

Integrating Professional Skills into Information and Computing Technology (ICT) Academic Programs

Executive Summary

This report provides a review of the increasing importance of professional skills in Washington’s information and computing technology (ICT) job market. We review two programs that have developed professional skills curricula and supporting resources: the National Convergence Technology Center (National CTC) and the New World of Work (NWoW) 21st Century Skills. The report identifies several strategies for integrating professional skills into new and existing tech curricula, including new course development, integration into existing curricula, and online learning platforms. Providing project- and work-based opportunities for tech learners to develop professional skills are highly recommended components of each strategy. Faculty development is a crucial component for each strategy’s development, implementation and success.

Introduction

This report provides a review of the current tech labor market¹ with models and approaches for instructing professional skills within information and computing technology (ICT) workforce education programs at Washington’s community and technical colleges (CTCs).

The skills gap – under or unemployed workers faced with employers expressing difficulty finding qualified candidates – requires active and productive relationships between CTCs and the industries they serve. Employers invariably seek proven technical skills; in today’s competitive job market, however, applicants must also demonstrate *professional skills*. Soft skills, employability skills, 21st century skills, to name a few, are what we refer to as professional skills.²

Professional skills are an increasingly crucial consideration in employer hiring decisions globally.³ These higher cognitive skills include communication, collaboration, critical thinking, problem solving, time management, and the ability to work independently.¹ For instance, as automation increasingly replaces people in routine job tasks due to new generative Artificial Intelligence (AI) technologies, remaining tasks

¹ [Standard Occupational Code \(SOC\) 15-1200](#) occupational cluster.

² The term “soft” is squishy and subjective but unfortunately (at least for us) the term is here to stay. We prefer to use the term professional skills and also use related terms in the report depending on the context and information source. It is ironic that professional skills are considered soft - such skills are arguably the hardest to achieve for long term career success.

³ Professional skill requirements are reflective of larger global trends, with academic papers exploring this topic across disciplines such as engineering in multiple countries, including the Philippines, India, Pakistan, South Africa, Australia, New Zealand, France, UK and Europe. See, for instance, Nataliia Zinukova. 2022. “Development and mastery of soft skills among graduate students,” *Ukrainian Journal of Educational Studies and Information Technology*, Vol 10, Issue 4.

for people require higher level cognitive skills and experiences in problem solving, critical thinking and adaptability. More highly skilled workers in these areas tend to have higher wage growth over time than less skilled workers performing routine or repetitive, low skill tasks.ⁱⁱ

By providing professional skills development opportunities while teaching the required technical knowledge, Washington CTC tech programs will be better equipped as they prepare their learners for success. The key is to find cost-effective strategies for both the educational providers and students, i.e., integrating professional skills development into existing curricula as well as providing new and innovative curriculum development strategies.

The report provides a companion labor market update, especially in light of post-pandemic layoffs that accelerated across tech companies in the first half of 2024.ⁱⁱⁱ The layoffs have been offset by increased reliance on tech positions across industries due to the increasing adoption of new technologies across industries, including agriculture, manufacturing, healthcare and professional services. New technologies include the adoption of AI technologies in operations, increased reliance on online and remote operations requiring technical staff to address complex operational needs onsite and remotely, and growing demand for skilled occupations in software development, data-driven operations, and ICT support.

Increased automation and the rapid adoption of AI applications in multiple business operations is also driven by staffing challenges post-pandemic, changing demographics, and talent constraints. In response, colleges are developing ICT academic programs responsive to current and emerging technology needs. We believe that professional skills development should be an integral part of these conversations.

Project Objective

The Center of Excellence for Information and Computing Technology is positioned to provide resources to CTCs on professional skills and other skill in-demand by industry. This report provides:

- An analysis of professional skills that are most in-demand in tech jobs is based upon labor market data, ICT skill standards and other resources
- A review of what it means to have and successfully use those skills in the context of a tech career
- Details of how colleges are incorporating soft skills into ICT curricula
- Where students/learners/job seekers can attain these skills currently.

Tech learners need increased access to professional skills development that leads to better educational and career outcomes. Our hope is that this report helps frame future conversations, supports pilot program development, and contributes to related initiatives that enable college faculty to more easily teach and assess these skills.

Washington Tech Sector Snapshot

Washington is a leading state for tech jobs and is likely to continue to attract and retain tech jobs throughout the state in tech companies as well as across industries including agriculture, manufacturing and professional and retail services.

Employment

CompTIA estimates current net tech employment of 358,616 positions in both tech and non-tech industries statewide with a total economic impact of \$142.2 billion or more than one fifth of Washington state's economy (21.8%). There are more than 20,000 tech business establishments statewide with a total of approximately 63,000 job postings in 2023.

