM-based career.

Sources:

1. Testimony before the House Higher Education Committee, Feb. 25, 2014.
2. STEM stands for “science, technology, engineering, math.”
3. Great Jobs Within our Reach: Solving the Problem of Washington State’s Growing Skills Gap,” Washington Roundtable, March 2013.
4. Ibid.
5. Olympic College, Edmonds Community College, Seattle Central College, Highline College, Yakima Valley College and Columbia Basin College.
6. Washington MESA Community College Program Overview, Data & Highlights, by Washington MESA, Jan. 19, 2014.
7. Washington State Board for Community and Technical Colleges Research Department, Oct. 18, 2016. Forty-six percent of students earned a STEM degree or the 90 credit associate degree-direct transfer agreement with over 55 credits in calculus, statistics, science and engineering.
8. Washington State Board for Community and Technical Colleges Research Department, Oct. 18 2016.
9. Washington MESA Community College Program Overview, Data & Highlights, by Washington MESA, Jan. 19, 2014.
10. Innovations in American Government Awards, Kennedy School of Government at Harvard, awarded to California MESA in 2001.
11. Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, California MESA 2000.
12. Expanding Underrepresented Minority Participation: America’s Science and Technology Talent at the Crossroads, National Academy of Sciences, National Academy of Engineering and Institute of Medicine, 2011.



Partnering for Student Transfer Success



Independent Colleges of Washington
Better Together: Partners in Student Success

Washington's community and technical colleges, private non-profit baccalaureate, and public baccalaureate colleges and universities have a proud history of partnering to serve students. Nowhere is our cooperation more evident than in the smooth transfer process from community and technical colleges into the four-year colleges and universities.

National research cites four factors that lead to efficient transfer ^{1,2}

1. Complete an associate's degree before transfer.

Washington students transfer with an associate's degree and earn bachelor's degrees at much higher rates than students nationally.

	Washington	Nationally
% transferring with AA degree	66%	20%
BA within 3 years post-transfer ◆ Transferred with AA	68%	41% ³
BA within 3 years post-transfer ◆ No AA	60%	31%
BA within 6 years post-transfer ◆ Transferred with AA	81%	72%
BA within 6 years post-transfer ◆ No AA	75%	56%

2. Follow a clear pathway. Statewide transfer agreements allow students to transfer to universities with two years of college-level coursework with general education requirements, already completed (for DTA).

Direct Transfer Agreement associate's degree (also called "the DTA") with clear pathways –

Major Related Programs in:

- ◆ Biology
- ◆ Business
- ◆ Computer Science
- ◆ Construction Management
- ◆ Math Education
- ◆ Music
- ◆ Nursing
- ◆ Pre-Nursing

Associate of Science – Transfer (AS-T) — with

Major Related Programs in:

- ◆ Bioengineering and Chemical Engineering
- ◆ Computer and Electrical Engineering
- ◆ Mechanical/Civil/Aeronautical/Industrial/ Material
- ◆ Engineering Technology

Transfer degrees are honored by all Washington's public and most private colleges and universities.

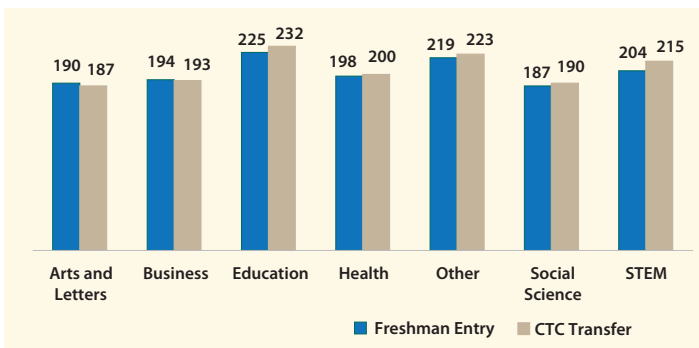
Key Facts

- ◆ **16,025** Washington students transferred from community and technical colleges to four-year institutions in 2014-2015.
- ◆ Transfer students are **40%** of all bachelor's degree graduates from Washington public colleges and universities, including:
 - ✓ 47% of business graduates
 - ✓ 46% of health field graduates
 - ✓ 35% of STEM majors graduates
- ◆ Washington **ranks 1st in the nation** for the average rate by which a community college student transfers to a four-year institution earns a bachelor's degree within six years of entering higher education.
- ◆ Washington **ranks 5th in the nation** for the average rate by which a community college transfer student earns a credential before transferring to a four-year institution.
- ◆ Two basic **associate's degrees smooth the process** for the majority of WA transfer students:
 - ✓ DTA for social sciences, humanities and some sciences
 - ✓ AS-T for engineering, physics, chemistry
- ◆ **98% of AS-T** graduates who earn a bachelor's degree do so in a STEM-related field.

Partnering for Student Transfer Success

3. Make sure all academic credits transfer. In Washington, transfer students graduate with a bachelor's degree with a similar number of total credits as those who start at four-year universities as freshmen. This is not true nationally, where "lost" credits result in far more total credits and more expense for the average transfer student.

*"Students who transferred almost all of their community college credits were 2.5 times more likely to earn a bachelor's degree than students who transferred fewer than half of their credits."*⁴



4. Utilize a multi-sector group to solve emerging issues. The **JOINT TRANSFER COUNCIL** is a collaboration that includes the community and technical colleges and public and private baccalaureate institutions that guides college-transfer policy across the state. It is involved in the development of new transfer pathways and new multi-institution agreements. Its members continually look at emerging issues and opportunities to make the transfer experience better.

