



Industry-Driven Apprenticeship What Works, What's Needed

TAMAR JACOBY and ROBERT I. LERMAN

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ABOUT THE AUTHORS

Tamar Jacoby is president of Opportunity America, a Washington-based nonprofit working to promote economic mobility—work, skills, careers, ownership and entrepreneurship for poor and working Americans. A former journalist and author, she was a senior writer and justice editor at *Newsweek* and, before that, the deputy editor of *The New York Times* op-ed page. Her articles have appeared in *The New York Times*, *The Wall Street Journal*, *The Washington Post*, *The Weekly Standard* and *Foreign Affairs*, among other publications. She is the author of “Someone Else’s House: America’s Unfinished Struggle for Integration” (Free Press, 1998). Her edited volumes include “Reinventing the Melting Pot: The New Immigrants and What It Means To Be American” (Basic Books, 2004) and “This Way Up: New Thinking About Poverty and Economic Mobility” (American Enterprise Institute, 2017). Since 2008, she has also been president of ImmigrationWorks USA.

Robert Lerman is an institute fellow at the Urban Institute. He is also professor emeritus of economics at American University and a research fellow at the Institute for Labor Economics (IZA) in Bonn, Germany. His published research covers employment issues, earnings and income inequality, family structure, income support and youth development, especially as they affect low-income populations. His principal current focus is on skills, employer training and apprenticeship programs in the United States and abroad. Currently the principal investigator of US government evaluations of apprentice demonstration grants and of a project building occupational competency-based frameworks, he is the founding president of the American Institute for Innovative Apprenticeship and serves on the board of the International Network for Innovative Apprenticeship. In the 1970s, he worked as staff economist for the Congressional Joint Economic Committee and the US Department of Labor.

ABOUT THE ORGANIZATION

Opportunity America is a Washington-based nonprofit promoting economic mobility—work, skills, careers, ownership and entrepreneurship for poor and working Americans. The organization’s principal activities are research, policy development, dissemination of policy ideas and working to build consensus around policy proposals.

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Executive summary

Changing technology, growing skills mismatches and weak wage growth are drawing attention to the need for more sophisticated, more relevant career and technical skills, especially for workers who lack a four-year college degree. Among the most effective ways to raise skill levels and prepare workers for rewarding careers is with apprenticeships that combine classroom learning and paid on-the-job experience, teaching skills in demand across an industry. Yet it has proven surprisingly difficult to scale apprenticeship in the United States.

In 2018, just three-tenths of one percent of US workers were enrolled in civilian apprenticeship programs—about 450,000 apprentices, compared to nearly 20 million students in degree-granting postsecondary institutions.

President Donald Trump aims to dramatically increase this number by encouraging industry groups to develop and oversee programs, including in sectors that have not traditionally relied on apprenticeship training.

In doing so, he will tap into a long American tradition of employer-sponsored, apprenticeship-like training that is not registered with state or federal agencies.

What evidence we have points to a vast, varied terrain of independent, employer-sponsored apprenticeship.

Newly available government data suggests that as many Americans working today may have come up through independent earn-and-learn training as through registered apprenticeships. Like registered programs, independent offerings appear to be common in the construction trades, but also in an array of other industries. Some are fostered and supported by national industry associations; others arise spontaneously, at the initiative of an enterprising employer.

Yet little is known about these programs—how widespread they are, how effective or whether and how they maintain quality standards absent regulation by the government.

This study begins to address that gap.

We mine newly available data from the US Department of Education’s 2016 Adult Training and Education Survey (ATES) on nondegree credentials and work-experience programs for adults—data that suggests independent earn-and-learn may be considerably more widespread than previously understood.

We draw on a half-day convening of some 20 employers and employer association executives with firsthand knowledge of scores of independent programs and the employer-developed skills standards on which they are based.

We have compiled four intensive case studies of quality unregistered apprenticeship programs in industries where we believe the approach may be particularly prevalent: construction, advanced manufacturing, health care and automotive maintenance and repair.

The paper also addresses policy, building on our empirical findings and lessons from other countries with robust apprenticeship systems to reflect on the Trump administration’s initiative to scale what it calls “industry-recognized apprenticeship programs” (IRAPs).

Our five principal policy recommendations:

A true alternative. Few countries have succeeded in growing apprenticeship nationwide without establishing it as a reputable and effective “brand”—a true alternative to university, appealing to talented young people and as if not more likely than traditional academic education to lead to a respected, well-paying job.

Some countries, such as Germany, have long-established apprenticeship brands. England created one over the past decade. National funding spurred a dramatic expansion of apprenticeship opportunities, and the resulting programs catapulted thousands of trainees to better jobs with better pay.

The US too should work to create a brand recognizable and respected by employers and aspiring young people—call it “American Apprenticeship.”

Skills standards. Equipping workers with skills in demand across an industry requires standardized occupational frameworks—curriculum to structure both classroom instruction and on-the-job training.

Ready-made standards can greatly reduce the complexity of starting a new program. But developing frameworks is costly and time-consuming.

Some countries rely on a highly centralized approach that looks to government or a single public-private agency to craft standards. An alternative increasingly popular in the US—and aligned with the administration’s vision—relies on independent industry groups that draw on input from employers across the sectors they serve.

We propose to combine these approaches in a two-track system that allocates modest funding for industry-based certifiers and for a centralized standards institute. We recommend experimenting with both approaches and, in time, evaluating their effectiveness.

Government funding. The US cannot hope to build a respected apprenticeship brand or expand it on the scale that’s needed without funding. Employers and employer associations must play a part, developing training programs, structuring on-the-job learning, training trainers and paying apprentices’ wages. But there is also a role for government.

Several states have tried using tax credits to incentivize employers to offer programs, and Congress has considered adopting a similar approach.

Another option: in many countries with robust apprenticeship systems, public and private sectors split the cost. Employers provide on-the-job training and pay apprentices’ wages, while government foots the bill for off-job instruction, whether at a college, a nonprofit organization, a for-profit entity or an employer-sponsored training center.

We recommend that government pay for the off-job component of registered and unregistered apprenticeship programs, and we propose financing this subsidy with public funds currently devoted to less effective forms of workforce education and training.

Marketing. Encouraging companies to develop new training programs and hire apprentices is not easy. Most employers have little knowledge of apprenticeship. Few top executives focus on how their firm handles human resources. Unless funding for off-job training is linked with substantially improved efforts to sell and organize apprenticeships, take-up by employers is likely to be limited.

Among the best ways to fill this gap is with a third-party “intermediary” that works to persuade employers of the benefits of apprenticeship, then collaborates with the firm to organize a training program. Many different kinds of organizations play this role: nonprofit groups, private training companies, industry associations, community colleges and state agencies, among others.

Policymakers—state and federal—should encourage industry groups and other organizations to take on the job by providing financial incentives.

Outcomes metrics. As with any brand, the success of American Apprenticeship will depend on its reputation for quality.

Employers, educators, students and policymakers will expect programs to build skills of value in the marketplace. And only programs that meet this exacting standard should expect government subsidies. The question for policy: how to assess quality?

One possible approach relies on end-of-program student assessments administered by third parties—state agencies, industry associations or approved accrediting bodies. Another option is to measure employment outcomes—post-program, training-related job placement and wage gains.

Few registered apprenticeship programs guarantee quality with either end-of-program assessments or employment metrics. And few countries have experience using performance indicators to assess company-run programs, particularly smaller programs. This is an area where there is more work to be done. We cannot ask taxpayers to pay for expanding apprenticeship without effective quality assurance.

Introduction

Changing technology, growing skills mismatches and weak wage growth are drawing attention to the need for more sophisticated, more relevant career and technical skills, especially for workers who lack a four-year college degree. A national consensus is emerging: among the most effective ways to raise skill levels and prepare workers for rewarding careers is with apprenticeships that combine classroom learning and paid on-the-job experience, teaching skills in demand across an industry.

Some of the nation's most influential CEOs have endorsed apprenticeship. Many if not most career educators recognize it as a gold standard for postsecondary workforce development. Two recent presidents, Barack Obama and Donald Trump, have championed the model and committed resources—both funding and political capital. Yet it has proven surprisingly difficult to scale apprenticeship in the United States. In 2018, just three-tenths of one percent of US workers were enrolled in civilian apprenticeship programs—about 450,000 apprentices, compared to nearly 20 million students in degree-granting postsecondary institutions.¹

There are no doubt many reasons why this is so. Parents and students focused on degrees don't grasp the value of career preparation. Public funding for traditional education far outstrips spending for any kind of workforce development. Launching an apprenticeship program is expensive and time-consuming for employers. Many don't understand the model or where to turn for help in establishing a program. And the obstacles are particularly steep for smaller companies that lack dedicated staff to handle human resources.