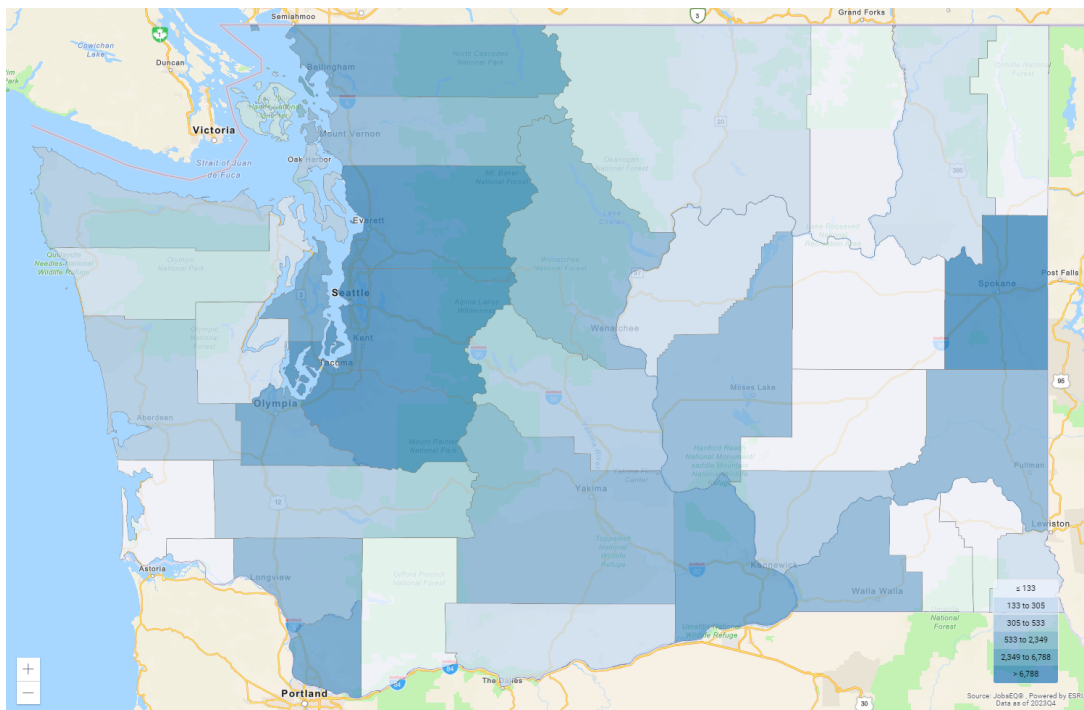
By the numbers - Washington State:

- 1st nationwide in terms of concentration of tech workers relative to the state's overall employment base (9.4%)
- 1st nationwide in terms of tech economic impact as a percent of the total state economy (21.8%)
- 5th nationwide in terms of net tech employment gains
- 6th nationwide in terms of net tech employment, with approximately 359,000 jobs.^{iv}

In terms of metro areas, the greater Seattle area is the seventh largest metro area nationwide in terms of net tech employment (287,621) and the second largest metro area in terms of economic impact as a percent of the local economy, outpaced only by San Jose.^v Not surprisingly, the greatest concentration of tech jobs is the Seattle and broader King, Snohomish and Pierce county region (Figure 1).

Within the ICT occupational cluster (SOC 15-1200), software developers have the largest share of jobs, followed by computer user support specialists, and computer systems analysts (Figure 2). Location quotient is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. The high location quotients show continued strong demand for ICT occupations statewide.

Figure 1. Geographic distribution of tech jobs in Washington



Source: JobsEQ®, <http://www.chmuraecon.com/jobseq>.

Figure 2. Tech occupation snapshot

6-Digit Occupation	Empl	Avg Mean Wages	LQ	3-Year Empl Change	Annual Demand	Forecast Ann Growth
Software Developers	91,260	\$161,900	2.44	17,429	7,396	2.4%
Computer User Support Specialists	21,781	\$77,300	1.30	3,864	1,605	0.6%
Computer Systems Analysts	17,583	\$133,500	1.46	2,422	1,224	1.0%
Computer Occupations, All Other	13,376	\$117,900	1.32	2,214	979	0.9%
Software Quality Assurance Analysts and Testers	10,217	\$118,900	2.21	1,965	861	1.9%
Network and Computer Systems Administrators	8,553	\$113,700	1.10	938	506	0.3%
Web and Digital Interface Designers	6,194	\$122,600	2.28	1,299	570	1.8%
Information Security Analysts	5,485	\$141,000	1.40	1,374	507	2.8%
Computer Network Architects	4,973	\$159,200	1.20	997	284	0.4%
Web Developers	4,936	\$141,700	2.18	1,024	411	1.7%
Remaining Component Occupations	13,371	\$123,900	1.33	361	879	0.4%
Information Technology (CTE Cluster)	197,728	\$137,800	1.76	33,886	15,283	1.7%

Source: JobsEQ®, <http://www.chmuraecon.com/jobseq>.

Demographics

Occupation demographics address age, race, ethnicity, gender, and education and training requirements.⁴

Age

Tech workers are young; those workers 20 to 44 years of age comprise two thirds (66%) of the total age span ranging from 16 to 65 years of age and older.

Race, Ethnicity and Gender

Tech workers are primarily White or Asian, comprising 90 percent of those in tech occupations, almost entirely non-Hispanic/Latino (96%). About four out of every five tech workers are male (78.4%).

Education and Training Requirements

The overwhelming majority of tech workers have a bachelor’s degree (86%), while those with an associate degree or certificate or no award comprise less than 15 percent. As shown in Figure 2, computer user support specialists have the second highest statewide employment in ICT occupations. Individuals interested in computer user support specialist occupations can earn certificates and associate degrees at multiple CTCs statewide to prepare for this in-demand role. Washington CTCs also provide certificate, associate and applied baccalaureate degrees for multiple occupations listed in the information technology occupational cluster.