"Washington state is fortunate to have a 40-year history of public two- and four-year institutions working together to facilitate the transfer process for students."

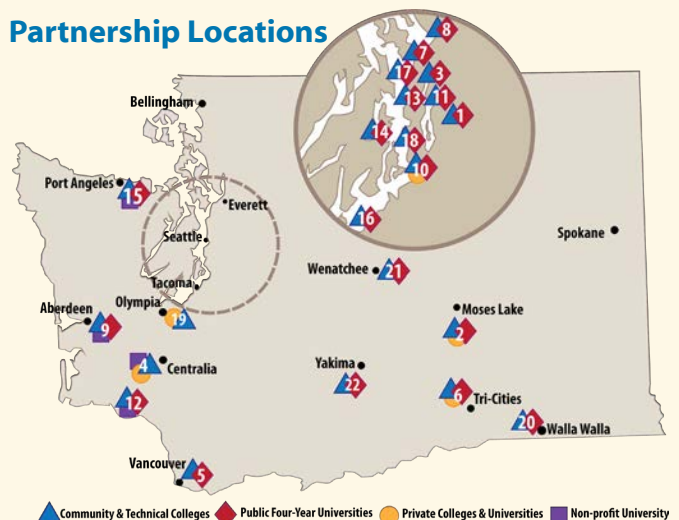
Community College Research Center, Columbia Teachers College. July 2014⁵

University bachelor's degrees are also available at most of Washington's 34 community and technical colleges.

Campus-based partnerships (degrees vary by location)

1. Bellevue College – EWU
2. Big Bend Community College – CWU
3. Cascadia College – UW
4. Centralia College – City U/St. Martin's
5. Clark College – EWU
6. Columbia Basin College – WSU/Heritage
7. Edmonds Community College – CWU
8. Everett Community College – CWU/EWU/WWU/ Evergreen/UW/WSU/Hope International Univ.
9. Grays Harbor College –Evergreen
10. Highline College – CWU
11. Lake Washington Institute of Technology – CWU
12. Lower Columbia College – EWU /WSU /City U/ Warner Pacific Univ
13. North Seattle College – CWU/EWU/WWU
14. Olympic College – Brandman Univ/Old Dominion Univ/WSU/WWU
15. Peninsula College – CWU/WWU/Evergreen/ City U
16. Pierce College Ft Steilacoom – CWU
17. Shoreline Community College – UW
18. South Seattle College – EWU
19. Tacoma Community College – St. Martin's
20. Walla Walla Community College – WSU
21. Wenatchee Valley College – CWU
22. Yakima Valley Community College – CWU/WSU

Partnership Locations



1. WICHE, *Successful Student Transfer: A Key Building Block of the Completion Agenda*, November 2014.
2. Community College Research Center, Columbia University, January 2015.
3. Crosta, P.M. and Kopko, E.M., *Should Community College Students Earn Associate Degree Before Transferring to a Four-Year Institution?*, Community College Research Center, 2014.
4. Community College Research Center, Columbia University, January 2015.
5. Community College Research Center, Columbia University, July 2015.

STEM update: Computer Science and IT programs

Nancy Dick

Director, Workforce Education, SBCTC

**COMPUTER
SCIENCE
TRANSFER
DEGREES**

- Associate of Applied Science (AS-T) completers

Track 2, engineering/physics, includes some CS

- 796 completions 2016-2017*

Computer and Electrical Engineering AS-T

- 45 completions 2016-2017*

- Associate in Computer Science DTA/MRP recently approved, currently being implemented

* Source: SBCTC Research department, preliminary data

MESA PROGRAM

Mathematics, Engineering, Science Achievement

- Support for students traditionally under-represented in STEM fields
- Many first in family to attend college, low-income
- New legislative funding of \$750K/year to add six colleges (double CTC system capacity)
- Strong outcomes for MESA participants, including better completion rates and increased share of under-represented populations

**WORKFORCE
CS/IT
PROGRAMS**

- Nearly **500** programs across **34** colleges including software engineering, application development, UX/UI, computer networking, cybersecurity, support technician, data analyst, database technology
- **158** applied baccalaureate completions in 2016-2017 in Computer Science/Information Technology fields; double previous year
- **1034** Associate of Applied Science completions
2016-2017 492 long certificates (one year) 492
2016-2017
- **1908** short certificates (< one year; typically skill upgrades)

* Source: SBCTC Research department, preliminary data

**CENTER OF
EXCELLENCE
FOR
COMPUTING AND
INFORMATION
TECHNOLOGY**

- Connects employers, K12 and university partners with community and technical college programs
- Provides research and reports on industry trends, current and future workforce demand, industry perceptions of the CTC system and its graduates, and emerging technology developments
- Maureen Majury, Director
maureenmajury@bellevuecollege.edu

<http://www.coeforict.org/>
<http://yourfuturein.it/wainfotech/earn-a-bachelors-of-applied-science-in-it/>



Colleges and universities sign new transfer agreements for computer science, music

June 03, 2016 by SBCTC Communications and Council of Presidents

[Facebook](#) [Twitter](#) [LinkedIn](#) [Email](#)

OLYMPIA, Wash. — Higher education officials today announced two new agreements aimed at giving future community and technical college transfer students a jump start on bachelor's degrees in computer science or music.

