

APPRENTICESHIPS:

AN EMERGING COMMUNITY COLLEGE STRATEGY
FOR WORKFORCE DEVELOPMENT





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INTRODUCTION

There has been steady economic recovery since the Great Recession of 2008. Since mid-2017, the unemployment rate has held steady near 4%, or slightly below.¹ Most Americans have returned to work; however, prosperity has not been felt equally by all communities. In some cities and towns, unemployment soars above 30%.² The unemployment rate for African Americans (7.3%) is nearly double that of Whites (3.9%).³ And unemployment remains high for those with only a high school diploma (4.6%) or less (6.5%), compared to people with an associate degree (3.4%).⁴

Adults who are out of work typically have low levels of education and limited work experience.⁵ In response, there has been an increased interest among leaders from the higher education and business communities to expand “earn and learn” opportunities that connect people to both postsecondary education and a career. Apprenticeships are a growing strategy in the U.S. to allow people to earn a postsecondary credential and gain job experience that will lead to a well-paying career. From 2013 to 2017, the number of registered apprenticeships grew by over 40% nationally and there are currently more than half a million active apprentices in registered programs across the country.⁶ Students and employers stand to benefit from increased apprenticeship opportunities, and community colleges play a key role in delivering these programs and educating the local workforce.

Policymakers focused on economic recovery also have taken note of the potential of apprenticeships to connect people to postsecondary education and careers, thus ultimately improving their opportunities for prosperity. At the federal level, both President Donald Trump and former President Barack Obama have called for increased investments in registered apprenticeships, especially by expanding across states and into new industries.^{7, 8} Lawmakers in Congress have introduced legislation to expand funding for work-based learning, such as the Jumpstart Our Businesses By Supporting Students (JOBS) Act of 2017, which seeks to allow use of Pell Grants for short-term training programs including apprenticeships.⁹ Furthermore, state and local policymakers, with support from federal grants, are expanding apprenticeship opportunities as a strategy for workforce development.¹⁰

This paper provides an overview of registered apprenticeship programs, including pre-apprenticeships and youth apprenticeships, and describes their recent growth. It also discusses several barriers to further expansion and strategies to improve programs, including to:

- Increase funding and align funds for postsecondary education and workforce development;
- Expand to industries not typically served by apprenticeships, especially in growing fields such as health care and information technology;
- Increase diversity of participants, especially with intentional outreach to communities of color and women; and
- Expand access to pre-apprenticeships and youth apprenticeships aligned with postsecondary pathways.

The paper features profiles of apprenticeship programs at Harper College and San Jacinto College. These programs illustrate how community colleges are working to expand apprenticeship opportunities for students to gain jobs in growing and in-demand industries in their regions. The profiles also detail how the colleges are working to diversify apprenticeship programs to non-traditional industries and reach out to a diverse range of students, especially women and students of color.

APPRENTICESHIPS OVERVIEW

Apprenticeships allow individuals to gain job experience while also working towards a postsecondary degree or industry-recognized credential. Traditionally, apprenticeships have been thought of as a model through which to train workers in technical fields or skilled trades such as construction. However, today the discussion about apprenticeships includes expanding programs to include training for growing white-collar and service-oriented occupations. This section provides more detail about registered apprenticeship programs and early career preparation through pre-apprenticeships and youth apprenticeships.

Registered Apprenticeships

The federal Registered Apprenticeship program provides hands-on learning opportunities that lead to an industry-recognized certificate and career opportunities in a recognized occupation. Registered apprenticeships must meet standards set by the National Apprenticeship Act. In addition to leading to a postsecondary credential, registered apprenticeships provide employment protections for participants—such as participants must be no younger than 16 years old.¹¹ The average starting wage for an apprentice is \$15.00 per hour and the average salary for those who have completed an apprenticeship is \$60,000 per year, according to the United States Department of Labor (DOL).¹²

While many community colleges offer career and technical education, Registered Apprenticeship programs are typically coordinated through DOL and sponsored by employers, leading to a separation between postsecondary education and apprenticeship opportunities.¹³ However, colleges and universities can register with DOL as a program sponsor, better facilitating postsecondary pathways.¹⁴