Yet when asked why they do not offer earn-and-learn programs, some employers give a different answer: what they see as the burden of registering them with state or federal agencies—currently a requirement if the training is to be formally considered an apprenticeship and eligible for the benefits, including some funding, that come with that designation.

Intended originally to ensure program quality and protect workers, in many instances, registration has become a bureaucratic gauntlet. Entities that sponsor programs—employers, educators and others—must

develop detailed plans and submit them for approval by a government agency. The process can take months, or longer.

Many employers feel it ties their hands, reducing their flexibility to train as they see fit on a schedule that works for them. Others know little about apprenticeship or the registered apprenticeship system.

Employers, educators and policy-makers recognize apprenticeship as a gold standard for postsecondary workforce development. Yet it has proven surprisingly difficult to scale apprenticeship in the US.

Researchers and policymakers have long suspected that many employers in a range of industries offer apprenticeship-like training that they choose not to register. Yet little is known about those offerings—either their quality or how widespread they are.

This study begins to address that gap.

We mine newly available data that suggest as many Americans working today may have come up through independent earn-and-learn training as through registered apprenticeships.

We draw on a half-day roundtable convening of some 20 employers and employer association executives with firsthand knowledge of scores of independent programs and the employer-developed skills standards on which they are based.

We have compiled four intensive case studies of quality unregistered apprenticeship programs in industries where we believe that approach may be particularly prevalent: construction, advanced manufacturing, health care and automotive maintenance and repair.

The paper also addresses policy. The Trump administration is eager to expand both registered apprenticeship and unregistered earn-and-learn training—what it calls “industry-recognized apprenticeship programs” (IRAPs). The US Department of Labor has convened a task force on IRAPs and issued a technical guidance for state officials—with more steps expected in months ahead.

Newly available data suggest that as many Americans may have come up through independent earn-and-learn training as through registered apprenticeships.

This paper builds on our empirical findings and lessons from other countries with robust apprenticeship systems to reflect on the administration’s approach and offer recommendations for policy.

How much unregistered apprenticeship training exists in the US today? Can we use policy and government funding to expand independent offerings nationwide, perhaps on a significant scale? Can these programs be incorporated into a broader national system that rivals traditional academic education as an appealing pathway for students? And if the nation decides to devote resources, what steps can be taken to guarantee the quality of independent programs—to ensure that training prepares workers with the skills they need to succeed on the job?

We see independent earn-and-learn training as a great, untapped opportunity: an effective and, for employers, relatively accessible way to upskill workers, improve the quality of jobs and increase productivity, while significantly expanding apprenticeship in the US.

The goal of this paper is to explore this potential and propose how the nation can tap it for the benefit of workers and employers.

AMERICAN APPRENTICESHIP

A new brand that includes independent programs

By Robert I. Lerman and Tamar Jacoby

Like Barack Obama before him, Donald Trump has made apprenticeship the centerpiece of his approach to workforce development. The administration aims to dramatically scale earn-and-learn training nationwide by encouraging employers and industry groups to develop and oversee programs. Two critical questions for the future: how to guarantee quality while rapidly expanding offerings and how to create a national brand – a recognized and respected alternative to a bachelor’s degree.

AMERICAN APPRENTICESHIP

A new brand that includes independent programs

Apprenticeship is a proven, cost-effective way to help individuals learn skills and boost productivity. Yet the US has largely failed to take advantage of the potential of apprenticeship. Commercial and industrial construction contractors have long relied on earn-and-learn programs to train a skilled workforce—electricians, plumbers, carpenters, roofers and bricklayers. But the US lags behind many other countries in embracing the earn-and-learn model—not just Austria, Germany and Switzerland, but also Australia, Canada and England. As of 2018, nonmilitary apprenticeships registered with the US Department of Labor numbered about 450,000, just three-tenths of one percent of the US workforce.² In contrast, in Australia, Canada and England, the average share is roughly nine times that percentage.

The conventional wisdom in the US is that employer-provided training in general and apprenticeship in particular are minimal and declining.³ But in fact very little is known about what's offered at companies across America.

The Bureau of Labor Statistics has not conducted a dedicated survey asking US employers about their training programs since 1995. Data on registered apprenticeships are readily available, but no data have been collected on employer-sponsored apprenticeships not registered with a state or federal apprenticeship agency. Researchers and policymakers have long known that such programs exist: independent, employer-provided training initiatives that combine academic instruction with paid, work-based learning and teach skills in demand across an industry. But there has been little effort to investigate or quantify these offerings.

The four case studies in this report document the high quality of selected industry-based, bottom-up training efforts that embody the key components of apprenticeship but are not registered with a state or federal apprenticeship

agency. Employers in the manufacturing, construction, health care and auto maintenance and repair industries have developed promising solutions, upskilling workers to meet the increasingly technical demands of middle-skill jobs. All the programs profiled combine academic instruction with work-based learning. Apprentices are paid for their work and, even as they train, make essential contributions to production.

It's difficult to know how widespread such company-backed efforts are, but data from the 2016 Adult Training and Education Survey (ATES) offer some insight into the likely scale of apprenticeships not registered with a state or federal agency.⁴

In fact, very little is known about what kind of earn-and-learn training is offered at companies across America.

Several questions in the survey ask whether respondents have completed apprenticeships. Individuals are asked to answer "yes" or "no" to the following statements: "I received journeyman status at the end of an apprenticeship" and "I got a state or federal apprenticeship number." Our interpretation of the responses: people with government-issued apprenticeship numbers have almost surely been enrolled in registered apprenticeships, while those who say they have earned journeyman status could have undergone registered or unregistered training.

If this assumption is correct, tabulations suggest that about the same number of American workers have participated in unregistered earn-and-learn training as in registered apprenticeship programs. In 2016, 1.4 million people reported having had a state or federal apprenticeship number, while

1.5 million indicated that they had earned journeyman status but had no apprenticeship number of the kind they would have been assigned in a registered program. With some 50,000 to 60,000 workers completing registered apprenticeships each year, the cumulative number of 1.4 million looks plausible.

Neither the public nor policymakers showed much interest in apprenticeship of any kind—registered or unregistered—from the 1970s through the early 2000s. Few people saw the need for intensive skills training or believed it was possible to expand offerings on a national scale. But the conversation has changed dramatically in the last decade.

First South Carolina and then England proved it was possible to rapidly expand apprenticeship.

First South Carolina and then England proved it was possible to rapidly expand offerings. Two presidents have embraced the cause and taken steps to promote the growth of apprenticeship. Most recently, President Donald Trump called for a “moonshot” to create four million to five million new training slots. He also asked Congress for increased funding and created a task force that recommended a number of changes designed to expand apprenticeship in the US.

The president’s Task Force on Apprenticeship Expansion recognized that registered apprenticeships constitute only a subset of earn-and-learn training and that the process of registering a program can be a long, complex undertaking. The group pointed to a continuum of existing earn-and-learn programs—from less to more highly structured—all of which have value and should be encouraged. And it recommended experimenting with an alternative method of approving what it called Industry-Recognized Apprenticeship Programs (IRAPs).⁵

The new approach would empower independent accrediting bodies to approve unregistered programs developed by employers and other groups as long as the training led to recognized industry credentials. The independent accreditors would provide or oversee the content of training programs and ensure that they met quality standards. At the same time, the task force also recommended modernizing the registered apprenticeship system, in effect condoning a two-track system.

The task force offered a set of intriguing suggestions for expanding apprenticeship and encouraging the growth of independent apprenticeships, especially competency-based programs.

Yet it provided no new research on existing unregistered apprenticeships. It did not explore how other countries have expanded or upgraded their apprenticeship systems and offered no lessons learned for the US. Most important, it provided no framework for incorporating independent apprenticeships in a broader national system—no vision of how the government should spur the creation of new programs or oversee them to ensure quality control.

The purpose of this paper is twofold: first, to synthesize some lessons learned about industry-based, apprenticeship-like programs not registered with state or federal agencies and second, to offer a framework for incorporating these programs into a broader, more robust US apprenticeship system.

The first section of the paper explores the economic context and rationale for scaling apprenticeship nationwide. Next, drawing on case studies and a roundtable discussion with company managers, we describe some 20 independent apprenticeship programs: why employers offer them, who develops and provides skills standards, how programs combine classroom instruction with work-based learning and what credentials they offer. Third, we consider how to incorporate these and other independent offerings into a broader apprenticeship system.

How do we expand apprenticeship and guarantee quality instruction while maintaining the flexibility so prized by employer sponsors of unregistered programs? We believe there are important lessons to be learned from existing initiatives and from the experience of other countries that have succeeded in recent years in expanding apprenticeship.

THE NEED

Jobs are plentiful in today's labor market, as unemployment rates fall to record lows. After a slow economic recovery, the employed share of 25- to 54-year old men and women has recovered to previous highs. But there remain serious problems with wages, careers and the future of work.