The new “major related programs” are specialized versions of Washington’s decades-long direct transfer agreement, which allows students to finish the first two years of their bachelor’s degrees at a community or technical college and then transfer as juniors. The new agreements go one step further by including credits that apply directly to either a computer science or music major.

“This gives students a direct route toward a computer science or music major, and provides students with access pathways to meet their goals,” said Julie Garver, associate director for academic policy for the [Council of Presidents \(http://councilofpresidents.org/\)](http://councilofpresidents.org/), the organization representing four-year public colleges and universities.

The new agreements include all 34 community and technical colleges and all six public universities and build on the nearly 50 years of transfer work between the community and technical colleges and four-year institutions in Washington. Transfer students who earn a degree under either of the two agreements are guaranteed a set of their credits will meet certain prerequisites for the majors.

Joyce Hammer, director of transfer education for the [State Board for Community and Technical Colleges \(/default.aspx\)](http://www.sbctc.edu/)(SBCTC), said the new agreements are the latest chapter in a long history of cooperation between community and technical colleges and four-year universities.

“Every year, about 20,000 community and technical college students transfer to four-year universities,” said Hammer. “These agreements are just one more way we’re partnering to move students through college faster and move Washington closer to its higher education goals.”

The new agreements were crafted through the Council of Presidents, SBCTC and the Washington Student Achievement Council, along with the Independent Colleges of Washington. Garver and Hammer credited faculty for working to identify the common components of computer science and music degrees among four-year universities, and then match those to common courses among the state’s community and technical colleges.

Statewide direct transfer agreements already exist for biology, business, nursing, pre-nursing, technology and construction, and in math education for aspiring secondary teachers. The latest agreements add computer science and music to the list.

Transfer agreements don’t guarantee that students will be admitted into universities or their majors; students must still competitively apply for admission.

Mobile, Virtual Reality, and Wearable Interaction



EyeContact
High accuracy scleral coil eye tracking for virtual reality



Finexus
Tracking accurate finger motions using magnetic sensing



MagnifiSense
Wrist-worn magnetic sensor that monitors daily activity



SideSwipe
Detect in-air gestures using unmodified GSM signals



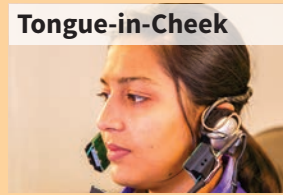
GripSense
Using built-in sensors to detect hand posture and pressure on phones



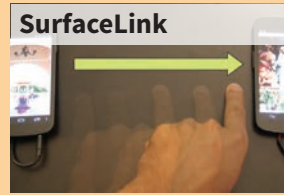
PaperID
Paper interfaces based on long-range, passive RFID



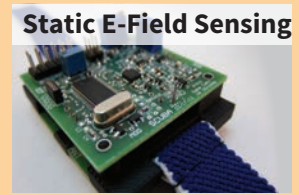
SwitchBack
Using gaze tracking on smartphones to guide attention for task resumption



Tongue-in-Cheek
Wireless signals to enable non-intrusive and flexible facial gesture detection

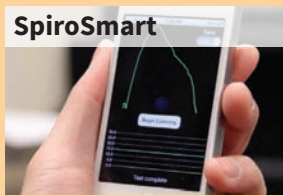


SurfaceLink
Impromptu multi-device interactions on a surface



Static E-Field Sensing
Ultra-low power human body motion sensor using static E-field sensing

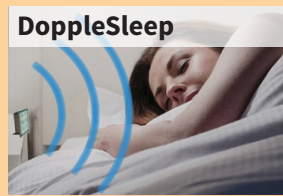
Health Technologies



SpiroSmart
Spirometry from a mobile phone



BiliCam
Using mobile phones to monitor newborn jaundice



DoppleSleep
Sleep stage estimation through non-contact physiological signal sensing



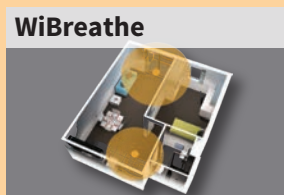
CoughSense
Automatic, ambulatory cough monitoring from a mobile phone



OsteoApp
Screening for osteoporosis on a smartphone using vibration



iPressure
A smartphone-based system for assessing intraocular pressure



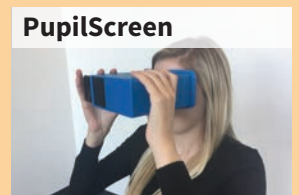
WiBreathe
Sensing breathing in natural settings using 2.4GHz wireless signals



HemaApp
Noninvasive screening of hemoglobin concentration using a smartphone camera

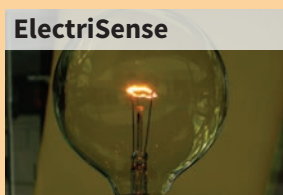


BPSense
Monitor changes in blood pressure using an unmodified smartphone

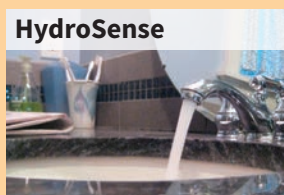


PupilScreen
Using smartphones to assess significant head trauma

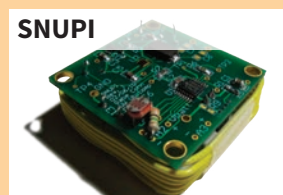
Sustainability and Low-power Sensing



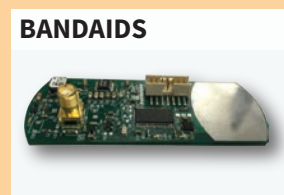
ElectriSense
Whole-home, single-point sensing of disaggregated electricity usage



