

Why Apprenticeship Programs Matter to 21st Century Postsecondary Education

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Abstract

The United States job market will soon face a deficit of middle-skilled workers upon the retirement of the baby boomer generation. Measures to address this issue must be presently implemented and meet these demands by preparing workers in the middle-skilled professions gap. Further, current Career and Technical Education programs must expand to include training in emerging industries. This present research explores the expansion of apprenticeship programs in the United States and posits how they may support the successful transitions of students and workers into postsecondary education and business and industry. A new apprenticeship model is proposed.

Introduction

Over past decades, the need to better prepare high school students for further education or work in today's high-tech and knowledge-based economy has been well documented (Aasheim, Li, & Williams, 2009; Carnevale, Smith, & Strohl, 2013). This lingering issue has fueled a national push for emphasizing college and career readiness in high schools to help students experience successful transitions and better preparation into postsecondary education and the workforce (Loera, Nakamoto, Oh, & Rueda, 2013). However, in a school-centered education system with limited connection to work experiences, this push is often misconstrued as a need for a 4-year degree (Gordon, 2014). However, nearly one-third of students do not continue to postsecondary institutions, and many of the students that do enter into postsecondary institutions are said to still be under-equipped for careers upon graduation (Parton, 2017).

What experiences are students having leading up to college or their entrance into the workforce? High schools with Career and Technical Education (CTE) programs are doing their part in supporting student achievement, occupational exploration, technical skills attainment, and workplace readiness. However, with work-based learning as a key component of the Association of Career and Technical Education (ACTE) Framework (ACTE, 2017), how are policy makers, stakeholders, postsecondary institutions, and educators looking at extending those critical learning opportunities to better support future workers?

High-quality apprenticeships help prepare students for potential careers, often providing a pathway to postsecondary education and training, while offering paid, real-world experiences. These programs give students hands-on learning experiences promoting engagement, retention, and transferability of skills (OECD, 2017). Apprenticeships help improve skills and competencies that meet the need of industry and the employer. In these programs, apprentices

receive on-the-job training and education in their career focus, opportunities for career advancement, while also receiving industry issued, nationally recognized credentials and articulation agreements between training programs and 2 and 4-year colleges (OECD, 2017). This can create opportunities for college credit and postsecondary education certificates and degrees. Further this may aide students in avoiding student loans for academic and training completion.

Purpose of Study

Apprenticeship programs are largely underutilized in the Unites States compared to other countries such as Germany and Switzerland (Hoffman et al., 2015). There has been an increased focus on CTE programs and workplace readiness. Even with grant funding being allocated to develop and strengthen apprenticeships, and further emphasis on the expansion of pathways, many postsecondary institutions, employers, and students may not be aware of the positive outcomes of apprenticeship programs. The purpose of this paper is to describe and discuss apprenticeship programs, pathways for program expansion, and rebranding to increase positive public perceptions.

Theoretical Frameworks

Situated Cognitive Theory (SCT), Cognitive Apprenticeship Model (CAM), and Social Cognitive Career Theory served as the theoretical frameworks that guided this research. The proposed Career Development Through Apprenticeships Model (Figure 1), in the present research is a gestalt model constructed from the synergistic components of these three theories and highlight the core constructs and goals of high-quality apprenticeships. Apprenticeships support the idea of learners being situated in the contexts in which they will be working, the development of students through carefully articulated steps, and posit that students will gain career related efficacies through experiences (Brown, Collins, & Duguid, 1989; Lent et al., 2005; Pappas, 2015; Vygotsky, 1978).

The Situated Cognition Theory (SCT), outlined by Brown, Collins, and Duguid (1989), is centered on the idea that knowing is “inseparable” from actually doing and highlights the importance of learning within context. SCT is based upon principles related to the fields of anthropology, sociology, and cognitive sciences. Its main argument is that all knowledge that a learner acquires is somehow situated within activities that are socially-, physically- or culturally-based (Brown et al., 1989). SCT supports that knowledge cannot be acquired if the learner is not in the context the skill is being taught and eventually utilized in.