Wage stagnation was no doubt worsened by the country's long, unequal recovery from the Great Recession, but it is not a new trend. Men's long-term earnings have stagnated with each passing cohort from those entering the workforce in 1967 to those entering in 1983. (Women's earnings increased 59 percent over this period, but from a low base.)⁶

Every political faction has a different explanation for labor market problems—bad trade deals, declining manufacturing jobs, the outsourcing of jobs, an uncompetitive tax and regulatory environment and lax immigration policy, among other causes. But research suggests that wage stagnation is driven largely by low starting wages, a pattern that suggests weak transitions from school to the labor market.⁷

Demographics and the rising cost of fringe benefits such as health insurance and paid leave account for a modest share of the wage slowdown. But workers with less than a bachelor's degree have lost ground to college graduates in recent decades.⁸ The dearth of promising career prospects falls hardest on middle-skill workers without a four-year college degree. Over one-third of men age 25 and older with no degree were not working in mid-2018.

Surprisingly, despite these problems, workers report high levels of satisfaction with their jobs—a finding unchanged over several decades. In August 2017, 52 percent of workers reported they were “completely satisfied” with their jobs; another 40 percent said they were somewhat satisfied.⁹

At the same time, all workers regard salary and pay as important, and nearly 43 percent reported they were underpaid for the work they do. Another cause for continuing concern: more than 40 percent do not think of their current jobs as careers. They see their work as “just a job to get you by.”¹⁰

The macroeconomic picture is also far from rosy. Since 2010, productivity growth increased by just 0.8 percent per year, far below the 2 percent per year rate since 1960. In 2018, productivity grew by 1.6 percent, and unemployment rates are now below 4 percent, so the US may begin to experience broad, sustained wage growth. But it's also possible that wage increases will be limited and employers will continue to face skill mismatches.

How do we expand apprenticeship and guarantee quality instruction while maintaining the flexibility so prized by employers who sponsor unregistered programs?

In another troubling trend, a declining share of young people have any work experience and, as a result, no way to develop essential workplace skills. The employment rate for 16- to 19-year-olds dropped from nearly 50 percent in 1979 to about 30 percent in 2018. Even in today's high-employment economy, only about 67 percent of 20- to 24-year-old men are working, down from about 80 percent in 1979. Forty percent of black 20- to 24-year-old men lacked jobs in March 2018, at a time when the overall unemployment rate was below 4 percent.¹¹

The upshot: many young people have no work experience and few employability skills—no experience with listening, responsibility, teamwork or interacting with other workers and supervisors.

Also problematic is the weakness of US career education—secondary, postsecondary and job training systems that prepare students for well-paying jobs and rewarding careers. Despite increased years of schooling, growing government spending and mountains of student debt, US employers report troubling skills mismatches, especially in technical fields. One survey of manufacturing companies found that 84 percent of executives agree “there is a talent shortage in US manufacturing,” and they estimate that “six out of 10 open skilled production positions are unfilled due to the shortage.”¹²

This gap is not driven by a shortfall in the general skills that come with a college education. On the contrary, what’s missing are primarily occupational and employability skills—communication, teamwork, problem solving, reliability, responsibility and the ability to allocate resources efficiently. Strikingly, in hard-to-fill jobs, firms generally prefer relevant work experience over a bachelor’s degree.¹³

In-demand skills are increasingly complex and technical. Practical problem solving and teamwork are increasingly essential in all jobs.

In-demand skills are growing increasingly complex and technical. Practical problem solving and teamwork are increasingly essential in all jobs. Yet policymakers and the public remain all but exclusively focused on traditional academic education and test scores.

Also troubling, many young people are disengaged from formal schooling. High school outcomes are weak: more than half of graduates who enroll in two-year colleges require remedial

coursework.¹⁴ Community college completion rates are low. Among students who started a two-year program in 2012, only 22 percent overall—and only 12 percent of black students—graduated within three years.¹⁵

Evidence suggests that apprenticeship programs are effective—and cost-effective—in engaging young people in ways that improve skills, especially occupational and employability skills. Yet the US lags far behind other developed countries—Germany and Switzerland, but also Australia, Canada and England—in creating apprenticeships. In these countries, apprentices constitute 2.5 to 3 percent of the labor force—about nine times the rate in the US.¹⁶

Apprenticeships work especially well for occupations that do not require a bachelor’s degree but demand extensive work-based learning or specialized talent—creativity, responsibility, salesmanship and occupation-specific technical expertise. One good example of such a highly paid noncollege occupation: police supervisors. Although 60 percent of workers in the field lack bachelor’s degrees, their median annual earnings are \$78,000—compared to an average of \$69,000 for occupations where 50 percent or more of the workers are college graduates.¹⁷

Similar occupations—where most workers lack bachelor’s degrees but earn above-average wages—exist in a wide range of fields. Among them: police officers, court reporters, aircraft mechanics, construction managers, buyers and purchasing agents, lodging managers, appraisers, engineering and industrial technicians, and operators of gas plants.¹⁸

Finally, apprenticeships work to upgrade jobs, not just teaching skills but also influencing how positions are structured and limiting the mismatch between what workers learn and employers need. Differentials within occupations account for more than 60 percent of the total wage gap between those at the 25th and 75th percentiles, and apprenticeship can help bridge the difference by raising worker productivity, especially in fields that do not require a bachelor’s degree.

Increasing the availability of apprenticeships would increase youth employment and wages, broaden access to rewarding careers, ease the transition from school to work, teach the skills companies value and increase economic productivity, among other positive returns for employers and workers.

One way to achieve scale is to build on existing company training that incorporates the core elements of traditional apprenticeship but is not registered with a state or federal agency. The next section reports on how some such programs work and why they should be considered part of the nation's apprenticeship landscape.

THE LANDSCAPE OF INDEPENDENT APPRENTICESHIP

In the absence of reliable data on the scope and scale of unregistered earn-and-learn skills training in the US, this paper offers a preliminary glimpse of the landscape—a descriptive scan of a few apprenticeship-like programs offered at companies and colleges in several states.

Our information about what we believe to be an extensive unknown territory was gathered in two ways: four case studies and a roundtable discussion. Each of the studies was based on a daylong site visit and several additional phone interviews—input from the employer offering the training, the educational institution providing related instruction or the employer association responsible for the skills standards on which the program is based, as was relevant in each instance. The half-day roundtable, held at Jefferson Community and Technical College in Louisville, Kentucky, on March 27, 2018, brought together 11 employers or employer groups that offer unregistered earn-and-learn training and six industry associations that develop skill standards and issue industry-recognized occupational certifications.¹⁹

This is not a large sample. It may or may not be representative, and no informal scan can substitute

for a large-scale quantitative study. But together, the case studies and roundtable discussion offer a window on unregistered earn-and-learn training in four of the industries where it appears to be most common: construction, manufacturing, health care and automotive maintenance and repair. Our double-barreled inquiry produced detailed information about more than 20 programs at a dozen companies. And nationwide, the employer associations that attended the roundtable determine content and standards for thousands of workforce programs preparing tens of thousands of trainees for highly skilled, high-paying jobs across the US.

A definition

The programs described come in virtually all shapes and sizes. Trainees range from high school students seeking a glimpse of career opportunities in automotive maintenance and repair to midcareer registered nurses seeking specialized skills to function in a hospital operating room. Several of the employers surveyed—Toyota Motor Manufacturing Kentucky, Fluor Corporation and Fairview Health Services—are among the largest in their states. Others are tiny: just a handful of employees and one or two trainees every year or few years. The earn-and-learn programs they offer also vary widely: in length, structure—the mix of classroom and hands-on instruction—when and how trainees are assessed and what credentials, if any, they earn as a result of training.

What all the programs examined have in common: they draw on the classical European apprenticeship model but choose to implement what they borrow in their own unique way, unsanctioned by state or federal government and forgoing the privileges generally available to registered earn-and-learn training.

For the purpose of this study, we defined unregistered or “independent” apprenticeship as a workforce development program that combines robust, structured on-the-job learning with robust, structured related instruction in a classroom or lab setting, teaching portable skills in demand

industrywide. We chose not to specify duration. Programs vary so widely in what exactly they call instruction and how they distinguish on-the-job learning from permanent employment that we found it difficult to draw a clear line. But all the programs surveyed offered at least a year of some kind of instruction or training, and in many if not most cases, it took trainees several years to reach journey-level in their chosen occupation.

Flexibility to meet business needs

The employers surveyed were all but unanimous in explaining why they chose to offer an unregistered earn-and-learn program: the flexibility it gave them to meet rapidly changing business needs.

An industrial construction contractor that builds bridges, refineries, power stations and wind farms, among other projects, in more than 40 states, Cianbro offers a telling example. In 2008, the Maine-based firm bid on and won a job building giant pipe modules—50 complex, precisely engineered units, each one bigger than a house—for installation at an oil refinery in Port Arthur, Texas. It was a major contract, time was of the essence, and Cianbro needed to hire workers fast, adding some 250 pipe welders and 150 pipefitters in just three to five months.

