Creating a Gold-Standard National Occupational Standards Development System

Batia Katz
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Registered apprenticeship offers an opportunity for employers to hire, train, and retain a skilled workforce, and workers to earn income while they learn. But the complexities of the American apprenticeship system deter many potential sponsors from creating or registering programs. While many other countries use a centralized system for creating apprenticeship standards, the US allows individual employers or groups of employers to create their own standards to gain approval as a registered program. Because every employer has to start from scratch and use valuable resources to develop an apprenticeship program, this process creates barriers and prevents apprenticeship programs from scaling nationally. To begin addressing this problem, the US Department of Labor selected the Urban Institute to produce National Occupational Frameworks in a variety of growing occupations and sectors, which will become the foundation for a gold-standard occupational standards development system through the Registered Apprenticeship Occupations and Standards Center of Excellence.[1]

This brief describes the current landscape of apprenticeship standards and how Urban's process fits in. We go into depth about the different parts of Urban's process and discuss how we build strong occupational frameworks. First, we talk about the process for identifying high-interest occupations. Then, we discuss how we research and write the initial drafts of the frameworks. Next, we describe our process for identifying expert reviewers and vetting the frameworks. We then describe how we develop the classroom curricula to accompany the on-the-job training. And finally, we discuss how we publish

and disseminate the frameworks and how we expect them to be used and applied to scale apprenticeship programs nationally.

Background

Apprenticeship is a type of job training program wherein apprentice workers receive on-the-job training and classroom instruction while earning a wage and contributing to production. Apprentices receive competitive pay and mentorship on the job, and many earn an industry credential upon completing the program (Boren et al. 2022). Employers hire, train, and promote those workers internally to develop and retain a skilled workforce. Apprenticeship has existed for centuries worldwide in different forms but has recently been expanding in the United States, particularly through the federal registered apprenticeship system (Dimeny et al. 2019). Under this system, sponsors, as employers or in partnership with employers, develop apprenticeship programs to meet federal requirements and register the program with US Department of Labor (DOL). Traditionally associated with construction and other trades, apprenticeship can be a viable option for training workers in a range of growing occupations and sectors, including IT, health care, teaching, and more.

Internationally, there are many examples of apprenticeship systems where employers work together with the government to develop programs. For example, Germany has a very robust system and significant participation throughout the country.[2] In Germany, apprenticeship chambers bring employers and labor leaders together and decide what standards should be and how to assess workers at the end of their apprenticeship (Elliott and Farnbauer 2021). Employers are motivated to participate because they want to have a say in how workers will be trained. It is such an integral part of the German workforce that half of all graduating high school students complete an apprenticeship (Elliott and Farnbauer 2021). However, it takes time to create and update standards in Germany because the process involves many stakeholders weighing in and reaching consensus. German standards require that all employers teach apprentices the relevant occupational skills. Committees of employers, labor representatives, and government members assess the specified skills of apprentices upon program completion. Other countries, including Switzerland, the UK, and Australia, use similar methods to develop apprenticeship standards and assess apprentices.[3]

These approaches are markedly different from the registered apprenticeship system in the US. Here, the system is significantly more decentralized and customized to individual program sponsors. One characteristic of the system is that the US does not have national occupational standards, and many employers in the US want to customize their programs, meaning that they need apprenticeship frameworks to be significantly more flexible. The US also lacks the cooperative networks some other countries have for employers to work together. However, there are some regional consortia where employers work together on job training to improve retention. For example, in the San Antonio area, a group of manufacturing employers realized they were poaching employees from one another and losing money and talent and decided to build the Texas Federation for Advanced Manufacturing Education (TX FAME) training program together to prevent this from happening in the future and broaden the regional talent pipeline.[4] Another example is the Apprenticeship 2000 consortium, which partners to create and support registered youth apprenticeship programs throughout the state of North Carolina

(Arabandi et al. 2021). However, this sort of collaboration between employers is rare, and individual approaches to standards development are more the norm in the US system. Because of this lack of standardization, there is a deep need for national occupational frameworks to help guide sponsors in developing high-quality standards. The next section examines the US system in depth.