The Cognitive Apprenticeship Model (CAM), developed by Collins, Brown, and Newman (1989), closely relates to SCT, indicates that context learning and immersion in a field is important for learning. In CAM, the student is expected to develop, with guidance from the expert in the field of interest. Also, in CAM, the student and expert work through *Modeling*: Where the expert demonstrates the skills and efficacies; *Coaching*: Where the apprenticeship then demonstrates the skills and efficacies and the expert provides meaningful feedback for improvement; *Scaffolding*: Applying the skills and efficacies through tasks and building upon knowledge; *Articulation*: The expert has the apprentices apply skills to other projects, while still providing feedback; *Reflection*: Having the apprentice think about practices during

demonstrations, and after, also reflecting on the feedback given by the expert; *Exploration*: When the apprentice is encouraged to perform new strategies, problem-solve, and critically analyze on their own (Pappas, 2015), (see Figure 1). This workforce training strategy is based on Bandura's Social Cognitive Theory (1986). This approach to skill development and acquisition moves from classroom training to actual workplace practices. During this development process, Bandura suggests the in-vivo practice, or Situated Cognition, where the learning takes place in the real-life environment (Bandura, 1986; Collins et al., 1989).

Both SCT and CAM frameworks are based on salient features from the social cognitive theory, where the learners are best engaged in immersion of rhetoric, activities, and links theory to doing. Students are able to apply knowledge and content in a relevant and practical environment, enhancing skills and efficacies. Learning extends beyond the cognitive processes to include real life environments to apply and test knowledge (Merriam et al., 2007). These frameworks highlight when external activities become an internalized function, the learner moves through higher intellectual levels because the structure and organization of the cognition is changed (Luria, 1982; Vygotsky, 1978).

The application of Social Cognitive Career Theory (SCCT) to apprenticeship programs provides a unique lens regarding intentions of career development. SCCT, Social Cognitive Theory (1986), explains how academic and career interests develop, how educational career choices are made, and how career success is obtained. Three constructs that are central to SCCT are *self-efficacy, outcome expectations, and goals* (Lent et al., 2005). These three variables are important for the development of learner engagement in the apprenticeship pathways, as well as overall success in regards to retention and career aspirations in career development (Lent & Brown, 2019).

Self-efficacy, or an individual's personal beliefs about his or her own capabilities, are immutable. It can increase or decrease depending on the confidence levels in particular fields. If a person has a set of industry preferred skills and experiences in a particular working environment, SCCT predicts that the person will generate interest, perform better, and be inclined to pursue that career pathway (Lent & Brown, 2019).

Outcome expectations are the beliefs about performing specific behaviors and related consequences. According to SCCT, people are more likely to engage in activities if the activities lead to positive outcomes. Positive outcomes can be: social mobility, tangible rewards, and better working environments. When students or employees have negative outcome expectations, they are less likely to actively engage in the career pathway (Lent & Brown, 2019).

Personal goals according to SCCT are the intentions to engage in specific activities. Goal setting helps engage a person in the guidance and organization of their behaviors. SCCT posits personal goals are important to both self-efficacy and outcome expectations. The success or failure of goals directly effect, by altering or confirming, self-efficacy and outcome expectations.

The SCCT supports career development activities by reinforcing continued engagement, skill development, and the interaction of career development processes. These processes include

interest, choice, and performance (Lent & Brown, 2019). Self-efficacy has been researched as an important determinant of many workforce fields. Observing positive, or successful, models tend to increase self-efficacy, and negative, or failed, tend to decrease self-efficacy. SCCT is concerned with proximal contextual variables for facilitative support and influence (Lent et al., 2005). Based on this model of developing interest through activity exposure and performance, one could potentially gain interest in career and technical fields through apprenticeships that yield positive experiences (see Figure 1). SCCT's framework indicates that a person's learning experiences will affect their self-efficacy and outcome expectations, so when those prove to be negative their interests will diminish further positive actions (Lent & Brown, 2019).

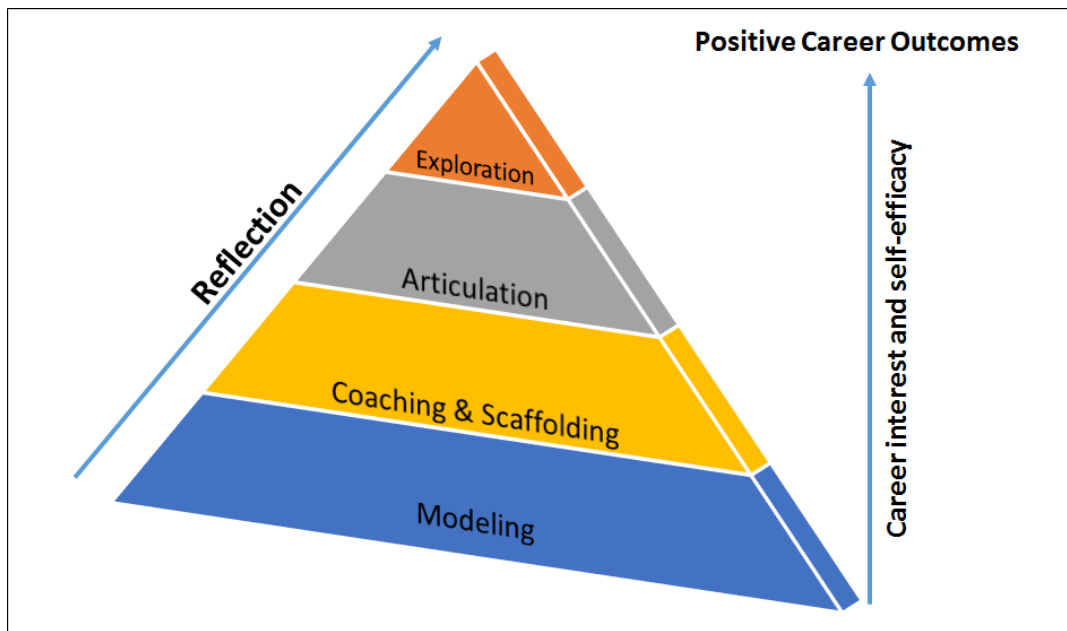


Figure 1. Career Development through Apprenticeships Model

The Career Development through Apprenticeship Model was developed using the CAM and SCCT. The models were used to describe the cognitive development of an apprentice (i.e. modeling, coaching, scaffolding, articulation, exploration), reflection of practice, and the positive career outcomes attributed to successful completion of the cognitive domains. In this model, reflection is an ongoing process throughout the apprenticeship that can produce positive career outcomes by increasing career interest, as well as career and self-efficacies. As the learner moves through each stage, it is proposed that the apprentice will gain career interest and self-efficacy, as well as more positive career outcomes (Lent et al., 2005).

Apprenticeships in the 21st Century

The 21st century demands a new approach to apprenticeships as a call for the vacancies of an array of middle-skilled occupations. There are trends of retirements that will be happening with the baby-boomer generation that will lead massive amounts of openings in the middle-skills labor market. Fifty-three percent of American labor market fall within “middle-skill job” category (OECD, 2017). However, data suggest that there is a 10% deficit of workers to fill those positions (National Skills Coalition, 2017). With globalization, changing industries and an

evolving job market, the middle-skills gap will continue to widen unless institutions can create and implement apprenticeship programs to prepare students for stepping into the workforce and becoming more qualified workers (Center for American Progress, 2017).

Workforce professionals are challenged with developing new and cutting-edge training programs that meet the needs of employers, labor market demands, and a more diversified landscape of students. Apprenticeships can connect classroom learning and theory to real-world workplace efficacies, career development, goals, and outcomes (Lent et al., 2005; Merriam et al., 2007; Parton, 2017). According to the U.S. Department of Labor, apprenticeships are defined as: paid, on-the-job learning under the supervision of skilled employees; it is related to classroom-based instruction; has ongoing assessments against skills standards; culminates in a portable, industry-recognized credential (Department of Labor, 2018).

Apprenticeships can offer training, workforce experience, and career readiness that employers are looking for while offering employees breaks from large student debt and providing certificates to indicate effective and customized industry training. Apprenticeships support a talent pool by delivering industry standard training, the employees are engaged and tend to stay longer within career paths. Employers are partnered with the institutions to craft curriculum that supports student learning and acquisition of knowledge, meets the needs of the industry, and familiarizes students with workplace interpersonal skills and company culture.

Apprenticeship programs have the opportunity to provide a more skilled workforce, provide livable wages, and readily gain employment and workforce experiences. Twenty-seven percent of workers with credentials less than an associates' degree earn more than the average worker with a bachelor's degree (Austin, Mellow, Rosin, & Seltzer, 2012). These programs pay students to work and go to school and offer pay incentives by increasing wages with each credential attained. Having students work in fields of interest, while simultaneously completing credentials, can increase motivation and engagement. Students are looked at as employees, not just students. Although the idea of students as paid employees participating in experiential learning processes is developing in the United States, this view has already produced gains in European education models (Hoffman et al., 2015).

Youth Apprenticeship Programs

Youth apprenticeships are largely underutilized in the United States. Though they are developing gradually, little has been written and there still remains no legal definition. Youth apprenticeships, or apprenticeships that occur during high school, have the same criteria except that the partnerships transpire between the high schools, postsecondary institutions, and employers (Parton, 2017). These programs are designed for students to successfully transition into a registered or other high-quality apprenticeship program. Re-evaluating and promoting the need for youth apprenticeships in high school can begin training for high demand trades at an earlier age. This can aide students' transition into the workforce earlier, or develop 21st century skills that will be needed as the student enters into postsecondary institutions.

Youth apprenticeships are not federally vetted; however, the US Department of Labor have profiled a series of high-quality standards including: approved training and curriculum; strategies

for long-term success; Access to appropriate support services; promotes greater use of Registered Apprenticeship to increase future opportunities, meaningful hands-on training that does not displace paid employees, and facilitated entry and/or articulation (Department of Labor, 2018). Youth apprenticeships are not regulated by the government, therefore it is important to align high-quality standards for program and student success.

Though an answer to education and industry need, apprenticeship programs should be selective in participants involved. Recommendations for programs acceptance can comprise interviews, pre-apprenticeship or internship experiences with the employer. Students should fulfill all prerequisites, a minimum GPA requirement, have no attendance issues, and should be able to pass a drug test. Employing students that have demonstrated a commitment to occupational learning will help strengthen apprenticeship programs. Students selected must go through required safety and legal training to ensure they are prepared for the workforce, as well as the employer and the secondary institution. Parents of underage workers must agree to terms and conditions and apply all federal laws pertaining to time restrictions, payment, and other legalities (Council of State Governments, 2017; Parton, 2017).

Pre-apprenticeship Programs

A pre-apprenticeship program is a program that helps prepare students for the apprenticeship program in a particular trade or field. These programs equip students with training and experience to be further prepared for the apprenticeship program and the working environment. These programs focus on hands-on experiential opportunities to gain prerequisites, understanding of daily tasks, and professional strategies so they are the most viable apprenticeship program candidate.

Registered Apprenticeships

A registered apprenticeship program (RAP) is an apprenticeship program proven by the Department of Labor or State Agency Program, as a proven and validated model. The validated model includes paid work, work-based learning, mentorship, educational and instructional components, and industry-recognized credentials (Department of Labor, 2018). According to the Department of Labor, 94% of apprentices continue to work after completing their apprenticeship program. As of 2018, there were 585,000 registered apprentices in the United States, indicating a 56% growth since 2013. There are 23,400 registered apprenticeship programs (Department of Labor, 2018). During the 2018 Fiscal year, construction was the largest industry for apprentices.

Extended Apprenticeship Pathways

Labor market research found that apprenticeships can be expanded from twenty-seven programs to seventy-four commonly used occupations for apprenticeship programs (Fuller & Sigelman, 2017). Two specific categories are identified as being pathways for expansion: expander role and booster role occupations. Expander roles do not require a bachelor's degree while booster roles often times request a bachelor's degree by employers but are not necessary. The expansion of these roles is not to eliminate higher education from the pipeline but to streamline training in a more effective, and systematic way. Apprenticeship expansion across more occupations can give different trades a way to gain the experience, skills, and paid compensation as well as increase the labor market by 3.2 million job opportunities (Fuller & Sigelman, 2017).

Expanding apprenticeship programs can be a way to mitigate degree inflation, or up-credentialing, in the labor job market. Degree inflation is a term that describes employers requiring a bachelor's degree when one is not needed for those specific job requirements. Middle-skilled jobs, defined as occupations needing more than a high school degree but less than a Bachelor's degree, are being filled by workers that have 4-year degrees because employers ask for that credential although bachelor degrees are not necessary in many of these sub-baccalaureate occupations (Fuller & Sigelman, 2017).

Apprenticeship opportunities are predominant in career pathways within areas such as construction and the skilled trades, despite promising efforts underway to bring it to white-collar fields such as pathways in information technology, financial services (Parton, 2017). If students are given the opportunity to experience apprenticeship programs across career pathways, they can utilize this model in a variety of occupations that could streamline their path to the workforce. Offering apprenticeship programs in high school in career fields can increase career efficacies, positive career outcomes, and increase motivation in a chosen pathway (Lent et al., 2005). According to SCCT and CAM, students experiencing the modalities of learning and the engagement in positive career experiences, are more likely to stay in their chosen occupations (Brown et al., 1986; Brown et al., 1989).

Public perceptions of apprenticeship programs and career and technical education continue to persist as a terminal career path for blue collar occupations with limited upward mobility. However, there are European countries such as the United Kingdom, Germany, and Switzerland that are creating pathways to not only develop the highly-skilled workforce that is being called for but also create extended pathways to white-collar position in the profession (Hoffman et al., 2015). Creating these pathways and changing the public perception, may further change social stigmas attached to career and technical education by recruiting students for training, on the job the job paid experiences, and a way for potential candidates to pave pursuit to upward mobility. Extended apprenticeship pathways can increase student achievement, job marketability, retention, and provide a bottom up approach to training and promotion.

Importance of Postsecondary Alignment

In order to support the expansion of apprenticeships, there will need to be a strong partnership with postsecondary institutions. As apprenticeship programs are being used to promote workplace readiness and job training, there is not a smooth and continuous link for apprentices to complete their 2- or 4- year degree. Program benefits such as completion of program certificates, American Council on Education approved credits, which they are able to use for a 2- or 4-year degree, are not articulating as seamlessly as they could be. When postsecondary institutions include registered apprenticeships as a part of their attainment goals, it signals that apprenticeship programs are valid pathways into careers (Leventoff, 2018). According to Leventoff (2018), only twenty-one states reported the inclusion registered apprenticeship certificates within their postsecondary attainment goals.

The Importance of Business and Industry Partnerships

Business and Industry (B & I) partnerships are critical in the success of all apprenticeship programs, as well as provides correlations of the levels of opportunities that students can achieve in career development. Business and Industry is a key factor in whether or not apprenticeships can be developed within the partnership. If schools or institutions do not have the support and resources of the stakeholders, operators, companies, or sectors, apprenticeship programs will not have the on-the-job training component that the workforce is demanding from our young adults.

In effective apprenticeship models, B & I partnerships are main components in the training system. Partners give insight and expertise in the development of content, the access to real-world working environments, industry standards and benchmarks in regards to assessments and evaluations, and the mentorship and training parallel to academics (Howze, 2019).

Rebranding Apprenticeship Programs and changing the Paradigm

The transformation of apprenticeship programs as a key component to a streamlined workforce pipeline is critical when moving forward and bridging the skills gap with more qualified workers. Apprenticeship programs are often regarded as a disconnected pathway from higher education and primarily for career placement. If a student is not “college bound” they may come across an apprenticeship program. However, by making apprenticeship programs a high priority in Career and Technical Education recruitment and a main objective of career guidance, students may identify a pathway for individual success. Administrators and educators should highlight the tremendous opportunity in apprenticeships to market the programs as practical ways to get high wages, technical, and workplace skills that can create opportunities for extensions into 2-4-year college, career advancement and socio-economic mobility.

Currently, the diversity of our students, industry changes, and our nation’s call for more hands-on, relevant training brings highlight to a once criticized parallel track approach to education. John Dewey once criticized the dual pathway system stating separating vocational and academic education will only further an academic divide (Dewey, 1939). The separation system would lead to the division of socio-economic classes and social predestination (Gordon, 2014). Just as recent as the early 21st century, vocational education and apprenticeship programs were attached to a negative stigma. However, within the recent decade CTE has been in the midst of an important transition period of redevelopment. With this, important components of the CTE high quality standards have risen to the top of expected student outcomes. Work-based learning is an essential part of CTE. Work-based learning involves hands-on experiences that give students opportunities to gain practical and workplace efficacies that supplement academic attainment. Thus, apprenticeships should be structured into curriculum and developed as a structured extension to further education and working experience.

The US Department of Labor (DOL) has reported 100 million dollars in grant funding in creating new apprenticeship opportunities across sectors and industries (Department of Labor, 2018). According to the DOL, the grants use funds authorized by the American Competitiveness and Workforce Improvement Act which has been amended to expand the Industry-Recognized Apprenticeship Program. These industry sectors include focusing on Information and Communication Technology, including cybersecurity, and artificial intelligence, healthcare

occupations, advanced manufacturing, and financial services. There is a call for apprenticeships for those sectors that do not have a significant track (Department of Labor, 2018).

There now exists a government impetus to recruit, train, and retain more women in apprenticeship programs in fields such as cybersecurity and advanced manufacturing (Department of Labor, 2018). Grants will be awarded to organizations that develop pre-apprenticeship or nontraditional skills training, ongoing orientation for workers and employers on creating a safe working environment for women, and/or developing and setting networks for advanced support for women retention (Department of Labor, 2018).

There are a few states that are implementing pre-apprenticeship programs to support the workforce initiative for advanced training and workforce development. Colorado is one state that is implementing a pre-apprenticeship program for high school students. Modeled after VET, Colorado is working to fill employment in informational technologies, engineering, and biomedical sciences by working with major industry partners. With reports of less turnover and a decrease in training costs for those that participated in apprenticeships, Colorado along with states like California, Minnesota, Wisconsin, and South Carolina are creating opportunities to explore this underutilized education model (Council of State Governments, 2017). This initiative aims to create a modern, effective, and more streamlined training paradigm for high school students to either enter the workforce or into a postsecondary institution with occupational experiences (Council of State Governments, 2017).

Conclusion and Implications for Policy and Practice

It is essential that business and industry professionals embrace the apprenticeship education model as an effort to work collectively to streamline student achievement, technical skill attainment, and workplace readiness. Industry professionals should work in tandem with education partners to identify skills, training plans, and paid on-the-job training (Hoffman et al., 2015). CTE teacher educators should increase collaboration with business and industry in establishing cohesive and salient liability contracts for all parties. Rigid contractual documents for the employer, institution, student, and parent is imperative for standard safety issues and liabilities. All parties should agree before engaging in apprenticeship partnerships.

Having a coordinator or a team of coordinators work in conjunction with key partners to help create apprenticeship programs is instrumental in a success apprenticeship program. This should be a dedicated, full-time position that is filled by someone that can devote time, communication skills, resources, and engagement in partnerships to successful apprenticeships. This partnership can ensure a more seamless succession that connects the apprentice from classroom, to training, and then into the workforce.

Directing state funds to promote the expansion of current apprenticeship programs, as well as develop apprenticeship programs into new industry sectors can assist in creating a more skilled and prepared 21st century pipeline of workers. State funds can support the growth of youth apprenticeships and pre-apprenticeships into secondary schools. These state investments may provide an incentive for more employer participation and engagement. Apprenticeships are

usually financed through the employers; therefore, having state investment can multiply dividends.

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