Many people in the industry told the contractor it couldn't be done—after all, a traditional welder or pipefitter apprenticeship lasts four to five years. Cianbro was undeterred. Its insight: it didn't need to teach trainees everything they would ever need to know about welding or pipefitting to put them to work building modules—just enough to do the job at hand. The rest could come later.

The builder compressed and rearranged industry-standard curriculum modules. It offered classroom and hands-on instruction consecutively rather than simultaneously: first, eight to 12 weeks of training in a simulation lab, then and only then, into the field for on-the-job experience. Trainees, most of whom had little or no construction experience, earned a competitive wage in the classroom as well as on the job.

Most trainees were working as functioning members of a crew within a few months, and they were promoted to journey-level as soon as their supervisor deemed them competent—also, generally, in a matter of months. After the pipe modules shipped to Texas, many trainees returned to class to complete additional units of curriculum and sit for assessments leading to professional certifications respected across the construction industry.

What Cianbro executives learned from the experience: it's possible to tailor the traditional apprenticeship model to suit their own needs, shortening, focusing and restructuring instruction if appropriate to train workers for a pressing project. No one at the company questioned the value of combining class or lab learning with on-the-job experience—that was a given. But the builder needed a nimble, flexible, customized approach and found it could meet its timely business needs without sacrificing quality.

Independent apprenticeship programs come in all shapes and sizes.

Virtually all the companies surveyed for this study offer similar explanations for choosing unregistered earn-and-learn training. Technology is changing. Skills shortages are pressing. Firms need to train or retrain workers fast. The jobs on offer are more specialized than the relevant registered apprenticeship curriculum—industrial pipefitters don't need to learn plumbing, for example. Or the firm needs multiskilled technicians, proficient in several trades—in advanced manufacturing, for instance, knowledge of electrical and mechanical systems.

The common theme: employers want to be able to adapt training to their own needs. This doesn't always lead to an unregistered program. In some situations, business needs—often, requirements for federal contracting or state licensure laws—

argue for registered apprenticeship. And most employers interviewed for the study maintain a mix of programs, some registered, some unregistered.

For the same reason and not surprisingly, all the companies and associations that participated in this study favor competency-based training programs over those measured by time—time spent in class or time on the job. “Some people learn slowly, others more quickly,” one manufacturing employer explained. “How can you say that 144 hours of instruction is going to work for everyone in the room?” “Speed,” another manager offered. “In my business, the name of the game is speed. We need to be able to adjust training to the speed of business.”

Skills standards

At the same time, much as they prize flexibility, all the employers in the study felt it was imperative to structure their programs around something constant and reliable: the course content provided by externally developed occupational skills standards.

No two firms and no two training programs incorporate the standards in exactly the same way. Fixed, external standards are not incompatible with flexibility. But no employer started from scratch to develop a unique, standalone course of instruction. Each had a touchstone—an external authority of some kind—and all of their programs rely to some extent on borrowed structure and curriculum.

In countries with robust traditional apprenticeship systems—Germany and Switzerland, for example—the government coordinates skills standards and curricula. But perhaps not surprisingly, in the US, the job falls primarily to voluntary associations—in most cases, an industry trade group.

The employers who participated in the roundtable explained how it works. Four were industrial construction firms, and together they and Cianbro maintain more than a dozen unregistered earn-and-learn programs. The offerings vary widely—in

duration, sequencing and the type of employee served. But all rely on the same standardized, industry-recognized curriculum—a set of courses developed by the National Center for Construction Education and Research (NCCER).

The NCCER curriculum catalogue covers virtually every craft in demand among industrial and commercial construction contractors: nearly 60 different trades from drywall to welding to mobile crane operation, most of them offered at several levels, from beginner to master craftsman. And NCCER is not unique. The Automotive Service Excellence (ASE) Education Foundation plays a comparable role in the automotive industry. CompTIA, once known as the Computer Technology Industry Association, serves information technology (IT) employers. Indeed, many if not most skilled professions in the US look to a similar standard-setting body.

All the programs examined rely to some extent on borrowed structure and curriculum.

Some, like NCCER, cover close to an entire industry. Others focus on a single, broadly applicable skill such as welding or metalworking. Still others serve a subsector of a larger field—roofers or operating room nurses. But most of the nationally recognized groups work in roughly the same way: they set skills standards empirically with input from employers and others across the sector they serve.

It’s a complex, expensive process. The first step is assembling a cadre of what are generally known as “subject matter experts”: contractors, owners, managers, trainers, working technicians and others from all the different businesses that make up the industry. In the automotive service sector, for example, this includes vehicle manufacturers, suppliers, dealerships, aftermarket businesses and service franchises, among others.

The next step: these experts work together in small groups, breaking down each occupation—whether welder or software developer or operating room nurse—into a set of bite-sized tasks or functions. The product—the resulting catalogue of essential skills—is an occupational skills standard.

The employers at the table agreed most real learning takes place on the job.

There are several ways for an organization to transmit these standards back to employers in their industry. Some translate the job profiles into curriculum. Others accredit trainers and training providers. Most common and arguably the most effective way to set standards for an industry rather than just one company, virtually all the standard-setting bodies develop and administer skills assessments—sometimes on-paper tests, sometimes performance-based, sometimes a combination. Employers and educational institutions craft curricula that prepare trainees to sit for these assessments, and those who pass the tests earn credentials—occupational certifications—recognized across the sector.

The resulting industry credentials are not a perfect tool. The American National Standards Institute estimates that more than 4,000 certifying bodies issue occupational certifications, but according to the analytics firm Burning Glass Technologies, only a few hundred credentials are in demand among employers.²⁰ And according to many hiring managers, even the most popular are more a floor than a ceiling: more often a measure of basic knowledge than of technical mastery or finesse.

Still, the employers around the table left little doubt: most would have been unable to launch a training program without the structure and content provided by externally developed skills standards. And most looked to an industry association to provide the framework they needed.

On the job

The employers around the table also agreed about the second pillar of their earn-and-learn training programs—the on-the-job component. There was no question at any firm: all felt this was the more important of the two legs. Trainees need some time in class or lab, employers acknowledged, but most real learning takes place on the job.

This view was reflected in the training offered at most of the companies surveyed. Class and lab together rarely account for more than 25 percent of a trainee's time, often much less. In one program at Cianbro—for highly skilled, highly paid industrial riggers—trainees spend just six days in class and three years on the job before they can sit for a journey-level assessment offered by the National Commission for the Certification of Crane Operators (NCCCO). “There’s no substitute,” one employer explained. “It’s all about what happens on the job. That’s where you learn both the technique and how to behave—responsibility, teamwork, a work ethic.”

Less clear at many companies was just how the firm—its managers, supervisors, mentors and others—goes about structuring on-the-job learning and coordinating it with content taught in a lab or classroom.

Some national standard-setting bodies provide guidance: train-the-trainer curriculum modules, checklists, worksheets and, in one program studied, in-person workshops for mentors. But more often than not, the challenge falls to managers at the company. And the only metric, if there is one, is indirect: how well trainees perform on standardized assessments—do they pass the evaluations that lead to industry certifications?

Some firms fall back on tradition, trusting that field supervisors and experienced technicians will know how to oversee learning and show trainees the way—after all, the thinking goes, that’s how these more experienced workers, now mentors or managers, learned to do the job. At other companies, the process is more intentional: managers work to structure on-the-job learning and supervise the supervisors providing it.

Fairview Health Services is the second largest private-sector employer in Minnesota: 12 hospitals, 100 clinics and 34,000 employees—doctors, nurses and support staff—dispersed across the state. A national leader in workforce development, the giant system maintains dozens of training and education programs: summer camps for high school students, scholarships for inner-city residents, upskilling for frontline workers—janitors and food service staff training for entry-level clinical positions—as well as several registered apprenticeships and two unregistered earn-and-learn offerings, for IT technicians and operating room nurses.

The program for operating room nurses—perioperative training, or Periop 101—builds on the 150-year-old traditions of nursing education. From the Civil War through the 1970s, most nurse training took place on the job. Young women learned practical skills by working in a hospital alongside a more experienced nurse or a doctor. Still today, virtually all medical education—for doctors and nurses—includes extensive clinical experience: practicums and internships, generally offered after students have completed required coursework, but before they are allowed to practice unsupervised.

The classroom portion of Periop 101 is highly structured. On-the-job learning is more free-form.

At Fairview, as elsewhere across the profession, all nursing specialties require clinical practicums, and Fairview HR managers see little need to micro-manage what trainees experience on the job.

