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Building Careers in the Cloud: An Effective and Connected Community of Practice

By Career Ladders Project

Acknowledgments

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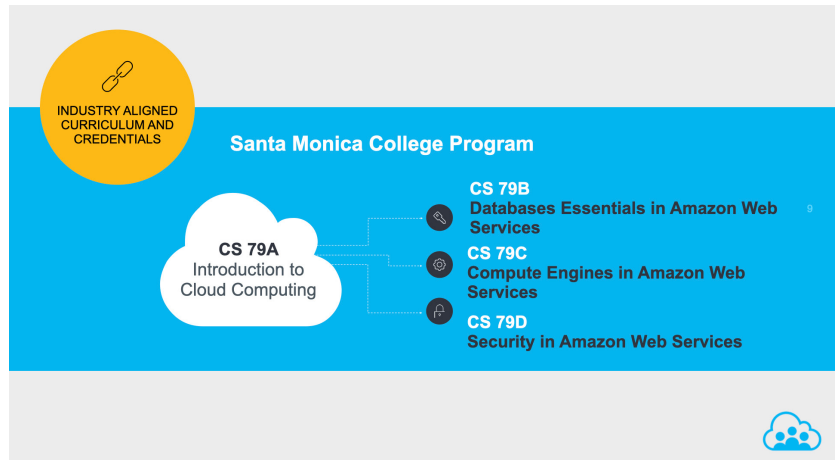
Section One: What the Project Accomplished

A. THE CALIFORNIA CLOUD WORKFORCE PROJECT

Cloud computing is the delivery of computing services—from applications to storage and processing power—over the internet.¹ It is widely considered the hottest growth area in technology today. Experts say that 90% of companies are on the cloud with the U.S. public cloud market accounting for \$124.6 billion in 2019.² With the advent of COVID-19, large sections of the workforce are working from home, increasing the demand for cloud computing services. Cloud computing offers students a prime opportunity to enter a high-wage growth sector.³

In Los Angeles and Orange Counties in 2018, there were 83,010 job openings requiring knowledge of cloud computing, while the region’s community colleges conferred 974 degrees or certificates in information and computing technology that year.⁴ To address this gap, Santa Monica College partnered with Amazon Web Services (AWS) and AWS Educate to develop college credit courses in cloud computing that begin in high school, continue in college, and lead to college certificates, degrees, and industry certifications. The partners created an entry-level, 18-unit Cloud Computing Certificate program that introduces students to AWS and other cloud technologies as well as to career pathways in the cloud. The four core courses teach architecting, database management, security, and other cloud essentials and are carefully aligned with industry competencies and certifications. During its initial pilot (2017-2018), Santa Monica College also partnered with Roosevelt High School to offer dual enrollment opportunities in cloud computing during the school year.

What distinguishes this work is that Santa Monica College and AWS Educate did not stop there. The partners had a



vision for a regional cloud computing pathway with the core curriculum expanded into high schools and colleges across the greater Los Angeles area. With funding from the California Community Colleges Chancellor’s Office under the Strong Workforce Program, Santa Monica College established a regional sector-based partnership of multiple cloud employers with 19 Los Angeles community colleges and their partner high schools, the Los Angeles County Office of Education, the Career Ladders Project, and many other involved stakeholders. The California Cloud Workforce Project (Cloud Project) provides coordination to promote regional employer involvement and the sharing of open source curriculum. It is the largest consortium in Amazon’s portfolio of AWS Educate projects around the globe. After three years, the Cloud Computing Certificate is now offered at all the participating colleges and is approved by the state as a regional certificate program with course credit portable across the 19 colleges. To date, 3,555 students in the Los Angeles region have enrolled in the cloud computing courses (Fall 2017-Fall 2020).

“I have never seen any other program at my college have such a dramatic, life-altering effect on students’ lives. This program helps students build careers in tech. Coupled with industry-recognized certifications, students are getting employed in great jobs with fantastic companies all over the tech field. It is so absolutely wonderful to see.”