States are also involved in implementing apprenticeship programs and incentivizing program growth. While DOL implements Registered Apprenticeship programs for about half of the states, the remaining states implement their own state apprenticeship programs.¹⁵ Many states also offer incentives for apprenticeships, mainly tax credits for employers to hire apprentices and tuition assistance for students who participate through a postsecondary institution, such as a community or technical college.¹⁶

Pre-Apprenticeships and Youth Apprenticeships

Pre-apprenticeship programs offer job seekers a direct link to the Registered Apprenticeship program and serve as an additional recruiting tool for employers. Participants receive academic preparation and foundational job training to become ready to enter the workforce. Registered Apprenticeship sponsors—often employers—may choose to offer their own pre-apprenticeship programs, or they can partner with other organizations such as community colleges or business and industry partners. Pre-apprenticeship programs are typically geared towards youth, low-skilled adults, and underserved communities.¹⁷

The Registered Apprenticeship for High School Students program, also known as youth apprenticeships, provides additional opportunities for students to gain early career preparation.¹⁸ Youth apprentices typically begin their programs during their junior or senior years of high school. Following the completion of their high school diplomas, youth apprentices can continue into adult apprenticeship programs, enter the workforce full time, or pursue higher education. Though youth apprenticeship opportunities are increasing, there remain several barriers to further expansion, such as limited funding, students' reluctance to participate in career and technical education, and employers' reluctance to employ students with limited work experience and postsecondary education.¹⁹

HARPER COLLEGE REGISTERED APPRENTICESHIPS^{20, 21}

Harper College in Palatine, Illinois was one of the first community colleges in the country to become a Registered Apprenticeship sponsor, supported by an American Apprenticeship Grant from the United States Department of Labor. The college places a special focus on offering apprenticeships in “non-traditional” fields and is well known for its programs in collaboration with the financial services and insurance sectors, particularly with Zurich Insurance.²² Harper College offers a total of eight Registered Apprenticeship programs, including several in other non-traditional fields including cyber security, retail management, and supply chain management.

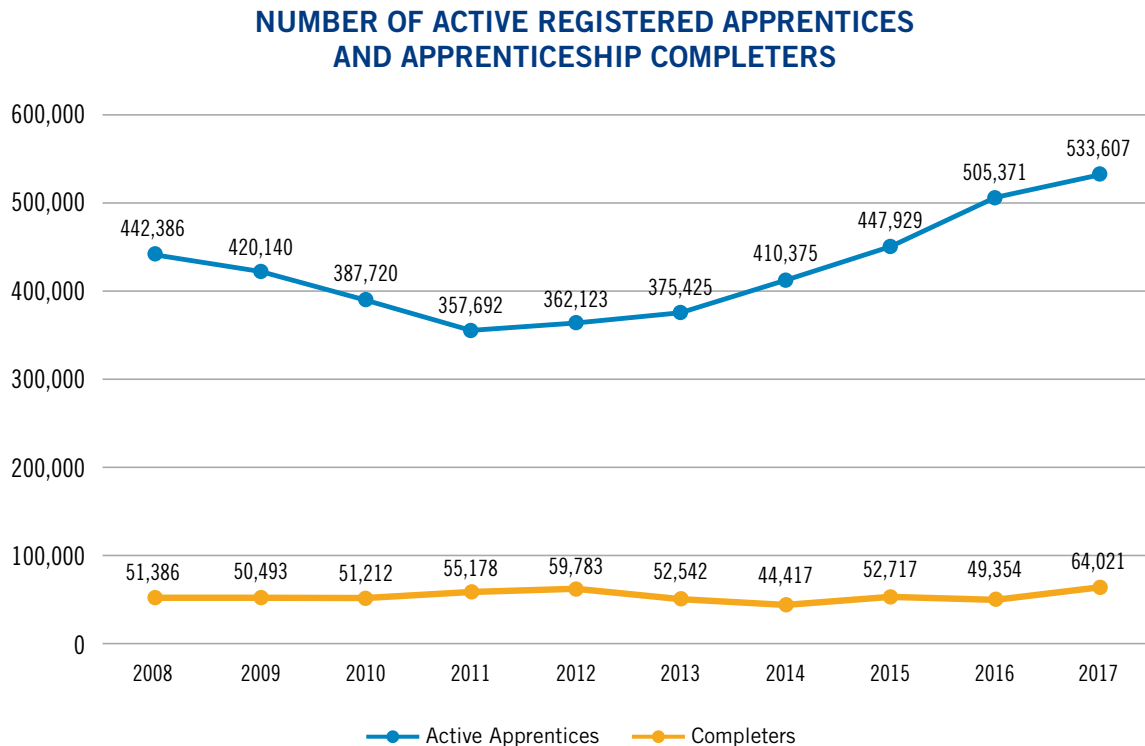
The process to become a program sponsor was “extremely doable,” according to Dr. Rebecca Lake, dean for workforce and economic development, and is a key step for community colleges seeking to start or expand apprenticeship programs. As a program sponsor, Harper College takes a lead role in designing the curriculum for each apprenticeship program. Community colleges that fill the role of program sponsor can better ensure that students are taking credit-bearing courses aligned with industry needs and their future education goals. The college also takes a lead role in reaching out to business and industry partners about their employment needs and necessary skills for employees. Business and industry partners are essential for providing students with on-the-job training and mentorship. Furthermore, in the Harper Registered Apprenticeships programs, each employer that hires an apprentice agrees to pay for their tuition in addition to a salary.

According to Lake, it has been a challenge to overcome norms in the education and business communities about the role of apprentices; however, the college is seeing early signs of success in its three-year-old program. The retention rate across their apprenticeship programs is 88% and the approximately 100 participating students have a mean grade point average of nearly 3.6 (on a 4.0 scale). The apprenticeship program goals are to support students’ academic and career success and to boost the local economy—all of which are central to the mission of Harper College.



APPRENTICESHIP PROGRAMS HAVE ROOM TO GROW

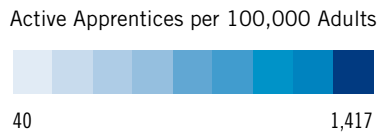
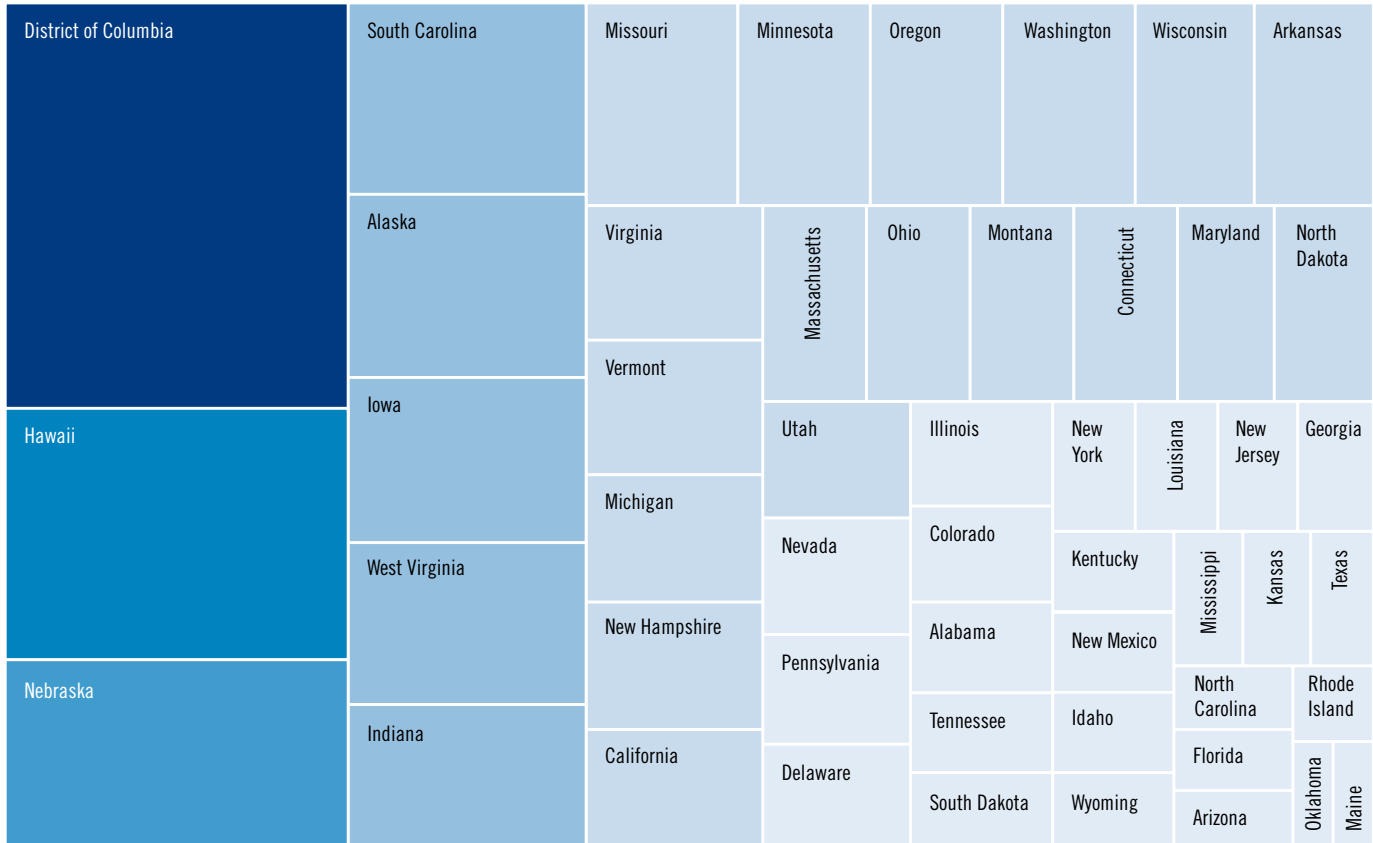
According to DOL, registered apprenticeships grew by 42% nationally from 2013 to 2017. In 2017, there were more than 533,000 active apprentices and 64,000 apprenticeship program completers.²³ The graph below shows in the number of active apprentices and program completers from 2008 to 2017. The data show that the number of participants has been increasing steadily since 2013, while the number of completers has only increased slightly. Over time, we should expect to see the number of completers to increase as active apprentices matriculate. Colleges will need to pay close attention to these trends and develop strategies to support students access apprenticeships and complete in a timely manner.



Source: United States Department of Labor

The number of apprenticeship opportunities varies greatly by location. In 2017, states with high numbers of active apprentices included California (approx. 63,000), Michigan (approx. 18,000), and Texas (approx. 17,500). In comparison, states with very few active apprentices included Rhode Island (approx. 500), Maine (approx. 500), and Wyoming (approx. 500).²⁴ However, when the number of apprenticeships is compared to the state adult populations (18 years and older), the largest concentration of apprenticeships is found in the District of Columbia, Hawaii, and Nebraska.²⁵

CONCENTRATION OF ACTIVE APPRENTICES BY STATE: NUMBER OF ACTIVE APPRENTICES PER 100,000 ADULTS (18 YEARS AND OLDER)

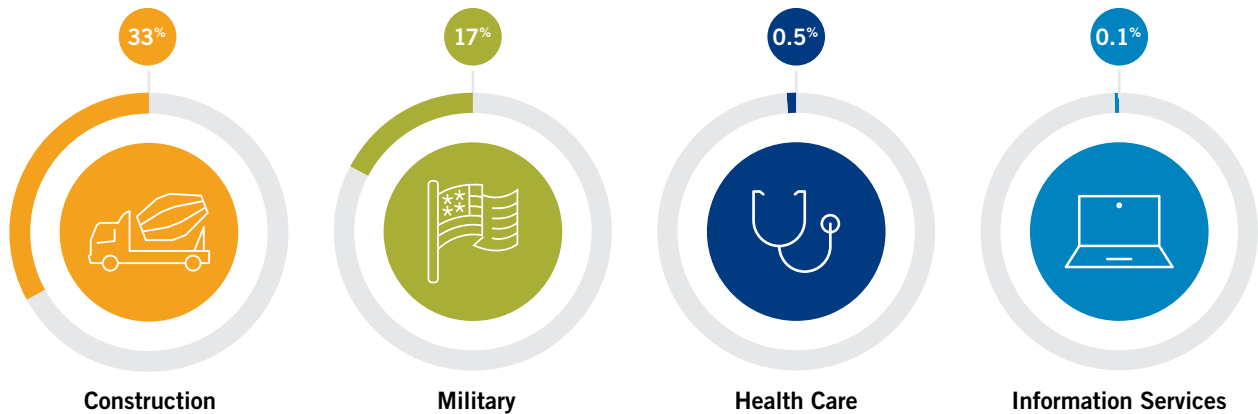


Sources: United States Department of Labor and United States Census Bureau

Though the number of apprenticeships is increasing, opportunities remain concentrated in a limited number of industries and occupations. In 2017, approximately one-third of all active federal apprenticeships were in the construction industry.²⁶ The next largest industry for federal apprenticeships the same year was the United States military, offering approximately 17% of active opportunities.²⁷ In contrast, less than 1% of active federal apprenticeships were available in growing industries such as health care and information services.²⁸ Furthermore, federal apprenticeship opportunities remain clustered in blue-collar occupations. In 2017, the top federal apprenticeships were for building trades including electrician, carpenter, and construction worker.²⁹ None of these occupations is among the fastest-growing occupations that require a postsecondary credential.³⁰

Apprenticeship opportunities are highly concentrated.
There's opportunity to expand to growing industries.

ACTIVE FEDERAL APPRENTICESHIPS BY INDUSTRY (2017)



In 2017, the top industries for apprenticeships were construction and the military. Very few opportunities were available in growing industries, such as health care and information services.

Source: United States Department of Labor

These data highlight that while apprenticeships are growing, there is still opportunity to expand to growing industries and occupations, including white-collar and professional fields not historically considered “apprenticeshipable.” According to analysis by Burning Glass Technologies and the Harvard Business School, the core occupational groups for apprenticeships could be tripled from 27 occupations to 74, increasing the number of apprenticeship opportunities to 3.3 million. According to the researchers, potential occupations for expansion include computer-controlled machine tool operators and solar installers. These occupations typically require at least some postsecondary education, but less than a four-year degree.³¹

In addition to expanding core apprenticeship industries and occupations, there is opportunity to increase the diversity of participating students. In 2017, only about 22% of active apprentices were women. Limited public data are available about other demographic characteristics of current apprentices, such as race, family income, and education level. However, other research in the field points to the lack of diversity among participants. For example, according to researchers at Jobs for the Future, in 2016 only one-third of new apprentices were people of color.³²

SAN JACINTO COLLEGE APPRENTICESHIP PROGRAMS^{33, 34}

San Jacinto College, located in East Harris County, Texas, offers several apprenticeship programs to help connect students to careers in local industries. Since 2015, the college has offered courses aligned with the registered Dow Chemical Apprenticeship Program, preparing students for careers in the petrochemical industry. Students start the program by taking full-time college courses and, over the course of the three-year program, transition to a mix of part-time course work and on-the-job training. Dow Chemical pays for students' tuition, books, and salary.

In addition to the program with Dow Chemical, San Jacinto partners with local businesses and industries to customize programs of study to meet specific employers' apprenticeship needs. Currently, the college is working with the Texas Workforce Commission and the Texas Higher Education Coordinating Board to create 18 industry "crosswalks" to map business needs with relevant community college courses, with the ultimate goal of establishing consistent practices across the state for awarding college credit for courses taken as part of a Registered Apprenticeship program. The college is also working on expanding these crosswalks to non-traditional apprenticeship fields, such as information technology.

Beyond expanding to new industries, San Jacinto is focusing on recruiting a more diverse pool of students. According to Dr. Sarah Janes, associate vice chancellor of continuing and professional development, many employers are looking for apprentices who already have two to three years of work experience and existing job-readiness skills. To fill this need, San Jacinto is looking for opportunities to recruit older students and to increase opportunities for pre-apprenticeships. In addition, the college is expanding recruitment strategies to reach more students of color and women. For example, when the college sends students and faculty to local career fairs to recruit new participants, they make sure to send people who represent the diverse local community.





ROLE OF COMMUNITY COLLEGES IN DELIVERING APPRENTICESHIP PROGRAMS

Community colleges serve an essential role in connecting students to well-paying, long-term careers. For many students today, their goal in postsecondary education is to improve their employment opportunities.³⁵ Furthermore, businesses often look to community colleges to educate and train the local workforce. Thus, community colleges serve as a key partner with the business sector to identify demand for apprenticeships from employers, and to connect students to available programs in their fields of interest.

Many community colleges work with business and industry partners to coordinate courses for either registered or non-registered apprenticeship programs. Programs are typically small in scale and sponsored by the employer; however, the strategy to offer more apprenticeship programs is growing. In 2017, Jobs for the Future conducted a survey of community college apprenticeship programs and found that the majority (84%) of participating colleges offered either a registered or non-registered apprenticeship program, with nearly two-thirds offering credit-bearing opportunities. While their survey highlighted the popularity of apprenticeship programs, they also found opportunities to increase community college's role by expanding to new sectors, increasing the diversity of participants, strengthening partnerships with employers, and increasing funding.³⁶

Other policy experts focused on apprenticeships agree that the limited, bi-furcated structure of federal and state funding for postsecondary education and apprenticeships hinders program expansion.³⁷ At the federal policy level calls for increased apprenticeships opportunities have been met with cuts to other federal programs that support community colleges' workforce development efforts. For example, though the Trump administration recently proposed spending \$200 million to expand apprenticeship programs, the administration has also sought to significantly cut funding for DOL and workforce training programs.³⁸

In July 2018, DOL announced a new \$150 million grant program to scale 15 to 30 new or existing apprenticeship programs, in particular for those geared towards occupations that have not typically used this model.³⁹ While this will support a number postsecondary institutions and businesses who receive the grant, the relatively small amount of funding is unlikely to result in a large-scale expansion of apprenticeships and is insufficient to make up for overall cuts to workforce training. In order to expand apprenticeship opportunities and facilitate community colleges' role nation-wide, robust federal and state policies are needed to connect postsecondary and workforce development funding; significantly increase investments in programs; and allow students more options for paying for postsecondary career and technical education. It is important that this funding come from a combination of federal and state grants, as well as eligible student financial aid, in order for colleges to sustain existing programs, increase offerings, and serve more apprentices.



RECOMMENDATIONS FOR COLLEGE LEADERS TO EXPAND APPRENTICESHIPS

1. Register your college as an apprenticeship program sponsor either through the United States Department of Labor or your state apprenticeship agency.

As a program sponsor, community colleges can take a lead role to ensure that students enroll in credit-bearing coursework aligned with their apprenticeship program and long-term educational goals. In this role, community colleges can partner with local businesses and industries to connect students to careers and support local labor market needs, especially in growing industries.

2. Develop strategies to increase diversity of students participating in apprenticeship programs.

To expand apprenticeships as a strategy for workforce development, community colleges and businesses need to recruit diverse participants, especially with more outreach to women and students of color. In addition to strategies focused on gender and race, colleges and businesses should develop strategies to tailor apprenticeship programs for students at different stages of their careers—ranging from young adults seeking new career opportunities to more experienced workers seeking upward career mobility. Expanding apprenticeship programs to “non-traditional” fields can also help increase participant diversity.

3. Partner with high schools and businesses to increase opportunities for youth apprenticeships and pre-apprenticeships linked to postsecondary pathways.

Youth apprenticeships and pre-apprenticeships offer high school students and young adults an early on-ramp to postsecondary education and career training. Colleges can partner with nearby high schools and businesses, leveraging funds for career and technical education, to increase opportunities and expand outreach. In addition to expanding opportunities, colleges must develop strategies to link youth programs to adult apprenticeships and further postsecondary education.



RECOMMENDATIONS FOR POLICY MAKERS TO EXPAND APPRENTICESHIPS

1. Provide funding to sustain and grow federal- and state-run apprenticeship programs. Allow students more financial-aid options to cover the price of the postsecondary coursework part of their apprenticeship programs.

Colleges and businesses rely on a combination of federal and state funding to implement apprenticeship programs. Sufficient funding is critical to allow community colleges and businesses to form partnerships for workforce development. Many apprentices also rely on financial aid to cover the price of tuition and living expenses while completing postsecondary coursework for their program and would benefit from more flexible options to use financial aid toward the completion of short-term industry-recognized credentials.

2. Support community colleges and the business sector to develop apprenticeship programs in growing industry sectors, such as health care, business management, and information technology.

For apprenticeships to grow, workforce-development strategies must be aligned to meet the needs of growing industries. Policy makers may seek to accomplish this goal with strategies such as targeted grant programs to develop apprenticeships in growing industries with employment needs. Nationally, growing sectors include health care, business management, and information technology. Different regions, cities, and towns have unique workforce development needs for their local industries. Policy makers should also encourage colleges and businesses to use labor-market data from sources such as the United States Bureau of Labor Statistics to inform the planning of apprenticeship programs and to ensure that course offerings and training are aligned with employer needs.

ENDNOTES

- 1 United States Department of Labor, Bureau of Labor Statistics. (2018). *Labor force statistics from the Current Population Survey: Unemployment rate*. Retrieved from <https://data.bls.gov/timeseries/LNS14000000>
- 2 United States Department of Labor, Bureau of Labor Statistics. (2018). *Seasonally adjusted metropolitan area estimates*. Retrieved from <https://www.bls.gov/lau/metrossa.htm>
- 3 United States Department of Labor, Bureau of Labor Statistics. (2018). *Labor force statistics from the Current Population Survey: Unemployment rates by age, sex, race, and Hispanic or Latino ethnicity*. Retrieved from https://www.bls.gov/web/empsit/cpsee_e16.htm
- 4 United States Department of Labor, Bureau of Labor Statistics. (2017). *Employment projections: Unemployment rates and earnings by educational attainment, 2017*. Retrieved from https://www.bls.gov/emp/ep_chart_001.htm
- 5 Ross, M. & Holmes, N. (2017). *Meet the out-of-work: Local profiles of jobless adults and strategies to connect them to employment*. Washington, D.C. Brookings Institution. Retrieved from https://www.brookings.edu/wp-content/uploads/2017/06/out-of-work_paper_final.pdf
- 6 United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/oa/data_statistics.cfm
- 7 White House. (2017). *Presidential executive order expanding apprenticeships in America*. Washington, D.C.. Retrieved from <https://www.whitehouse.gov/presidential-actions/3245/>
- 8 White House. (2016). Investing \$90 million through ApprenticeshipUSA to expand proven pathways into the middle class [Fact Sheet]. Retrieved from <https://obamawhitehouse.archives.gov/the-press-office/2016/04/21/fact-sheet-investing-90-million-through-apprenticeshipusa-expand-proven>
- 9 Jumpstart Our Businesses by Supporting Students (JOBS) Act of 2017, S. 206. 115th Congress. (2017).
- 10 United States Department of Labor. (N.d.). *Apprenticeship: State expansion grant*. Retrieved from <https://www.dol.gov/featured/apprenticeship/grants>; See also Wogan, J.B. (2018). *States increasingly look to apprentices to bolster their workforce*. Washington, DC. National Skills Coalition. Retrieved from <https://www.nationalskillscoalition.org/news/latest/states-increasingly-look-to-apprentices-to-bolster-their-workforce>
- 11 National Apprenticeship Act, 29 U.S.C. 50 (1937). Available at <https://www.law.cornell.edu/uscode/text/29/50>
- 12 United States Department of Labor. (N.d.). *Frequently asked questions about the apprenticeship program*. Retrieved from <https://www.dol.gov/featured/apprenticeship/faqs>
- 13 McCarthy, M.A., Palmer, I., & Prebil, M. (2017). *Connecting apprenticeship and higher education: Eight recommendations*. Washington, D.C. New America. Retrieved from <https://na-production.s3.amazonaws.com/documents/Connecting-Apprenticeship-HigherEd.pdf>
- 14 For more information see United States Department of Labor. *A quick-start toolkit: Building Registered Apprenticeship programs*. Available at https://www.doleta.gov/oa/employers/apprenticeship_toolkit.pdf
- 15 United States Department of Labor, Employment and Training Administration. (2018). Apprenticeship state contact list. Retrieved from <https://doleta.gov/oa/contactlist.cfm>
- 16 United States Department of Labor, Employment and Training Administration. (2018). *Learn about tax credits*. Retrieved from <https://doleta.gov/OA/taxcredits.cfm#tuitionsupport>
- 17 United States Department of Labor, Employment and Training Administration, Workforce GPS. (2017). *Pre-apprenticeship: Building strong apprentices*. Retrieved from <https://apprenticeshipusa.workforcegps.org/resources/2017/04/10/11/56/Pre-Apprenticeships-Building-Strong-Apprentices>
- 18 United States Department of Labor, Employment and Training Administration, Workforce GPS. (2018). *Youth apprenticeship*. Retrieved from <https://apprenticeshipusa.workforcegps.org/resources/2017/02/02/10/56/Apprenticeship-Youth>
- 19 Parton, B. (2017). *Youth apprenticeship in America today: Connecting high school students to apprenticeship*. Washington, D.C. New America. Retrieved from <https://na-production.s3.amazonaws.com/documents/Youth-Apprenticeship-Today.pdf>
- 20 Harper College. (2018). *Harper College Registered Apprenticeship*. Retrieved from <http://www.harperapprenticeships.org/>

- 21 Lake, R.S. (May 2018). Personal communication.
- 22 Elejalde-Ruiz, A. (2016, March 7). Apprenticeships come to insurance and financial services industries. *Chicago Tribune*. Retrieved from <http://www.chicagotribune.com/business/ct-insurance-apprenticeships-aon-zurich-0308-biz-20160307-story.html>
- 23 United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/oa/data_statistics.cfm
- 24 Ibid.
- 25 Ratio based on the number of active apprentices per 100,000 adults (18 years old and over) in each state. Author's analysis. United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/oa/data_statistics.cfm; and United States Census Bureau. (2017). *QuickFacts*. Retrieved from <https://www.census.gov/quickfacts/fact/table/US/PST045217>
- 26 Author's analysis. United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/OA/data_statistics.cfm
- 27 Ibid.
- 28 Author's analysis. United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/OA/data_statistics.cfm; United States Department of Labor, Bureau of Labor Statistics. (2017). *Employment projections: Employment by major industry sector, 2006, 2016, and projected 2026*. Retrieved from <https://www.bls.gov/emp/tables/employment-by-major-industry-sector.htm>
- 29 Author's analysis. United States Department of Labor, Employment and Training Administration. (2018). *Data and statistics: Registered apprenticeships national results fiscal year 2017*. Retrieved from https://doleta.gov/OA/data_statistics.cfm
- 30 Author's analysis. United States Department of Labor, Bureau of Labor Statistics. (2018). *Employment projections: Fastest growing occupations, 2016 and projected 2026*. Retrieved from <https://www.bls.gov/emp/tables/fastest-growing-occupations.htm>; United States Department of Labor, Bureau of Labor Statistics (2017). *Occupational Requirements Survey*. Retrieved from <https://www.bls.gov/ors/>
- 31 Fuller, J.B. & Sigelman, M. (2017). *Room to grow: Identifying new frontiers for apprenticeships*. *Burning Glass Technologies and Harvard Business School*. Retrieved from <https://www.hbs.edu/managing-the-future-of-work/Documents/room-to-grow.pdf>
- 32 Browning, B. & Nickoli, N. (2017). Supporting community college delivery of apprenticeships. Washington, D.C. Jobs for the Future. Retrieved from <https://jfforg-prod-prime.s3.amazonaws.com/media/documents/CCSurveyReport091917.pdf>
- 33 San Jacinto College. (2017). *Companies look to apprenticeships to build talent pipeline*. Retrieved from <http://www.sanjac.edu/article/companies-look-apprenticeships-build-talent-pipeline>
- 34 Janes, S. (May 2018). Personal communication.
- 35 Strada Education Network & Gallup. (2018). *Why higher ed? Top reasons U.S. consumers choose their educational pathways*. Washington, DC. Authors. Retrieved from http://stradaeducation.gallup.com/reports/226457/why-higher-ed.aspx?g_source=link_news9&g_campaign=item_232592&g_medium=copy
- 36 Browning, B. & Nickoli, N. (2017). Supporting community college delivery of apprenticeships. Washington, DC. Jobs for the Future. Retrieved from <https://jfforg-prod-prime.s3.amazonaws.com/media/documents/CCSurveyReport091917.pdf>
- 37 McCarthy, M.A., Palmer, I., & Prebil, M. (2017). *Connecting apprenticeship and higher education: Eight recommendations*. Washington, DC. New America. Retrieved from <https://na-production.s3.amazonaws.com/documents/Connecting-Apprenticeship-HigherEd.pdf>
- 38 United States Office of Management and Budget. (2018). *Efficient, effective, accountable: An American budget*. Retrieved from <https://www.whitehouse.gov/wp-content/uploads/2018/02/budget-fy2019.pdf>
- 39 United States Department of Labor. (2018). U.S. Department of Labor announces funding opportunity for apprenticeship expansion in key industry sectors [News Release]. Retrieved from <https://www.dol.gov/newsroom/releases/eta/eta20180718>