HydroSense
Whole-home, single-point sensing of disaggregated water usage



SNUPI
Ultra-low-power wireless sensor nodes utilizing powerline infrastructure



BANDAIDS
Power transfer through the body with NFC



DOSE
Sensing operating states of home electronic appliances from EMI

AWARDS

- 31 best paper awards & nominations in 7 years
- 4 National Science Foundation Fellows
- 1 National Defense in Science and Engineering Fellow
- 4 Microsoft Research Fellows
- 3 UW College of Engineering Innovator Awards
- 2 Qualcomm Innovation Fellows

PROFESSOR SHWETAK N. PATEL AWARDED:

- MacArthur 'Genius' Award
- Sloan Research Fellow
- Presidential Early Career Award for Scientists & Engineers (PECASE)
- TR-35 Top innovator
- Microsoft Research Faculty Fellow

FUNDING SOURCES AND COLLABORATIONS:





A means of measuring total hemoglobin in the blood using a smartphone's camera and flash. Many health conditions — such as anemia, malnutrition and pulmonary illnesses — impact hemoglobin levels. This app is not only a disease screening tool but it can also help medical professionals assess the nutritional well-being of individuals and communities. Current monitoring requires blood samples or expensive equipment. By eliminating the need for blood draws, HemaApp alleviates concerns about sample contamination or infection.

✓ HemaApp



✓ SpiroSmart

Hundreds of millions of people world-wide suffer from chronic respiratory diseases, and millions die each year. SpiroSmart measures lung function by having the patient blow into a phone's microphone, replacing an expensive dedicated spirometer for diagnosing and managing asthma, cystic fibrosis and other pulmonary diseases. SpiroCall is a related project that is particularly useful in low-resource settings where smartphone access is limited. It turns any ordinary phone into a spirometer through a toll-free calling service.

✓ BiliCam

An alternative for detecting newborn jaundice — which can lead to brain damage and death — using a smartphone's camera and flash. Instead of looking for “yellowness” in the skin, the camera and flash together measure the amount of bilirubin in the blood by examining wavelengths of light absorbed by the skin. In the U.S., this app will enable parents and general practitioners to screen before involving a specialist. In many parts of the world, midwives and traveling nurses more commonly deliver babies. Currently they have no screening tool for jaundice; this app will provide them with one.



✓ BPSense

Measures blood pressure by using Pulse Transit Time (PTT) analysis, the time taken by a pressure pulse to travel through the arteries. One method uses a phone's dual camera to measure a person's pulse at his/her fingertip and ear simultaneously. A second method uses a phone's microphone and camera to listen to the patient's heart beat and measure pulse at his/her fingertip. In addition to tracking, BPSense can also remind individuals to check their blood pressure at various times throughout the day.



✓ CoughSense

Coughing is the number one symptom individuals report when experiencing an illness. Currently, to assess coughing, patients are asked to self-monitor or wear specialized equipment. CoughSense uses the phone's microphone to monitor cough frequency for a single person or, when networked, to track trends across an entire population. In this way, it will be an important tool in monitoring the spread of diseases such as influenza or tuberculosis through pattern recognition in high-density areas. Further analyzing the cough signal could uncover the cause of certain symptoms.



Find out more...

<http://ubicomplab.cs.washington.edu>

Ubiquitous Computing Lab
University of Washington
Professor Shwetak N. Patel

health @ ubicomplab

UNIVERSITY OF WASHINGTON

Enabling smart care through smartphones



College of

Education

WASHINGTON STATE UNIVERSITY

College of Education STEM Education Research Summit

September 27th, 2017

Welcome – Dean Mike Trevisan and Noel Schulz

Keynote Speaker – WA STEM

Research Presenters and Topics

Chad Gotch and Janet Frost: Chad Gotch's and Janet Frost's research explores the effectiveness of STEM high schools and their innovative approaches to teaching and learning, focusing on the Riverpoint Academy in Spokane.

Paula Groves Price: Paula Groves Price's research aims to increase Native students' interest in STEM fields. Current projects focus on bringing Native students and teachers to WSU for STEM activities and increasing Native student success in STEM and medical fields.

Tamara Holmlund: Tamara Holmlund's research explores how teachers learn about and implement STEM education in various types of schools, how students learn through project-based STEM activities, and how leadership (e.g., principals, educational administrators) affects STEM education.

Don McMahon: Don McMahon's research aims to help students with disabilities succeed using assistive technologies such as mobile devices, virtual reality, augmented reality and wearable devices.

Amy Roth McDuffie: Amy Roth McDuffie's research aims to improve mathematics instruction by investigating mathematics teachers' professional development, use of curriculum resources, and culturally relevant practices.

David Slavit: David Slavit's research involves two areas: mathematics teachers' professional development, and students' learning of mathematics, with an emphasis on algebraic thinking.