The National Apprenticeship System's Approach to Occupations

In general, apprenticeship standards, which are a required element of registering a program, are developed individually by an employer looking to start an apprenticeship and then may be sporadically customized and updated by other employers who want to register programs in the same occupation. This results in two problems. The first is that there is significant duplication of work, meaning registration is more onerous than it needs to be. The second is that there is little standardization because there is so much variation in standards from employer to employer, which makes it harder to apply credentials across an industry.

Despite the fact that US apprenticeship programs are highly individualized,[5] some resources are in place that provide a basis for developing apprenticeship frameworks, many of which we build on in our process.

Registration can be complicated and time-consuming for new employers, especially the creation of the detailed training plan and related technical instruction. Some employers are not as familiar with the structure of apprenticeships and unaware of the benefits from registering their programs. While not all employers are discouraged in developing a registered apprenticeship program, small- and medium-sized businesses who have limited HR resources will need access to resources in creating programs and support through intermediaries (Elliott and Farnbauer 2021).

There are some existing basic resources that offer occupational information for developing frameworks, such as O*NET, a federally operated online database of many different occupations, that gives descriptions of the major tasks, skills, and abilities needed to perform each occupation.[6] Similarly, some individual groups have developed DACUMs (an acronym for "developing a curriculum").[7] These groups—often employer associations or community colleges unaffiliated with the federal government—assemble a group of occupational experts and use functional job analysis principles to brainstorm major themes and tasks for an occupation.[8] There are also National Guideline Standards, created by joint labor-management apprenticeship programs and other industry groups in a variety of industries but largely the construction industry. However, O*NET, DACUMs, and National Guildeline Standards are only available for a subset of occupations and may not be applicable for every employer seeking to create an apprenticeship program, especially in emerging sectors.

These resources are helpful but not comprehensive of all occupations. There is a significant need in the US for a system of National Occupational Frameworks that can be tweaked and utilized by a variety of apprenticeship programs. Our goal in the Registered Apprenticeship Occupations and Standards Center of Excellence (AOSC) is to begin filling this need, building on existing resources, and creating well-researched, reputable, and user-friendly frameworks that can be adapted and customized by a variety of organizations.

The Registered Apprenticeship Center for Excellence for Standards and Occupations

The Urban Institute was the recipient of a cooperative grant from the DOL's Office of Apprenticeship to create a new technical assistance center to modernize and create new standards for apprenticeship. Among the tasks of the AOSC is to create 80 National Occupational Frameworks (NOFs) over four years. The goal of building NOFs is to make these occupational frameworks widely available and free to any organization looking to register an apprenticeship program in that occupation. Another goal is to bring transparency to the national apprenticeship system's standards. These frameworks are intended to save employers time and financial resources and speed up the process of setting up high-quality registered apprenticeship programs. This work builds on a previous Urban Institute project, the Competency-Based Occupational Frameworks (CBOFs) for Registered Apprenticeship. [9]

Competency-Based Occupational Frameworks (CBOF) for Registered Apprenticeship

The Urban Institute received several years of funding from the DOL's Office of Apprenticeship to develop frameworks for registered apprenticeship based on core competencies and job functions. These frameworks were drafted and revised in consensus with employers, educators, and other workforce experts.

Over the course of the project, Urban's team created 43 frameworks for apprenticeable occupations across a variety of sectors, including advanced manufacturing, business services, education, energy, finance and insurance, health care, hospitality, information technology, and transportation.

Source: "Competency-Based Occupational Frameworks for Registered Apprenticeships," Urban Institute, accessed February 13, 2023, https://www.urban.org/policy-centers/center-labor-human-services-and-population/projects/competency-based-occupational-frameworks-registered-apprenticeships.

Through the NOFs, we take a comprehensive and inclusive approach to thinking about competencies or skills rather than tasks. We explore what apprentices would need to know to perform key job functions at a high level. Employers can use the frameworks to assess apprentices' knowledge and performance in different competencies. We also follow the guidance of industry experts in developing the frameworks, a practice influenced by international apprenticeship systems like that of Germany and the UK. This ensures that the frameworks are up to date and relevant, even in frequently changing industries.