The classroom portion of Periop 101 is highly structured. Curriculum is provided by a respected industry group, the Association of periOperative Registered Nurses (AORN). Instruction is delivered in online modules, supplemented at Fairview by classroom demonstrations, guest lectures, videos

and teacher-led discussion. The program coordinator is formally trained—AORN offers train-the-trainer modules—and little if anything is left to chance.

On-the-job learning is more free-form. It's an essential part of the program: trainees spend two-thirds of their time in an operating room, assisting during actual surgeries with guidance from a more experienced nurse known as a "preceptor." But there is no formal coordination between classroom learning and clinical practice. Although many preceptors have come up through the AORN program, they receive no additional training or counseling. Trainees and trainers navigate the experience together, informally.

Yet Fairview could hardly ask for better results. A full 100 percent of Periop 101 students pass the end-of-course AORN assessment; 98 percent of graduates are hired as permanent employees at the hospital where they trained. And Fairview depends on the course to staff operating rooms across the state: 80 percent of the system's periop nurses have come up through the program.

The story is very different at Mercedes-Benz of Arlington, a prosperous suburban dealership just across the Potomac River from Washington, D.C. A family-owned franchise with some 300 employees, like all car dealerships, it relies heavily on its service technicians: highly skilled workers who must meet Mercedes-Benz performance standards and keep current with rapidly changing automotive technology.

Until just a few years ago, hiring at Mercedes-Benz of Arlington was a casual hit-or-miss affair. Some would-be technicians interned briefly at the dealership during high school. Others came out of a local community college or a nearby for-profit trade school. Once hired, they were assigned to a more experienced technician and told to work alongside him. But more than half the time, they left the dealership within two years, and many blamed the unstructured on-the-job training.

Shop manager Doug Hinken had watched the process for nearly two decades with mounting

frustration, and a few years ago, he decided to do something about it. The tiny homegrown earn-and-learn program he launched in Arlington builds on Mercedes-Benz training modules, most of which are delivered online. But the most important part of the program, in Hinken's view, is the new, more formal on-the-job learning.

At Mercedes of Arlington, the mentor's pay depends on how well trainees perform on the job and how quickly they graduate from the program.

The new training builds on the firm's old, informal onboarding approach: now, as then, each new hire is assigned to work alongside an experienced employee. But unlike in the past, Hinken has created a scaffolding to structure the experience.

What newly hired techs do on the job is coordinated with online Mercedes-Benz training modules. Regular evaluations determine progress through a preplanned curriculum. Mentors are chosen far more carefully than in the past; those who don't meet expectations are rotated out of the lineup. And a new financial incentive system gives them a stake in their trainees' progress. What the industry calls the mentor's "flat-rate" commission pay depends on how well trainees perform on the job and how quickly they graduate from the program.

The Arlington program is not yet two years old—a second cohort of 10 trainees is just coming into the home stretch. But according to Hinken, 70 percent of graduates are still working at the dealership, and their productivity is comparable to that of considerably more seasoned technicians.

Some Mercedes-Benz dealerships in the US offer registered apprenticeships, and they may not face challenges of the kind Hinken faced in Arlington. This is one of the core advantages of registered apprenticeship: the guidance it offers smaller firms

and others that struggle to structure the on-the-job component of a training program. Not every company has a culture of work-based learning. Many lack the resources to plan in-house training. And a registered apprenticeship can provide the answer—a formal, structured plan, coordinated with related classroom instruction.

Still, the experience of Mercedes-Benz of Arlington and Fairview Health Services suggests, a registered program is not the only possible answer. Many employers—including small employers with no professional guidance—can solve the problem for themselves. In some cases, as at Fairview, this will mean looking to tradition—often a long, ingrained history of on-the-job mentoring, common not just in nursing, but also in the construction trades. In other industries, managers may have to be more attentive and deliberate. But this doesn't mean it can't be done.

Doug Hinken is a technician by profession, not an educator. Yet he demonstrates what can be accomplished by a committed employer determined to craft a flexible earn-and-learn initiative suited to its unique needs and circumstances.

Coming together to cope with challenges

Employers seeking to launch unregistered earn-and-learn training face an array of challenges—many of them similar to challenges facing companies with registered apprenticeships. And much of the discussion at the roundtable focused on strategies for addressing these obstacles.

Perhaps the number-one problem for both registered and unregistered programs: how do small employers find the wherewithal to offer an in-depth, year- or years-long apprenticeship experience?

Launching an earn-and-learn initiative can be expensive. It can be hard to find a community college or other educational institution to provide related classroom or lab instruction. Many smaller firms have no human resources staff to manage a program. They often operate on thinner margins,

and many report they have no idea how to begin thinking about a training initiative. Yet small businesses account for the overwhelming lion's share of all US employers—99.9 percent, according to the Small Business Administration—and nearly half of US employees.²¹

Many companies on both sides of the registration question offer a similar answer: employer collectives or collaboratives. The Federation for Advanced Manufacturing Education advanced manufacturing technician (FAME AMT) program, most of its offerings unregistered, is a classic example of how the model can work for employers and employees.

The FAME AMT program evolved over some three decades of trial and error at Toyota Motor North America's giant manufacturing facility in Georgetown, Kentucky. Recruiting workers who met Toyota's exacting quality control standards was never easy, and the Georgetown plant began experimenting with solutions in the late 1980s. By 2000, managers had committed to a two-pillar approach that combined classroom learning with time on the job at the company—both components originally offered in-house at Toyota.

A few years later, the plant partnered with a local community college to provide the academic portion of the curriculum, and managers stipulated that all learning be moved out of the classroom to a setting that looked more like a factory floor—no seats, no desks, no lecturing teacher—filled with state-of-the-art machinery. In 2008, the University of Eastern Kentucky conducted a task analysis much like the process employer associations use to develop occupational skills standards, breaking a manufacturing technician's job down into essential functions and developing an occupational profile that could be translated into curriculum.

But arguably the biggest breakthrough occurred the next year: Toyota reached out to several other central Kentucky manufacturers with similar workforce needs, one with just a few hundred employees and one with less than 20. It took a few years to form a working collective, but in 2012

four companies came together to sponsor a first cohort of FAME AMT trainees.

Over the next few years, Toyota manufacturing facilities in seven other states adopted the Georgetown model, recruiting nearby companies, large and small, to form employer collectives. By 2018, more than 300 firms across 11 states were participating in the FAME USA network, all of them organized in small, volunteer-led, local chapters.

All learning was moved out of the classroom to a setting that looked more like a factory floor—no seats, no desks, no lecturing teacher.

How it works: one to two dozen companies in a regional labor market come together to determine virtually every aspect of their local earn-and-learn program—choosing a community college partner, overseeing what and how it teaches, recruiting students and managing the coordination of classroom and on-the-job learning. The key ingredient, according to one participant at the roundtable: "Employers drive the program. We make all the decisions. We vet every student. We meet every month at the college to check on what's happening. This would be difficult for a big company—who has that kind of manpower?—and impossible for the rest of us. But it isn't hard for a collective."

The FAME model was a subject of considerable interest at the roundtable. But what emerged from the conversation was that many of the programs in the room relied on employer collaboration of some sort, albeit not always formal or readily apparent to outsiders.

The large industrial construction contractors at the table viewed themselves as members of an informal club. Though dispersed geographically, they tend to rely on the same skilled workforce—highly paid, in-demand craftsmen who travel from job

to job across the US. “Half a dozen of us in this room all use the same talent pool,” one manager explained. “So it’s important that we’re all singing from the same songbook—all teaching the same curriculum.”

Most employers said their wages rise over time as trainees acquire skills.

In other cases, a local chamber of commerce or workforce investment board had brought a group of companies together to organize training. In still other instances, an industry standard-setting body encouraged employers to think and act more collaboratively. And the one German firm in the room, which had developed an unregistered earn-and-learn initiative in the US, looked home to Germany, where a national industry association helped set standards and issued credentials for apprentices.

However they were organized, formal or informal, these collectives reduced the barriers to entry for small employers. They also helped solve a host of other problems facing large and small companies alike.

Most employers around the table shrugged off questions about poaching—the risk that rival companies might step in and hire away the workers they train. “I’m just trying to get people into the industry,” one human resources manager explained. “That’s why we train. I don’t care if they come to work for me or one of my competitors.”

Standing together as a collective also made it easier to bargain with a community college or other training provider that resisted tailoring its programs to meet business needs or refused to offer a course because there weren’t enough students to make up a cohort. “Together,” one employer explained, “we can make it financially worth their while.”

The collectives made scaling easier. Employers around the table were candid: even in a tight

labor market, it isn’t always easy to recruit other companies. “Many don’t see the long game,” one FAME member complained. “They don’t want to bother investing in students. But the conversation goes a lot better when we reach out—the FAME collective, rather than the community college.”

Still another area of strong agreement, and another realm where the collectives often seem to play a constructive role: nontechnical, employability skills. “Soft skills are emerging as the number one crisis in the workplace,” one manager announced, and many people around the table spoke up to underscore the point.

