BHEF BUSINESS-HIGHER EDUCATION FORUM®

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WORKFORCE PARTNERSHIP INITIATIVE CASE STUDIES

REGIONAL PARTNERSHIPS

Creating highly tailored educational and work-based learning opportunities in communities

ABOUT THE BUSINESS-HIGHER EDUCATION FORUM

The Business-Higher Education Forum (BHEF) is a private, nonprofit membership organization of leading C-suite business executives and university presidents who employ the latest market intelligence to inform strategic partnerships that create innovative talent solutions in high-demand emerging fields and promote diversity and inclusion. Members provide leadership by encouraging their peers to act on critical talent needs. For more information about BHEF, visit BHEF.com.

ACKNOWLEDGEMENTS

BHEF would like to thank Business Roundtable and the JPMorgan Chase Foundation for their leadership in the Workforce Partnership Initiative. We also thank WPI business and higher education partners for providing detailed information and insights on their respective roles, partnerships, and programs, namely Dawn Braswell, training manager, Siemens Energy; Michael Chiappetta, director of North America and Chicago market development, Accenture; Fran Coady, senior vice president, human resources, Day & Zimmermann; Roger Collins, apprenticeship manager, Siemens Energy; Ellen Glazerman, executive director, EY Foundation and EY Americas director, university relations; Daniel Serota, senior manager, public affairs, Aon; and Patty Warner, human resources director, Owens Corning. This work was funded by the JPMorgan Chase Foundation. However, any opinions, findings, conclusions, and/or recommendations are those of the authors and do not necessarily reflect the views of the foundation.

INTRODUCTION

In 2018, the Business Roundtable and the Business-Higher Education Forum (BHEF) joined forces to create the Workforce Partnership Initiative (WPI). The initiative invited Business Roundtable CEOs to form multi-company partnerships and connect with leaders of postsecondary institutions to meet regional workforce needs. Dozens of CEOs responded, and the JPMorgan Chase Foundation awarded BHEF a grant to support nine WPI projects around the country.

The resulting WPI partnerships created highly tailored educational and work-based learning opportunities in their own communities. These initiatives bring together unlikely partners, engage students in new curricula and apprenticeships, and grow America's pool of high quality, inclusive, and tech-enabled talent. The sites address different needs and are at different stages, but all are actively working with faculty, learners, and/or employees toward a common goal.

Strong, ongoing collaboration between business and higher education offers a solution to the skill shortage that was growing prior to COVID-19 and has been exacerbated by the new ways we now work and communicate. These skills are crucial to maintaining America's competitive advantage and to supporting durable, inclusive economic growth in our communities.

This document is part of a series of case studies on the WPI projects, with the series covering five of the nine partnerships: Chicago, D.C.-Maryland-Virginia, North Carolina, New York City, and the Southeast. Each initiative is tailored to its region's unique needs and assets, and each case study offers an in-depth examination of the particular challenge the regional effort is addressing, the solutions developed, the partners involved, and the outcomes achieved.

CHICAGO

A Networked Approach to Apprenticeships

THE CHALLENGE

The need for skilled workers is especially important for a company's entry-level positions, as recruiting, hiring, and, in particular, retaining such employees can be challenging. Moreover, many prospective workers find the cost of college a barrier to entry for a professional job, student loan debt a burden to a promising financial future, and the likely need to reskill daunting. Such concerns have a negative impact on a company's productivity and a region's economic growth.

THE SOLUTION

Professional apprenticeship programs can help address the skills needs that most companies face and bring broader pools of talent into companies. By recruiting from highly diverse sources such as community and technical colleges, companies can utilize an apprenticeship program as an alternate on-ramp for roles that normally require a specific degree or professional experience. An apprenticeship provides an opportunity for motivated, high-potential individuals to gain the required training, professional skills development, and experiential learning to fill those roles. Such programs can also reskill people interested in changing careers or whose jobs have been—or will be—disrupted by technology.

To meet emerging talent demands in the Chicago area, Aon and Accenture developed professional apprenticeship programs that mirror those historically used in fields such as advanced manufacturing. Implemented in 2016, Aon's 24-month program focuses on insurance, information technology, and human resources. Accenture also launched its program in 2016 in partnership with City Colleges of Chicago. That program focuses on in-demand tech roles in areas including cybersecurity, data analytics, and business operations.

Both programs allow apprentices to earn and learn by receiving paid classroom training, valuable work experience and mentorship, and a living wage, all with the potential for gaining relevant credentials and conversion to full-time hire upon completion. Ultimately, these programs can increase employee productivity and can fill positions that do not require a traditional bachelor's degree.

To expand the city's commitment to professional advancement through apprenticeships, Aon and Accenture co-founded the Chicago Apprentice Network in August 2017 to convene Chicago companies who either already have or are interested in creating their own apprenticeship programs. The network, now comprised of over 40 companies, hosts quarterly events that allow apprentices and employers to network with each other and discuss the benefits of apprenticeships and their shared experiences. In addition to this, the network facilitates the sharing of best practices and lessons learned among peers, including recruitment strategies, professional apprenticeship roles, and curriculum and training enhancements. Supported by the Business-Higher Education Forum (BHEF), the launch of the Business Roundtable Workforce Partnership Initiative (WPI) in 2018 provided major momentum toward the announcement of the network's landmark goal of 1,000 apprentice opportunities in the Chicago area by the end of 2020, furthering the impact and scale of the initiative.

PARTNERS

WITH AON AND ACCENTURE'S LEADERSHIP, the network promotes program awareness in high schools for a strong talent pipeline, facilitates partnerships with local educational institutions such as City Colleges of Chicago on curriculum development, and engages with nonprofit organizations like One Million Degrees on skill development, career enhancement, and recruiting. The U.S. Department of Labor and State of Illinois also provide guidance on program development, including how to apply for and gain approval as a registered apprenticeship.

With support from the Business Roundtable and BHEF, Aon and Accenture have been expanding the network to include additional members, have been featured as an exemplary work-based learning model in publications[1] and at meetings, and have learned from and shared insights with other Workforce Partnership Initiative apprenticeship sites. Altogether, the network drives workforce development and economic opportunities and builds deeper relationships with clients and the community.

CHICAGO APPRENTICE NETWORK MEMBERS

COMPANIES (publicly announced)	COMMUNITY COLLEGES	NONPROFITS	GOVERNMENT
AAR	Arrupe College (Loyola)	Apprenti	State of Illinois
Accenture (lead)	City Colleges of Chicago Daley College Harold Washington College Kennedy- King College Malcolm X College Olive Harvey College Truman College Wilbur Wright College	Center for Information Technology Talent Acceleration	U.S. Department of Labor
Aon (lead)	College of DuPage	General Assembly	
Catalyte	College of Lake County	Genesys Works	
Chicago Public Schools / Pre-K	Elgin Community College	i.c.stars	
Freedman Seating	Harper College	Lambda School	
Hartford	Illinois Central College	One Million Degrees	
JourneyCare	Rockford Community College	Skills for Chicagoland's Future	
JPMorgan Chase	Waubonsee Community College	Year Up	
McDonald's		YUPro	
Risk Management Solutions of America			
Rush			
SDI Presence			
SP +			
Walgreens			
Zurich			

Note: Another 27 companies have committed, pending public announcement

1. Gallagher, S., Jona, K., Waggoner, K., Knepler, E., Zapata-Gietl, C., Blochinger, S., Cardenas-Navia, I., Chen, J., & Fitzgerald, B. (2019). *Designing and implementing work-based learning: A call to action for CHROs. Boston, MA: Northeastern University*. Retrieved from https://www.bhef.com/publications/designing-and-implementing-work-based-learning-call-action-chros

OUTCOMES

BOTH AON AND ACCENTURE have experienced great success with their apprenticeship programs. Since WPI launched in 2018, the total number of apprentices in Accenture's Chicago program has more than tripled from 40 to 125. Of the apprentices that have completed the program, 87 percent have been hired to full-time roles in high-demand areas, including cybersecurity, data analytics, and web development. Since it began, Aon's program has had a total of 100 apprentices, with upward of 90 percent converting to full-time employment upon program completion. Both companies have committed to recruiting at least 25 apprentices each year moving forward.

The network itself has also experienced significant expansion. Since early 2018, the network's list of members has grown, including state and federal government, 16+ educational institutions, 10 nonprofit organizations, and 40+ companies who have launched or committed to 700+ apprentice opportunities to date—working toward the goal of 1,000 apprentice opportunities by the end of 2020.

CHICAGO WORKFORCE PARTNERSHIP INITIATIVE

300%

INCREASE IN THE TOTAL NUMBER OF APPRENTICESHIPS

87%

OF APPRENTICES HAVE BEEN HIRED

25+

APPRENTICES RECRUITED EACH YEAR PER COMPANY

BROADER IMPACTS

IN JANUARY 2019, Apprenticeship 2020 was launched as part of the WPI to broaden the Chicago Apprentice Network's reach. Apprenticeship 2020 is a $3.2-million fund aimed at scaling high quality, work-based learning programs in the Chicago area. It is a collaboration of Accenture, Aon, Chicago Community Trust, Joyce Foundation, JPMorgan Chase, MacArthur Foundation, Pritzker Traubert Foundation, Salesforce.org, and other organizations.

The network is also increasing the diversity of its locations and roles. For example, with strong support from leadership at the national, regional, and local levels, Accenture has expanded beyond the Chicagoland area to partner with many community colleges and nonprofits on apprenticeship programs in 20 North American cities, including San Antonio, Boston, Columbus, San Francisco and Detroit, and it will have 700 apprentices trained by the end of the 2020. The network has also expanded beyond its original focus on areas to include cybersecurity, healthcare, and call center support.

In addition, the network generously shares its knowledge and insights with a broader audience. For example, Aon has described the value of and advocated for the apprenticeship model with the U.S. Department of Labor and Congress. The network also released *Bridging the Gap between Talent and Opportunity: Apprenticeship Playbook for Professional Jobs,*[2] which equips companies with the necessary knowledge to develop apprenticeship programs that provide underrepresented groups with access to professional jobs and meets their specific talent needs.

2. The Chicago Apprentice Network. (2019). *Bridging the gap between talent and opportunity: Apprenticeship playbook for professional jobs.* Retrieved from https://www.illinoisworknet.com/DownloadPrint/Chicago-ApprenticeNetwork_BridgingtheGap_Digital_Final.pdf

PROFESSIONAL APPRENTICESHIP PROGRAMS CAN **HELP ADDRESS THE SKILLS NEEDS THAT MOST COMPANIES FACE** AND BRING BROADER POOLS OF TALENT INTO COMPANIES.

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NEW YORK CITY
Cybersecurity and Data Analytics Course
Innovation Initiative

THE CHALLENGE

Over the last decade, the number of technology jobs in the New York City (NYC) region has grown by 80 percent, to 142,600 jobs—an explosion of potentially high paying, in-demand positions. Many of these positions cut across sectors such as financial services, retail, health services, and law, which have also shown significant growth along with the technology industry as a whole.

This pace of growth requires job applicants and current employees to have the skills to work with technologies that did not exist in the last decade or, in many cases, last year. Education systems often struggle to keep up with these skills requirements and, as a result, end up teaching skills for outdated technologies and workplaces. Mobile technologies built on smartphones, cloud, artificial intelligence, and cybersecurity all demand skills and expertise that are typically taught in education pathways moored to the past. Adaptability, teamwork, and communication skills are also critical in today's education and work environments.

Given the demand and skills requirements, NYC employers have struggled to find candidates with the right skills to fill these high-tech jobs. In addition, recent graduates from minority groups have been chronically underrepresented in higher education—particularly in technical areas. A 2016 article in the *New York Times* titled, "Why Tech Degrees Are Not Putting More Blacks and Hispanics into Tech Jobs," discusses why many minoritized individuals, including those with bachelor's degrees in computer science and engineering fields, opt out of technology careers, with one reason being a lack of exposure to employment opportunities in high-tech areas.

NYC employers have struggled to find candidates with the right skills to fill high-tech jobs. In addition, recent graduates from minority groups have been chronically underrepresented in higher education—particularly in technical areas.

THE SOLUTION

Business Roundtable companies in NYC are partnering with the City University of New York (CUNY) to develop the Cybersecurity and Data Analytics Course Innovation Initiative, intended to provide students with foundational and advanced knowledge, skills, and abilities (KSAs) in cybersecurity and data analytics to address critical workforce needs for the NYC region. As the nation's largest urban university, CUNY serves nearly 275,000 degree-seeking students across 25 campuses, including community colleges, four-year institutions, and graduate and professional schools. With approximately 56 percent of its student population identifying as Black or Latinx, CUNY is an ideal academic partner for Business Roundtable companies looking to grow and recruit diverse, capable talent in digital areas.

With support from the Business-Higher Education Forum (BHEF) and its Workforce Partnership Initiative, CUNY and Business Roundtable companies have formed deep and mutually beneficial collaborations to create new credit-bearing courses or significantly enrich cybersecurity and data analytics courses at CUNY colleges. In some cases, these partnerships have extended beyond course co-development to include faculty mentoring and extracurricular activities such as boot camps and data challenges for students to develop needed exposure to emerging digital fields.

After a series of planning exercises, Business Roundtable companies, CUNY administration and faculty, and BHEF agreed to leverage CUNY's pre-existing Course Innovation Grant Program to support faculty members interested in working in deep partnership with Business Roundtable companies to develop new or enhance existing course content in cybersecurity and data analytics to better reflect real-world skill and knowledge needs. Business Roundtable companies agreed to identify and leverage internal resources such as staff time with subject matter experts (SMEs), as well as skill-building resources such as company training materials, courses, and data sets to support the co-development of courses in the two areas identified.