— Howard Stahl, department chair, Computer Science and Information Systems, Santa Monica College

The Cloud Project builds on Santa Monica College's initial pilot, including collaboration with area high schools. The introductory courses are offered as dual enrollment options at partner high schools, reaching diverse students who do not have access to technology programs at their school. The initiative sponsors work-based learning events, such as Cloud Days, where faculty and counselors invite industry speakers to talk with students about occupations in cloud computing. With the advent of COVID-19, the project organized a virtual Cloud Day and a virtual Welcome Day for students. The regional Welcome Day provided an orientation to the program for new students and featured alumni stories to inspire new and continuing students in the cloud pathway. The Cloud Project also developed its own specialized AWS certification bootcamp training to prepare students for the AWS Cloud Practitioner certification exam or the AWS Solutions Architect-Associate certification exam. All these types of student supports foster a sense of community among the cloud students and enable partners to regularly communicate with students and capture feedback to enhance program effectiveness.

The Cloud Project required a significant investment of energy, vision, and leadership to launch. At Santa Monica College, multiple levels of campus leadership supported the initiative and were committed to a regional scope from the beginning, including the Santa Monica College Board of Trustees, the district superintendent/president, the vice presidents of academic affairs, the CTE dean, project managers, and the 19 college deans that facilitated the funding needed to ensure multi-year success of this project. The Cloud Project draws upon the earlier work of the Los Angeles High Impact Information Technology, Entertainment and Entrepreneurship, and Communications Hubs (LA HI-TECH) Regional Consortium.⁵ That effort sought to connect regional community colleges with area high schools and industry to build career pathways in information and communications technology. Santa Monica College's relationship with AWS grew out of this body of work, with both partners recognizing the potential to share cloud computing curriculum across colleges and high schools in the region.

Supporting Partners

AWS EDUCATE is Amazon's global initiative to provide students comprehensive resources for building skills in the cloud. It is a no-cost curriculum providing access to content, training, pathways, AWS services, and the AWS Educate Job Board with employment opportunities. Educators can access AWS services, launch virtual classrooms, and use tools to help students learn the cloud.

CAREER LADDERS PROJECT (CLP) promotes equity-minded community college redesign. CLP collaborates with colleges and their partners to discover, develop, and disseminate effective practices. CLP's policy work, research, and direct efforts with colleges lead to system change—and enable more students to attain certificates, degrees, transfers, and career advancement. CLP publishes practitioner tools and policy briefs to support the field, advance reform, and inform policymakers.

LOS ANGELES COUNTY OFFICE OF EDUCATION (LACOE) is the nation's largest regional education agency. LACOE provides a range of programs and services to support the county's 80 school districts and 1.4 million students in the region.

LOS ANGELES ECONOMIC DEVELOPMENT CORPORATION (LAEDC) drives action in support of a reimagined Los Angeles regional economy that is growing, equitable, sustainable, and resilient—and provides a healthy and high standard of living for all. LAEDC collaborates with all stakeholders in the region including education, business, and government to foster the growth of well-paying jobs in key industries.

CENTER FOR A COMPETITIVE WORKFORCE (CCW) is a Strong Workforce Program regional project focused on engaging and institutionalizing partnerships between the 19 community

colleges in the Los Angeles region and employers from high-growth industry sectors. CCW leads and supports regional workforce development and employer engagement efforts on behalf of the 19 colleges in the Los Angeles region to better understand industry trends and the demands for talent.

LOS ANGELES TECHNOLOGY EMPLOYERS in addition to Amazon Web Services and AWS Educate, technology employers such as Apple, Mission Cloud Services, Onica, Kokomo Solutions, CDW Integrated Technology Solutions, Slalom Consulting, Think AI Corporation, and Los Angeles Metro support the Cloud Project, helping to convey industry competencies and in-demand skills, inform cloud courses, and offer work-based learning opportunities for cloud students.

Santa Monica College and its partners have built robust connections among regional colleges, high schools, and industry to align curriculum, engage in pathway design, incorporate work-based learning, and support students as they progress along a pathway.

It should be noted that the Cloud Project is still in development. Years one through three (2018-2020) focused on certificate development, partnership building, and program implementation. Now in year four, the project is sharply focused on supporting student completion of AWS industry certifications and preparation for employment and will report further on outcomes as the initiative matures. While it is early in the project to see longitudinal student outcome data, the project is committed to the routine review of data on student success to inform continuous program improvement. This brief is the first of two publications highlighting lessons from this locally-grown, sector-based partnership. This brief features insights from the faculty community of practice while the companion brief, *Building Careers in the Cloud: An Industry-engaged Pathway*, explores the project’s engagement with industry in greater depth.

By the Numbers

The Los Angeles Region

- **19** community colleges in Southern California implementing
- Over **50** faculty involved in professional development
- Student Enrollments in the Region
 - **2,155** cloud students, Fall 2017-Fall 2019
 - **1,400** cloud students, Fall 2020 (Projected)
 - Approximately **3,000** cloud students per year
 - Over **\$2M** in funds to scale and support

The Multiplier Effect

- **28** community colleges in Northern California planning to replicate the Cloud Project in the Bay Area region
- Several community colleges outside of the Los Angeles region are already participating in—and contributing to—the cloud community of practice

Timeline

2017	2018	2019	2020	2021
<p>Pilot</p> <p>Santa Monica College, AWS Educate, and Roosevelt High School</p>	<p>Program Launch</p> <p>California Cloud Workforce Project, 19 Los Angeles Community Colleges and High School Partners</p> <p>Regional Cloud Day at Santa Monica College</p>	<p>Implementation</p> <p>Developing the Community of Practice</p> <p>Collaborating on Open-Source Curriculum</p> <p>Faculty Professional Development</p> <p>Engaging Additional Tech Employers</p>	<p>Implementation</p> <p>Outreach to High Schools</p> <p>Work-Based Learning Events with Industry</p> <p>Faculty Professional Development</p> <ul style="list-style-type: none"> • Regional Industry Advisory Board • Intersegmental Professional Development with Los Angeles Unified School District • Virtual Cloud Day • Virtual Welcome Day • Cloud Practitioner and Solutions Architect Bootcamps 	<p>Program Improvement</p> <p>Scaling Bootcamps, Certification Preparation, and Career Readiness Activities</p> <p>Piloting Team Internship Model</p> <ul style="list-style-type: none"> • Regional Industry Advisory Board • Virtual Cloud Days • Virtual Welcome Day • Cloud Practitioner and Solutions Architect Bootcamps
<p>This timeline represents key events and the focus of each year of implementation. The Cloud Project works with the colleges and partners at their own pace. The initiative reflects a mix of early and late adopters. The project leadership adapts to the needs of the locally-grown partnership with implementation at different stages at different colleges.</p>				

Colleges in the Community of Practice

Cerritos College
 Citrus College
 Compton College
 El Camino College
 East Los Angeles College
 Glendale Community College
 Long Beach City College
 Los Angeles City College
 Los Angeles Harbor College
 Los Angeles Mission College
 Los Angeles Pierce College
 Los Angeles Southwest College
 Los Angeles Trade Technical College
 Los Angeles Valley College
 Mt. San Antonio College

Pasadena City College
 Rio Hondo College
 Santa Monica College
 West Los Angeles College

Colleges Outside the Region

Cuesta College
 Foothill College
 Las Positas College
 Moorpark College
 Riverside City College

Lead College

Santa Monica College

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B. THE FACULTY COMMUNITY OF PRACTICE

The regionalization of curriculum is nuanced work. The Cloud Project found that relationship building through a community of practice is a critical element in taking a pathway to scale. For the past three years, an active community of practice brought consistency and structure to project implementation and fostered genuine collegiality among faculty. It is important to note that this was not a top-down endeavor, but rather faculty driven at every step of the way. At any given time, 15-20 instructional faculty across institutions were engaged in project team meetings, professional development, and webinars on key topics—both participating in these activities and driving content to support their peers. Moreover, 50 faculty have attended professional development training to date. This level of peer exchange has made a tremendous difference in widespread uptake of the core curriculum across the 19 colleges and their high school partners.

A project leadership team—composed of instructional faculty, college and high school dual enrollment faculty, counseling faculty, a project manager for the Cloud Project, a CLP project lead, and other members of the larger community of practice—kept the project moving along. This cross-functional, cross-institutional team met on a weekly basis to share updates, evaluate progress, iterate best practices, and design professional development. The project team served as a hub of expertise for the region. Team members provided knowledge and support to the colleges, helping practitioners to facilitate conversations, enlist partners, and cultivate champions for the work at individual campuses.



“Knowing that we had a new program in great demand for our students excited me.”

— Dorothy Phillips, faculty, Computer Technology,
Los Angeles Harbor College

From the beginning, the work of the leadership team was informed by industry-required competencies with input from Los Angeles technology employers using a range of cloud solutions. A regional advisory board for the Cloud Project also informs project curriculum and work-based learning activities with representation from Amazon Web Services and AWS Educate, CDW Integrated Technology Solutions, Slalom Consulting, Think AI Corporation, Los Angeles Metro, the Los Angeles Economic Development Corporation, and the Center for a Competitive Workforce.

With leadership from CLP, the project team was intentional about professional development. The team worked with college partners to identify and design relevant professional development to support implementation at the colleges. In years one and two, faculty professional development focused on cloud computing technical training and practices to build a robust career pathway. In year three, in-person training addressed outreach to area high schools and included intersegmental professional development with feeder high schools to foster dual enrollment relationships with the colleges. Monthly webinars augmented professional development, addressing a range of topics such as project data, high school and community college partnerships, outreach to students, and incorporating work-based learning into the pathway. Outside of formal training, the project used a channel (chat room) in the Slack communication platform to further connect faculty together. All these structured efforts helped to cement relationships and create a forum for ongoing resource sharing across the region.

This community of practice created a spirit of collaboration and community among faculty, not competition. A structured, intentional, and consistent approach to bringing practitioners together enabled collaboration to flourish.

The Role of the Career Ladders Project

CAREER LADDERS PROJECT (CLP) utilized its expertise in equity-minded redesign and knowledge of K-12 and community college systems to support the faculty community of practice. In addition to ongoing support for project meetings, CLP facilitated collaboration between high school and community college partners, supported communications outreach by providing information to counselors on the cloud computing sector, and designed faculty professional development to meet the needs of regional partners. CLP worked one-on-one with the colleges to assist with planning, address issues, and help keep the work on track. Additionally, CLP worked with Santa Monica College on its initial pilot and advised the college regarding the original design, especially helping to broaden the focus beyond AWS to include other cloud platforms and technology employers. With support from CLP, the California cloud community of practice has fostered innovation in the region and much has been learned from this work. CLP, along with project partners, will continue to share lessons learned with the broader field.

Section Two: What The Project Team Learned

A. FACULTY REFLECTIONS ON THE WORK

CLP asked cloud faculty to reflect on their experience with this community of practice, including key factors that led to success. Across the board, the faculty shared that networking with peers, sharing effective practices and challenges, and the willingness of their counterparts to provide support was essential to an impactful program launch. They noted the benefit of starting with the model developed by Santa Monica College, which made curriculum development easier at the colleges. They shared that the monthly professional development training was instrumental to implementation and many also pointed to the importance of having a central point of contact, the project manager, providing support. All agreed that there is strength in numbers. The regional structure helped to demystify processes and practices, while creating a rich sense of connection that is often missing for faculty, especially those teaching in small departments.

“Sharing with the other instructors and hearing about their college’s successes and how they were putting it together was great...Sharing a very successful model (Santa Monica College) that was working helped us to build a successful program.”

— John Bowman, Jr., faculty, Computer Science, Los Angeles Southwest College

“I was an outsider when I first learned about the Cloud Project.... I was made to feel very welcome. And then right off the bat...I was invited to training at Glendale College and I was able to meet other faculty. I think it was really that training on a Saturday that helped me get a better understanding of what I needed to do... to get the course approved through curriculum and go through my own training.... I was so appreciative to be part of a larger group that had the same focus.”

— Edmond Garcia, faculty, Computer Network Systems Engineering, Moorpark College

“It can be isolating to work as an instructor in a community college, especially if you’re one of very few instructors in your discipline, as many cloud faculty are. Unfortunately, part of the job is that you work in isolation and we kind of get used to it. It’s working on a regional project like this—which is not common, I think, across our institutions—that brings a new level of engagement that when I was teaching wasn’t present for me. And so I’m glad to provide that as an option, because I know how lonely it was for myself to be in my class, trying to figure out my classes.”

— Salomón Dávila, project manager, California Cloud Workforce Project

The faculty were enthusiastic about “Regional Cloud Day” events, where high school and college students across the region attended industry panels and breakout sessions to learn more about cloud computing careers from cloud professionals. Seeing students (current, potential, and alumni) excited about the cloud industry sector and inspired by one another at these events was a genuine highpoint for many faculty.

Faculty were willing to invest their time and talents developing the program because it addressed an in-demand sector that promised high-paying, quality jobs for students. Faculty appreciated that the curriculum was based on industry-desired competencies and were confident that students would gain skills in a range of cloud computing platforms and technologies including AWS and Microsoft Azure. They noted that many traditional computer science programs do not cover cloud computing and it is difficult to find cloud programs even at four-year institutions. The Cloud Project is serving a broad range of students seeking entry



into cloud occupations, including career changers (7%) and those without any background in information technology (62%). Offering a cutting-edge curriculum that could change students' career trajectories, while meeting industry demand for talent, was a point of pride for faculty in the community of practice.

"Knowing that we had a new program in great demand for our students excited me."

— Dorothy Phillips, faculty, Computer Technology,
Los Angeles Harbor College

With that said, high student demand creates challenges. Several faculty reflected that it is difficult to find enough instructors with cloud expertise to teach these courses. Finding good instructors, ideally with industry expertise, who have time to teach represents an ongoing struggle for the colleges.

The ultimate indicator of the initiative's success is the impact on students. As one faculty member shared, students are demonstrating significant career gains as a result of their experience in cloud courses and project activities:

"Recently one of our students with no technical background was offered an internship that led to a full-time opportunity. Over the span of 1.5 years, he has been promoted twice. We also had a high school student who completed the cloud certificate program and landed a summer internship upon graduation. The CEO was so impressed with her skills that he extended the internship through fall. These are a few of the success stories that show the immediate impact experienced by students in our program."

— Koda Kol, faculty, Computer Information Systems,
El Camino College

B. INSIGHTS FOR THE FIELD

The experience of the Cloud Project suggests important lessons for colleges seeking to build robust communities and pathways. While there is no one formula for success, several core principles have served this project well and may be of interest to the broader field. Chief among these:

Be intentional about the design of the community of practice. A strong community is one where participants genuinely care about each other and root for the success of their colleagues. Such a community is not just a “happy accident”—it is purposefully cultivated.⁶ The community of practice was carefully designed with faculty at the center. The project team, as the hub of the community, drew faculty into the conversation and empowered them to deepen their involvement when they felt comfortable. The team did not push out content for colleges to implement; rather, they provided structure and resources for faculty and encouraged codesign of curriculum and project activities.

Regionalize core structures and practices. The project team crafted core structures at a regional level in order to simplify implementation at the local level. The team figured out the complexities of building the pathway so that individual colleges didn’t have to, making it easier and faster to get a cloud program off the ground at the colleges. These structures included:

- *Professional development* that was timely, relevant, and consistent.
- *A curriculum approval process* with course outlines and documentation available through the online Canvas learning management system and the adoption of a regional cloud certificate approved by the state Chancellor’s Office—making it simple for college and high school teams to adapt and adopt.
- *Regional labor market data* to share with partners, counselors, instructors, and students, including labor market data from the Centers of Excellence and an online scan of job openings requiring knowledge of cloud computing technologies.
- *Regional Advisory Committee minutes* to share with college partners for local curriculum committee program approvals and state submission.

Use a “hub of experts” to empower faculty. The consortium found that having a project leadership team to support practitioners helped to legitimize the work. Individual faculty could achieve big goals because they had a team of experts behind them. For example, faculty often brought project team members to meetings with high school principals to explain the value of the cloud computing courses and program. At El Camino College, the cloud instructor was a first-year hire. It can take years for faculty to cultivate relationships with senior colleagues and successfully navigate power structures at their respective campuses—all necessary to develop a new certificate program. The El Camino faculty member was successful, in part, because he had a regional team supporting him, helping to mobilize buy-in at the college and with external partners.

Incentivize faculty. The Cloud Project encouraged faculty participation in the regional endeavor in several ways. The project provided specialized training to high school and college faculty around the AWS platform and cloud technologies as well as professional development on key topics such as outreach to high schools and work-based learning. Faculty appreciated the opportunity to gain knowledge and skills that could advance their careers. The initiative demonstrated strong labor market demand for cloud computing programs and brought industry leaders to the table—all important motivators for faculty. Colleges and consortiums pursuing similar efforts can consider a range of strategies to incentivize faculty such as: access to industry expertise, training, and certifications; additional professional development resources; compensation for additional responsibilities; or demonstrating high student and industry demand for programming from the onset.

“We worked with individual colleges at their own pace while consistently hosting meetings and events to maintain engagement in the community of practice. This model engendered trust in each other and created space for collegiality to develop.”

— Salomón Dávila, project manager, California Cloud Workforce Project

“The work done at the regional level improved buy-in of the program at the local level.”

— Khai Lu, faculty, Computer Information Systems, El Camino College

Consider including outside facilitators in the conversation. Both CLP and the regional project manager for the Cloud Project were not affiliated with any one college (Santa Monica College did house the grant) and were seen as objective and trusted allies for faculty and counselors. As outsiders, the CLP project lead and the regional project manager could often bring expertise and a regional perspective to the work, helping colleges to cut through “stuck points” that might otherwise stall innovation.

Be transparent about results. The project team established mechanisms with faculty and students to collect individual college project data. As a neutral third party, the team made these results visible to the community of practice, always there to lend a helping hand as course corrections were needed. The project team emphasized that the colleges were all in this together. The team regularly used data during webinars and project meetings to inform conversations about next steps. The team reviewed student enrollment by college as well as survey data on student educational backgrounds, work experience history, purpose for enrolling in the program, and educational goals. Individual faculty members

reviewed student success and progress data. As the project has matured, the partners are developing strategies to better track job placement.

This transparency allowed the community of practice to honestly evaluate progress and draw lessons for improvement. For example, in a review of aggregate data, the project team discovered that 42.5% of the regional cloud students already held a bachelor’s degree or higher (about half of these students held non-technical degrees). Many on the project team were surprised by these findings. To ensure that students without college credentials had access to the cloud computing pathway, the project team focused more on building relationships with partner high schools with the explicit intention of reaching out to students who might not otherwise be included in STEM fields—all of which was explored in the larger community of practice. It might have been daunting for individual faculty to address the findings on their own; but, in collaboration with their peers, the colleges easily prioritized relationship-building with the high schools.

Conclusion

The California Cloud Workforce Project has crafted a strong community that is helping faculty to support one another, share practices, and diffuse learning across the Los Angeles region and beyond. The endeavor is inspiring to students, partners, and faculty alike. Working together across the region, the partnership has scaled implementation at the colleges further and faster than an individual college might accomplish on its own. A welcoming community of practice—with a thoughtfully designed regional infrastructure at the center—was essential to achieving project goals. As a result, students across the region have access to cloud computing programs that lead to high-paying jobs in a growth industry sector with opportunities to advance in college and careers—and early evidence suggests that students are completing the program and getting hired.

Endnotes

1 Ranger, S. (2018, December 13). *What is cloud computing? Everything you need to know about the cloud explained*. ZDNet. <https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/>

2 Galov, N. (2020, December 4). *25 Must-know cloud computing statistics in 2020*. Hosting Tribunal. <https://hostingtribunal.com/blog/cloud-computing-statistics/>

3 According to ZipRecruiter, the majority of cloud computing salaries in California range between \$91,920 to \$139,600, with top earners making \$173,026 annually. *Cloud computing annual salary in California (\$107,108 Avg: Dec 2020)*. ZipRecruiter (2020, December 4). <https://www.ziprecruiter.com/Salaries/Cloud-Computing-Salary--in-California>

4 Centers of Excellence. (2018, September). *Cloud computing-Amazon Web Services (AWS), Los Angeles and Orange Counties*. <http://www.coecco.net>

5 Funded in 2014 by the California Career Pathways Trust (CCPT), a state grant, the Los Angeles High Impact Information Technology, Entertainment and Entrepreneurship, and Communications Hubs (LA HI-TECH) Regional Consortium brought together eight community colleges and sixteen high schools with business and community partners to create career pathways in information and communications technology (ICT) across the Los Angeles region. LA HI-TECH represented approximately 3,600 high school and community college students and over half of ICT majors in the region's community colleges. Pasadena City College served as the fiscal agent and Santa Monica College served as one of four regional hubs in the consortium.

6 Vogl, C. H. (2016). *The Art of Community: Seven principles for belonging*. Berrett-Koehler Publishers, Inc.



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