APPLYING CAREER AND TECHNICAL EDUCATION FRAMEWORKS TO CORPORATE WORKFORCE DEVELOPMENT PROGRAMS

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Abstract

As job growth has increased and wages have remained largely stagnant, a large portion of the American workforce has been left behind, particularly workers from underrepresented and under-resourced neighborhoods. One-third of American companies report having open positions for which they are unable to find qualified workers, this is particularly true of middle-skilled jobs. The growing skills gap in the United States poses a problem as the wealth gap increases, underemployment levels rise, Baby Boomers exit the workforce, and productivity falters below an optimal level. To address this gap, some companies have created in-house workforce development programs, similar to career and technical education programs, to train workers for middle-skilled jobs and create a pathway to sustainable wages. Through the use of interviews, this research examines three companies to assess what methods are used to train these individuals and their similarity to traditional career and technical education methods. This research focuses on programs within these companies that focus specifically on the development of young adults. The results show that these new corporate workforce development programs use a similar framework as traditional career and technical education programs, but also include incentives for apprentices to further their education.

Even though the U.S. unemployment rate has reached relatively stable, the U.S. labor force is facing two simultaneous crashing waves: high levels of job openings and increasing levels of under-skilled labor. Middle skill jobs are at the forefront of this situation; these are jobs that require more than a high school degree but less than a 4-year postsecondary degree (Cantor 2015). In 2016, there were 5% more job openings than available, skilled labor (Restuccia et al 2018). Furthermore, this number is expected to increase as Baby Boomers age out of the workforce in the coming years leaving more job openings available (Cantor 2015). In a 2018 collaborative report by the U.S. Chamber of Commerce and Burning Glass Technologies, 4.4 million open, middle skilled jobs were identified across 12 industries. This surplus of available jobs and deficit of skilled labor is known as a skills gap. Essentially, people do not have the required skills to fulfill these open roles. In a 2021 survey, nearly 7 in 10 employers reported having difficulties filling positions and nearly half reported that the lack of skilled talent is affecting their ability to serve their customers (Manpower Group 2021). The growing demand for middle skilled jobs has put pressure on companies to explore new ways to meet this challenge.

Meanwhile, there are 4.1 million people between the ages of 16 and 24 in the United States that are neither working nor in school (Social Science Research Council 2021). Minority groups are particularly affected with 1 in 5 young Black persons disconnected from school or work and 1 in 5 young Latino people disconnected from school or work (Social Science Research Council 2021). It is crucial young people are either working towards a degree of educational attainment or developing skills for employment. Those who are neither working or in school go on to earn lower wages, pay less taxes, commit more crime, and rely more on social services than their in-school or working peers even after they find employment (Ayers 2013).

The estimated annual cost of this to U.S. taxpayers is $93 billion (Bridgeland and Milano 2012). This demonstrates how the adolescent and young adult years are formative for individual economic independence and future societal cost. Not only should young people be in school or working, but those jobs must be *good jobs* defined as jobs that provide a wage consistent with the middle-class standard of living for a given area (Acemoglu 2019), as well as legal protections, health benefits, safe working conditions, and a clear career path for self-development and fulfillment (Rodrick and Sabel 2020). *Good jobs* are those that offer employees an opportunity to escape poverty and earn sustainable wages.

Young people are of particular interest to companies lacking skilled labor because of the duration they will remain in the workforce but there is also a unique opportunity for them to develop a career path. The cost of college has increased eight times faster than wages since the 1980s, leaving college financially out of the question for many young people (Maldonado 2018). Roughly 65% of jobs require some training or education after high school; however, only one-third of people will have completed a 4-year degree by the age of 25 (Schwartz 2014) which leaves a unique opportunity reach this target demographic.

Major corporations, like JP Morgan & Chase and Bank of America, have recently implemented workforce development programs that offer young workers a pathway to sustainable employment without a college education. These programs are designed to train individuals with the skills demanded by these companies. This paper will examine three programs across three in-demand industries through the use of interviews with program coordinators and draw conclusions about what mechanisms are used to train and place young people in these roles.

Literature Review

Career and technical education (CTE), sometimes referred to as vocational education, in the United States grew out of funding from the Smith-Hughes Act of 1917 and has prepared citizens for middle skill jobs for over a century. Traditional CTE fields include manufacturing, repair, culinary arts, cosmetology, construction, and engineering; traditionally these jobs involve skilled, manual labor. Often beginning in secondary school and sometimes extending into post-secondary education, CTE "encompasses a wide range of activities intended to simultaneously provide students with skills demanded in the labor marker while preparing them for post-secondary degree in technical fields" (Jacob 2017) or employment. CTE career pathways include hands-on training, career-oriented classes, internships, and apprenticeships (Jacob 2017). CTE particularly targets non-college bound students as a means of obtaining a sustainable wage and career. Research has shown that for every additional year of upper-level CTE, annual wages increase two-percent on average (Jacob 2017). Additionally, 92% of apprentices retain employment and go on to earn an average of about $300,000 more in lifetime earnings than their non-apprentice counterparts (Department of Labor 2021). Even though CTE in the U.S. boomed in the mid-20th Century, apprenticeships and vocational training has only recently begun to regain traction after a sharp decline from the 1980s (Martinez Jr. 2007). During this decline in vocational training, a gap in academic research on the efficacy of apprenticeships in the U.S. transpired. However, Germany has remained a steady leader in vocational education and offers a modern-day case for a society that truly capitalizes on vocational training.

Despite the global decline in manufacturing, Germany has maintained high productivity rates as a result of its dual education system, a system which students are divided into two tracks to

prepare them either for university or skilled apprenticeships. Interestingly, Germany ranks in the middle tier for educational performance among OECD countries (OECD), but possesses a highly-skilled workforce and remains a leader in human capital measures (World Economic Forum 2017). Human capital is the "most important ingredient for what drives economic performance in the contemporary globalized economy" (Audrestch and Lehmann 2016). Germany's use of vocational schools and apprenticeships has kept the German youth unemployment rate low with only 8.2% of 15-29 year olds not in employment, education, or training (NEET) (OECD). This is compared to the OECD average of 12.9% of 15-29 year olds who are NEET and the U.S. rate of 13.4% of 15-29 year olds who are NEET (OECD). Students who remain in school or employment are less likely to struggle financially and rely less on social services, so low NEET rates are desired. The German apprenticeship system can serve as an important proxy to compensate for the gap in academic research on CTE training and apprenticeships.

Career and Technical Education Frameworks

To better understand what causes the success of these programs, an analysis of CTE training frameworks must be done. The U.S. Department of Labor outlines the official requirements to be recognized as a registered apprenticeship. Registered apprenticeships must include a work component and classroom component that ultimately culminate in an industry-recognized credential (Office of Apprenticeship 2021). The Registered Apprenticeship framework also declares mentorship a requirement of program recognition. These requirements are the standards by which CTE apprenticeship programs are judged, so the analysis will use them as a standard CTE framework.

The central tenet is work-based learning, where a learner has the "opportunity to develop measurable skills through instruction at the worksite and, where appropriate, in a school or training program" (Showalter and Spike 2016). The concept of using work-based learning to supplement learning that takes place in a traditional academic setting stems from academic research on learning itself. This is best summarized by Clark:

> "CTE instruction consists of classroom teaching, laboratory applications, and supervised work experience along with career and technical student organization activities. Students learn concepts or theories in the classroom and form the basis for other types of work experiences including supervised instruction in the laboratory, which is characterized by problem-solving and hands-on experiences in application of the theory knowledge learned." (Clark et al 2010)

Clark et al. examines the use of situational learning in classroom and laboratory settings in CTE programs, which must be "tailored to represent the environment that the student might expect to encounter in the workplace" (Clark et al 2010). We know that by adding work-based learning to academic learning, the learner will begin to transfer the learning into other elements of life (Clark et al 2010). Furthermore, by integrating academic and work-based learning, "CTE can motivate students to attend school more frequently and be more engaged" (Jacob 2017), which in turn leads to more successful outcomes later in life.

Work-based learning also exposes students to professionals in the field which offers an opportunity for students to see themselves in these roles and ask questions. As students work alongside industry professionals or report to them during internships, students develop professional skills, or *soft skills.* Mentors and supervisors can provide valuable feedback for the learning process and develop professional relationships with industry professionals, which is associated with higher job quality (Ross et al. 2018). A national study of longitudinal data in 1997 found that students who received mentorship through apprenticeships, internships, and co-op programs had increased rates of college enrollment and employment for those who

participated (Ross et al. 2018). Once again, being employed or enrolled in school increases the probability of successful outcomes later in life.

Industry-recognized credentials include certificates, certifications, licenses, and degrees that "verify skill mastery, educational attainment, and the authority to perform a task or operation – conveying real economic benefits in the labor market" (Association for Career and Technical Education). Credentials are valued by employers because they can certify skills and qualifications without having to perform an assessment of skills or hire at risk (Association for Career and Technical Education). Registered apprenticeships require credentialing for both of these reasons, as well as to create a standard for apprentices to be compared.

Beyond the Industry-Recognized Apprenticeship Program requirements framework, research underlines cross-sector partnerships as fundamental to CTE programs. Partnerships act as a safety net to "ensure that on-the-job training and related classroom instruction complement one another" (Tesfai 2021). Successful work-based learning programs rely on community partners such as schools, philanthropic organizations, community organizations, and other intermediary organizations to reduce the burdens on employers (Showalter and Spiker 2016). Intermediary organizations facilitate recruitment, classroom curriculum design, connecting stakeholders, collecting and analyzing data, and provide funding support through financial contributions or dispersing the financial burden amongst engaged partners. Partnerships with community colleges are beneficial because community colleges are catalysts for economic development (Cantor 2015). Additionally, partnerships between employers and educational organizations, especially post-secondary institutions, lessen the perception of competition which deters students from pursuing immediate employment (Showalter and Spiker 2016) and in the long-run boosts individual human capital.

These mechanisms have yielded success in CTE fields by producing skilled, qualified candidates to fulfill open roles in traditional CTE industries. For example, the SME Education Fund, the education branch of the Society of Mechanical Engineers, sponsors high school CTE programs across the United States. There are nine different career pathways offered ranging from mechatronic and robotics to computer-aided design and manufacturing. SME programs include academic learning that takes place in high school classrooms, and work-based learning that occurs through internships and co-ops. The students receive professional development and mentorship, and the program concludes with the reception of an industry-recognized credential. Despite the COVID-19 pandemic, SME programs reported metrics indicating success during the 2020-2021 academic year. In total, programs across the country awarded over 300 industry-recognized credentials and reported an 89% placement rate of students into manufacturing careers (SME Prime 2021). Programs like these show the outcome of CTE training mechanisms. The success of these mechanisms call attention to the question: what mechanisms are these new corporate workforce development programs in non-traditional CTE fields using, and how similar are they to traditional CTE mechanisms?

Hypothesis

Given the reported success of new corporate workforce development programs and storied success of CTE programs, this research seeks to explore how companies in non-traditional CTE industries have been implementing workforce development programs. Using interviews with program directors, I expect that many of the mechanisms used by corporate workforce development programs will be similar to those employed by traditional CTE programs.

Additionally, I expect the interviews to reveal additional components of successful programs that are more specifically tailored to these industries. The research does not seek to prove or disprove any hypothesis, as much as highlight what mechanisms of effective corporate programs are used to address the skills gap.

Data and Methods

To assess what mechanisms non-traditional CTE programs are using to achieve success, interviews were conducted with program managers at three companies across the top three industries demanding middle skilled jobs. These industries are healthcare where labor demand exceeds labor supply by 44%, business and financial operations where demand exceeds supply by 21%, and computer science where demand exceeds supply by 17% (Restuccia 2018). These companies were Indiana University Health (IU Health), OneAmerica, and Salesforce. IU Health is a non-profit healthcare network and the largest health network in the State of Indiana. OneAmerica is a financial services company which specializes in mutual insurance holdings, retirement savings plans, and employee benefits. Salesforce is a cloud-based software company focusing on enterprise applications to boost corporate customer service, marketing, and analytics. Despite the difference in products and services offered by these companies, they share many similarities which contributed to their identification for this study. All of these programs were implemented within the past five years and are of similar size to each other.

The interviews were conducted in 30-minute sessions using video conferencing technology throughout the Summer of 2021. Each interview participant was asked a series of questions that followed the same outline. First, program directors were asked to introduce their

program and its mission and vision. This allowed program directors to share first and foremost the parts of their program they deemed most relevant, including which mechanisms they valued the most. The open-ended nature of this question allowed for respondents to share information first without any bias or direction from using the CTE framework. Second, directors were asked specifically about how they used certain techniques that traditional CTE programs employ. Each component included a series of sublevel questions. For example, when asked about the integration of academic and work-based learning, directors were also asked where each of those learnings take place, who are the instructors, where was the curriculum derived from, and how is the curriculum tailored to both the company and the students' needs. Then, program directors were asked to share any plans currently in development to better facilitate these programs and any additional practices outside the scope of typical CTE practices that they believe to have impactfully contributed to the success of the program. These questions often took the form of offering any advice for a peer company who wished to implement a similar program. Finally, participants were asked to share any success metrics or stories that speak to the success of the program.

Additionally, some of the interviews were supplemented with public facing information online or additional documents that the respondents shared. For example, the respondent at Salesforce followed up with a slide deck for the public outlining the program.

Results and Analysis

Interviews revealed that these three programs were using techniques very similar to traditional CTE training, but also modified CTE frameworks and included techniques not seen or

emphasized in traditional CTE training. Even though the skills being taught were very different than traditional CTE programs, these programs still used the general frameworks of traditional CTE training. As hypothesized, the integration of academic learning and work-based learning was central to these programs, just like in CTE programs. Similar to CTE programs, mentorship and learning alongside an industry professional was pivotal to the development of the apprentices. Additionally, most of these programs concluded with an industry-recognized credential that certified apprentices as qualified candidates; however, unlike most traditional CTE programs, most of these programs also offered direct hire employment with the parent company. Finally, these programs also relied on partnerships to reduce burdens and provide more services to apprentices. Where these programs differed was their commitment to support the continued education of their apprentices.

Work-based Learning Integrated with Classroom Learning

The integration of academic learning and work-based learning is the most pivotal element of CTE programs, so it is expected that new programs mimic this in their workforce development programs. Capitalizing on both learning styles allows these parent companies to tailor their curriculum directly to the skills demanded for their open roles.

The IU Health Fellowship at Crispus Attucks High School is a model example of how to blend classroom learning with work-based learning to maximize student impact, mimicking the long-standing approach taken by traditional CTE programs. The three-year high school program has two tracks: medical assistant or patient care technician. Throughout the course of the program, students complete courses that are also eligible for 29 dual credit hours at Ivy Tech Community College and complete internships and externships. The students take courses in anatomy, medical law and ethics, and specialized care such as dementia care and home care. This

in-class learning is complemented by work-based learning experiences sponsored by IU Health. Students complete summer immersion programs after their sophomore and junior years. Additionally, during the summer months students are connected with paid internships with either the IU School of Medicine or Project SEED, a summer program by the American Chemical Society for economically disadvantaged youth. Finally, during their junior year, students complete 75 hours of clinical work through the American Senior Communities Clinical program, and during their senior year, students complete externships at leading regional hospitals like Eskanazi or IU Health Methodist or are employed part-time at long-term care facilities. This combination of academic learning supplemented by work-based learning keeps students engaged and prepares students for career in healthcare. In this way, IU Health's program is most similar to traditional CTE programming.

OneAmerica differs slightly from the traditional model because it places heavy emphasis on developing the apprentice as a professional and person, not just developing the required skills. OneAmerica utilizes a classroom setting within the OneAmerica headquarters to teach high school students about the various roles at OneAmerica and their corporate values. During the classroom portion, students participate in professional development training, social capital programming, socio-emotional learning, networking, and financial literacy education. To supplement the classroom learning, cohorts take a field trip to Camptown, a non-profit center focused on skill-building for youth through outdoor recreation. Students compete in games and challenges that develop leadership skills, critical thinking, and socio-emotional capacity. Building socio-emotional and soft skills are necessary because of the interpersonal nature of the role. Outside of the classroom setting, students complete work-based learning projects with their

mentor and job shadows in different departments within the OneAmerica ecosystem, which is where the work-based learning becomes integrated with classroom learning.

Salesforce uses a 100% online training platform, which is a technique that is relatively new to the CTE field. Interestingly, Salesforce may be uniquely situated to serve as a model for traditional CTE programs looking to integrate online learning. During the 20-week online program, students learn how to use Salesforce software through online learning and simulations. The training is conducted on Salesforce free online platform, Trailhead, which includes learning modules, games, and hands-on case studies that offer students a chance to learn and practice their new skills in a simulated real-life scenario. The program concludes with a multiple choice certification exam. Salesforce was revolutionary in the sense that they released their software, their main product and source of revenue, for free on this platform such that students could train with the actual technology they were learning. The Trailhead platform is able to offer a combination of academic learning through modules and work-based learning through games and case simulations.

Mentorship and Career Guidance

This research revealed that mentorship is especially crucial in the development of apprentices in non-traditional CTE programs. Working alongside an industry professional has been a pillar of traditional CTE programs for decades, but what these interviews affirmed the importance of mentorship and career guidance for these non-traditional programs. Most disconnected youth lack connections with role models who can teach workplace culture, professional communication skills, and soft skills (Showalter and Spiker 2016). These programs reported that majority of their targeted populations have never had someone in their life in these roles, especially because these roles were not open to individuals without a college degree until recently, so mentorship has

proven to be imperative. Additionally, many traditional CTE fields are much more visible to people even outside the industry. For example, even if you are not an electrician, you have probably encountered an electrician or at least can visualize what they do. For careers in financial services for example, the duties and responsibilities are largely unknown and unseen to people unfamiliar with the industry. Interview respondents asserted that because it is harder for participants to envision themselves in these roles, mentorship is pivotal to participant retention and success.

OneAmerica offered detailed insight into their mentorship program. OneAmerica pairs participants with a mentor with common interests, similar demographic qualities, and from similar family structures. Mentors must have been with the company for over a year and are trained by a counselor from the University of Indianapolis. The training consists of implicit bias training, role play simulations, crisis intervention, and how to interact with people from different backgrounds than you. One observation the program has made is that students who have been previously exposed to mentor relationships tend to take better advantage of the program, while those who have not have been known to shirk their weekly meetings with their mentor and avoid communicating with their mentor. Some participants have even been known to hide in the bathroom to avoid confrontation with their mentor. This mentorship relationship presents an opportunity for further research.

Likewise, IU Health augments one-on-one mentorship with career guidance via extracurricular activities. Students are required to complete extracurricular requirements in the following three areas: employability skills, social capital, and leadership skills. Each semester students must participate in one IU Health event such as job shadowing, networking event, or hospital tours and participate in one Center for Leadership Development program each year.

Students are also required to join the Health Occupations Students of America (HOSA). By connecting students with industry professionals and aspiring industry professionals like themselves, the IU Health Fellowship is able to enhance the mentorship experience.

Salesforce differs from the other programs because they divide Pathfinders into mentorship groups of about six to eight students. Within these groups, students receive synchronous instruction from Salesforce employees and employer partners such as Deloitte who offer career development programming like through workshops on how to act in the workplace, networking events, social events, resume workshops, and mock interviews.

Credentials and Employment

Similar to traditional CTE programs, Salesforce and IU Health offer industry-recognized credentials. After completion of Salesforce Pathfinder training, candidates take a multiple choice exam for the opportunity to be certified in one or more of the 30 industry-recognized credentials offered. These certifications include Salesforce Administrator, Salesforce Developer, or specialist in software such as Tableau or other Salesforce products. Completion of the IU Health Fellowship program includes the opportunity to earn seven industry-recognized credentials including CPR, First Aid, Certified Clinical Medical Assistant (CCMA), Patient Care Technician (PCT), or an entry-level Certified Nursing Assistant (CNA). These certify that participants have meet the universal criteria to perform in the corresponding role.

Credentials are emphasized by traditional CTE programs because they are transferrable across markets and verify candidates as qualified regardless of where they are applying. However, a key difference in the importance of credentials between traditional and non-traditional CTE programs stems from the fact that majority of these new, non-traditional programs are housed within a parent company who plans to hire apprentices directly after

program completion. OneAmerica does not offer industry-recognized credentials, but Pathways students are offered a progression towards sustainable wages and health benefits through continued employment with OneAmerica. OneAmerica does not advertise that they guarantee employment but they have yet to fulfill their goal of 200 hires by 2025 so nearly all participants have been offered employment. Likewise, IU Health has made a commitment to guarantee employment for students who complete the Fellowship at Crispus Attucks. Salesforce does not guarantee employment within their company; most Pathfinders find employment at the Salesforce employer partners, companies that use Salesforce technology to perform business functions.

Partnerships

Like traditional CTE programs, these three corporate workforce development programs relied heavily on partnerships with other organizations and companies. Because these programs are still relatively young, some of them only had a few partners, but they relied on them more heavily than traditional CTE programs. For example, OneAmerica shared they were still actively looking for new partners, especially to expand their outreach and increase their participation rates in certain local neighborhoods. However, for the most part the types of partnership resembled those of traditional CTE programs: schools, community organizations, and other intermediary organizations.

All three of these programs were partnered with the local community college for their location, IvyTech Community College. IvyTech was one of the first Salesforce partners for the initial launch in Indianapolis. Salesforce stated they see community colleges as an equalizer for individual financial freedom, so they recruit heavily from community college students looking to improve their economic mobility. Likewise, the IU Health partnership with IvyTech reduces the

burden of curriculum planning and instruction while also offering students dual credit and an opportunity to easily pursue higher education. OneAmerica partners with IvyTech to offer participants a pathway to continue their education at no cost.

A presence in local high schools was deemed essential for both the IU Health and OneAmerica programs. IU Health operates its fellowship within the walls of Crispus Attucks High School. In this way, Indianapolis Public Schools (IPS) and Crispus Attucks High School act as IU Health's arm to reach local underrepresented, under-resourced youth. Connecting with IPS has enabled IU Health to handle less of the cost, personnel, and curriculum planning. Likewise, OneAmerica has been trying to increase their presence in the local high schools to boost program participation.

Community partners assist with recruiting, curriculum planning, career services, and other community development initiatives. The IU Health program has been effective specifically due to burden sharing with the Local Initiatives Support Coalition (LISC). LISC's Bridges to Career Opportunities Centers (BCOs) are centers stationed around a metropolitan area that offer all-encompassing support for the unemployed and underemployed in low-wealth areas including skills training, certifications, literacy support, financial coaching, and job search support. LISC provides essential operational support to the IU Health Fellowship. Similarly, OneAmerica partners with community organizations, like Shepherd Community Center, to connect with young people and offer additional support for program participants.

Salesforce relies less heavily on these community partners because their program is free, online, and accessible from anywhere. The main partners are employer partners that hire Pathfinders graduates and in return employer partners gain employees trained on Salesforce products that can grow their business. Employer partners connect with program participants and

provide career support to facilitate a smooth transition from the Pathfinder program to full-time employment at their company.

Support for Continued Education

Unlike traditional CTE programs, these programs place a greater emphasis on support for continued education. This is largely due to the nature of these roles which continued education offers more opportunity for advancement, as well as corporations having more capital to sponsor students' education than traditional CTE programs. Both IU Health and Salesforce offer their high school apprentices with college preparedness courses which include workshops to help students apply for admission and financial aid. Beyond this, OneAmerica has utilized the concept of "last in dollars." This means that OneAmerica guarantees its students free tuition at IvyTech Community College but first exhausts all scholarship and grant opportunities. Essentially, OneAmerica covers the remaining cost of tuition after the student has received additional financial aid from external sources. For example, students could receive federal grant money and a local community based scholarship but have a remaining $800 per semester that needs covered. OneAmerica will cover that remaining $800 so that the student pays none of the cost. Apprentices must have been with OneAmerica for more than 90 days and communicate a clear educational objective to fulfill a business need to be eligible. The cost of a semester at IvyTech is about $2,500, but budget analysis revealed that would quickly exhaust the entire program budget so instead they opted for the "last in dollars" approach. By aiding in students in applying for external aid, OneAmerica is able to offer its apprentices full-tuition scholarships at the lowest cost to the company.

Likewise, IU Health offers scholarships to its fellows who wish to continue their education. The Fellowship aligns its 29 dual credit hours through IvyTech with the curriculum for an

associate degree in the Healthcare Specialist program, such that students who plan to continue their education are already on track to complete their associate degree. Due to the regional dominance of IU Health, most of the fellows who continue their education at IvyTech return to IU Health after completion.

The Salesforce Pathfinder program does not offer financial support like tuition reimbursement or scholarships to its participants. Because the program prepares students for careers at employer partner companies, there is no incentive for Salesforce to offer financial support. Additionally, because the program is free to all users, there is no need to offer financial support.

Conclusions

It appears that these programs are following the same frameworks used by traditional CTE programs. The programs all, at different degrees and at times in different ways, generally followed the framework provided by traditional CTE programs. The overlapping elements of both these non-traditional and traditional programs were: work-based learning, academic learning, mentorship, credentialing, and partnerships. Not all of these programs had fully developed these elements into their programs, and in some cases, they had not implemented one of these components. For example, OneAmerica does not credential their apprentices. Different from the traditional CTE framework, these corporate programs offered support for continued education, with the exception of Salesforce. This is because of the differences in opportunities for advancement between these industries and traditional CTE industries. By incentivizing further academic achievement, these programs can fill open roles beyond entry-level positions and create a sustainable system that leaves entry-level positions open for future apprentices.

Given the success of these programs and traditional CTE education, it can be assumed that these mechanisms, proven to be effective for traditional CTE programs, produce successful apprentices and create a significant impact in these students lives even in non-traditional CTE industries.

However, these programs are still developing so it may be too early to measure how effective these programs have been. Further research would need to be conducted to empirically measure the outcomes of the programs once the programs have had adequate time to fully develop and produce several cohorts of apprentices. Research should explore how impacts that can be measured vary by the program elements using a larger sample. This would require programs to collect data on their graduated apprentices and for that data to be collected in a standardized manner across several years. Data like number of open positions, company revenue, and corporate expansion may serve as important proxies to measure how successful programs have been at the organizational level. While data like salary, household debt, educational attainment, and net worth may serve as important proxies to measure success at the individual level. This data does not exist and is a limitation of this study. Further research should also explore the impact these programs have had at the community level, such that the impact on economic and community development can be measured. These programs are all within their inaugural five years and one must account for the lag in success as a result of program implementation and development. What can be concluded is that the CTE framework is largely transferrable to these industries and appear to be effective in producing skilled labor.

If further research can improve and verify the findings of this research, it would prove workforce development programs like these to be an efficacious way of narrowing the skills gap

for middle-skilled positions and improving the economic well-being of the program participants. If this is true, it would advisable for public policy to support similar programs like these.

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