

Apprenticeship in Post-pandemic America: Evolution, Dilemma and Reform

Wenrui Hu

Guangzhou Sontan Polytechnic College, Guangzhou, China

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Abstract: Since Registered Apprenticeship was established, it has provided a large number of high-quality labors for infrastructure construction and economic development of the United States. However, the implementation of Apprenticeship is in trouble due to the pandemic outbreak, therefore it is urgent to “Expand Apprenticeship” to support industrial development and economic recovery. Hereby this article begins by presenting the history and status quo of American Apprenticeship, and analyzes both the internal and external causes of its dilemma in post-pandemic era. Based on the current difficulties, the author summarizes the reformation system that the federal and state governments have built and its corresponding positive influences, in the hope of providing some reference to develop “Apprenticeship with Chinese characteristics” in vocational education.

1. History of Apprenticeship in the United States

1.1 The connotation of apprenticeship in the United States

Apprenticeship is an industry-driven, high-quality career pathway, as defined by the U.S. Department of Labor's official apprenticeship website. Employers train and prepare their future workforce, and apprentices are paid for work experience, classroom instruction, and a cumulative, nationally recognized portable certificate through a "learn-while-you-earn" model [1]. Apprenticeships offer a mutually beneficial path for apprentices and employers. On the one hand, apprentices receive competitive compensation from the start, on-the-job learning and work-based instruction. On the other hand, employers can benefit from government technical assistance, tax credits, and subsidies for hiring specific populations, as well as customize training content, develop skilled workers, increase productivity, and reduce turnover.

1.2 Registered apprenticeship

In 1937, the U.S. Congress passed the National Apprenticeship Act, which marked the birth of registered apprenticeship. At the federal level, "apprenticeship" and "registered apprenticeship" cover the same meaning [2]. "Registered apprenticeship" is a system in which registered apprentices follow a program, learn professional theory and operational skills under the supervision of a corporate mentor, participate in production work, and pass an examination to obtain a "skilled trade" qualification, job opportunities, and admission to higher education. The apprenticeship system is a system in which apprentices learn professional theory and operating skills under the supervision of an enterprise mentor, participate in production work, and pass an examination to obtain a "skilled trade" qualification, job opportunities, and a qualification for further study at a university. "Registration" means that the entity sponsoring the program must apply for registration with the Department of Labor or a state apprenticeship office, be approved to operate, and be officially regulated and protected [3]. High-quality registered apprenticeship programs require a three-way partnership between the sponsor, the employer, and the educational institution: the sponsor coordinates program management, the employer provides on-the-job learning, and the educational institution provides classroom instruction. The organization applying for registration is called the "sponsor" and is an eligible entity such as a corporate employer or community college. The program is a combination of on-the-job learning at the company and formal courses at the educational institution, including pure on-the-job learning, classroom instruction and on-the-job

learning in sequence or simultaneously.

1.3 Industry-recognized apprenticeship

"Industry-recognized apprenticeships are a key focus of the Trump administration's development strategy. It has led to the transfer of program management to third parties such as employers, nonprofits and educational institutions to remedy institutional rigidity and lack of industry drive. The establishment of industry "standards-accredited entities" to spearhead the creation of high-quality apprenticeship programs and develop program specifications has been considered an a priori attempt at apprenticeship reform in recent years.

2. The Dilemma of American Apprenticeship in the Wake of the Pandemic

2.1 Structural changes in American labor market

2.1.1 Pandemic-driven technology development changes employment landscape

The epidemic has facilitated a surge in online activity and accelerated the adoption of automated technology. At the same time it has led to a reduction in demand for official travel, weakening the need to hire for low-income offline service positions. The focus of apprenticeship training is lagging behind current industry trends.

2.1.2 The pandemic reshapes jobs and skills needs

The technological innovations caused by the pandemic have redistributed a large amount of labor across industries, and the rapid development of automation and artificial intelligence will also force workers to improve their labor skills. The development of artificial intelligence and advanced technologies will reduce the demand for apprentices. In the long run, however, the productivity leap brought about by the application of technology will create more jobs and increase the demand of companies for high-end skills. Technology has changed the task structure of jobs and the skill sets required of employees.

2.1.3 Pandemic increases employment difficulties for vulnerable labor force

Community colleges have historically seen an increase in enrollment during economic downturns, and a significant drop in enrollment during the epidemic. This means that people with lower levels of education and occupational employability are having to enter the labor market and are having a harder time optimizing their career paths through educational advancement.

2.2 The internal and external dilemma of American apprenticeship

2.2.1 Endogenous defects hinder effectiveness

First, registered apprenticeship implementation is concentrated in the construction and manufacturing sectors, with a large number of unregistered, high-quality apprenticeship programs. Sponsor registration procedures are cumbersome and slow to be approved, and industry and business awareness of the apprenticeship system is lacking. Second, industry-approved apprenticeship is implemented without review as sponsors set their own terms of agreement, lacking minimum teaching hours and quality standards. Pay increases for apprentices are set by employers and entities, and progressive wages and training subsidies are not specified. Replacing government oversight with industry certification also fails to ensure workplace safety, and the occupational orientation of industry-recognized and registered apprenticeship systems clearly overlap. The design flaws of industry-recognized apprenticeship seriously reduce its effectiveness, and the Department of Labor has even rated it as "redundant to registered apprenticeship".

2.2.2 External factors exacerbate the difficulty of implementation

Factors such as social distance regulations and economic uncertainty under the pandemic have caused a large number of programs to stop accepting apprentices or have been forced to suspend them. The gradual shift of apprenticeship implementation online has increased the cost of skills for

training providers and the difficulty of engaging the online unskilled population. The recession has also intensified competition for entry-level basic jobs among job seekers. In October 2020, the unemployment rate for Generation Z in the U.S. exceeded 25%, with some youth choosing to continue their education rather than enter the labor market through apprenticeship programs.

3. Reforming Post-pandemic American Apprenticeship

3.1 The revision of the law to change the chapter, set the apprenticeship system top-level design of the general direction

3.1.1 Adoption of amendments to *National Apprenticeship Act*

In 2020, the number of people completing registered apprenticeship programs in the United States accounted for only 0.38% of the workforce [4]. As a result, in 2021, a bipartisan amendment to the National Apprenticeship Act was passed to authorize \$400 million in fiscal year 2022 and invest more than \$3.5 billion over five years to expand registered apprenticeships to create nearly 1 million apprenticeships. Financial allocations are used to encourage employers to recruit underrepresented populations, increase funding for national industry intermediaries and local intermediaries, establish and expand various programs under apprenticeship, and codify and simplify apprenticeship agreements and registration standards. It is also used to incentivize businesses to increase the number of high-skill jobs and to support the development and expansion of the youth apprenticeship, institutional consortia, and school-enterprise data sharing.

3.1.2 Withdrawal of industry-approved apprenticeship

Since the implementation of the industry-recognized apprenticeship system, 27 "standard certification entities" have been audited and approved, but only one has accepted apprentices, and the pilot has not been as effective as desired. In November 2022, the U.S. Department of Labor announced the elimination of industry-approved apprenticeship.

3.1.3 Revision of the advisory board charter

Registered apprenticeship is highly dependent on sponsors and partners to sustain long term operations. *National Apprenticeship Act* authorizes the establishment of a National Apprenticeship Advisory Committee to provide pro bono advice for policy development. Committee members are drawn from employers or industry associations, colleges and universities, certificate providers, and other agencies, with government representatives serving as ex-officio members. As the old Commission charter was repealed, in 2021 the U.S. Employment and Training Administration issued an exposure draft of a charter revision that would require membership to include representatives of young apprentices ages 16-24, promote the commission's innovative apprenticeship model, provide policy research and industry employment feedback, and be presented in medium- and long-term reports.

3.2 The main body is clear and constitutes a solid synergy for the expansion of registered apprenticeship

3.2.1 Government-led, playing a good policy "combination" at all levels

"The expansion of registered apprenticeship has developed an organizational system coordinated by the federal Department of Labor, assisted by the Departments of Education and Commerce, and implemented by state government apprenticeship offices. At the workforce system level, it is being promoted to employers through the American Job Center, adding registered programs that meet the requirements of the *Workforce Innovation Opportunity Act* grant to the Eligible Training Provider List, and encouraging apprentices to use their Individual Training Accounts to fund program completion. The system will also encourage apprentices to use their "individual training accounts" to fund program completion, offsetting the cost of tuition, books and fees. The government encourages human and service intermediaries to transform into sponsors to assist employers in designing and registering programs, and to create "apprentice navigators" to work full-time on

program promotion. At the state government level, first, through government officials, local boards and intermediaries, prospective employers are approached and provided with financial incentives and technical support to build operational capacity and establish monitoring standards. Second, the government should target youth with direct marketing and social media advertising to recruit apprentices from high schools and community colleges and improve the grant system. State of Georgia provides 70 percent tuition assistance for state residents attending public technical colleges and full grants for apprentices entering high-demand occupations such as health care and information technology.

3.2.2 Business-driven, innovative means to stimulate momentum

Mobilizing employers is the focus and challenge of “expanding apprenticeship”. Technical assistance, tax credits, and hiring subsidies have all proven viable, and the government has funded the creation of apprenticeship employer alliances that provide one-stop guidance and tuition sponsorship. Alliance companies receive special education fund subsidies and teacher training, and the alliance office can take care of the registration process except for key steps. In addition, representative companies lead the way and stimulate the endogenous motivation of peer companies. Apprenticeship Ambassadors, part of “National Apprenticeship Week”, seek out sponsors to promote apprenticeships and network, with good businesses receiving national recognition and enhanced social prestige. Companies such as Amazon Web Services are also taking the initiative to develop apprenticeships, partnering with community colleges and K12 schools in the San Francisco Bay Area. According to the survey, companies participating in Bay Area IT industry apprenticeship programs invested an average of \$44,800 per apprentice [5]. Meanwhile, various hard measures are in the pipeline. The U.S. Economic Development Council has initiated that employers should apply to be sponsors of at least one apprenticeship program and partner with three local high schools or community colleges.

3.2.3 Institutional synergy, alliances share linking functions

One of the key actors in registered apprenticeship is K12 district schools, community colleges, universities and educational institutions. As training providers, institutions provide classroom instruction driven by industry standards, customize curriculum, faculty, implement evaluations, award certificate degrees and solicit resources. As an intermediary, the institution serves as a bridge between government, business and apprentices, recruiting and screening apprentices. As the sponsor, the institution leads the design, operation and management of the program. The expansion of registered apprenticeship is highly dependent on institutions performing the functions of education and teaching, communication and coordination. The "Alliance of Registered Apprenticeship Institutions", formed by institutions at all levels, has a mature mechanism for cross-system certification of apprenticeship credits and university credits, and is directly connected to corporate standards and interoperability. The organization form of the consortium leaves room for institutions to explore their own characteristics under the premise of standardization and unification, and provides new ideas to consolidate their linking functions and bring into play the synergistic effect of the "trinity".

3.3 Multiple parallel lines, bring the resonance effect of preparatory apprenticeship and youth apprenticeship into play

3.3.1 Development of youth apprenticeship

Youth apprenticeship is structured, work-based learning apprenticeship programs for high school students. By combining academic and skills learning with work experience through registered apprenticeships, it provides students with diverse options after graduation and also prepares them for careers in finance and other industries. States offer several incentives to promote youth apprenticeship, including a tax credit of \$2,000 per youth apprentice or up to 50 percent of wages for businesses. Youth apprenticeship is offered in grades 11/12, with on-the-job learning increasing from 1/4 of the total hours in the first year to 3/4 of the total hours in the third year. apprentices can

earn a high school diploma in the second year. At the end of that year, they can earn transfer credits and trade certificates for college courses, work full-time, enroll full-time in an institution of higher education, or complete a degree on a part-time basis. Research in the state of Illinois showed that youth had an interest rating of 9.2 (out of 10) in participating in apprenticeships, and were most attracted to apprenticeships because they were linked to vocational training and could earn a steady income [6].

3.3.2 Promote preparatory apprenticeship system

Preparatory apprenticeship refers to programs or ancillary services that prepare individuals for registered apprenticeships for vulnerable populations such as youth (out-of-school youth), women, individuals with disabilities, and veterans [7]. It serves youth and veterans and individuals with barriers to employment and seeking to change careers by providing free room and board, health care, a living stipend, and assistance in completing their high school education. The Department of Labor, in conjunction with businesses, has developed a framework for quality development of preparatory apprenticeship and offers transitional programs, including GED (alternative U.S. high school diploma test) subject remediation, counseling, and career planning. The framework also specifies that sponsors must assume obligations for safety and security, reasonable supervision, and job referrals. Preparatory apprenticeship opens the pipeline for disadvantaged workforce into registered apprenticeship programs, extending the reach and inclusiveness of apprenticeship.

3.4 Formal innovation, promote distance learning application and certificate certification reform

3.4.1 Remote and virtual reality broaden the breadth

Distance and virtual learning are key trends in apprenticeship reform, helping to reduce commuting costs, ensure the continuity and safety of apprenticeship programs, and facilitate access to large rural areas. Distance learning is mainly implemented through online teaching platforms such as Canvas, and virtual reality (VR) technology is gradually being applied to apprenticeship programs in the manufacturing industry, creating a simulation environment where skills are practiced and real-time instruction and grading is conducted by robotic "virtual instructors". The management and monitoring of program operations have also shifted to electronic, such as the Workhands platform, which can handle apprentice onboarding, assignment, work hour statistics, course assignment, performance evaluation, and policy compliance online. The application of new technology is an important fulcrum for the implementation of the "expanded apprenticeship" policy, with platform development, open resources, VR simulation, scientific management, and support improvement.

3.4.2 Alternative certificates and degree certificates to extend depth

Apprentices can earn a cumulative, portable "certificate of completion" from the federal or state Department of Labor upon completion of the program, but the high cost of time and lack of corporate certification do not meet the needs of job seekers for specific credentials. The main direction of reform is to form a certificate system based on certificates of completion, supplemented by alternative certificates and degree certificates. The Organization for Economic Cooperation and Development (OECD) defines alternative certificates as "certificates that are not recognized by the national education authorities and are independent of formal educational qualifications" and include three forms: industry-recognized certificates, digital badges and micro-certifications. Industry-recognized certificates are used to certify specific skills or apprenticeships, and are issued after completion of a course and validation by a professional body, industry or product seller. Google has introduced a series of occupational certificates in areas such as IT and data analytics, built certificate-oriented apprenticeship programs with community colleges, and established the "Google Certificate Employer Alliance" to recognize alternative certificates and hire holders. Another trend in apprenticeship certificate reform is the degree apprenticeship, which leads to both a certificate of completion and an associate's degree. The "Registered Apprenticeship Consortium"

is the foundation of the degree apprenticeship system by certifying credits for extra-curricular learning hours and by facilitating credit transfer and credit certification between institutions.

4. Conclusion

Although the United States is a non-traditional apprenticeship country, registered apprenticeship has been implemented for more than 80 years to produce a large number of high-quality personnel for infrastructure development and economic development. Because of the impact of the epidemic, it has made drastic reforms in laws and regulations, implementation subjects, system derivation and means forms. In contrast, the concept of "apprenticeship system with Chinese characteristics" is only a few years old from its introduction to the new version of *Vocational Education Law*, and is still in the initial exploration stage. It is still a long way to go to explore the optimal solution for localization of the path through horizontal comparison, and practice makes true.

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