CUNY's Office of Academic Affairs issued a request for proposals in May 2019, inviting faculty throughout the CUNY system to submit plans to develop content and/or update courses, including incorporating specific collaboration and engagement opportunities with Business Roundtable companies' SMEs in areas such as guest lecturing, course curriculum development and review, class project design, and other activities. BHEF was able to draw on work from its Sloan Foundation-funded NYC Data Science Task Force and other regional projects from its Workforce Partnership Initiative to establish a planning framework. The key goals for the New York City Workforce Partnership included:

- Cultivate ongoing partnerships between employers and CUNY faculty or academic programs to enhance curriculum, expand student skill sets to meet job market demand, and ultimately place students into internships and jobs;
- Integrate real-world datasets and industry problems into existing coursework/curricula;
- Access industry learning platforms with interactive content and videos, as well as licenses for tools and technology (where possible); and
- Build university-wide capacity to organize students, employers, and faculty in professional development activities specifically for key sectors of the NYC economy.

After a competitive review of faculty proposals by a committee of CUNY, IBM, and BHEF staff, nine grants of $10,000 each were awarded. The participating campuses reflected a mix of two and four-year institutions, as well as departments and academic disciplines, and they represented four of the five NYC boroughs (Bronx, Brooklyn, Manhattan, and Queens).

PARTICIPATING COMPANIES AND HIGHER EDUCATION INSTITUTIONS

AS THE LEAD BUSINESS ROUNDTABLE company in the initiative, IBM spearheaded a group that included Pitney Bowes, JP Morgan Chase, Guardian Life, UPS, and Mastercard. IBM and participating companies worked with CUNY and BHEF to organize convenings between faculty members and corporate partners to discuss collaboration opportunities for the development of courses. Each Course Innovation awardee was assigned to a corporate SME based on area of focus to co-design course syllabi, reading lists, problem sets, and other content around business-driven challenges. Joint planning and course design activities took place between October and December 2019, and course launches were set for the spring 2020 semester.

The onset of the COVID-19 pandemic in February 2020 required a re-tooling of implementation. In response to city and state-wide quarantine orders, CUNY moved all of its course instruction online. Faculty members had to re-work and adjust their course content to translate it to the new virtual format. Consequently, Business Roundtable company partners focused on virtual interactions with students and faculty and providing content and tools that would work in a virtual learning environment. Additionally, as the demand for tech-enabled solutions and products increased, there was new demand for tech talent in the areas of cybersecurity and data analytics, which amplified the urgency of delivering courses that impart KSAs with strong value in the job market.

OUTCOMES

CUNY FACULTY AND BUSINESS ROUNDTABLE companies created a series of industry-informed course experiences, events, and applied-skill workshops. Across seven participating campuses and nine awardees, 544 students received direct engagement through delivered course innovation initiatives. Students participated in enriched academic experiences that combined text material with simulated lab experiences and discussion panels, anchoring technical course information to an applied and hands-on context. Among the activities now offered to students are a six-month data science seminar series with a culminating data challenge; intense hands-on secure coding practices and cryptography workshops; and three-week virtual cybersecurity apprenticeships.

While the COVID-19 pandemic required a shift in delivery from in-person to virtual, these activities allowed campuses and partners to test how course innovations can be scaled. Campuses and Business Roundtable companies will continue to expand their courses in the upcoming Fall 2020 semester, with an increased focus on applied skillsets, virtual internships, and apprenticeships.

CUNY INSTITUTIONS	COURSES
Cybersecurity	
Hostos Community College	Issues in Law Enforcement
Borough of Manhattan Community College	Secure Coding for Advanced Programming
Borough of Manhattan Community College	Information Assurance
Queensborough Community College	Data Security for Business
York College	Software and Web Applications Security
LaGuardia Community College	Advanced Network Security
Data Analytics	
Baruch College	Business Analytics; Data Mining for Business Analytics; Data Visualization; Statistical Learning for Data Mining; Machine Learning for Data Mining
Queensborough Community College	Statistics with SAS Applications
Brooklyn College	Introduction to Data Analytics and Visualization in the Social and Behavioral Sciences

CUNY IS MONITORING THE IMPACT of the Cybersecurity and Data Analytics Course Innovation Initiative within participating institutions and, potentially, at other campuses within the system. The initiative was featured in an article appearing on-line in *Forbes*, which noted that "the CUNY partnership is a potential model for other cities and regions, to ensure that the nation's college students graduate with the right skills to work in high-tech careers."

PROGRAM SPOTLIGHT: BARUCH COLLEGE

Pitney Bowes Data Science Seminar Series and Data Challenge

Pitney Bowes is a global technology company that helps its clients succeed by simplifying the complexities of commerce in areas of ecommerce, shipping, mailing, and financial services. Like many companies transforming themselves to respond to rapid changes in the digital economy, Pitney Bowes requires a nimble, data-savvy workforce to enable the company to infuse data analysis into all aspects of its business. Equally central to the company's human resources goals is the recruitment and retention of top talent from among diverse demographics, including underrepresented minorities, women, first-generation college-goers, and other groups.

As one of the colleges within the CUNY system, Baruch College includes the nationally ranked Zicklin School of Business, the Paul H. Chook Department of Information Systems and Statistics, and the Graduate Career Management Center/Starr Career Center. Each of these programs was tapped to support a series of innovative courses and extracurricular activities in the first year of CUNY's partnership with Pitney Bowes as part of the Cybersecurity and Data Analytics Course Innovation Initiative.

In total, 294 Baruch College students took part in this year-long program, which included a four-part data science seminar series, a Python and cloud for analytics boot camp, and a culminating data challenge event. Baruch faculty members worked closely with SMEs from a cross-section of Pitney Bowes business units to deliver cutting-edge content and exposure to real-world challenges faced by technology-driven industries. Among the corporate business units represented were Data Science; the Strategic Technology and Innovation Center; Interaction Design; Intelligent Lockers; and User Experience Design.

The data challenge was originally designed as an in-person competition, but after the switch to distance learning in response to the COVID-19 pandemic, it was adjusted to a virtual format. Pitney Bowes and Baruch augmented the learning environment by extending the challenge over several days, they and incorporated asynchronous sessions up front to describe a business problem in the logistics domain that the students needed to solve by converting the problem to a data science framework and using tools including Jupyter Notebooks/Python to solve it. Students built their models and presented them via Zoom, and Pitney Bowes SMEs selected the winning teams.

After the completion of the culminating data challenge event, Baruch College and Pitney Bowes met and confirmed their desire to continue their partnership and to repeat the year-long data science seminar series the following academic year. Give the continuous challenges of COVID-19, they are planning to continue to use both asynchronous and synchronous methods of delivery, given the success of the last two seminars and the data challenge event, which were entirely online.

PROVIDING STUDENTS WITH **FOUNDATIONAL AND ADVANCED KNOWLEDGE, SKILLS, AND ABILITIES IN CYBERSECURITY AND DATA ANALYTICS** TO ADDRESS CRITICAL WORKFORCE NEEDS FOR THE NYC REGION

ACKNOWLEDGEMENTS

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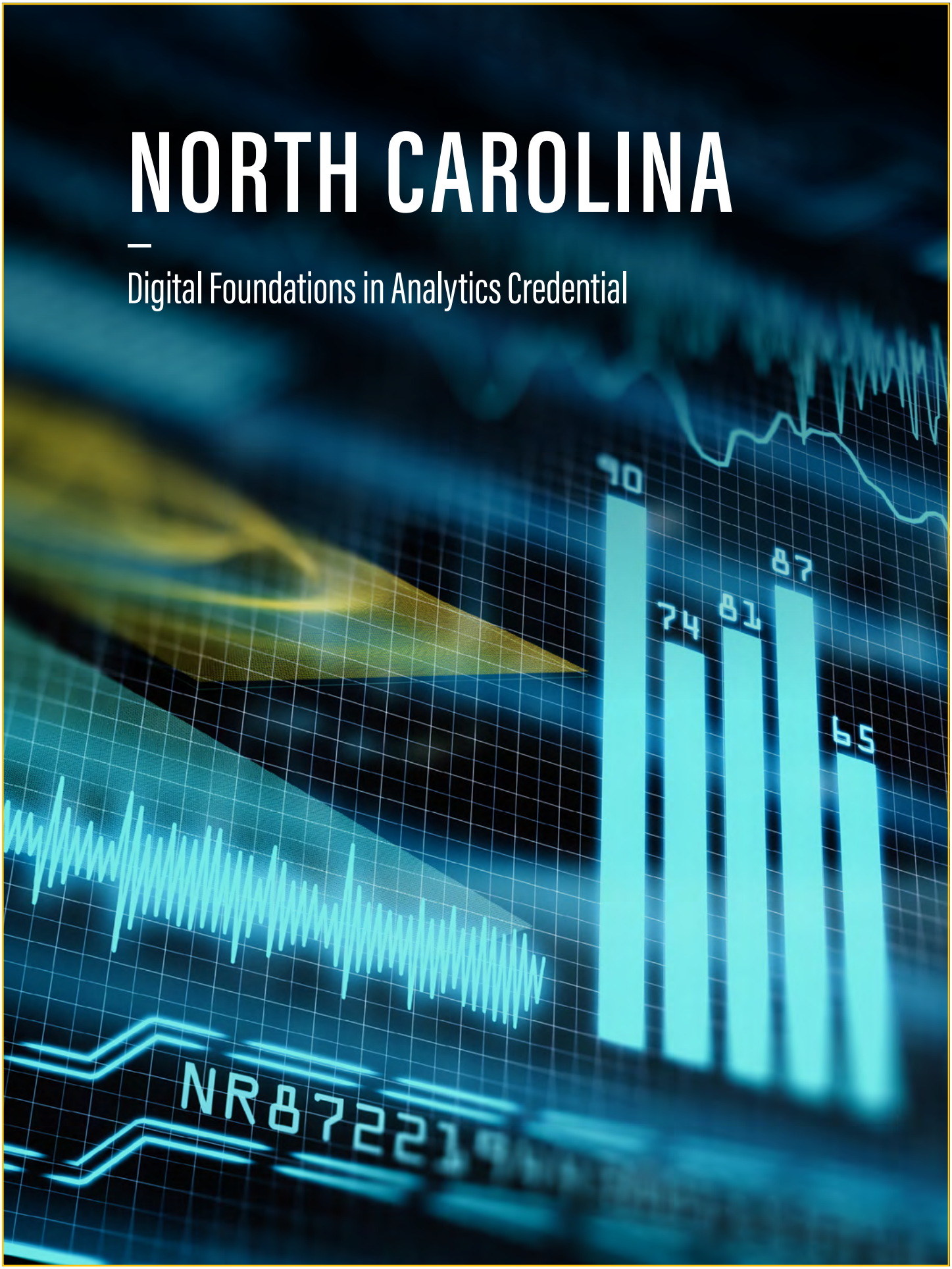
NORTH CAROLINA

Digital Foundations in Analytics Credential



THE CHALLENGE

Businesses across all industries increasingly rely on data-driven decision making as a core component of their operations. According to the Business-Higher Education Forum (BHEF), "data-enabled professionals who can marry a deep background in a particular field (e.g., the arts, agronomy, economics, finance, health, or business) with the ability to apply analytics and visualization tools" are well-positioned for these data-enabled roles. In fact, additional research conducted by Gallup and BHEF on the data science and analytics (DSA) talent reveals that "by 2021, 69% of employers expect candidates with DSA skills to get preference for jobs in their organizations. Yet only 23% of college and university leaders say their graduates will have those skills."

In North Carolina, several companies became interested in developing a foundational digital technology credential. Demand for digital skills outpaced their traditional supply channels, and a credential would allow companies to expand their talent pools by enabling students from different majors to explore more career opportunities. With a credential, companies would be able to foster more entry-level candidates who have broad technical knowledge in digital technologies, in addition to other, more foundational skills, and who, once hired, can continue learning on the job.

Data-enabled professionals who can marry a deep background in a particular field with the ability to apply analytics and visualization tools are well-positioned for data-enabled roles.

THE SOLUTION

North Carolina Business Roundtable member companies are partnering with five higher education institutions in the region to develop the Digital Foundations in Analytics Credential to equip undergraduate students with the foundational digital data analytics skills needed in today's technology-driven workforce.

With support from BHEF and its Workforce Partnership Initiative, North Carolina businesses laid the groundwork for the credential in 2018 by refining and verifying the knowledge, skills, and abilities (KSAs) from the DC, Maryland, and Virginia (DMV) region's existing Generalist Digital Technology Credential to ensure that these foundational competencies met the local business needs in North Carolina. These competencies are generally focused on data analytics, visualization, and security. However, unlike the DMV's KSAs, the North Carolina companies proposed the addition of two areas: foundation of systems development life cycle and data application/business acumen. These two additional KSA categories were designed to address application-focused areas.

Participating companies agreed that students from non-technical academic backgrounds, particularly business and liberal arts and humanities, would benefit from this credential. Although the credential would not be a stand-alone degree, these companies felt that it would ultimately serve as a signal of the baseline skills that recent graduates in entry-level positions need to be successful in the digital economy.

BHEF and participating companies then reached out to presidents and provosts of higher education institutions to ensure senior-leader buy-in for the credential. Next, department heads and faculty from a variety of disciplines were brought in to discuss credential implementation. This collaboration demonstrates how higher education can be flexible, agile, and responsive to industry needs when there is a wide array of stakeholders involved in the credential implementation process.

Once the companies agreed on the set of competencies and the higher education institutions were identified, BHEF led a competency mapping exercise to ensure alignment of the KSAs to existing curricula, pinpoint gaps within curricula, identify content expertise that could be leveraged, and assess any barriers for student enrollment. The higher education institutions chose at least one current major, minor, or other program to examine course learning objectives further and understand how these existing courses aligned to the KSAs. Additionally, institutions played a critical role in providing feedback on the KSAs and developing new or augmenting existing credentials that fulfill business needs. BHEF then compiled the results and found:

- On average, existing university credentials covered 31 out of 53 KSAs;
- Most schools needed to realign their existing programs to ensure KSA coverage because many courses were offered at the junior or senior levels and required prerequisites; and
- Many of the available courses are more specialized and require more depth of knowledge than asked for by the companies.

Simultaneously, companies developed a value proposition to encourage students to pursue the credential. These commitments included:

- Guaranteed resume review for internships and full-time employment, provided other hiring requirements are met;
- Hosting groups of students for shadow days;
- Hosting receptions with company leadership; and
- Providing case studies and data sets.

These commitments will enhance the learning experience in the classroom and expose students to networking opportunities. Within a six-month period, many of the higher education institutions identified credential pathways ready for enrollment beginning Fall 2020, including minors, certificates, and incorporating new required courses into full degree programs.

PARTNERS

WITH EY AS THE LEAD COMPANY, participating companies were able to provide strategic guidance and direction on how the credential was shaped. They validated KSAs to signal to higher education the desired skill set for recent graduates. And with support from BHEF, a diverse set of higher education institutions were recruited to participate in the initiative including a community college, large state and research-intensive universities, and a historically black college or university. This diversity of institutions allows companies to increase their access to students with whom they may not traditionally interact within recruitment cycles, including nontraditional students, underrepresented minorities, and liberal arts majors.

PARTICIPATING COMPANIES AND HIGHER EDUCATION INSTITUTIONS

COMPANIES	HIGHER EDUCATION INSTITUTIONS
Bank of America	North Carolina A&T
Cisco	North Carolina State University
EY	University of North Carolina, Chapel Hill
SAS	University of North Carolina, Charlotte
Wells Fargo	Wake Technical Community College

Participating companies are interested in a credential that supports upskilling and reskilling individuals already in the workforce.

OUTCOMES

THE KEY GOALS for the North Carolina Workforce Partnership included:

- Increase the number of students completing their education with the data analytic skills needed across a range of domains;
- Increase hiring of data-enabled students; and
- Explore the expansion of credentials into other digital technology areas, as well as support the upskilling of incumbent employees.

Higher education institutions have identified pathways in which students will pursue the credential. While some of the programs and courses are still in development, the initial group of students enrolled in eligible courses in Fall 2020.

HIGHER EDUCATION INSTITUTION	TYPE OF CREDENTIAL
North Carolina A&T	Certificate of Business Analytics in the Willie A. Deese College of Business and Economics
North Carolina State University	Minor in Data Science initially offered with classes in the Department of Statistics
University of North Carolina, Chapel Hill	Applied Data Science Certificate for students who are not pursuing math, statistics or computer science degrees
University of North Carolina, Charlotte	Minor open to students in the College of Liberal Arts
Wake Technical Community College	Certificate in Business Analytics

BROADER IMPACTS

THE SKILLS-SIGNALING WORK PERFORMED by the companies has been a valuable asset to the higher education institutions, and the development of the Digital Foundations in Analytics Credential has created a deeper institutional interest in embedding these foundational skills in additional academic programs.

As a result, University of North Carolina (UNC) Charlotte and Wake Technical Community College have both embedded the KSAs in recently developed and existing technical degree programs. UNC Chapel Hill has recognized data science as a priority growth area for the entire university, is developing a new School of Data Science, and will require all students to take a one-credit data science literacy class as part of a student's core degree requirements.

Wake Technical Community College is pursuing articulation agreements with North Carolina universities to support students who are enrolled in the existing A.A.S Business Analytics and Data Science Programming Support Services programs to ensure these students can fully qualify for the credential and receive recognition from partnering companies. These agreements would allow A.A.S. students to pursue bachelor's degrees and to be fully considered for hiring opportunities with partner companies. To date, they have developed an agreement with North Carolina A&T and are in the process of developing an agreement with UNC Charlotte. Additionally, they are looking into an opportunity with North Carolina State University (NCSU) as part of the AI Apprenticeship program.

Additional schools in the region want to join the partnership as well and are reviewing their curricula for opportunities to embed the KSAs and offer them to students. One such institution, Wake Forest University, is interested in offering the credential to students who are primarily pursing a liberal arts degree.

The participating companies are also interested in a credential that supports upskilling and reskilling individuals already in the workforce. Academic institutions have taken note and are incorporating this into strategic initiatives. For example, NCSU initiated a lifelong-learning taskforce and will use the KSAs to inform their work. UNC Chapel Hill is also developing a professional degree which will fulfill all the KSAs.

Lastly, a key outcome for the participating companies has been the ability to share the KSAs with colleges and universities outside of North Carolina in order to expand their hiring pipelines nationally with more data-enabled students.

PARTNERSHIPS TO EQUIP UNDERGRADUATE STUDENTS WITH THE **FOUNDATIONAL DIGITAL DATA ANALYTICS SKILLS** NEEDED IN TODAY'S TECHNOLOGY-DRIVEN WORKFORCE.

ACKNOWLEDGEMENTS

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SOUTHEAST REGION

Advanced Manufacturing Apprenticeships

THE CHALLENGE

ACCORDING TO THE NATIONAL ASSOCIATION OF MANUFACTURERS (NAM), there were approximately 12.8 million manufacturing employees in the U.S. in 2018.[1] But with the digital revolution reaching the industry, shop-floor skills are rapidly changing. Based on analyses of the Gartner 2018 Shifting Skills Survey, 70 percent of employees have not mastered the skills they need for their jobs today, and only one in five employees have both current and future skills preparedness.[2]

In addition, one in five workers in the Southeast region are near retirement age, and young adults are often not aware of or interested in pursuing the dynamic opportunities offered in the manufacturing industry.[3] Consequently, advanced manufacturing companies are struggling to find workers with the technical skills sets needed for success in their plants.

THE SOLUTION

Apprenticeships build the future workforce by addressing a company's critical talent issues. To help close the skills gap in the Southeast region, the Workforce Partnership Initiative (WPI) brought together three companies (Siemens, Day & Zimmermann, and Owens Corning) to increase the number of apprenticeships in advanced manufacturing. As part of the initiative, these companies either expanded their existing apprenticeship models or developed new apprenticeship programs to meet the company's talent needs.

As the lead company for the region, Siemens' registered apprenticeship program, which was adapted from the German-style apprenticeship model, served as a model for WPI replication. Started in North Carolina in 2012, the program developed a longstanding partnership with Central Piedmont Community College and local high schools to recruit talent. As part of the recruiting process, students undergo a thorough screening and review and, once admitted, receive 1,600 hours of highly technical classroom training and 6,400 hours of on-the-job training to fulfill specific job roles, which currently covers three trades: CNC machinist, mechatronics electrician, and mechatronics technician. Simultaneously, apprentices work towards a journeyman's certificate from ApprenticeshipNC (North Carolina Community College System) and the U.S. Department of Labor (DOL), as well as an associate's degree in computer integrated machining or mechatronics from Central Piedmont. In many situations, apprentices begin the program as contractors but transition to full-time employees after completing the first year of the program.

As one of the nation's leaders in construction, engineering, staffing, and defense, Day & Zimmermann continued to grow the wide-range of apprenticeships in all of its building trades, which are primarily located in the Southeast and Southwest regions. As part of its apprenticeship program, Day & Zimmermann works with unions and customers to train both new hires and current employees. The program provides both classroom instruction and in house, on-the-job learning programs to deliver training to apprentices.

Expected to launch in the near future, Owens Corning is leveraging its existing upskilling programs consistent with the principles of Total Productive Maintenance (TPM) to develop its inaugural apprenticeship program in North Carolina and South Carolina. The program will focus on training new hires to fill roles as highly skilled operators or technicians, and it will be a combination of in-house training and classroom instruction at local colleges. Owens Corning also plans to register its apprenticeship program with the DOL.

PARTNERS

EACH COMPANY'S APPRENTICESHIP program includes partnerships with local community colleges, who can develop curriculum and deliver classroom training to apprentices. In addition, supporting statewide efforts serve as resources for apprenticeship program development. For example, ApprenticeshipNC, as the governing apprenticeship agency in North Carolina, supports employer-driven models such as Apprenticeship Charlotte, Apprenticeship 2000, Guilford Apprenticeship Partners, and Career Accelerator Program. These programs combine on-the-job learning with related classroom instruction and allow businesses to create flexible and effective training and hiring solutions that work for their industry. Furthermore, Apprenticeship Carolina, a division of the SC Technical College System, ensures all employers in South Carolina have access to the necessary information and technical assistance they need to create demand driven, DOL-registered apprenticeship programs. To support and leverage each other's knowledge, the companies have come together within and across WPI apprenticeship sites to discuss best practices for manufacturing apprenticeships. With the Business Roundtable's support, BHEF facilitates this knowledge sharing by holding conversations with employees at each company in which they present on their respective apprenticeship models, reflect on any challenges they are confronting, and share possible solutions.

COMPANY	COMMUNITY COLLEGES	GOVERNMENT
Day & Zimmermann	Estrella Mountain Community College	
	Florence-Darlington Technical College	
	North Georgia Technical College	
	Tri-County Community College	
	West-Mec Community College	

COMPANY	COMMUNITY COLLEGES	GOVERNMENT
Owens Corning	Gaston College	

COMPANY	COMMUNITY COLLEGES	GOVERNMENT
Siemens (lead)	Central Piedmont Community College	U.S. Department of Labor
	Northeast Alabama Community College	State Apprenticeship Agencies
	Lone Star Community College	
	Piedmont Virginia Community College	
	Spartanburg Community College	
	Rivers Parishes Community College	
	Forsyth Community College	
	Westmoreland County Community College	
	Lanier Technical College	

OUTCOMES

TARGETING BOTH NEW HIRES and current employees, Siemens' program has grown to more than 30 apprentices at any given time in multiple states, with an overall enrollment retention rate from the outset of the program at 80 percent. Siemens' intent is for all apprentices to transition into full-time positions at the company with no student debt and an average starting salary of $55,000 a year.

Day & Zimmermann's Union Shop operations group trains between 10 and 15 percent of its workforce, or about 1,500 trade-craft employees, with a goal of 30 percent diversity in its apprenticeship program. Day & Zimmermann's program averages 1,500 apprentices and has a 100 percent conversion rate of apprentices to new hires every year in building trade craft positions.

Owens Corning has a target of five apprentices for its inaugural cohort and expects 100 percent of its apprentices to simultaneously work and earn postsecondary credits. Owens Corning also plans to match the demographics of its apprentices with the larger company's guidelines on diversity.

SOUTHEAST REGION PARTNERSHIP INITIATIVE

$55,000
AVERAGE STARTING SALARY

30
APPRENTICES AT ANY GIVEN TIME IN MULTIPLE STATES

80%
RETENTION RATE

BROADER IMPACTS

EACH COMPANY HAS COMMITTED to continued expansion efforts in a variety of ways. For example, Day & Zimmermann has already implemented its program nationally, and as they prepare to launch their inaugural program, Owens Corning is considering expanding beyond the Carolinas and recruiting for additional roles.

In addition, Siemens regularly shares its knowledge and insights with other individuals and organizations. To encourage nationwide replication, Siemens developed a playbook in partnership with Alcoa, Dow, NAM, and the DOL, *Employer's Playbook for Building an Apprenticeship Program*, for other manufacturers seeking to launch similar programs.[4] The Siemens apprenticeship program was also highlighted as an exemplary model in a BHEF work-based learning publication[5] and at a two-day workshop hosted by BHEF and NSF in 2018 where about 150 leaders from business, academia, government, and nonprofits discussed the evolving needs of the nation's workforce, particularly in the engineering and advanced manufacturing sectors.[6]

4. Alcoa, The Dow Chemical Company, Siemens, & the National Association of Manufacturers. (2014). *Employer's playbook for building an apprenticeship program*. Retrieved from http://www.themanufacturinginstitute.org/~/media/53456D700856463091B62D1A3DA262F4/Full_Apprenticeship_Playbook.pdf

5. Gallagher, S., Jona, K., Waggoner, K., Knepler, E., Zapata-Gietl, C., Blochinger, S., Cardenas-Navia, I., Chen, J., & Fitzgerald, B. (2019). *Designing and implementing work-based learning: A call to action for CHROs.* Boston, MA: Northeastern University. Retrieved from https://www.bhef.com/publications/designing-and-implementing-work-based-learning-call-action-chros

6. Business-Higher Education Forum. (2019). *Reskilling America's workforce: Exploring the nation's future STEM workforce needs*. Retrieved from https://www.bhef.com/publications/reskilling-america%E2%80%99s-workforce-exploring-nations-future-stem-workforce-needs

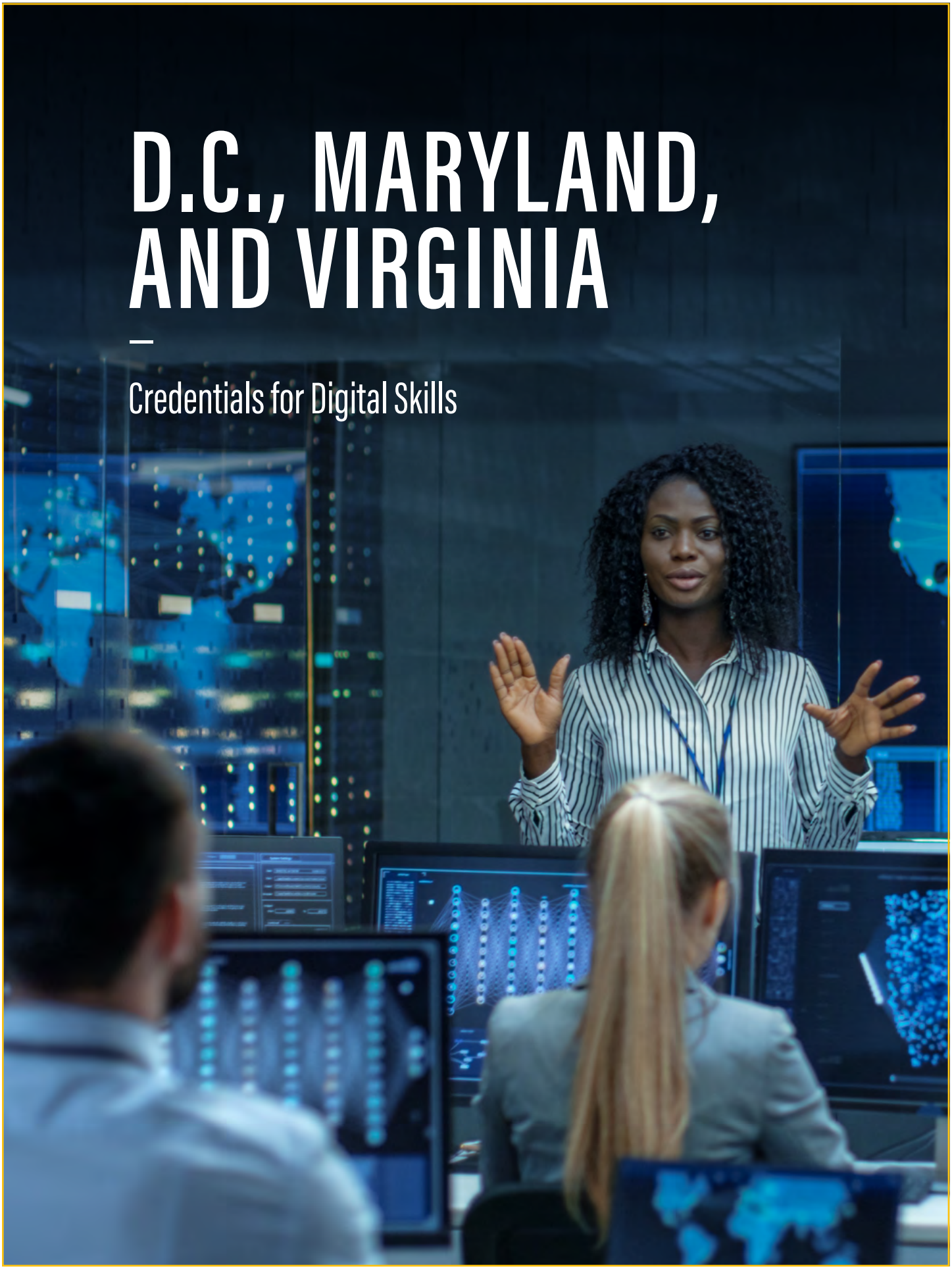
APPRENTICESHIPS BUILD THE FUTURE WORKFORCE BY ADDRESSING A COMPANY'S CRITICAL TALENT ISSUES.

ACKNOWLEDGEMENTS

BHEF would like to thank Business Roundtable and the JPMorgan Chase Foundation for their leadership in the Workforce Partnership Initiative. We also thank WPI business and higher education partners for providing detailed information and insights on their respective roles, partnerships, and programs, namely Dawn Braswell, training manager, Siemens Energy; Fran Coady, senior vice president, human resources, Day & Zimmermann; and Patty Warner, human resources director, Owens Corning. This work was funded by the JPMorgan Chase Foundation. However, any opinions, findings, conclusions, and/or recommendations are those of the authors and do not necessarily reflect the views of the foundation.

D.C., MARYLAND, AND VIRGINIA

Credentials for Digital Skills



THE CHALLENGE

THE CAPITAL REGION of D.C, Maryland, and Virginia (DMV) is the third largest economy in the United States. It hosts multiple industries including the federal government, defense, healthcare, information technology, and professional services—a dynamic mix that creates a myriad of needs for in-demand digital tech skillsets.

As a result, the region faces two primary challenges: not enough individuals with the skills businesses need, and lack of access for underrepresented populations. Without expanding the digital tech talent pipeline, the Greater Washington Partnership estimates that nearly 60,000 positions will go unfilled annually by 2025.[1] While the region's technology and technology adjacent workforce is more diverse than the nation as a whole, historically marginalized groups are still underrepresented—only 17 percent of technology workers are Black, and 5 percent are Hispanic/Latinx.[2]

1. "The Capital Region Faces a Huge Tech Talent Shortage." Greater Washington Partnership. July 2020.
2. Ibid.

THE SOLUTION

INITIAL SCOPE

In early 2018, the Greater Washington Partnership formed the Capital CoLAB (Collaborative of Leaders in Academia and Business) with 12 of its member businesses, 12 universities, and 1 university system with a focus of developing the digital technology talent and workforce needed in the region now and in the future. Because several members of the Greater Washington Partnership are also members of the Business Roundtable, CoLAB served as the anchor for the Workforce Partnership Initiative's DMV site, and the Business-Higher Education (BHEF) was engaged to provide support. Business partners agreed to initially focus on creating undergraduate credentials in digital technology.

Wes Bush, then CEO of the Northrop Grumman Corporation, convened executives from seven companies to identify areas where they were experiencing significant talent shortages. Through meetings and a survey administered by CoLAB, companies identified data analytics, cybersecurity, machine learning, and cloud computing as the common areas with substantial need for talent. After further analysis, they recognized that their organizations needed two types of new employees with additional digital technology skills—generalists and specialists. Generalists are people pursuing non-STEM careers that are increasingly becoming more digital in nature, such as human resources, marketing, logistics, and many others. The generalist competencies most needed were data analytics, visualization, security, and ethics. Specialists are individuals pursuing STEM careers, but who need additional skills along with their primary field of study. Specialist credentials would complement a traditional STEM degree by offering stackable digital technology skills in machine learning, data analytics, cybersecurity, and cloud computing.

In advance of meeting with partners from higher education, the Greater Washington Partnership convened groups of subject matter experts from a diverse set of industries to identify the most critical knowledge, skills, and abilities (KSAs) for the generalist credential and for specialist credentials in data analytics, cybersecurity, and machine learning, opting to address cloud computing in the near future. The KSAs were then validated by human resources and technology leaders at a variety of companies. Next, company subject-matter experts and university faculty members worked together to refine the KSAs and identify learning outcomes, enabling multiple universities to teach students to the same standard. BHEF supported universities in mapping the KSAs against their curriculum and developing pathways. Faculty members and administrators created new courses, adapted existing ones, and worked through the institutional processes required to launch these new credentials.

KSAs were finalized for the Digital Tech Generalist credential and included six components—data analytics, statistics, data manipulation, visualization and communication, data ethics, and data security. Two institutions, George Mason University and Virginia Commonwealth University, began offering programs in Spring 2019, just months after the KSAs and learning outcomes were finalized. Additional universities followed, and the specialist KSAs and learning outcomes were subsequently finalized.

Upon earning a credential, students receive a digital badge, embedded with meta-data detailing the specific KSAs the learner has gained. Employers can see that students have acquired critical competencies, and this badge is aligned with open-badging standards, which allows the data to connect to multiple systems, such as applicant tracking systems used by CoLAB employers. In addition to in-demand skills, a credential provides students with access to internships, events, job shadowing, priority interviewing, mentoring and to the opportunity to connect with the credential alumni network.

EXPANSION

AFTER FORMING ITS INITIAL PARTNERSHIP, CoLAB expanded by adding businesses and university partners and creating TalentReady, a CoLAB Pathways Initiative. With support from the JPMorgan Chase Foundation and Bloomberg Philanthropies, this initiative brings education leaders from five the DMV communities together with employers to create and enhance IT pathways that connect early postsecondary opportunities, high-value credentials, and real-world work experiences. The Employer Signaling System (ESS), a fundamental piece of this work, combines labor market information and employer insights with educator feedback to develop and refresh the knowledge, skills, abilities, and credentials (KSACs) needed for entry-level IT roles in the region. The partnership is now using ESS to align and refresh KSACs across all CoLAB programs, positioning the team to meet its goal of engaging 45,000 students and adult learners by 2025, with at least 50 percent of people engaged from underrepresented populations.

PARTNERS

WPI COMPANIES, HIGHER EDUCATION INSTITUTIONS, AND JURISDICTIONS INVOLVED

COMPANIES
Amazon
ASGN
AstraZeneca
Capital One
Central Intelligence Agency
Booz Allen Hamilton
Deloitte
EY
Exelon
INOVA
General Dynamics
JPMorgan Chase
McKinsey & Co.
MedStar Health
Monumental Sports
Northrop Grumman
Stanley Black & Decker
T.RowePrice
Under Armor
Washington Gas

HIGHER EDUCATION INSTITUTIONS
American University
Bowie State University
Frostburg State University
George Mason University
George Washington University
Georgetown University
Howard University
Johns Hopkins University
Marymount University
Towson University
University of Maryland, Baltimore County
University of Maryland, College Park
University of Maryland, Eastern Shore
University of Maryland, Global Campus
University of Richmond
University of Virginia
University System of Maryland
Virginia Commonwealth University
Virginia Tech

JURISDICTION PARTNERS
Baltimore City
Fairfax County/
Northern Virginia
Montgomery County
Prince George's County
District of Columbia

Efforts are guided by the CoLAB advisory board consisting of Wes Bush, chair; Ardine Williams (Amazon); Frank LaPrade (Capital One), Amy Gilliland (General Dynamics); Peter Scher (JPMorgan Chase); Scott Rutherford (McKinsey & Company) and Kathy Warden (Northrop Grumman). And efforts are staffed by a team from the Greater Washington Partnership, led by Vice President and Managing Director Jeanne Contardo.

> In this rapidly changing world, our **students are always seeking ways to distinguish their skills and abilities to future employers**—Capital CoLAB's Digital Tech Credential allows us to ensure American University students have recognizable skills and extra engagement with employers that help them be better prepared for the world of work.

SYLVIA MATHEWS BURWELL, PRESIDENT, AMERICAN UNIVERSITY

OUTCOMES

GEORGE MASON UNIVERSITY and Virginia Commonwealth University launched the Generalist Credential in Spring 2019, followed in the fall by Virginia Tech and the Georgetown University School of Continuing Studies. As of Fall 2020, they have been joined by ten universities—American University, Frostburg State, George Washington University, Howard University, Marymount University, Towson University, University of Maryland Baltimore County, University of Maryland College Park, University of Maryland, Global Campus, and the University of Richmond.

George Mason University has launched a Specialist Credential in data analytics, and institutions such as Howard University, Marymount University, and University of Richmond have identified pathways for students to earn Specialist Credentials in cybersecurity and machine learning. Participating CoLAB universities are in the process of expanding course development across multiple pathway offerings. As of December 2020, 781 students were engaged in the various digital technology credentials. Of those students, 31 percent are Black and Hispanic/Latinx.

Building on this work, in September 2019, the National Science Foundation awarded BHEF a planning grant to develop a replicable and scalable model for digital technology upskilling and reskilling in the DMV region in areas such as data analytics, cybersecurity, cloud computing, networking/IT, and artificial intelligence. In collaboration with the Greater Washington Partnership, Business Roundtable, and CoLAB members, BHEF assessed current upskilling and reskilling efforts in digital technology and identified strategies for aligning and coordinating efforts to increase the quantity and efficacy of upskilling and reskilling business-higher education partnerships. The ultimate goal of the effort is to create a much larger and more diverse digital technology workforce in the DMV region.

BROADER IMPACTS

EFFORTS HAVE LED to increased collaboration not only between higher education institutions and businesses but also among the individual businesses invested in this effort. Together, these businesses collectively signal and address their talent needs, rather than continuing to go it alone. Additionally, the increased partnership, information sharing, and problem solving has sped up the time it takes for universities to offer new programs.

The region recently finalized a strategic plan focused on driving leadership around inclusive growth and becoming a national model for building diverse talent. To support that goal, partners are in the early stages of building a scholarship program funded by industry that will support students interested in earning a credential but unable to afford the cost.

> “Thanks to the strong support provided by early partners, including the Business-Higher Education Forum and the Business Roundtable, **the Capital CoLAB at the Greater Washington Partnership has built an industry-aligned Digital Tech Credential program that will help ensure the Capital Region has the best prepared, most diverse digital tech workforce in the country**. Efforts like this one are vital to building solutions at scale that drive inclusive growth.”
>
> **WES BUSH**, CHAIR, CAPITAL CoLAB

> Thanks to the incredible investments from our employer and educator partners, we have been able to commit to the region that **by 2025, the CoLAB will engage at least 45,000 people in digital tech pathways, at least half of whom will be from underrepresented populations**. Together, we will ensure this region is the best place to live, work, build a business, and raise a family—for everyone.

JEANNE CONTARDO, VICE PRESIDENT & MANAGING DIRECTOR, CAPITAL CoLAB

CREATING A MUCH LARGER AND **MORE DIVERSE DIGITAL TECHNOLOGY WORKFORCE** IN THE DMV REGION.

ACKNOWLEDGEMENTS

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WPI partnerships create highly tailored educational and work-based learning opportunities in their own communities. **This initiative brings together unlikely partners, engages students in new curricula and apprenticeships, and grows America's pool of high quality, inclusive, and tech-enabled talent.**

Strong, ongoing collaboration between business and higher education offers a solution to the skill shortage crucial to maintaining America's competitive advantage and to supporting durable, inclusive economic growth in our communities.

THE WORKFORCE PARTNERSHIP INITIATIVE INVITES BUSINESS AND POSTSECONDARY LEADERS TO CONNECT AND DEVELOP SOLUTIONS TO MEET REGIONAL WORKFORCE NEEDS.

BHEF BUSINESS-HIGHER EDUCATION FORUM®

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