Several of the collectives, formal and informal, appear to see it as their role to ensure training does not scant employability skills. The FAME curriculum is divided into three equal parts: technical training, “professional behaviors”—soft skills like public speaking and teamwork—and what the network calls “competitive practices,” first and foremost, problem solving. If the community college fails to include these components, one FAME member said, “we force it.”

In other cases, employers take it on themselves to add soft skills to the training that takes place at the company. “That’s the most important thing students learn on the job,” one construction contractor explained, “professionalism, responsibility, critical thinking.” Another builder in the room takes an even more practical approach, teaching workers how to balance a checkbook and manage their credit cards—skills itinerant construction workers are sure to need as they move from job to job. “Bottom line,” one participant explained, “we care a lot about generic, nontechnical skills—we have to. We don’t need anyone to remind us to include them.”

None of the collectives around the table move in lockstep. Most FAME members are hesitant to register their programs or see no need to do so. But a small handful find it useful, and FAME leadership does not discourage it.

Most collectives, formal and informal, also leave it

to companies to make their own decisions about money. All the employers at the table pay for time on the job. FAME mandates a minimum wage level—enough to cover the cost of tuition at the local community college, plus books and other education-related expenses. The other companies in the room said they paid something toward tuition, though not always enough to cover the cost. About a third pay wages for time spent in class. And most said their wages rise over time as trainees acquire skills, though none appeared to scale wages automatically, as is mandated in registered apprenticeship programs.

Perhaps the greatest divergence around the table: policy—how government should view unregistered apprenticeship and how, if at all, Washington should work to ensure quality control.

Some employers argued there was no role for policy—they had no need for government funding and saw no need for government oversight. (Others pointed out that this was shortsighted: surely all the programs around the table were subsidized to some degree, if only through state support for community colleges.)

What if the government were to inject significant new funding to expand unregistered apprenticeship? Some employers argued that local workforce boards should decide which programs were worthy of support. Others wondered if the national standard-setting bodies should take a bigger role, overseeing quality and bearing the burden of government regulation, as the Trump administration imagines. On one point, the employers agreed: companies don't want more paperwork or red tape. But beyond that, there was little consensus—about policy or funding.

THE TRUMP ADMINISTRATION APPROACH

The case studies, the company roundtable and data from the Adult Training and Education Survey

point to a largely ignored set of employer-led training programs that match the intensity and possibly the scale of registered apprenticeships. Many of these programs have been developed by individual firms. Others involve consortia. But however they began and evolved, employers gained well-trained workers for good jobs.

Until recently, most policymakers have ignored independent apprenticeships. Unregistered programs generally do not qualify for public funding, whether federal grants, state tax credits, training vouchers or subsidies for those transitioning out of the armed forces. Nor are such apprenticeships subject to the regulations that apply to registered programs.

But the climate is changing. There is growing interest in independent apprenticeships. The Trump administration is eager to scale earn-and-learn training. The president's task force proposed a robust effort to foster the growth of IRAPs that need not fall under the registered system. And the administration's FY 2019 budget requested significantly increased funding for apprenticeship—\$200 million a year—to be paid for with cuts to other workforce programs.²²

The focus of the Trump strategy is on what the Department of Labor calls 'certifiers.'

In July 2018, the US Department of Labor (USDOL) offered some clarification of its thinking on IRAPs in a guidance intended for governors, labor commissioners, state apprenticeship offices and workforce agencies—Training and Employment Notice (TEN) 3-18.²³

This document explains how the department aims to implement the task force's recommendations. It specifies a governance structure. In order to qualify as IRAPs, programs must be "developed or delivered by third parties, [which] may include trade and industry groups, companies, nonprofit

organizations, educational institutions, unions and joint labor-management organizations.” Each offering is to be certified by “a third-party certifier that has received a favorable determination from DOL.” And like the task force, the notice calls for retaining the registered apprenticeship system while creating a distinctly different kind of governance for independent programs.

The focus of the IRAP strategy, as described in the notice, is on what the department calls “certifiers.”

As envisioned by USDOL, these industry bodies play many roles. They develop skills standards for their sectors and certify company training programs. They ensure that apprentices who complete programs earn recognized industry credentials. They will be required to vouch for the quality of programs: the academic instruction, work-based learning, mentorship, safety and equal opportunity. And they must gather and report data on training they oversee.

USDOL will approve certifying bodies to participate in the system only if they meet all these criteria and are able to carry out all required activities.

Although IRAP programs can apply for and become part of the registered apprenticeship system, employers operating IRAPs without registration will not reap the benefits of registered programs—tax credits, automatic recognition as training providers that qualify for subsidies from the WIOA system, or the wage benefits that come from having trainees considered as apprentices under the Davis-Bacon Act.

The USDOL approach articulated by the task force and the TEN raises a number of questions.

Conflicting roles? A first question concerns the multiplicity of roles and duties being assigned to certifiers. In most countries with robust apprenticeship programs, a government entity or independent body is responsible for developing and maintaining occupational skill standards,

drawing heavily on employer input. But this organization is not usually responsible for providing training, testing apprentices, auditing programs or marketing apprenticeship to employers.

In England, for example, the Institute for Apprenticeship oversees the development of occupational standards. In Germany, employers, unions and the government work with the Federal Institute for Vocational Education and Training to write and revise frameworks. The task of assuring that employer programs meet these standards typically falls to separate, auditing bodies, and apprenticeship programs that do not abide by the standards lose access to subsidies and resources.

One problem with combining the two roles—standard-setting and evaluating programs—is that the two functions require very different types of expertise. It takes one kind of knowledge and experience to work with employers to develop skills frameworks—and a very different kind of expertise and experience to enforce regulations and requirements. Combining the two roles also opens the way to conflicts of interest for the certifying body.

Still, the US is different from many of the countries with robust apprenticeship systems—bigger, less centralized, more diverse—and an alternative approach might work here. We cannot rule out the possibility that some industry bodies may perform well both in setting standards and evaluating programs.

Standards for on-the-job training? A second question about the task force’s vision: are the skills standards it mandates robust and comprehensive enough to serve as frameworks for high-quality apprenticeship programs, structuring both classroom instruction and on-the-job learning?

Several industry-based accreditors, including NCCER, ASE, CompTIA and the National Institute for Metalworking Skills (NIMS), have been able to recruit employers from across their sectors to develop widely respected skills standards and

industry credentials. These frameworks are designed primarily to structure classroom instruction and short-term training, and they do not always specify skills to be learned in the workplace or provide guidance for structuring the on-the-job component of an apprenticeship program.

Why should firms choose to participate in the IRAP system? Why should certifying bodies participate?

As the IRAP system evolves, certifying bodies may find they need to provide additional tools for employers—frameworks to help companies structure work-based learning.

Too many standards? A third question: will IRAPs lead to a proliferation of skill frameworks—and is this a problem? Widely varied, narrowly tailored standards are a core feature of the registered apprenticeship system. But many other countries guard against such fragmentation and aim to maintain nationally standardized skills frameworks.

In the US, the development and registration of skills frameworks—USDOL calls them “work processes”—is highly decentralized. Some programs register with the federal government, others with their states. State registration processes vary widely. Proposed skills frameworks vary from firm to firm even within a single industry, and some company frameworks are proprietary—the firm will not share them with other firms.

Although standards for some occupations, especially in the building trades, have gained national recognition, especially among union-shop contractors, in other industries, the lack of transparent, well-recognized occupational frameworks could limit the value of training—making what trainees learn at one company less valuable at another firm.

The IRAP system envisioned by USDOL aims to strike a balance between centralization and decentralization. The July 2018 TEN anticipates sector-wide bodies that gather input from across their industries, but it does not favor a “single oversight body or requiring agreement and uniformity of standards.” Instead, it argues for empowering a range of certifiers to create “industry-recognized, competency-based and nationally portable” standards that can ensure quality but also appeal to a wide variety of companies.

This issue may or may not be a concern as America’s unique brand of industry-recognized apprenticeships evolves in years ahead.

The risk would be a confusing welter of standards that limit the expansion of earn-and-learn training. On the other hand, it’s possible that a new, effective job training marketplace will emerge, in which employers and educators choose among available skills standards, and the curricula that work best to train workers eventually rise to the top as the industry standard.

Industries or occupations? A fourth issue ignored in the task force report and the training and employment notice is the distinction between industry and occupation.

Industries typically employ workers in a wide range of occupations—think of the many different trades that make up the construction industry. And conversely, different industries often employ workers with the same occupational competence. Welders, for example, are in high demand in manufacturing, construction and the automotive sector, among others.

The classical apprenticeship model—as implemented in other countries and in the US registered system—is designed to train workers for occupations, not industries, and these occupations are often in demand across several sectors.