Rising Demand for ICT Skills in Non-Tech Industries

Another positive development for tech occupations is the increasing demand for ICT skills across multiple industries. In Washington state this is apparent in the growing amount of tech skills needed in industries as

⁴ Data source unless otherwise noted: JobsEQ®, <http://www.chmuraecon.com/jobseq>.

diverse as agriculture, manufacturing, and data center expansion. ICT jobs are large and growing especially outside of the traditional tech industry.^{vi}

The Washington State Achievement Council publishes the *Washington State Higher Education & Labor Market Report (Helm Report)* in collaboration with the Workforce Training and Education Coordinating Board, Washington State Board for Community and Technical Colleges, and the AWB Institute.^{vii} As they report:

Nationally, nine out of ten jobs in computer & information technology are in companies outside the tech sector...Washington jobs data reflects this same trend. In fact, most information technology jobs are in industries such as professional and scientific services, finance and insurance, retail, healthcare, and manufacturing. Operations in all these industries are becoming increasingly digital, requiring workers skilled in Information technology...[Helm Report, page 19]

Some of the largest sectors outside ICT in Washington state for ICT-specific occupations include corporate management, aerospace, and scientific and consulting services.^{viii}

The Washington Technology Industry Association (WTIA) has identified several emerging trends over the next five to ten years that Washington state and Seattle should support and promote:^{ix}

- Generative artificial intelligence (AI) – more on that below
- 5G, edge computing, and digital transformation, for instance, in machine-machine communication
- Continued growth of the cloud and Washington’s status as one of the world’s largest cloud computing hubs, including Amazon Web Services and Microsoft Azure
- Satellite broadband
- ICT in healthcare, maritime and clean energy.

Generative Artificial Intelligence (AI) – Promises and Challenges

Generative Artificial Intelligence (AI) commands significant attention as a potential tech job disruptor; there are benefits as well as challenges, including automation of repetitive development tasks, improved coding accuracy, and more personalized customer experiences such as significant improvements in chatbots and other customer service tools.^x Since Washington state is a major hub for generative AI and intelligent applications (Microsoft owns ChatGPT for instance), there is likely to be continued strong demand for AI development and adoption across tech occupations.^{xi}

Washington students continue to pursue computer science degree programs, outstripping the academic slots available. Despite recent attention on tech layoffs, recent layoffs at Amazon were intended specifically for the company to focus its efforts on AI, and the company is offering free AI skills training and education to two million people globally by 2025.⁵ Washington colleges and universities are expected to continue seeing high demand for computer science degrees, and employers continue to express high demand for graduates.^{xii}

Concern that AI will threaten tech job employment is debatable. A McKinsey study showed that, if anything, AI enables software developers to document code and complete coding tasks more quickly, leading to higher productivity. Developers using generative AI have reported greater job satisfaction as well since it eliminates grunt work and allows them to gather information and solutions more quickly.^{xiii}

⁵ Additional information: <https://www.aboutamazon.com/news/aws/aws-free-ai-skills-training-courses>.

Another potential benefit of AI technology: increased demand for “human” or professional skills such as communication, collaboration, analytical thinking and innovation. An emerging stream of thought is that professional skills will be increasingly critical for new AI technologies, according to one observer. Another industry observer describes research showing that 30 percent of ICT leaders struggle with lack of collaboration across teams and that what was once a highly technical skills-based profession will require increasing levels of professional skills to manage teams in hybrid work scenarios.^{xiv}

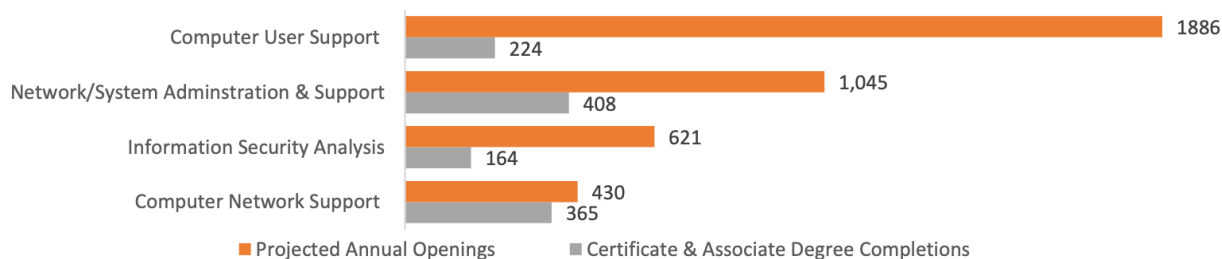
The nexus of AI technologies with human resources is likely to include new resume screening tools, virtual assistants and chatbots, real-world workplace simulations, and performance-based certification exams that likely would include professional skills evaluation.^{xv} Whether these technologies will be widely adopted remains to be seen.

As AI rapidly evolves, one observer summarized, “Human skills will be increasingly important in an AI-driven world.”^{xvi} Some professional skills may also become even more critical to career success, including interpersonal, self-leadership and cognitive skills, for instance, coping with uncertainty, synthesizing messages, and adaptability.

The Midlevel and Bachelor’s Labor Market

Midlevel jobs require education beyond high school but less than a bachelor’s degree. Among these jobs, computer network support specialists and computer user support specialists earn the highest median wages between \$30-\$40 per hour. Selected midlevel computer occupations show job openings greatly outpacing annual certificate and associate degree completions (Figure 3).

Figure 3. Selected midlevel computer occupations – projected annual openings and completions 2021-22

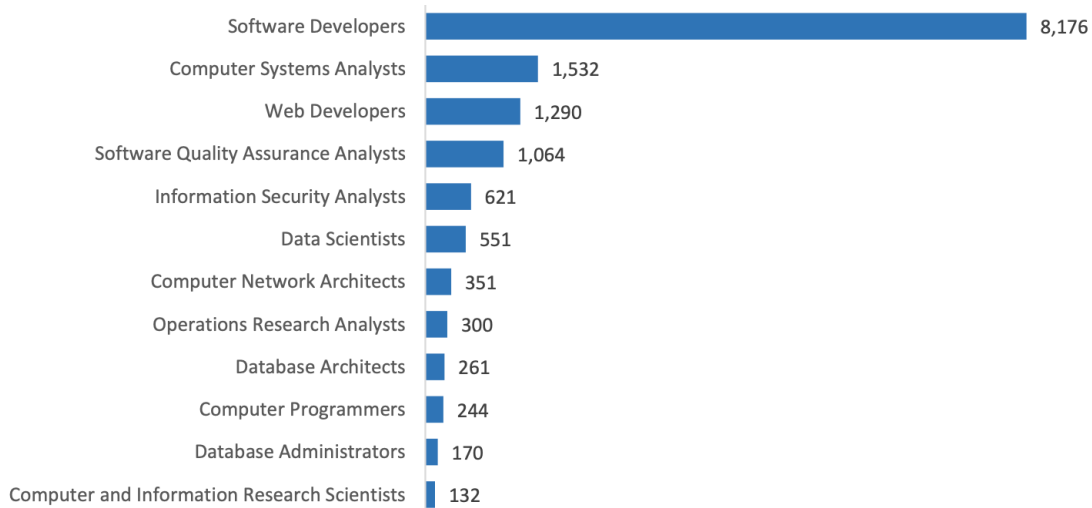


Source: Lightcast Q4 2023 Data Set; ESD; Integrated Postsecondary Education Data System

Source: Washington State Higher Education & Labor Market Report (Helm Report).

At the bachelor’s degree level – relevant to CTC applied ICT baccalaureate degree programs – software developers are expected to remain in very high demand, driven in part by AI developments focused on how work is carried out and increasing productivity. In the computer and information technology fields overall, certificate and degree completions are significantly fewer than projected annual job openings in Washington expected between 2023-2033 – 15,307 projected annual openings versus 3,296 estimated bachelor or higher degree completions (Figure 4).

Figure 4. Computer & information science occupations projected annual openings 2023-33 – Bachelor’s level and above



Source: Lightcast Q4 2023 Data Set; Washington State Employment Security Department (ESD)

Source: Washington State Higher Education & Labor Market Report (Helm Report).





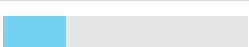
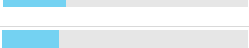


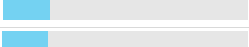
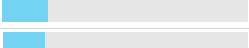
Tech Career Focus – Professional Skills for Diverse Learners

The focus of this report is professional skills development. We’re most interested in assessing employer demand for professional skills and proven and promising teaching practices that Washington’s community and technical colleges can adopt. In this section we explore two approaches from the National Convergence Technology Center (National CTC) and the New World of Work (NWoW) 21st Century Skills.

When it comes to hiring practices, human resource (HR) and learning and development (L&D) leaders are examining new practices and approaches to employee experience, skills-based hiring and development, and the effect of new technologies such as AI on new skill requirements.^{xvii} Demonstrated professional skills is a significant aspect of the hiring process.

There was a total of 67,800 active tech job postings in Washington state from May 2023 to May 2024. Active job ads listed the following professional skills in order of total active job ads requiring the specific skill. Communication (verbal and written) skills was listed most frequently, followed by cooperative/team play, problem solving and project management. Figure 5 shows the ten most frequently listed professional skills.

Figure 5. Professional skills posted in Washington State active tech job ads, May 2023 to May 2024

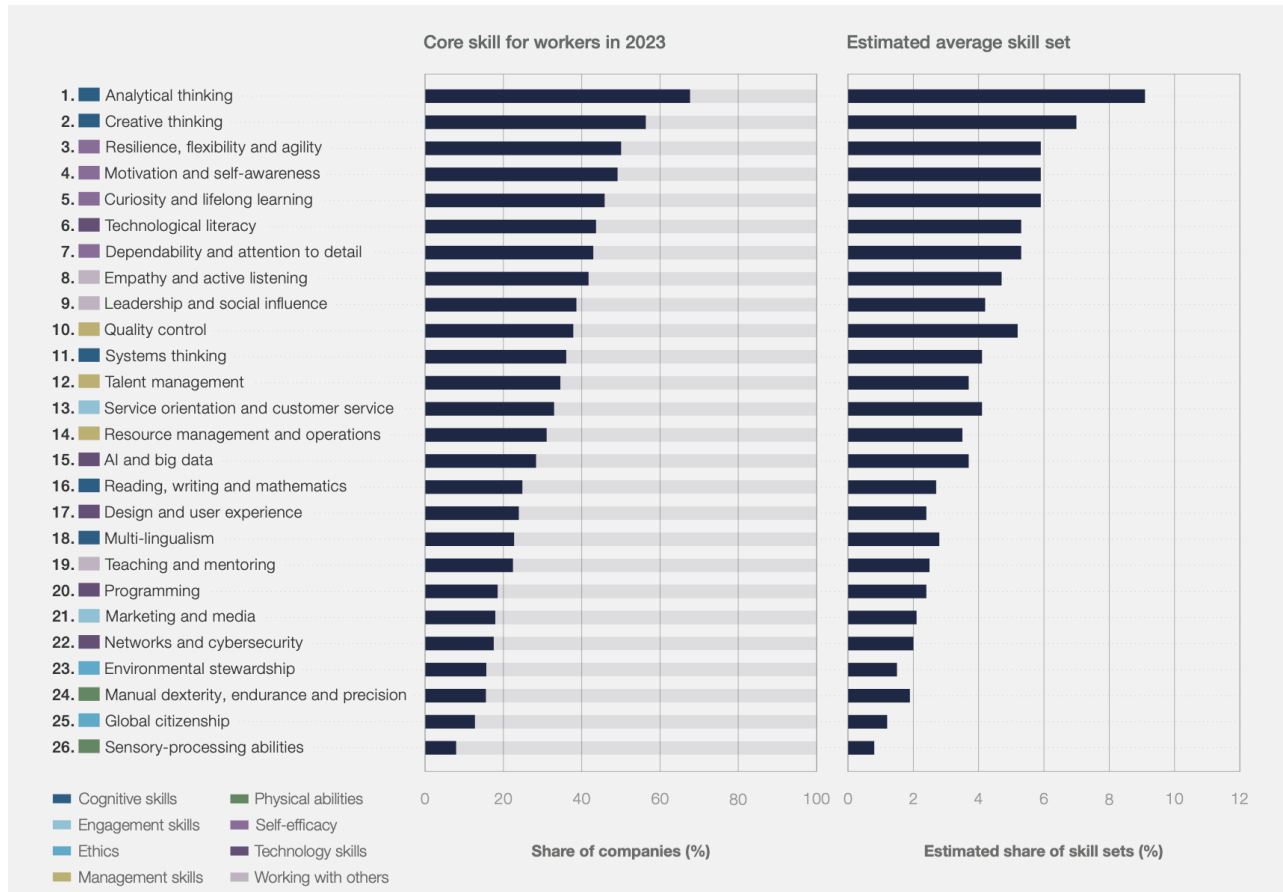
Skill Name	Active Job Ads	
Communication (verbal and written skills)	36,537	
Cooperative/Team Player	34,771	
Problem Solving	14,957	
Project Management	9,548	
Self-Motivated/Ability to Work Independently/Self Leadership	9,334	
Analytical	8,375	
Prioritize	7,008	
Ability to Work in a Fast Paced Environment	6,949	
Detail Oriented/Meticulous	6,740	
Customer Service	6,218	

Source: JobsEQ®, <http://www.chmuraecon.com/jobseq>

Demonstrated proficiency in these skills is increasingly important to ICT job recruiters and HR staff. Dice, an online hiring platform for ICT job seekers, recruiters and HR professionals, highlights the importance of showcasing proficiency in behavioral interview questions related to professional skills like adaptability, collaboration, growth potential, leadership, prioritization, and culture fit.^{xviii}

The World Economic Forum Future of Jobs Survey shows core skills across all occupations. Analytical Thinking is considered a core skill by more companies than any other skill. Creative thinking ranks second, ahead of self-efficacy skills – resilience, flexibility and agility (Figure 6).^{xix}

Figure 6. World Economic Forum Core Skills



Source: World Economic Forum Future of Jobs Survey 2023.

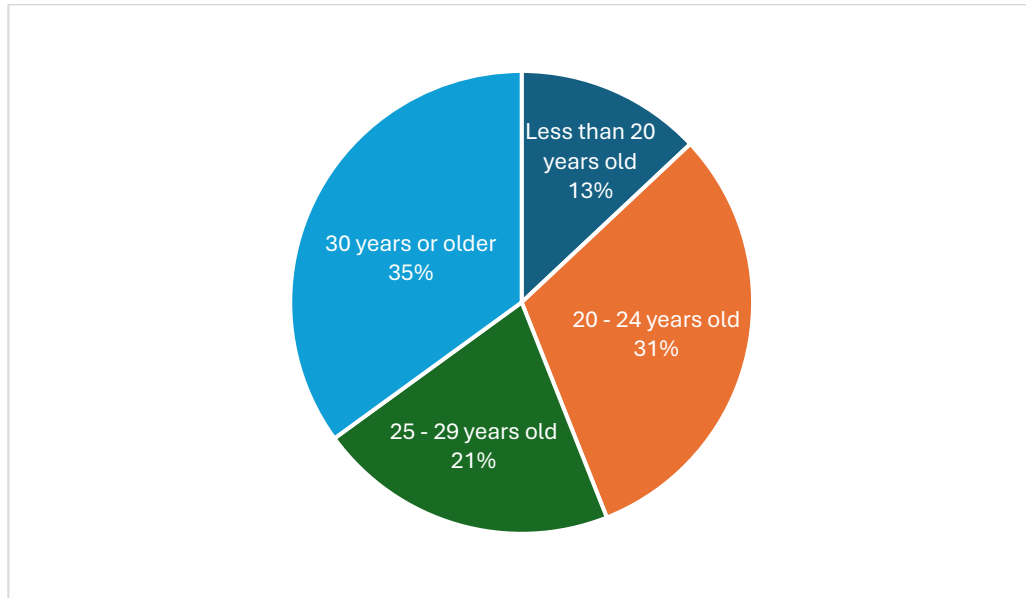
Washington community and technical colleges provide tech recruiters and HR managers across multiple industries with substantial opportunities to increase their tech workforce diversity with highly educated workers.⁶ 2023-24 demographic data for ICT students in Washington’s professional-technical CTC programs include the following certificate, AAS/AAS-T and applied baccalaureate enrollment characteristics (11,327 total students):

- 52 percent were attending full-time
- 42 percent received need-based financial aid
- More than half (56%) of students are 25 years or older (Figure 7)
- 26 percent are female

⁶ White and Asian races constitute approximately 90 percent of the tech occupation demographics. The majority of these workers are male (78.4%) between the ages of 25 and 44 years old (61.3% of total population). Source: JobsEQ®, <http://www.chmuraecon.com/jobseq>.

- 51 percent are students of color
- 19 percent have dependents
- Nine percent are active duty, veteran, or a dependent of a veteran.

Figure 7. Age distribution of ICT students in Washington Community and Technical Colleges 2023-24



The demographic characteristics of Washington CTC tech students underscores that many of these students bring professional skills acquired from diverse work and life experiences. Translating hard-earned professional skills that these students already possess from a broad variety of work and life experiences into new tech workforce careers calls for innovative strategies that Washington CTCs are well-equipped to address, namely, outstanding program practices evidenced in Washington’s I-BEST program and project-based learning strategies.^{xx}

With these considerations in mind, the following sections examine professional skills development by the National Convergence Technology Center and the New World of Work 21st Century Skills.

National Convergence Technology Center (National CTC) Professional Skills

The National Convergence Technology Center (National CTC) was established to meet the workforce need for skilled specialists in Convergence Technology, Information Technology, and Cybersecurity. Funded by the National Science Foundation,⁷ the National CTC’s efforts included the development of 11 professional skills and proficiency levels in the five following focus areas:

- Infrastructure Connectivity Management and Engineering
- Data Management and Engineering
- Technical Project Management
- Technical Support
- Software development.

⁷ The National CTC’s grant funding ended September 30, 2023.

The 11 professional skill domains are:

1. Workplace professionalism and work ethics
2. Written communication
3. Oral communication
4. Teamwork
5. Problem solving and critical thinking
6. Organization and planning
7. Adaptability and flexibility
8. Initiative
9. Accuracy
10. Cultural competence
11. Self and career development.⁸

Figure 8 provides an example of professional skills for software development.

Additionally, the National CTC Business & Industry Leadership Team developed required knowledge, skills and abilities (KSAs) for the most desirable ICT graduates 12-26 months into the future. The review of KSAs can help inform future efforts to develop professional skills curricula.⁹

⁸ Contact the Center of Excellence for Information and Computing Technology for the detailed professional skills associated with each ICT curriculum focus area.

⁹ Additional KSA documentation is available at the National Science Foundation's Advanced Technological Education (ATE) website: https://atecentral.net/r38923/infrastructure_ksas_2022.

Figure 8. Software Development Professional Skills

Workplace Professionalism & Work Ethics	<p>Level 1 - Employee learns expectations of workplace environment (professional behavior and ethics) and adheres to practices with some guidance.</p> <p>Level 2 - Employee exhibits sound professionalism, judgment, and integrity and accepts responsibility for own behavior. Employee exhibits these qualities without guidance but occasionally refers to policies as needed.</p>
Written Communication	<p>Level 1 - Employee understands written instructions and executes tasks with guidance and feedback from supervisor. Employee clearly communicates concepts in writing.</p> <p>Level 2 - Employee comprehends and executes written instructions with minimal guidance. Employee composes well-organized written documents.</p>
Oral Communication	<p>Level 1 - Employee understands oral instructions and executes tasks with guidance and feedback from supervisor. Employee communicates concepts orally while clarifying for meaning. Employee develops listening skills.</p> <p>Level 2 - Employee comprehends and executes oral instructions with minimal guidance and exhibits good listening skills. Employee clarifies for meaning without needing prompting from supervisor.</p>
Teamwork	<p>Level 1 - With guidance and feedback from supervisor, employee obeys team rules and understands team member roles. Employee actively participates in team activities, volunteers for special tasks, and establishes rapport with co-workers.</p> <p>Level 2 - Employee demonstrates commitment, enthusiasm and supports team members. Employee follows up on assigned tasks and leads by example.</p>
Problem Solving & Critical Thinking	<p>Level 1 - Employee identifies the problem and relevant facts and principles with guidance and feedback from supervisor. Employee summarizes existing ideas and demonstrates creative thinking process while problem solving.</p> <p>Level 2 - With minimal supervision, employee analyzes underlying causes, considers risks and implications, and uses logic to draw conclusions. Employee applies rules and principles to processes and recommends solutions.</p>
Organization and Planning	<p>Level 1 - Employee prepares schedule for self, monitors and adjusts task sequence, and analyzes work assignments with guidance from supervisor.</p> <p>Level 2 - Employee manages timelines and recommends timeline adjustments. Employee escalates timeline-impacting issues as appropriate.</p>
Adaptability and Flexibility	<p>Level 1 - With guidance and feedback from supervisor, employee is able to adjust ways of doing work based on changing dynamics. Working under pressure is difficult, but employee makes it through the project with guidance and oversight.</p> <p>Level 2 - Employee makes inquiries of co-workers regarding possible changes needed in ways of doing work and adapts accordingly. Observes co-workers increasing work productivity under pressure and follows their lead.</p>
Initiative	<p>Level 1 - Employee finishes a step in a project and waits for direction before going on to the next step.</p> <p>Level 2 - Employee finishes multiple steps in a project and appropriately begins working on the next step without being asked.</p>
Accuracy	<p>Level 1 - Employee makes mistakes routinely but is committed to learning to adjust work habits to prevent them in the future.</p> <p>Level 2 - Employee occasionally makes mistakes but quickly makes adjustments to work habits to avoid making the same mistake twice.</p>
Cultural Competence	<p>Level 1 - Employee is inexperienced with working with diverse teams. With support and guidance and getting to know team members, employee develops working relationships.</p> <p>Level 2 - Employee is committed to working with diverse teams but struggles when differences arise. Employee identifies those challenges and works with colleagues to find ways to work effectively.</p>
Self and Career Development	<p>Level 1 - Employee requires feedback and direction from supervisor regarding improvement needed in professional and technical skills. Employee follows through with skills development with monitoring by supervisor.</p> <p>Level 2 - Employee builds upon self-assessment experience and can develop a professional and technical skills improvement plan in conjunction with supervisor. Employee completes development plan without prompting from supervisor.</p>

Source: [National Convergence Technology Center](#): ICT Skill Standards 2020 and Beyond (NSF ATE project grant DUE 1838535).

New World of Work (NWoW) 21st Century Skills

The California Community Colleges developed the New World of Work (NWoW) 21st Century Skills¹⁰ to provide postsecondary educators with ways to explicitly teach professional skills. According to a program review by Dalporto and Lepe (2022):

The aim is to produce graduates with recognizable competency not only in academic and career-technical skills, but also in the soft skills needed to navigate a modern, diverse, and rapidly evolving work environment.

The NWoW is based on three components theorized to strengthen professional skills:^{xxi}

- A classroom component with direct instruction in specific professional skills
- A concurrent, work-based learning experience
- An assessment and credential-granting component (digital badges).

Employers value digital badges and credentials from reputable organizations like CTCs and demonstrated, work-based learning experiences.^{xxii} Employers particularly want to see demonstrated professional skills in work-based settings, and they want to see transparency in the way that instructors and their credential-granting institutions develop the professional skills curriculum, learning outcomes and methods of accreditation.^{xxiii}

To connect professional skills classroom learning to real-world applications, the NWoW recommends that faculty encourage students to obtain work experiences while receiving classroom instruction, help students receive employer evaluations on their professional skills, and encourage digital badges or microcredentials demonstrating proficiency. The NWoW has identified the following professional skills (similar in construct to the NCTC professional skills):

1. Adaptability
2. Analysis/solution mindset
3. Collaboration
4. Communication
5. Digital fluency
6. Empathy
7. Entrepreneurial mindset
8. Resilience
9. Self-awareness
10. Social/diversity awareness.¹¹

¹⁰ <https://newworldofwork.org>.

¹¹ The 10 professional skills were determined by NWoW in partnership with the Mozilla Foundation based on a national review of college and career ready competencies from [multiple sources](#). MDRC provides additional details on the 21st Century Skills [here](#). See also the NWoW [professional competencies list](#) with postsecondary level attributes and secondary level traits.

Professional Skills Development in Washington’s Community and Technical College Tech Programs

MDRC, a national nonprofit research organization, provides several recommendations for structuring professional skills instruction:

- Focus on teaching a small number of skills in depth
- Provide avenues for online instruction but keep lessons in real time to build opportunities for student-to-student and student-to-teacher interactions.

As noted by Dalporto and Lepe (2023) regarding the NWoW program:^{xxiv}

While various soft-skills course formats have competing pros and cons, in NWoW the “fewer skills” approach seemed to work best across the board. Some colleges in the study added the soft-skills lessons to an existing credit-bearing course, such as a work-experience class or even an English class. The benefit of integrating the curriculum into credit-bearing courses is that students may be motivated to show up regularly, and programs can avoid the bureaucracy sometimes associated with creating new registered courses; the downside is that time is constrained by the existing course materials, so instructors may have further limitations on how many skills they can cover in a class. In contrast, in colleges where the curriculum was offered through stand-alone, noncredit workshops, instructors could structure their courses more flexibly. However, low attendance and completion issues presented a challenge in these circumstances, with students dropping in sporadically and with only a limited number completing skill assessments and badges. Regardless of course format, keeping the curriculum focused on a few skills can also allow instructors to integrate their teaching better with students’ work experiences—for example, by creating space for employer visits.

Online Learning Platforms

Online learning platforms provide one relatively affordable and logistically feasible way to incorporate professional skills and credentials into existing ICT programs. Instructors have the option to review specific courses of interest and assign students the particular courses. Instructors can then dedicate time for shared class instruction and discussion.

Coursera has more than 148 million learners and 7,000 institutional customers, including content from 325 university and industry partners. Coursera’s 2024 *Global Skills Report* identifies several skill trends driving increased course enrollments: the growth of generative AI, increased use of professional microcredentials, increased cybersecurity courses, and more women learning on Coursera, narrowing the global gender gap in online learning. Top skills in the United States that learners are seeking include professional skills, specifically, business communication and project management. Integrating these and other professional skills into existing courses may provide learners with an attractive opportunity to enroll with the colleges rather than acquiring these and related skills independently.^{xxv} Coursera offers multiple soft skills courses – refer to their online catalog for additional information and pricing at <https://www.coursera.org>.

Udemy offers thousands of online soft skills courses; approximately 4,000 courses are rated 4.5 stars and higher. Examples include:¹²

- Soft Skills: The 11 Essential Career Soft Skills - \$139.99
- SOFT SKILLS: Most Crucial Career Success Soft Skills! - \$44.99
- The Complete Communications Skills Master Class for Life - \$119.99

Other online learning platforms include:

- [Skillshare](#)
- [Ed2Go](#)¹³
- [edX](#)
- [LinkedIn Learning](#)
- [Pluralsight](#).

Pricing plans and accessibility for specific courses and curricula vary.

Instructional Models Focused on Specific Workers

The "[Workin' It Out](#)" (WIO) program series represents five, related classroom-based, cognitive-behavioral curricula designed to help learners succeed in today's workplace with topics such as gaining self-awareness, managing emotions, handling difficult conversations, and problem solving. The program is focused on five specific groups:

- New workers
- Hard to serve
- Youth at risk
- Returning citizens (individuals in transition from various correctional settings)
- Native Americans.

The program also provides instructor training, certification and workbooks.

Summary and Recommendations

Washington state is a national leader in tech jobs and Washington's community and technical colleges provide substantial training and educational opportunities in support of Washington's tech workforce at the certificate, associate and applied baccalaureate levels statewide. The advent of new technologies – particularly AI – will be a cornerstone of tech development in Washington since the state is and will likely remain a leader in tech research, development and commercial applications. As tech applications become more important across a wide range of industrial applications and consumer use, tech learners will have many opportunities to gain employment in a wide variety of industries and settings.

¹² All pricing as of May 18, 2024 and subject to change.

<https://www.udemy.com/courses/search/?q=soft+skills&ratings=4.5&sort=relevance&src=ukw>, accessed May 31, 2024.

¹³ See, for instance, Ed2Go's Soft Skills Suite provided through [South Puget Sound Community College](#).

Professional skills development is a growing and increasingly important component of ICT education and training, especially in light of new technological developments like AI forcing the successful acquisition of higher level professional skills – for instance, communication, collaboration, and analytical thinking.

Integrating professional skills development into existing tech curricula can be undertaken using several strategies:

Strategy 1: Develop stand-alone, credit-bearing professional skills courses with a work-based learning component.

Strategy 2: Integrate credit-bearing professional skills development into existing curricula.

Strategy 3: Integrate microcredentials and online learning platforms like Coursera into existing tech educational and training programs.

Faculty support should be an integral part of any strategy to impart professional development skills to tech learners.^{xxvi} For instance, the Minnesota State IT Center of Excellence provides system faculty with curriculum templates including “Using Agile Teams for Group Projects”, “Using Code Reviews in Class”, and more.^{14,15}

Strategy 1: Develop stand-alone, credit-bearing professional skills courses with a work-based learning component.

This strategy is the most comprehensive and would require convening CTC faculty and tech employers to participate in a curriculum development effort (DACUM). This effort would also require funding for a pilot program in which several CTCs would adopt the professional skills courses that are developed. Although most comprehensive and resource-intensive, this effort would capture the critical employer-faculty consensus on the optimal professional skills courses for Washington’s CTCs. It would also include support for faculty professional development. The work-based learning component can be achieved through close involvement of tech firms like Microsoft and Amazon Web Services who have a strong presence in Washington state and are highly supportive of internships and other work-based learning opportunities. It should also involve outreach and engagement strategies for non-tech companies who are supportive of work-based learning opportunities for tech students in their respective industries. [The use of generative AI can be a potentially powerful aid in content creation, for instance, creating syllabi, course objectives, assessments, and learning outcomes.^{xxvii}]

Strategy 2: Integrate credit-bearing professional skills development into existing curricula

This strategy would involve providing consulting support to assist colleges integrate professional skills development into existing courses. Faculty would develop and instruct project-based student team assignments with projects designed to acquire professional skills and demonstrate proficiency in the classroom and work-based settings. This could be accomplished through professional development

¹⁴ Contact the Center of Excellence for Information and Computing Technology for additional information on professional skill modules from the Minnesota State IT Center of Excellence.

¹⁵ An Agile team is defined as a “cross-functional, self-organized group who collectively share the responsibility of delivering high quality results in a timely manner.” Source: [teamwork.com](https://www.teamwork.com).

workshops and one-on-one coaching and support. Integrating professional skills development into existing curricula would provide a cost-effective approach without requiring additional credit-bearing course requirements. Application, however, would likely vary in terms of intensity and effectiveness depending on the specific faculty, syllabi, and access to work-based learning opportunities.

Strategy 3: Integrate microcredentials and online learning platforms like Coursera into existing tech educational and training programs

There is a wealth of online learning platforms that faculty can evaluate for application in their existing curricula. To assist in this effort, faculty stipends and grant funding could be used to incentivize and support the development of a catalog of professional skills courses that could lead to either a specific microcredential, college credit, or non-credit documentation of course completion. The downside risk to this approach is that, while it may be cost effective and relatively easy to integrate online courses into existing syllabi, the course content may be too generic and not applicable to the real work environment that students may be heading into. This would require a review of existing online learning platforms and their professional skills courses to develop a catalog of high quality professional skills courses that CTCs could assess for their applicability and value for current tech course offerings.

Conclusions

Washington has one of the strongest tech labor markets nationally in terms of the concentration of tech workers, economic impact, employment gains, and employment levels across the state economy. Washington is also at the forefront of developing new technologies such as generative AI and cybersecurity which are having significant effects on business operations in myriad and nascent ways, further supporting long term ICT occupational growth projections.

Washington's 34 community and technical colleges provide comprehensive ICT educational offerings spanning short-term certificates to associate degrees to applied baccalaureate degrees. Job demand in multiple ICT occupations greatly outstrips course completions, underscoring a continuing critical workforce need that colleges are addressing with highly diverse learners.

More robust approaches to how CTC ICT programs address professional skills will enhance the quality of Washington ICT courses and programs. The greatest challenge for workforce deans and faculty is addressing the desired level of integration in current and new programs across the certificate and degree spectrum based on programmatic and cost considerations. The decision points range from developing stand-alone credit-bearing professional skill courses; integrating professional skill development into existing curricula; and providing high quality microcredentials and online commercial course offerings through college ICT programs. The benefits of providing professional skills development are clear: better course progression, completion rates and higher quality long-term career outcomes for Washington's tech learners.

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