Closing Remarks by **Dean Trevisan and President Kirk Schulz**

Networking Reception to follow

For more information, go to <https://education.wsu.edu/events/stemsummit/>



Washington State CEMETS Delegation Summer 2017

ETH zürich KOF

KOF Swiss Economic Institute

Purpose of the Trip

Learn about the Swiss apprenticeship system and how it might apply to Washington State

Inform the Governor's Career Connect Washington Initiative

Inform our state vision, goals, and strategies to build a robust career connected learning system that includes registered youth apprenticeship

Swiss Summer Institute Washington Delegation

Marie Bruin, Washington State Employment Security Department

Bri Durham, Aerospace Joint Apprenticeship Committee

Nova Gattman, Workforce Training and Education Coordinating Board

Teesha Kirschbaum, Washington State Rehabilitation Council

Tim Knue, Washington Association for Career and Technical Education

Amy Liu, Microsoft Philanthropies

Michaela Miller, Office of Superintendent of Public Instruction

Christopher Nesmith, West Valley School District

Natalie Pacholl, SEH America

Shana Peschek, Construction Center of Excellence

Gilda Wheeler, Washington STEM



Switzerland



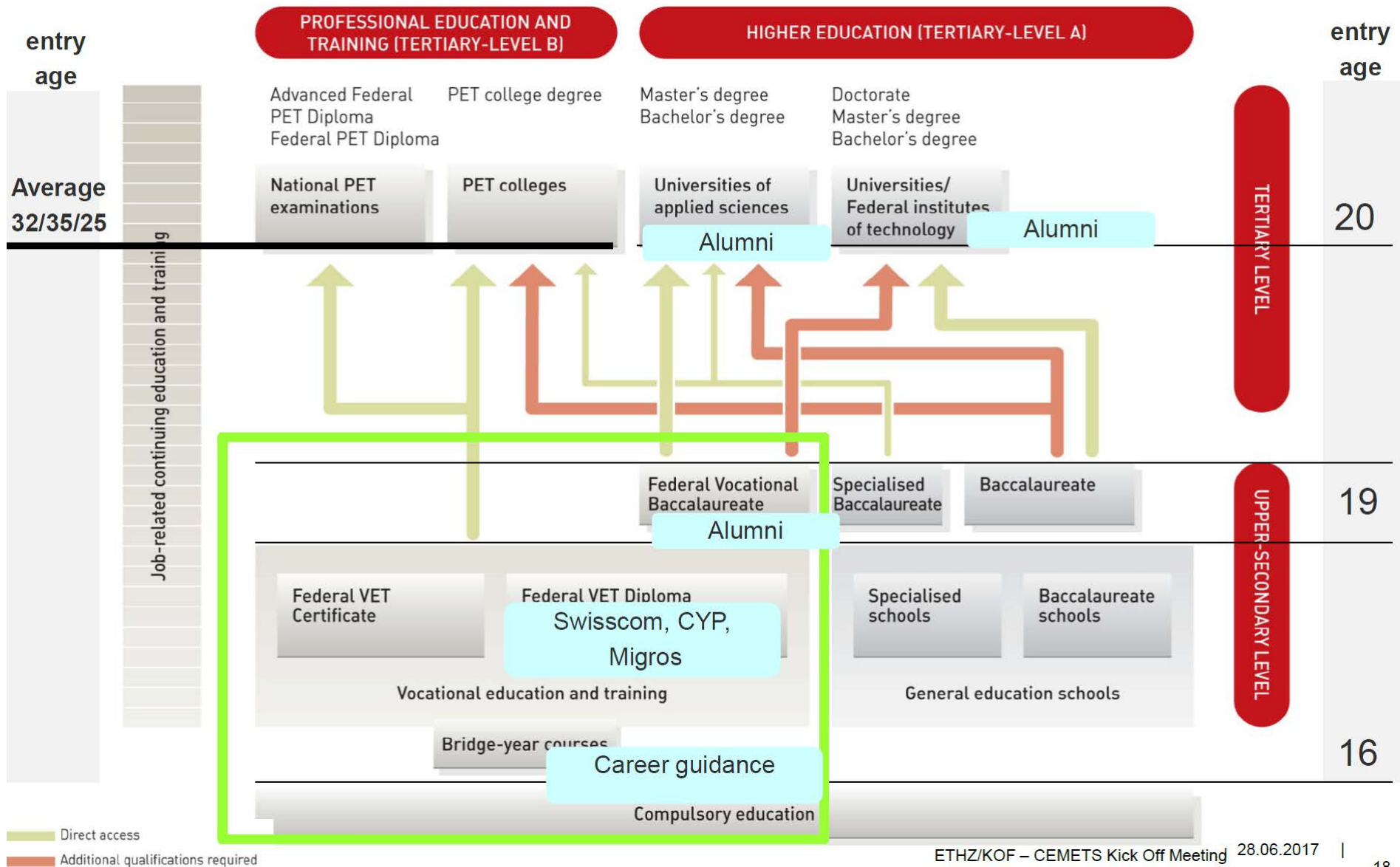
- Population: 8.3 M
- Median gross income \$6K/month
- 15.9K square miles
- 4 national languages