Some American industry-driven certifiers—NCCER, for example, and ASE—provide curricula and

assessments for specific occupations. Others, such as the American Welding Society, focus more on skills in use across several industries. And it may be that together these skills frameworks cover most or all of the training required in relevant sectors.

But USDOL's plans for the IRAP system do not acknowledge the importance of occupations—an issue that could potentially be of concern as the department works to expand apprenticeship to new industries and new occupations.

Will employers participate? A fifth, critical question: why should companies choose to participate in the IRAP system?

As envisioned by USDOL, the new approach puts the burden of managing independent apprenticeships primarily on the certifying bodies. It is they who will have to earn approval by USDOL. They will be responsible for overseeing company programs. They will collect and report data and answer to the government if metrics are not met. Even so, it's hard to imagine that there will be no obligations for participating companies. And USDOL has said little or nothing about incentives or benefits for individual firms—those that offer independent earn-and-learn training or those considering launching new programs.

Why should firms choose to participate in the IRAP system? Why should certifying bodies participate? The registered apprenticeship system imposes a number of burdens on companies, but it also rewards them with some financial incentives and other benefits. How will the IRAP system appeal to employers loath to undertake new paperwork or submit to new reporting requirements?

USDOL's initial plan for an IRAP system is not without promise. It builds on existing industry networks and processes and aims to combine flexibility for companies with meaningful accountability. Yet there are challenges ahead.

How will the new system ensure rigor and quality—programs that teach trainees what they need to know to succeed in the marketplace? How will it

incentivize companies to launch earn-and-learn instruction? How will it measure outcomes and hold programs accountable for the training they offer?

WIDENING THE SCOPE OF APPRENTICESHIP POLICY

The evidence from the case studies suggests that companies with independent apprenticeships generally see little added value from participating in the registered system. Companies offering unregistered earn-and-learn training often collaborate with local educational institutions and national or regional industry associations, but many hesitate to engage with state or federal government. Other companies do not offer apprenticeships, registered or unregistered.

Given these realities, how can an industry-recognized system expand apprenticeship in the US, incorporating existing independent programs and expanding the number of firms and schools offering earn-and-learn training?

It is a hard question to answer with confidence, but several policies are likely to motivate at least some employers to offer or expand apprenticeships.

A true alternative. Few countries have succeeded in growing apprenticeship nationwide without establishing it as a reputable and effective “brand”—a true alternative to university, appealing to talented young people and as if not more likely than traditional academic education to lead to a respected, well-paying job. Some countries, such as Germany, have long-established apprenticeship brands. England created one over the past decade. National funding spurred a dramatic expansion of apprenticeship opportunities; the resulting programs catapulted thousands of trainees to better jobs with better pay. And today most British young people aspiring to become engineers, among other occupations, seek to do so through apprenticeship rather than stand-alone bachelor's degree programs.²⁴

The US too should work to create a brand recognizable and respected by employers and aspiring young people—call it “American Apprenticeship.”

A brand will not emerge overnight. But if it was managed properly, each new employer sponsor and new successful program would add to the momentum. Young people would come to recognize apprenticeship as a reliable, cost-effective way to gain not just skills, but also experience implementing them on the job. Employers would come to view their talent development efforts as part of a broader system that could compete with college and attract talented applicants. And companies seeking to hire workers would come to respect apprenticeship completers as much if not more than bachelor’s degree holders.

Establishing a brand would also help unleash funding. It will require public funding to create a brand. But once a brand is in place, it will be easier for policymakers to allocate spending and provide additional supports, such as a service matching apprentices with apprenticeship slots.

Skills standards. Equipping workers with skills in demand across an industry requires standardized occupational frameworks—curriculum to structure both classroom instruction and on-the-job training.

Ready-made frameworks can greatly reduce the complexity of starting a new program. But crafting standards is costly and time-consuming. They should be flexible and easy to adopt, but also rigorous. Trainees must learn skills in demand in the marketplace, and certifications of completion must be meaningful.

How such standards are best developed and maintained is an open question.

Currently, many if not most independent apprenticeship programs rely on skill frameworks developed by private-sector bodies such as NCCER, ASE and NIMS. Companies voluntarily use these organizations’ curricula for short-term training as well as independent apprenticeships.

And they will no doubt continue to do so with or without government involvement.

But if independent apprenticeships are to be incorporated into a national system and public funding is to be directed toward new programs, there will have to be some process for government oversight or endorsement of occupational frameworks. Government support should go only to high-quality career preparation programs.

One possibility for developing and maintaining frameworks is to rely on industry certifying and accrediting bodies that draw on input from employers across the sectors they serve—as envisioned in the USDOL training and employment notice.

Companies would come to respect apprenticeship completers as much if not more than college graduates.

A modest government competitive grant program could award selected certifiers with funding to create occupational standards. Grant criteria should include the certifiers’ ability to appeal to companies in their industries—proven buy-in by firms that train and hire in the relevant occupations. Certifying bodies would submit their skills standards to a designated government agency. And once that entity sanctioned a framework, companies that use it would qualify for state or federal subsidies.

An alternative approach would create a centralized public-private entity charged with developing and maintaining occupational frameworks based on input from employers. England’s Institute for Apprenticeship offers an example of this approach. Similarly, in the US, an American Apprenticeship Standards Institute (AASI) could work with industry associations and other employers to produce frameworks.

In both cases—whether industry-driven or crafted by a public-private institute—skills standards should specify the job functions workers need to succeed in the job and the competencies required to perform those functions at a high level. Frameworks should include academic competencies, workplace competencies (technical skills, working with tools, planning, teamwork, scheduling and problem solving, among others) and cross-cutting personal competencies (reliability, adaptability, initiative, interpersonal skills and others).

In many countries with robust, established apprenticeship systems, public and private sectors split the cost.

One possible way to proceed: USDOL could launch a new, two-track IRAP system that incorporates both approaches—modest funding for industry-based certifiers and also for a centralized standards institute. Different circumstances—different industries, different employers, different regions—may require different approaches. We recommend trying both and, in time, evaluating their effectiveness.

Government funding. The US cannot hope to build a respected apprenticeship brand or expand it on the scale that's needed without funding. Employers and employer associations must play a part, developing training programs, structuring on-the-job learning, training trainers and, eventually, paying apprentices' wages. But there is also a role for government.

Several states have tried using tax credits to incentivize employers to offer programs, and Congress has considered adopting a similar approach. This may or may not be effective. South Carolina's experience suggests that tax credits are not a particularly meaningful incentive—relatively few employers who offer training apply for them. But perhaps a more tailored program would be more successful.

Another option: in many countries with robust, established apprenticeship systems, public and private sectors split the cost. Employers provide on-the-job training and pay apprentices' wages, while government foots the bill for off-job instruction, whether at a college, a nonprofit organization, a for-profit entity or an employer-sponsored training center.

Many if not most of the skills learned in off-job courses are general—of value not just at one company but across an industry. The increased productivity of a better-trained worker accrues not only to the company that sponsors their training but also to other firms that employ the trainee in the future. Other parties also benefit. Workers earn higher wages, in some cases throughout their careers. And the government saves money, as better jobs and higher wages increase tax revenue and reduce transfers.

Bottom line: the off-job component of apprenticeship is no different from other forms of general education. The widely dispersed benefits are externalities that justify public support.

The government should not specify or restrict the types of training providers that may offer off-job instruction. A wide variety of institutions and organization can be expected to come forward: community colleges, nonprofit and community organizations, for-profit training providers, unions and employer collectives, among others. But guardrails must be put in place to ensure that public dollars are well spent.

Among the criteria that could be used to determine whether programs are eligible to receive funding: accreditation by an IRAP certifying body, relevant academic accreditation, eligibility for WIOA training dollars, eligibility for Veterans Affairs training subsidies and whether programs prepare students for licensure or industry certification tests. In addition, funding could be performance-based—programs that fail to meet performance metrics could be denied access to government support.

It's not easy to estimate the public subsidy that would be required to fund the off-job component of American apprenticeship. The cost will depend on uptake—how robustly the new brand grows. One possible target would be 1.5 million civilian apprenticeships—a threefold increase from today. The cost of off-job training will vary widely across fields, but the average might be \$5,000 per apprentice per year—for a total cost of \$7.5 billion a year.

To finance this subsidy, we propose drawing on existing government spending for education and training.

Among potential sources of funding:

- Workforce Innovation and Opportunity Act (WIOA) spending, currently budgeted at about \$4 billion a year.²⁵ A recent experimental study found that WIOA-funded training has little if any effect on employment outcomes, and some of the money now being spent on ineffective programs could be redirected to apprenticeship.²⁶ Training WIOA business services staff to sell and organize apprenticeships could also defray some of the costs of expanding the brand.
- Funding allocated for Trade Adjustment Assistance, Job Corps and YouthBuild, currently around \$3 billion a year.²⁷ Some of this spending could be used to cover off-job apprenticeship training for individuals who participate in these programs.
- Federal financial aid, including the Pell Grant program. Currently, over half of Pell recipients attend public two-year or for-profit colleges, often in career-focused education programs. Permitting them to use Pell Grants for apprenticeship could save money—off-job apprenticeship training is sometimes cheaper than college tuition—and generate higher earnings gains.
- The Strengthening Career and Technical Education for the 21st Century Act, or Perkins V, which funds career and technical education in high schools and colleges. We favor using more

Perkins money for career and technical education (CTE) programs that include opportunities for apprenticeship and also for high schools that offer youth apprenticeship programs.