Our frameworks build on, but are distinct from, occupational work process schedules. A framework contains a work process schedule but also includes background information about the occupation, information on how to use the work process schedule, and an outline of the courses and certificates that can be used to develop the apprenticeship program's required related technical instruction. Even for occupations that already have existing work process schedules that were developed by one employer,

the creation of a high-quality and updated national occupational framework is crucial to scaling apprenticeships because they create a high standard that is replicable across employers.

Finally, and importantly, our frameworks are subject to customization by employers and sponsors, so long as the core competencies are included. While the frameworks are industry driven and draw from high-quality research, there is significant flexibility in our approach, which makes it useful for a wide variety of apprenticeship programs.

Process

The Urban team is building on existing approaches to framework development in the US and other countries. In doing so, we have developed a rigorous process for creating occupational frameworks for registered apprenticeship, starting with the CBOFs for Registered Apprenticeship project and continuing into the current AOSC project.

Urban and the DOL identify occupations for NOFs, and then Urban's team of experts researches and drafts the standards. Next, the team seeks and incorporates feedback from industry experts and develops an instructional outline. After the frameworks are approved by the DOL, the team publishes and disseminates the frameworks so that they may be used for developing new apprenticeship programs. These steps, described in more detail below, comprise a holistic view ofs each occupation, ensuring the standards are useful across a variety of different employers and program types.

Identifying Occupations

The Urban team uses several criteria to identify occupations. First, we use quantitative and qualitative data to identify occupations where there is **significant labor market demand** and growing interest among various apprenticeship employers and other stakeholders. We do this to ensure our frameworks are the most relevant to the current labor market conditions. For example, this year we are developing a framework for the physical therapist assistant occupation, which has a projected growth of 35.4 percent between 2020 and 2030. Most, but not all, of the occupations we make NOFs for are currently high growth.[10]

BOX 2

Criteria for Identifying Occupations

1. Use labor market information to identify occupations with significant demand and interest.
2. Review existing popular, apprenticeable occupations in need of an industry practice refresh.
3. Prioritize growing and critical occupations and industries to the US labor market.
4. Focus on occupations that align with the apprenticeship and employment goals of the DOL.

Second, we also focus on building NOFs for **emerging occupations and industries**, where registered apprenticeship programs are rare or do not exist today as an apprenticeable occupation. We also look at occupations in which it is difficult to access jobs without a degree in the field. For example, while the building trades in the construction industry are well-known for apprenticeship programs, they have their own high-quality systems in place that are uniquely suited to those sectors. Instead of duplicating frameworks for these programs, we focus on other fields. A special interest for this project is in preparing occupations that will undergo transformation because of climate change's effects, energy efficiency, and clean energy and green infrastructure practices.

We **collaborate with the DOL** to identify these occupations, ensuring that the frameworks in development also align with their goals for registered apprenticeship and an effective labor market.[11] Because the department has priorities for scaling apprenticeship in specific occupations or sectors, we aim to produce frameworks that complement those goals. Table 1 below shows the ten occupations that were developed for the first year of the project, and table 2 shows the tentative occupations in development for 2022–23. Each occupation met both criteria that we focus on, as can be seen through their projected growth rates and projected average annual openings. In future years, we plan to develop roughly 20–25 frameworks annually.

TABLE 1

2021–22 National Occupational Frameworks Developed

Occupation name	SOC code	Projected growth, 2020–30	Projected average annual openings
Physical therapist assistant	31-2021	35.4%	16,400
Supply technician	13-1081	29.5%	24,500
Interpreter and translator*	27-3091	23.7%	10,400
Respiratory therapist	29-1126	23.0%	10,100
Substance use, behavioral disorder, and mental health counselors	21-1018	22.9%	41,000
Paralegal/legal assistant*	23-2011	12.0%	43,000
Human resources generalist	13-1071	10.4%	73,400
Occupational health and safety specialist	19-5012	9.0%	1,800
Junior cloud technician*	15-1231	3.9%	1,600
Correctional officer	33-3012	-7.2%[1]	34,000

Sources: "FY 2020 Data and Statistics: Registered Apprenticeship National Results Fiscal Year 2020: 10/01/2019 to 9/30/2020," US Department of Labor, Employment and Training Administration, accessed February 13, 2023, https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020; "Occupation Employment Projections Data," US Bureau of Labor Statistics," last updated January 5, 2023, https://www.bls.gov/emp/data/occupational-data.htm; Joseph B. Fuller and Matthew Sigelman, *Room to Grow: Identifying New Frontiers for Apprenticeships* (Cambridge, MA: Burning Glass Technologies and Harvard Business School, 2017), https://www.hbs.edu/managing-the-future-of-work/Documents/room-to-grow.pdf; World Economic Forum, *Jobs of Tomorrow: Mapping Opportunity in the New Economy* (Geneva, Switzerland, World Economic Forum, 2020), https://www3.weforum.org/docs/WEF_Jobs_of_Tomorrow_2020.pdf.
Note: SOC = Standard Occupational Classification.
*Approved for use by the DOL.

TABLE 2
2022–23 National Occupational Frameworks in Development

Occupation name	SOC code	Projected growth, 2020–30	Projected average annual openings
Warehouse technician	53-7065	4.4%	360,500
Software QA analyst and tester	15-1253	22.2%	189,200
Appraiser and assessor of real estate	13-2023	4%	3,100
Teacher (elementary school)	25-2021	7.4%	110,800
Registered nurse resident	29-1141	9.0%	194,500
Psychiatric technician	29-2053	12.8%	8,000
Infection preventionist	19-1041	29.6%	900
Forest fire inspector and prevention specialist	33-2022	23.9%	400
Medical secretary	43-6013	10.6%	75,200
Welder, combination	51-4121	8.2%	49,200
Electrical and electronic engineering technologist and technician	17-3023	1.6%	11,000
Education paraprofessional (teaching assistant)	25-9042	8.9%	136,400
Medical and clinical laboratory technician	29-2012	10.9%	25,900
Occupational therapy assistant	31-2011	36.1%	7,800
Insurance sales agent	41-3021	7.0%	50,400
Financial examiner	13-2061	17.9%	6,900
Industrial machinery mechanic	49-9041	21.3%	45,100
Fabricator (semiconductor)	51-2090	-6.7%	125,200
Internet and document accessibility specialist	**	-	-

Sources: "FY 2020 Data and Statistics: Registered Apprenticeship National Results Fiscal Year 2020: 10/01/2019 to 9/30/2020," US Department of Labor, Employment and Training Administration, accessed February 13, 2023, https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020; "Occupation Employment Projections Data," US Bureau of Labor Statistics," last updated January 5, 2023, https://www.bls.gov/emp/data/occupational-data.htm; Joseph B. Fuller and Matthew Sigelman, *Room to Grow: Identifying New Frontiers for Apprenticeships* (Cambridge, MA: Burning Glass Technologies and Harvard Business School, 2017), https://www.hbs.edu/managing-the-future-of-work/Documents/room-to-grow.pdf; World Economic Forum, *Jobs of Tomorrow: Mapping Opportunity in the New Economy* (Geneva, Switzerland, World Economic Forum, 2020), https://www3.weforum.org/docs/WEF_Jobs_of_Tomorrow_2020.pdf.
Note: SOC = Standard Occupational Classification.
** = no SOC code identified yet

Research and Writing

COMPONENTS OF THE FRAMEWORKS

Each NOF follows a format distilling the most important information about the occupation that would be needed to design an apprenticeship program. Each framework begins with a set of instructions for use, to make the frameworks as accessible as possible for apprenticeship stakeholders. We define the major parts of the framework and describe how it can be adapted to assess performance and progress in different types of apprenticeship programs.

BOX 3

Steps for Researching and Writing Frameworks

1. Consult government resources, information from industry associations or credentialing agencies, and job postings.
2. Develop a list of key job functions.
3. Create a work process schedule with core and optional competencies for each job function.
4. Add occupational background information.

The first main section of the framework is an occupational overview that provides basic information about the occupation. This includes the purpose of the occupation, potential job titles, common prerequisites, and the recommended length of the apprenticeship.

The bulk of the framework is made up of the work process schedule—a table that organizes the major job functions and competencies required to learn the occupation on the job. It also assesses apprentices' performance against those competencies. It includes both "core" competencies that are common to all employees in the occupation and those considered optional by industry experts.

In each framework, we include job functions and competencies related to diversity, equity, and inclusion (DEI) as appropriate. For example, we have ensured that cultural understanding, inclusive and respectful communication, and ethical behavior are core competencies across all the frameworks we develop. In some occupations, these DEI-related competencies are reflected in various job functions, and in other occupations, such as for substance use counselor, we dedicate a specific job function toward DEI. We also make sure to consider any equity implications specific to each occupation. As an example, for our correctional officer framework, Urban worked with incarcerated peoples' organizations to fully understand the implications of current training.

INFORMATION SOURCES

We consult several major sources during the initial research and writing process. These include, but are not limited to, the following:

1. O*NET
2. industry associations and unions
3. credentialing organizations
4. college curricula
5. approved past work process schedules and DACUMs
6. international apprenticeships
7. job descriptions, current job postings, and other related industry information

Vetting with Industry Experts

Once we have developed an initial draft of the frameworks, we begin to reach out to industry experts to request their input.

Who Are the Industry Vetters?

We aim to have at least seven industry experts vet each framework to ensure we have captured a consensus on the important features of the occupation. To get diverse perspectives, we look for expert reviewers who

- have been employed in the occupation;
- have supervised others in the occupation;
- have experience with apprenticeship in the field;
- are trainers and educators in the field;
- are well established in the industry or occupation; and
- represent diverse oranizations, geographic regions, and demograhic populations.

We ask the reviewers to read the documents and provide feedback on how we have represented the occupation. We use the feedback to refine the different versions of the framework, identify disagreements between different reviewers, and create a document that best represents the occupation as a whole. This also helps ensure the framework is useful to as many different programs and employers as possible.

Having discussions with vetters also allows us to be sensitive to emerging trends and changing contexts within an occupation. For instance, while working on our framework for human resources generalists, we found out that the pandemic has changed key job functions, and apprentices in the occupation now must be more sensitive to employee needs and accommodations during telework and return to work. Reviewers also told us about the need for data and analysis to help organizational leaders make informed decisions during uncertain times.

We are especially interested in the **diverse perspectives** vetters of different backgrounds bring. Our team intentionally diversifies our pool of reviewers by race, gender, location, and organization type. For example, for the interpreter and translator framework, our team ensured we reached out to diverse interpreters and translators, including women, people of color, representatives from large and small businesses, and specifically American Sign Language interpreters. We also ask vetters about DEI-related competencies and get input on specific DEI issues about a particular occupation. For instance, for the substance use counselor framework, reviewers told our team that the framework should explicitly name diverse populations that counselors would support.

Vetters are a crucial part of the framework development process, and many stay involved beyond the initial review phase. Some vetters help us identify other reviewers or may participate in vetting additional frameworks under their expertise. They may also help us disseminate and promote the frameworks once published.

Developing the Curriculum

Registered apprenticeship programs also include some classroom instruction, known as related technical instruction, which is a recommended minimum of 144 hours annually. In developing our occupational frameworks, we create a standard instructional curriculum that can be used or customized by employers and sponsors in concert with educational providers. To establish the RTI, Urban consults a range of training providers, including college and noncollege educational organizations, to determine which courses are essential to apprentices learning their trade.

BOX 5

Steps for Developing the Curriculum

1. Understand and contextualize the work process schedule competencies.
2. Research any occupational licensure requirements.
3. Source available syllabi from colleges, universities, and nontraditional education providers.
4. Develop a list of important courses and learning objectives.
5. Determine hours needed for related classroom instruction.

Early in the process, we also note if there are any state occupational licensing requirements and check to see if these requirements may change soon. For some occupations, **occupational licensing rules** may require apprentices to have a specific degree. For example, almost all allied health occupations (including nurses, respiratory therapists, and more) require credentialing and often an associate degree before apprentices may perform on the job. A degree is not always needed in other fields, such as paralegal,[12] but is an option for getting into the field. Our team examines colleges and universities that offer the required degree program in these situations.

Based on the available courses and programs, we create a curriculum with suggested courses and course objectives. We aim to find between 8 and 12 colleges or universities that offer programs in the occupational area, including a mix of community colleges and four-year institutions. After examining offerings at colleges and universities, we also look for courses from nontraditional education providers. For example, in some instances, the occupation might have a training program offered by the state or federal government or the military (such as correctional officer). We also look at what is available online through MOOCs (massive open online courses) and similar resources. This process ensures we provide

recommendations that can work with various educational options and allow apprenticeship programs of all kinds to meet related technical instruction standards.

Once we assess the different offerings, we aggregate providers with similar classes and objectives and bundle them into courses with descriptive titles. We **create learning objectives** based on what we have seen across the spectrum of offerings.

After setting the courses and learning objectives, we then estimate the hours needed in classroom instruction for the apprentice to reach the journeyworker level. If we use a specific college degree program, hours are determined based on the degree requirements. If we are not using a degree program, we calculate how much time a provider would spend teaching each course. We recommend an estimated range of hours. An employer could choose to require more time on classroom instruction in any occupation but is generally required to meet the minimum recommended 144 hours of instruction per year of the apprenticeship.

As a final step, we ensure that everything in the curriculum outline **aligns with the competencies in the work process schedule**. Sometimes there are minor differences, as we want to ensure that the competencies and curriculum goals will bring a worker to full competence in the occupation and are realistic for an entry-level worker. Employers and sponsors can then use this curriculum outline to discuss with educational institutions and partners selected to provide related technical instruction.

Publication and Dissemination

After vetting and revising the frameworks, our team submits the framework to the DOL. As a final step, the frameworks are **published on Urban's website** following any revisions from the DOL.

BOX 6

Steps for Publication and Dissemination

1. Submit frameworks for review to the DOL.
2. Make final revisions.
3. Publish the frameworks on the DOL and Urban Institute websites.
4. Conduct outreach to employers and other apprenticeship stakeholders.

Once the frameworks are published, Urban disseminates them to employers and **the larger apprenticeship ecosystem.** Dissemination is a crucial part of the process, as it links the creation of our frameworks and scaling apprenticeship more broadly. We also distribute them via Urban newsletters, which include recipients such as workforce development professionals, education and employer groups, policymakers, and other researchers. Our network of apprenticeship and industry experts spread the

word about the frameworks to employers or other sponsors interested in registering apprenticeship programs in that occupation. Further, webinars and panels hosted by Urban or others help reach new audiences to share the benefits of registered apprenticeship and the available frameworks that make starting high-quality programs easier.

Use and Applications

The national occupational frameworks provide an essential resource for employers and sponsors seeking to register apprenticeships. The federal registration process requires that all new apprenticeship programs build a set of occupational standards against which to measure the apprentice's progress.[13] The NOFs provide a high-quality product from which sponsors can register programs. Further, NOFs require significantly less effort for employers to develop their curriculum, which saves time and resources in the design and registration phase. NOFs can also be used to track apprentices' progress during the program, with mentors or supervisors noting performance against the job functions and competencies in the work process schedule and through the instruction outline courses.

Several sponsors and employers use Urban's previously developed CBOFs to start apprenticeship programs, which are similar in purpose. Urban's frameworks in tech occupations have gained traction in the industry. For example, several large tech companies have used Urban's UX designer and software developer occupational frameworks, customizing them for their own needs. Other employers have used our IT generalist, cybersecurity, and data analyst frameworks.

For example, Onramp, a national apprenticeship organization, used Urban's software developer framework to start a registered apprenticeship program. Onramp is a workforce development company focused on developing diverse talent in the tech industry.[14] Odette Nemes, head of growth at Onramp, said that before engaging with Urban Onramp had worked to start and support apprenticeship programs in tech for four years. Their apprenticeships were successful, with 92 percent of apprentices eventually converting to full-time employees. However, Onramp's programs were not yet registered, and some tech companies preferred a registered program. This issue kept Onramp from closing major partnership deals despite their successes.

Onramp worked with Urban to register their first apprenticeship program for software developers. They started with the software developer CBOF and customized it to fit their needs. In reviewing each competency, they matched the standards to training materials and information from the companies they worked with to ensure the competencies made sense for their model. As a result, Onramp's software development program was officially registered in March 2022, and they closed a deal with a major tech company because they implemented a registered apprenticeship program. The funding they received from having a registered program was also essential to their growth and future business opportunities. None of these benefits would have been possible without registration and an occupational framework that acted as their crucial starting point.

Future Directions

Registration confers essential benefits on apprenticeship programs, including the portable value of a DOL or state credential, additional funding, and third-party validation (Lerman et al. 2009). Urban's National Occupational Framework development is an important step in supporting the design and registration of programs. With the creation of frameworks for additional occupations, there is an opportunity to expand and scale apprenticeships, especially in emerging sectors.

We have now completed the first year of a four-year project. Moving ahead, we plan to create occupational frameworks across various industries for a total of 80 occupations across all five years. In addition to developing these frameworks, we will support registered apprenticeship standards creation in several ways. We are conducting outreach to cultivate stakeholder partnerships, developing materials to guide framework users, writing reports to document processes and best practices, and disseminating our frameworks broadly. These efforts represent a crucial step toward scaling registered apprenticeships in the US.

Notes

[1] For more about the AOSC, see the website: https://www.urban.org/policy-centers/center-labor-human-services-and-population/projects/registered-apprenticeship-occupations-and-standards-center-excellence (accessed February 20, 2023).

[2] Diana Elliott and Batia Katz, "Three Lessons from the Swiss Apprenticeship Model to Inform Our Post-COVID-19 Recovery," *Urban Wire* (blog), July 20, 2020, https://www.urban.org/urban-wire/three-lessons-swiss-apprenticeship-model-inform-our-post-covid-19-recovery.

[3] "Trailblazer Groups," Institute for Apprenticeships and Technical Education, accessed February 20, 2023, https://www.instituteforapprenticeships.org/developing-new-apprenticeships/trailblazer-group/.

[4] For more about TX FAME, see their website: https://www.txfame.com/ (accessed February 20, 2023).

[5] Programs are individualized in the sense that individual employers often register programs on their own. However, about 54 percent of the apprenticeship system is union-based. These programs are built largely through National Guideline Standards created by joint labor management groups. For more on union-based apprenticeship standards, see: https://www.urban.org/research/publication/union-based-apprenticeships-young-people (accessed February 20, 2023).

[6] For more information on O*Net, see the website: https://www.onetonline.org/ (accessed February 20, 2023).

[7] "What is Developing a Curriculum (DACUM)?," Eastern Kentucky University Facilitation Center, accessed February 20, 2023, https://facilitation.eku.edu/what-developing-curriculum-dacum.

[8] Erik van Vulpen, "Job Analysis: An HR Practitioner's Guide," Academy to Innovate HR, accessed February 20, 2023, https://www.aihr.com/blog/job-analysis/.

[9] For more information about the CBOF project, see the website: https://www.urban.org/policy-centers/center-labor-human-services-and-population/projects/competency-based-occupational-frameworks-registered-apprenticeships (accessed February 20, 2023).

[10] The current fastest-growing occupations are listed in the Bureau of Labor Statistics's "Occupational Outlook Handbook": https://www.bls.gov/ooh/fastest-growing.htm (accessed February 20, 2023).

[11] DOL is currently developing a new process for determining the apprenticeability of new occupations, but they agree that our process meets their current requirements for apprenticeability.

[12] "Paralegal and Legal Assistant National Occupational Framework," Registered Apprenticeship Technical Assistance Centers of Excellence, June 2021, https://www.urban.org/sites/default/files/2022-12/Paralegal%20Legal%20Assistant%20National%20Occupational%20Framework.pdf.

[13] For more information on building standards for registration, see the DOL website: https://www.apprenticeship.gov/employers/registered-apprenticeship-program/register/standards-builder (accessed February 20, 2023).

[14] For more about Onramp, see their website: https://www.onramp.io/ (accessed February 20, 2023).

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About the Authors

Batia Katz is a research analyst in the Center on Labor, Human Services, and Population at the Urban Institute, where she researches workforce development, job quality, and apprenticeship. Katz's previous research experience includes studying the science labor market, the impact of personality traits on employment outcomes, and gender and family in the workforce. Katz graduated with high honors from Haverford College, where she earned a BA in economics.

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