Washington



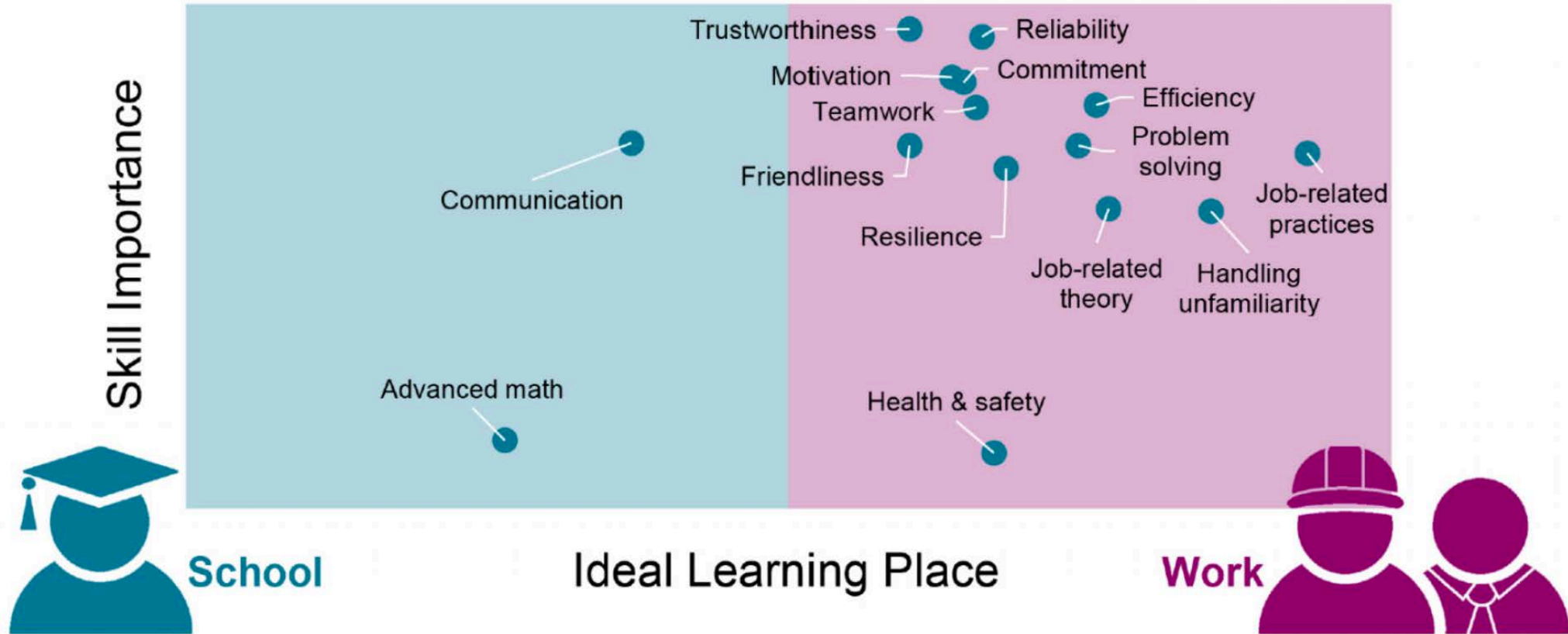
- Population: 7.12 M
- Median gross income \$5.5K/month
- 71.4K square miles
- Over 80 languages spoken in some school districts

The Swiss Education System – Permeability



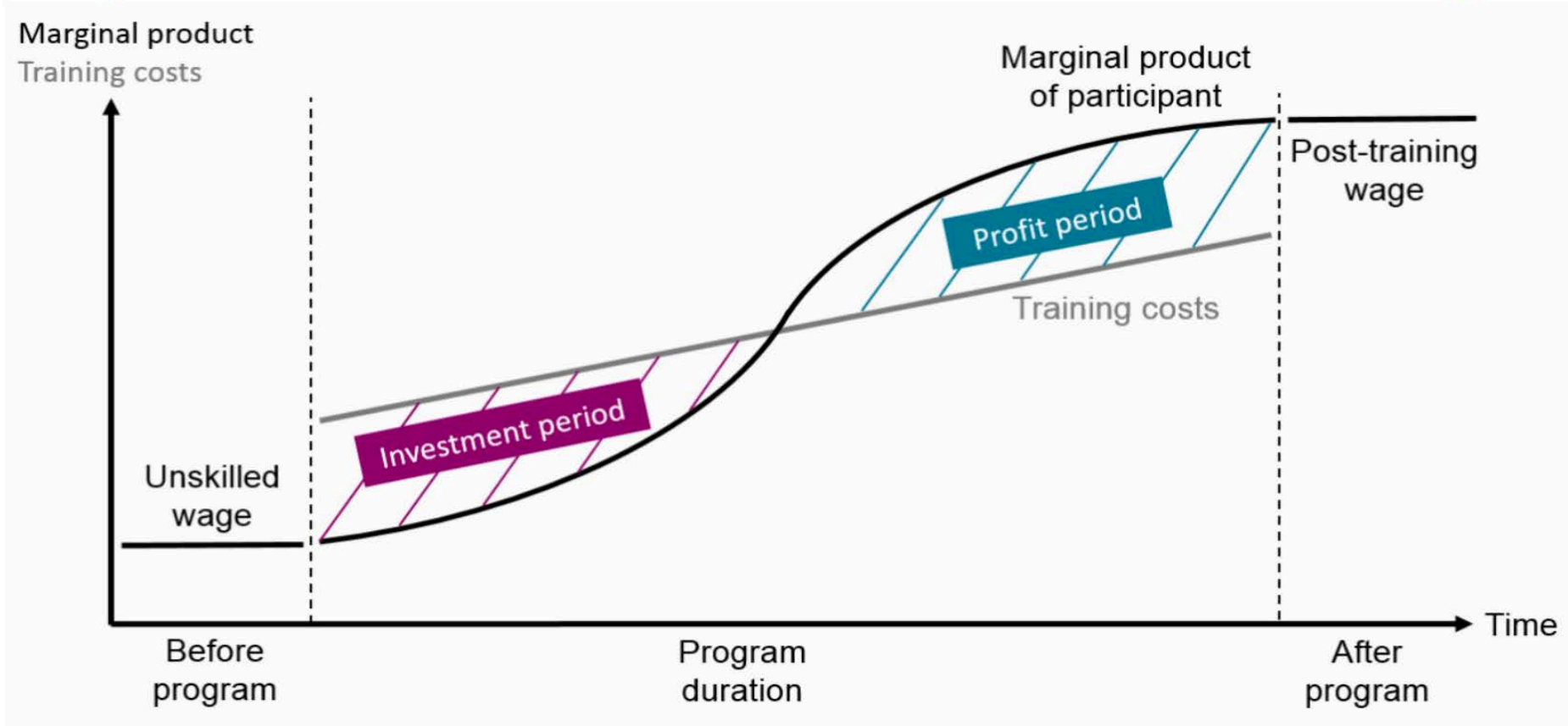
KOF WTT Survey

Where are key skills best learned?



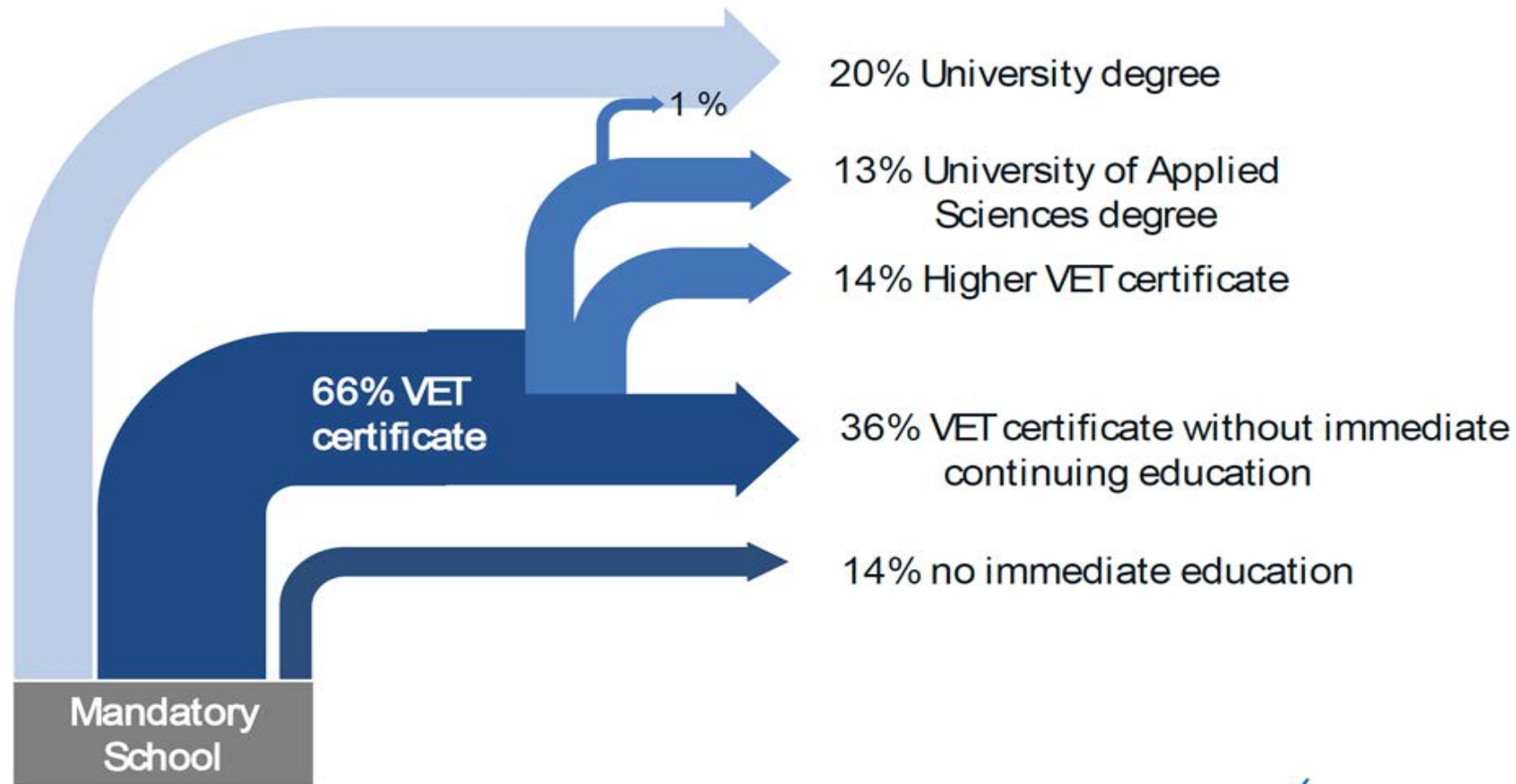
KOF WTT Survey

Companies want cost-benefit-balanced training



Swiss education system

Current overall education levels / permeability



Model for VET programs (3/4 years)

Practical skills

Theoretical skills



In-company training

Learning on the job

3 to 4 days per week

Intercompany courses

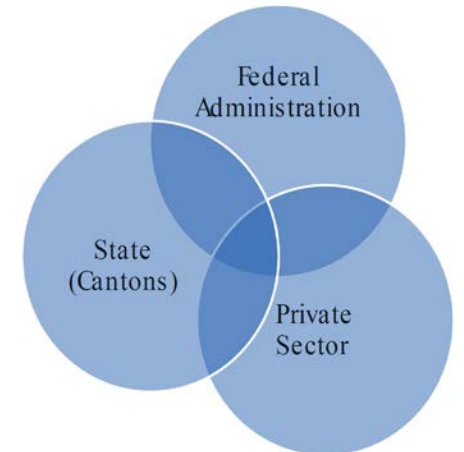
Basic skills

Block courses
40 to 50 days
(1st and 2nd year)

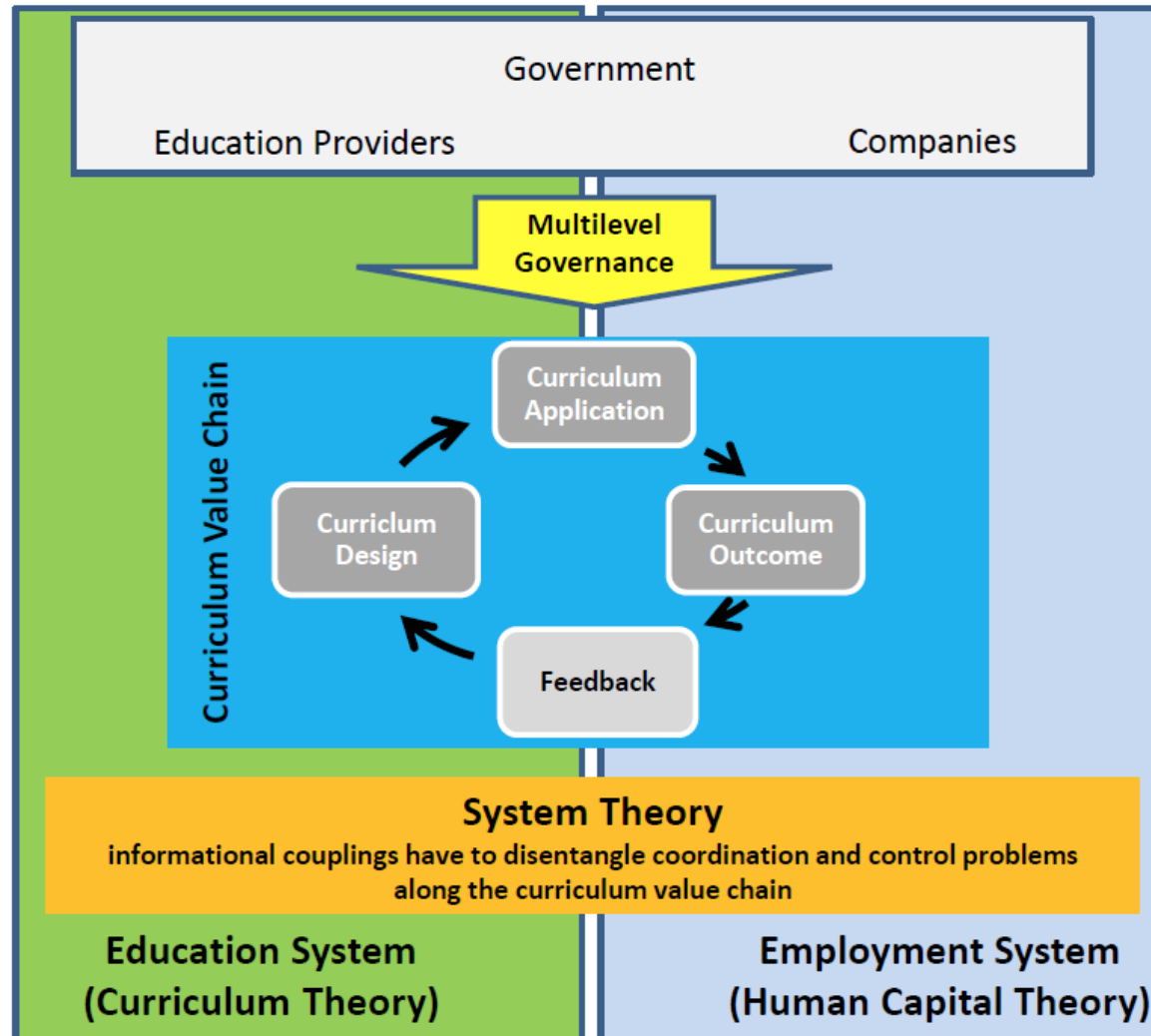
Vocational schools

Theoretical knowledge

1 to 2 days per week



System Design



Hallmarks of the Swiss youth apprenticeship system

- Transparency
- Permeability
- Employer engagement