- Existing secondary and postsecondary funding. More high school funding should be directed toward programs that complement apprenticeship work-based learning, and states should consider rebalancing their support for community colleges, spending less on academic programs and more on offerings that prepare students for careers—including off-job training for apprentices.
- The Post-9/11 GI Bill. This legislation already provides housing benefits and wage subsidies for veterans in apprenticeships, but it funds expenses for those attending college and university much more generously. An amended bill should right this imbalance, allowing veterans to use more of their college benefits to pay for the off-job education and training in apprenticeship programs.

The Trump administration's FY 2019 budget also envisions funding an expansion of apprenticeship with cuts to other training programs—cuts that would reduce total federal spending on workforce education. Our proposals do not call for reduced federal funding, but rather for shifting the allocation of existing dollars.

The success of American Apprenticeship will depend on its reputation for quality.

Marketing. Encouraging companies to develop new training programs and hire apprentices is not easy. Many companies already have recruiting and training systems. Most employers have little knowledge of apprenticeship or the current apprenticeship system, and few top executives focus on how their firm handles human resources.

Unless funding for off-job training is linked with substantially improved efforts to sell and organize apprenticeships, take-up by employers is likely to be limited.

Among the best ways to fill this gap is with a third-party “intermediary” that works to persuade employers of the benefits of apprenticeship, then collaborates with the firm to organize a training program. Many different kinds of organizations play this role: nonprofit groups, private training companies, industry associations, community colleges and state agencies, among others.

Some of the ways they help: working with employers to identify workforce needs and target occupations that are difficult to fill, developing a plan to combine work-based learning and academic instruction, selecting cost-effective providers of off-job instruction and identifying sources of government funding.

The registered apprenticeship system relies on intermediaries. Indeed, they have been responsible for much of the growth of the system in recent years and could play a similar role for employers who opt to launch independent apprenticeships. Certifying bodies like NCCER, NIMS and ASE are ideally positioned to convince firms of the need to launch training programs and show them the way. Policymakers—state and federal—should encourage such groups to take on the job by providing financial incentives.

Evidence suggests that effective marketing and organizing of apprenticeships could be achieved at a cost of \$1,000 to \$2,000 per trainee.

Funding should be performance-based and go only to intermediaries that stimulate new apprenticeships. Existing intermediaries like NCCER and for-profit training and staffing companies should be eligible for support.

If intermediaries stimulated a half-million new apprenticeships per year, the initial costs would total about \$1 billion. Eventually, if intermediaries stimulated 500,000 new participants and 400,000

completers per year, the costs of the incentive could reach \$1.5 billion per year.

Along with incentives for intermediaries, the federal government should establish an independent auditing system to ensure that the apprenticeships they create meet occupational standards and prepare trainees to succeed in the workplace.

We cannot ask taxpayers to pay for expanding apprenticeship without effective quality assurance.

Outcomes metrics. As with any brand, the success of American Apprenticeship will depend on its reputation for quality.

Employers, educators, students and policymakers will expect programs to build skills of value in the marketplace. Offerings must be evaluated and assessed, and only those that meet this exacting standard should expect government subsidies. The question for policy: how to measure program outcomes—which apprenticeships effectively prepare trainees to succeed on the job?

One possible approach relies on end-of-program student assessments administered by third parties – state agencies, industry associations or approved accrediting bodies. Most countries with well-established apprenticeship systems rely on assessments of this kind—on-paper tests or hands-on performance assessments, or both. Germany, for example, relies on a committee of experts to assess each apprentice’s competency: six to nine trainers and representatives from business and labor organizations. England recently embarked on an ambitious system of “end-point assessments” to be undertaken by approved assessment organizations that are independent of the training provider and the employer.²⁸

Industry-recognized certifications are gaining currency in the US, and training providers are increasingly focused on preparing trainees for

certification assessments. But in many fields, there is no respected credential, and not all certification systems rely on third-party evaluations.

Here too, the government should help, providing funding for the development of rigorous third-party assessments and certifications.

Another approach is to measure employment outcomes – post-program, training-related job placement and wage gains. This has obvious appeal to policymakers and taxpayers, who would help foot the bill for a new apprenticeship brand. But there are challenges.

Every state collects payroll information on employed residents—data designed to determine eligibility for unemployment benefits—and states use these labor market outcomes to assess education and training programs. One of the more sophisticated systems, in Washington State, uses employment outcomes to compare career preparation programs—high school CTE, professional and technical programs at community colleges, WIOA-funded training programs and apprenticeship.

The state’s Workforce Training and Education Coordinating Board tracks employment and earnings outcomes and estimates trainees’ net earnings gains relative to a comparison group that has undergone different training or no training.²⁹ (The results routinely show net gains for apprenticeship triple those of WIOA-funded training and community college professional and technical programs.)

The Washington system is state-of-the-art, but it does not attempt to estimate gains for specific apprenticeship programs—only for apprenticeship as a general category compared to other general categories of training.

The WIOA system requires states to report training outcomes: employment, retention and wages for up to a year after exiting any workforce system program.³⁰ But making apprenticeship funding conditional on the employment outcomes of specific programs might be more difficult.

Company apprenticeships are often too small to yield reliable results. And doing so might distort employer behavior, encouraging them to take only applicants who would do well with or without an apprenticeship program.

There is an extensive literature on how best to build performance indicators in government-sponsored training programs but little analysis of how to do so for apprenticeship programs, especially at the sponsor level. Clearly, this is an area where there is more work to be done. We cannot ask taxpayers to pay for expanding apprenticeship without effective quality assurance.

CONCLUSION

Creating a new national apprenticeship brand—a recognized, respected alternative to traditional postsecondary education—will not be easy. But the steps we propose in this paper would make a good start and would be generally consistent with the vision of industry-recognized apprenticeship programs laid out by the US Department of Labor.

We endorse the Trump administration’s proposal to begin with a two-track system, maintaining and improving the existing process for registering traditional apprenticeships while experimenting with ways to encourage and oversee unregistered earn-and-learn training. But in the long run, we believe, the US should move toward a single system—a single brand—that incorporates the best of both models and grants all apprenticeship programs the same privileges.

We believe our proposals will generate significant new employer interest in earn-and-learn training, dramatically expanding the brand, and increase the likelihood of incorporating existing independent programs into a robust, respected national apprenticeship system.

CASE STUDIES

By Tamar Jacoby

A vast, varied terrain of independent, apprenticeship-like training exists alongside apprenticeship programs registered with state or federal agencies. Yet very little is known about these independent offerings—how widespread they are, how effective or whether and how they maintain quality standards absent regulation by the government. The four case studies that follow describe independent apprenticeship programs in four industries—advanced manufacturing, construction, health care and automotive maintenance and repair.

CASE STUDY

FAME AMT

AT A GLANCE

The Federation for Advanced Manufacturing Education's advanced manufacturing technician (FAME AMT) program is a two-year earn-and-learn experience that prepares college-age and older students for careers as industrial maintenance workers. As in a classical apprenticeship, trainees divide their weeks into time spent in class and time on the job, learning by doing and earning competitive wages. The hallmark of the FAME model: employer collectives, each made up of 10 to 25 companies in a single regional labor market, determine every aspect of the program and its delivery.

An offshoot of a training regimen developed over several decades by Toyota Motor North America at its flagship Georgetown, Kentucky, plant, AMT has been adopted by more than 300 companies across 11 states.³¹ Firms come together in employer collectives and partner with community colleges to adapt a highly standardized curriculum that combines technical training with employability skills, problem solving and lean manufacturing practices. It's a relatively small, elite program—now some 400 graduates a year total—but growing, and leadership is exploring organizational changes that would allow it to scale nationwide.³²

LABOR NEED

According to the US Bureau of Labor Statistics, 522,000 manufacturing jobs stand empty today.³³ Over the decade ending in 2028, Deloitte and the Manufacturing Institute predict the industry will need to fill 4.6 million positions, and as many as 2.4 million of them may go unfilled because employers cannot find skilled workers.³⁴

Yet according to Toyota and other FAME employers, these numbers tell only part of the story. A generation of manufacturing workers is retiring. At many firms, robotics and other new technology are

creating new jobs, often more demanding than the positions they're replacing: jobs for highly skilled and adaptable technicians, adept at problem solving. