

**Strong Workforce Program
Information & Communication Technologies
Regional Workforce Advisory Meeting Proceedings:
Building the Full Stack
October 12, 2023**

**Hybrid Advisory - Sacramento County Office of Education and Zoom
Introduction**

The Los Rios Community College District, in partnership with Valley Vision and in collaboration with Sierra College, Yuba Community College District, and Lake Tahoe Community College, invests in Strong Workforce funding to organize and convene Regional Advisories. The objectives of the Regional Advisories are to build strong relationships between employers, educators, and the workforce that:

- Provide timely information on skills gaps and workforce needs, informing partners on major industry trend information;
- Improve the efficiency of the advisory process for educators and employers;
- Reflect a regional view of workforce needs and assets;
- Provide opportunities for more systemic, ongoing engagement, including workforce partners in key industry sectors.

Regional Advisory meetings help inform decisions on needed investments and enhancements for Career Education (CE) programs to help fill the growing demand for middle-skill positions. This meeting proceedings report includes key findings, best practices, and minutes from the Fall 2023 Regional Advisory meeting focused specifically on careers in Information & Communication Technologies.

Valley Vision supports a robust talent pipeline through our multiple 21st Century Workforce initiatives. We prepare our regional workforce for the future by addressing skills gaps, advancing research, aligning efforts, and strengthening systems. Valley Vision's workforce efforts are supported by the Sacramento Employment and Training Agency (SETA), Golden Sierra Workforce Development Board (WDB), North Central Counties Consortium, Yolo WDB, the City of Sacramento, local community college districts, and others.

The Strong Workforce program provides Career Education opportunities to increase social mobility and fuel regional economies with skilled workers.

Key Findings

- The Greater Sacramento region's information and communication technologies (ICT) workforce is set to have a projected job growth of 6% over the next five years, accounting for an additional 1,754 jobs and 2,741 annual job openings from 2022-27. The median annual wage across the industry is \$102,497.
- The positions that had the most significant demand from the labor market information in the ICT field were Computer User Support Specialist, Computer Systems Analysts, Database Administrators, Network and Computer System Administrators, and Software Developers.
- Our region's award completion rates are not meeting the local demand for ICT careers, the total supply of awards (1,370) coupled with the available job openings (2,471) shows a gap of 1,371 skilled workers that are needed to meet demand.
- Cybersecurity is one of the highest-demand fields, with a global demand of [3.4 million unfilled jobs](#), with the US alone having 700,000 unfilled jobs in the cybersecurity industry.
- While the ICT workforce is diverse in terms of race and ethnicity, the majority of workers identify as either white (44%) or Asian (31%). While Hispanics and Latinos make up 28% of the Greater Sacramento region's workforce, in the ICT sector they make up only 15% of the total workforce. Additionally, the industry skews heavily towards males, with 71% of the workforce identifying as male and only 29% of the workforce identifying as female.
- Younger developers (aged 18-24) are learning coding from mostly nontraditional methods. In a survey created by [Stack Overflow](#), 84% of respondents from ages 18-24 most frequently learn coding from online resources in the form of videos, blogs, and forums. Respondents between the ages of 25 and 34 were the top cohort to most likely have learned coding from online courses or certifications (52%) and school (55%).
- Employers value soft skills in the workplace with strong communication (both verbal and written), adaptability, motivation, teamwork, and leadership identified as skills most necessary for successful teams and projects.
- The highest demand technical skills across the ICT sector are computer science, SQL, Javascript, Agile Methodology, APIs, Java, Python, and Information Systems. These skills are also prominent in full stack development jobs.

Meeting Proceedings

Welcome and Introduction

Hilary Tellesen, Project Leader at Valley Vision, and Alena Anberg, Director of Employment Partnerships in Business and Technology Sectors from the North Far North Regional Collaborative, welcomed attendees and introduced the event. Tellesen emphasized the importance of collaboration between colleges and employers in providing quality and relevant workforce training for individuals interested in working in the information and communication technologies sector.

Labor Market Information and Job Posting Insights

After the welcome, Ebony Benzing, Interim Director of the North (Greater Sacramento) Center of Excellence for Labor Market Research, hosted by Los Rios Community College District, provided labor market data that gave an overview of full stack developer and ICT career paths in Greater Sacramento. The data presented included the employment outlook for students, the skills and credentials needed for employment, and educational supply to gauge gaps in the workforce demand. This portion began with an in-depth look at Full Stack Developers, followed by an analysis of the career pathways in the field overall.

Becoming a Full Stack Developer

Full stack developers are developers or engineers who can build both the front end and back end of a website. A full stack developer is versatile with job duties that include: working with a website from start to final launch; prototyping, creating, and building websites along with user interface teams; designing user interactions through robust front-end architecture; and communicating with end users to determine a product's effectiveness.

Benzing shared essential knowledge, skills, and abilities (KSAs) for full stack developers. These KSAs included:

- Front-end languages and frameworks (HTML, CSS, and Javascript)
- Back-end technologies and frameworks (PHP, Python, Ruby, java, NodeJS, Django, Flask, and C++)
- Web Architecture
- Database Management (MySQL, SQL server, PostgreSQL, MongoDB, and Oracle)
- Version Control (Git and GitHub)
- Basic Design principles and skills (UI & UX design, prototyping, scalability, etc)
- Soft Skills, including: analytical mindset, communications, time management, curiosity, attention to detail, creative vision, and patience.

Benzing highlighted outcomes from [Stack Overflow's Annual Developer Survey](#) on becoming a full stack developer and emphasized the varied training pathways from respondents. Some of the significant findings were:

- Most professional developers have at least a bachelor's degree (**47%**), with another quarter holding a master's degree (**26%**)
- Although 48% of survey respondents have been coding for less than 10 years, developers in the US have an average of **16.5 years of coding experience**
- Respondents between the ages of 18 and 24 most frequently learn coding from online resources (84% of respondents learned coding in the form of videos, blogs, and forums)
- Respondents between the ages of 25 and 34 were the top cohort to most likely have learned coding from online courses or certifications (52%) and school (55%).

Labor Market Demand in the Greater Sacramento Area

The labor market information shared spanned thirteen core ICT occupations and were put into four categories that included support specialists; systems and information analysts; database and networks; and software and web development (Figure 1.1). The first category, support specialists, typically require up to an associate degree. The other three categories typically require entry-level workers to possess a bachelor's degree, however, Benzing highlighted that alternative routes into these careers may exist. Full stack developer job titles are most closely aligned with the software and web development category, as this category most closely mirrored the KSAs utilized in their careers.

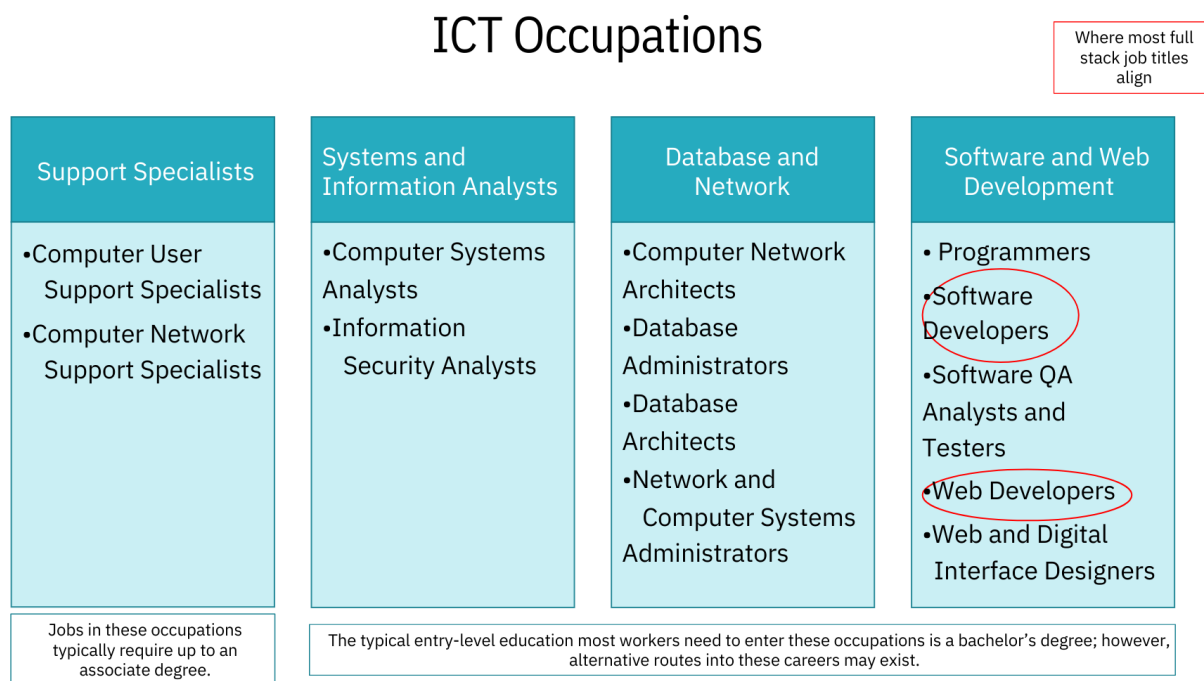


Figure 1.1 Information & Communication Technologies Job Occupations

Across the thirteen core ICT occupations in the Greater Sacramento region, there are nearly 32,000 jobs, with a projected growth rate of 6% over the next five years. This will add 1,700 new permanent jobs to the area by 2027. In terms of total job openings, Benzing stated that there will be more than 2,700 job openings each year for the next five years, which includes both

newly-created positions and replacements for existing ones. The median annual wage in 2022 for these occupations was \$102,497.

Figure 1.2 shows where the jobs are clustered, along with projected changes to the industry over the next five years. The largest number of ICT jobs are for Computer Support Specialists and Software and Web Development. These two main occupation categories were also highlighted by Benzing as the job groups with the most projected annual openings across the region.

Greater Sacramento ICT Employment

Occupational Group	2022 Jobs	2022-27 Projected Change	2022-27 Projected % Change	2022-27 Annual Job Openings
Computer Support Specialists	14,486	207	1%	1,203
Software and Web Development	10,119	1,091	11%	949
Database and Network	3,649	158	4%	279
Systems and Information Analysts	3,408	298	9%	309
Greater Sacramento Totals	31,662	1,754	6%	2,741

Source: Lightcast 2023.3; QCEW employees, Non-QCEW Employees, and Self-Employed workers.

Figure 1.2 Greater Sacramento ICT Employment

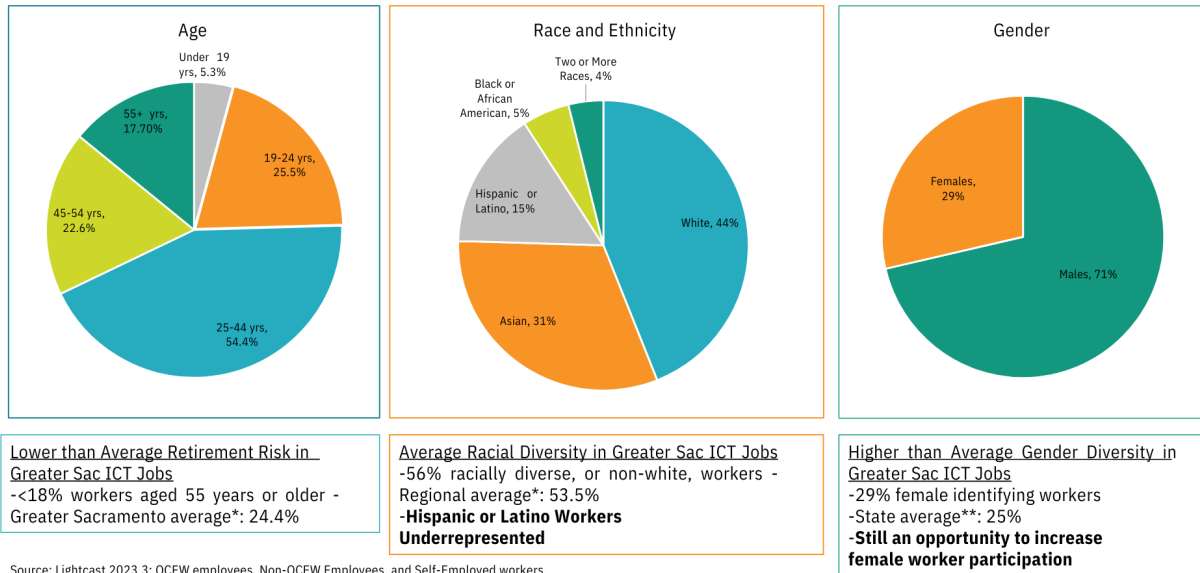
Within these occupational groups, most of the region’s jobs fall under computer user support specialists, with 13,500 jobs (Figure 1.3). The computer user support specialist is also projected to have the most job openings over the next five years. The occupations with the fastest and most projected growth are in software and web development, with over 1,000 jobs over the next five years and projected 11% growth with software developers being the fastest single occupation. While some speculation has occurred about the influence of generative AI on these and other occupations, a recent [Brookings article](#) concludes the new capability is less likely to impact job numbers and more likely to displace or replace some occupational tasks.



Figure 1.3 Target ICT Occupations

In terms of demographics, the current typical ICT worker is between the ages of 25-44 years old, white, and male. A large portion of workers identified as either white (44%) or Asian (31%). With only 15% of the workforce encompassing Hispanics and Latinos, the ICT workforce has an underrepresentation of Hispanics and Latinos who make up 28% of the total workforce in Greater Sacramento. Additionally, industry demographic data shows 71% of the workforce identifies as male. This data showcases an opportunity to increase female worker participation, as well as advance more opportunities for varied racial and ethnic demographics. Figure 1.4 provides more information on the comparison between the ICT workforce and regional/state metrics.

ICT Worker Demographics



Source: Lightcast 2023.3; QCEW employees, Non-QCEW Employees, and Self-Employed workers.

* Across all 798 occupations employed in 7-county North (Greater Sacramento) subregion

** Across the same 19 ICT occupations employed across California.

There were an insufficient number of workers who identified as Native Hawaiian or Other Pacific Islander and American Indian or Alaska Native employed in ICT occupations across Greater Sacramento; workers with these racial identified represented less than 0.5% of the ICT workforce in 2022.

Figure 1.4 ICT Worker Demographics

Job Postings Analysis

The data in Figures 1.5 and 1.6 further emphasizes the increased demand across the industry. The positions that had the most significant demand from employers according to [Lightcast](#) (Figure 1.5) in each category were Computer User Support Specialist, Computer Systems Analysts, Database Administrators, Network and Computer Systems Administrators, and Software Developers.

ICT Job Postings by Category

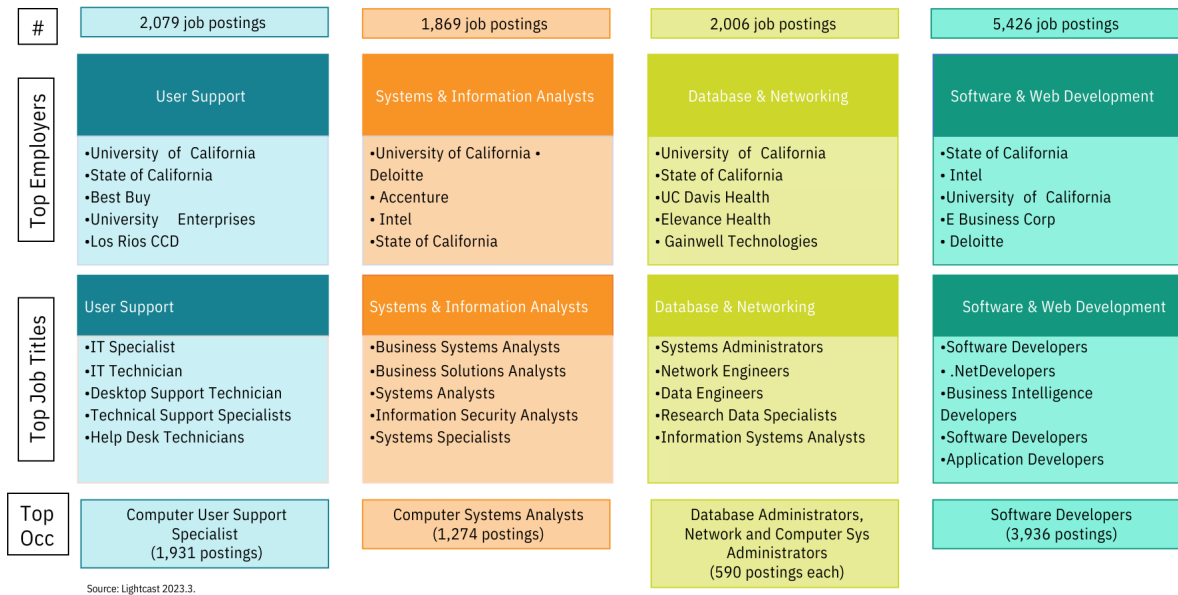


Figure 1.5 ICT Job Postings by Category

Benzing showcases the wage premium for full stack developers in Figure 1.6 while noting increased requirements for these positions. The majority of employers (60%) required a bachelor's degree or higher and 53% of postings required 2-6 years of prior work experience.

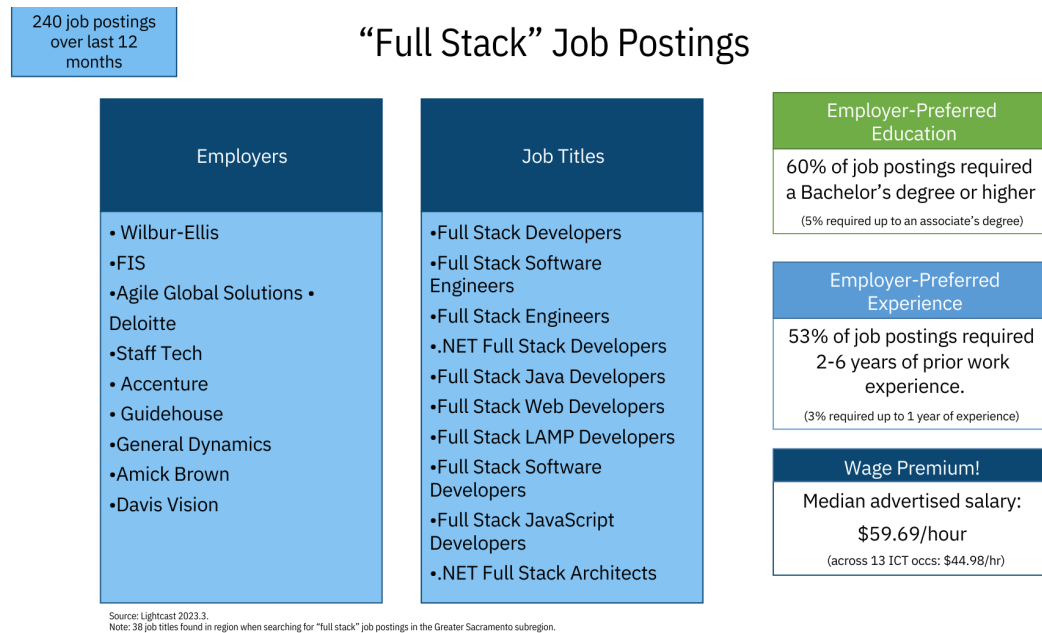
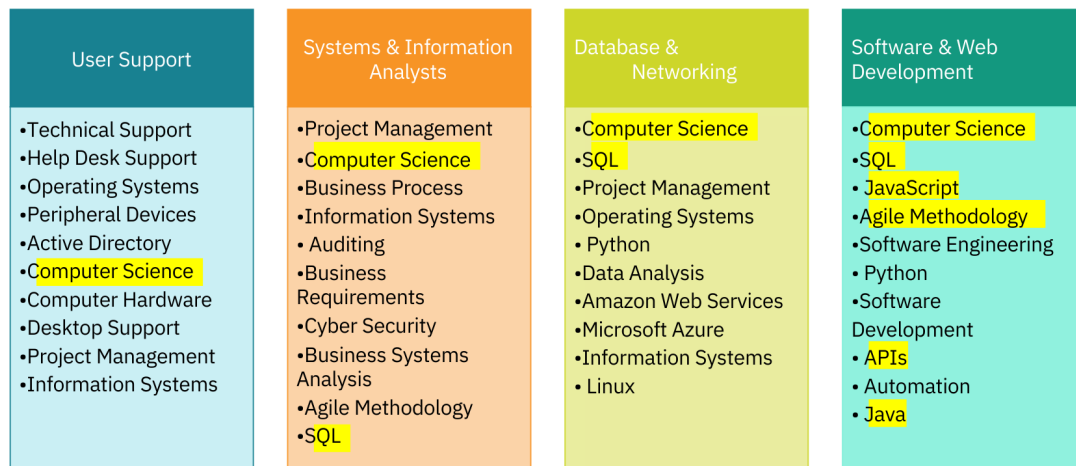


Figure 1.6 Full Stack Job Postings

Figure 1.7 highlights the most desired skills by employers for each respective category. Many of the skills also show up in full stack job postings, highlighted in yellow, which is attributable to the versatility of full stack developers.

Most Wanted ICT Job Skills by Category



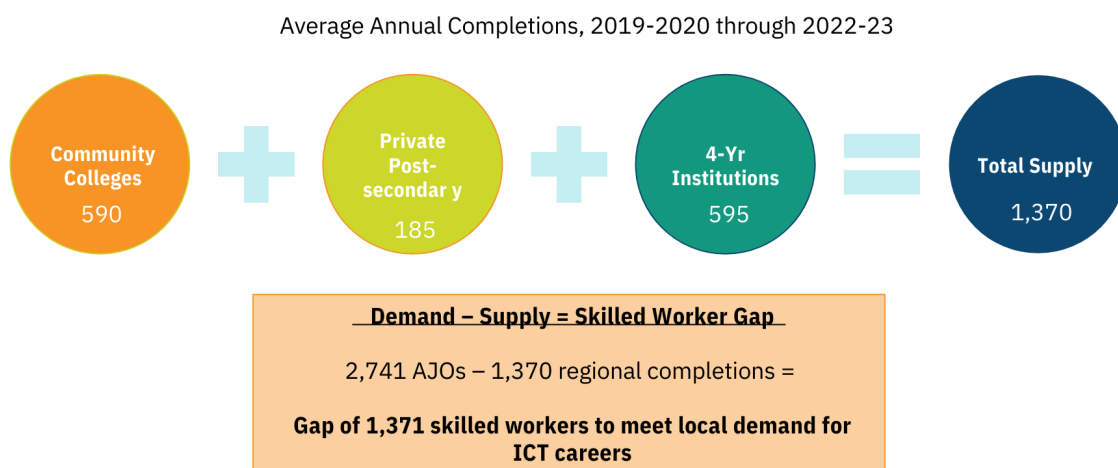
Source: Lightcast 2023.3.

These skills also show up in "Full Stack" job postings

Figure 1.7 Most Wanted ICT Job Skills by Category

Despite projected growth, high demand for skilled workers, and numerous job openings, the Greater Sacramento region is not producing enough skilled workers to meet the demand for these careers. Figure 1.8 shows community colleges' annual award rates at 590, private post secondary award rates of 185, and four-year institution award rates of 595 totalling 1,370 total annual awards. This leads to a gap of 1,371 skilled workers to meet employer demand.

Greater Sacramento ICT Program Completions



Sources: COE Supply Tables, National Career Education Statistics (NCES) Integrated Postsecondary Educational Data System (IPEDS), and Lightcast.

Figure 1.8 Greater Sacramento ICT Program Completions

Benzing’s presentation ended with a highlight on how demand for skilled ICT workers across Greater Sacramento is an opportunity to develop and promote programs that encourage and support underrepresented students in ICT career pathways. The coordination across ICT training programs, as well as increased focus on connecting communities outside of educational institutions to these jobs, will be important for closing the skilled worker gap.

Panel Discussion

The panelist discussion covered the most sought-after skills in candidates, emphasized the importance of focusing on underinvested communities, and detailed the value for companies to offer internships to students. A list of the participating industry panelists are as follows:

- Luyen Le, IT Manager, Placer County
- Greg Bianchi, Director of Microsoft Philanthropies, Microsoft
- Jesse Ravera, Assistant IT Director, City of Roseville
- Scott Stephenson, Director of Support Services, Swinerton

The panelists shared information from their respective agencies, providing insights into their organizations' workforce, client base, efforts to create a diverse talent pipeline, and projected staffing requirements. The panel included representatives from a range of business scales, including local employers within Placer County, nation-wide businesses such as Swinerton, and international perspectives on hiring needs from Microsoft Philanthropies. The panelists concurred with the demand across the industry and noted staffing challenges within their organizations.

Recruitment and Retention

Employers from Placer County and City of Roseville communicated having similar hiring requirements due to standardized qualifications. They have mandated job descriptions for certain positions including Systems Analyst I, II, III, and others that require a bachelor's degree. Both Le and Ravera emphasized the challenge of filling higher level positions due to the competitive nature of recruiting and strict adherence to job descriptions, explaining that the public sector is competing with the private sector that can offer higher wages and competitive benefits with fewer restrictions.

When retaining employees, panelists in the public sector discussed the high turnover in entry level positions due to staff moving to new positions after obtaining more hands-on experience, particularly to the private sector where wages are typically higher. Ravera explained the wage challenge and that it is difficult to compete with the private sector's salaries and benefits. Stephenson mentioned that Swinerton's tech support and help desk positions expose employees to a broad knowledge base of applications and software experiences that prepare them for opportunities to be promoted within the company, as well as provide marketable skills that benefit them outside of the organization. Stephenson also highlighted that Swinerton does not experience much turnover, partly because Swinerton is an employee-owned company that offers their employees many opportunities to develop their skills and promote to new positions within the company. Bianchi described multiple programs that Microsoft supports to encourage people to participate in the AI-enabled economy in order to prepare people for the many current and evolving occupational opportunities within the company.

Expanding Jobs

Panelists highlighted the demand for cybersecurity professionals and user support specialists in the tech industry. Bianchi discussed Microsoft's global-level outlook on hiring trends, and mentioned that it is in line with what the Greater Sacramento region is facing. Security is one of the highest demand fields, with Microsoft seeing a global demand of [3.4 million unfilled jobs](#), and the US alone having 700,000 unfilled jobs in the cybersecurity industry.

The employer panelists discussed the increasing demand for candidates with experience in AI. Bianchi highlighted a [future of work report centered on AI](#) that detailed how Generative AI technologies, like ChatGPT, massively increased the demand for AI experience, with ChatGPT's user base reaching 100 million users in just 3 months compared to Facebook's 4.5 years.

User support specialists were also identified as an increasingly valuable and focal position for hiring needs. For the City of Roseville, the IT department acts as the centralized information department for the city's 14 departments, with support to over 100 business applications and desktop support. Placer County faces a similar set of comprehensive IT services served by user support specialist positions. Swinerton's IT department supports all offices across their company with their technology and app support services desk.

Skill Development

Throughout the discussion, panelists shared the importance of Cybersecurity and AI. Bianchi from Microsoft stressed that AI skill development is a new talent demand, and rather than look at this technology as a disruption or a displacement, AI will be an augmentation of the existing roles.

Panelists noted the value of looking beyond the resume to consider the qualities and soft skills candidates bring to the table. Additionally, they clarified that they gauge not just the technical qualifications of the candidate, but the way they interact with interviewers and the soft skills they present. Soft skills in high demand were identified as strong work ethic, teamwork, communication, and a commitment to continuous learning as evidenced by accumulation of experience and credentials.

Panelists agreed work-based learning opportunities, including internships, are a critical component to skilling up workers and providing them with the experience necessary to thrive in the workforce. They also agreed on the benefit of having direct partnerships with community colleges. Stephenson mentioned their partnership with Sierra College allows students to participate in paid internships with Swinerton, with the program set to increase within the coming years. A big portion of the internship offered at Swinerton is providing learning opportunities that lead to students receiving more in-depth skill development. Microsoft has similar connections throughout multiple community colleges in the country. One program is a community of practice for cyber programs, a center of cyber academic excellence in Washington that provides low-income students with financial assistance to help fund their cybersecurity studies. Le and Ravera shared similar experiences having a close connection with community colleges in the region.

Diversity, Equity, and Inclusion

DEI initiatives are an important part of reducing barriers to entry in the ICT workforce and each panelist shared different initiatives aimed at addressing diversity. Swinerton's partnership with Sierra College provides them with specific information on diversity metrics and ways to adjust hiring practices to increase diversity in applicants. Stephenson highlighted how candidates will filter themselves out of the application process depending on how a job's description is written. Microsoft's approach, specifically in the Microsoft Philanthropies branch, focuses on reaching historically underrepresented populations and aims to invest resources and efforts to reach these populations and expose them to ICT careers. Bianchi highlighted that with their scholarship initiative in cybersecurity programs, 30% of scholarship recipients are African American/Black, and a majority of students come from underrepresented backgrounds.

Ravera explained that the City of Roseville has a city-wide inclusion commitment, and the IT department specifically has created interview questions centered around DEI principles with diverse panels that perform interviews. In Placer County, the human resources department has adopted recruitment efforts to encourage diverse applicants by designing job descriptions with inclusive language, and are creating a public information position specifically for marketing and Information and Communication Technologies Regional Advisory: Building the Full Stack

recruitment campaigns for those efforts.

Conclusion and Program Highlights

The final segment of the advisory included spotlights from the Sacramento Public Library and community-based organization Byte Back who provides basic digital upskilling to community members. Cassandra Keitges, Adult Learning and Literacy Supervisor, and Suzy Murray, Collection Services, presented details on the library's free [Coursera certifications](#) from Google IT Support, along with IBM IT, and Java Programming from [Gale](#). Andy Urrutia, Program Coordinator at [Byte Back](#), shared information on their Digital Navigators program which develops participants' computer literacy and programming skills in order to help community members increase digital skills imperative to work, health, education and life opportunities.

The event concluded with two community college IT program highlights. Shawn Monsen, Information Technology Instructor at Sierra College, shared details on their Cybersecurity, Data Analytics, Network Technician and IT Technician programs. Sierra College's programs include internship placements with local employers. Alena Anberg shared details on Folsom Lake College's Computer Information Science Program, showcasing courses in Data Analysis, Support courses, and AI coursework that derived from Folsom Lake's long-standing partnership with Intel.

In conclusion, attendees were encouraged to continue networking to expand aligned career education programs in IT. Contact information was provided for the Director of Employment Partnerships in Business and Technology Sectors, Alena Anberg, and Hilary Tellesen, Project Leader at Valley Vision, to support continued connections and career pathway development.

Contact information is listed below for each:

- Alena Anberg, North Far North Regional Collaborative, Director of Employment Partnerships in Business and Technology Sectors, aanberg@shastacollege.edu
- Hilary Tellesen, Workforce Development Project Leader, Valley Vision, hilary.tellesen@valleyvision.org

Resources

The following is a list of resources provided by panelists and speakers throughout the advisory. The list includes information on cybersecurity, skills development, and digital navigation, among other resources.

[Grow access to digital skills and opportunity](#)

[Future of Work Report: AI at Work](#)

[Skills for in-demand jobs](#)

[Building a Skilled Cyber Security Workforce in Five Countries](#)

[Global Green Skills Report 2023](#)

[Microsoft launches national campaign to help community colleges expand the cybersecurity workforce](#)

[LinkedIn Learning](#)

[Sacramento Library Adult Education](#)

[Sacramento Public Library: Online Resources](#)

[Get a Library Card](#)

[360 Digital Navigators: ByteBack](#)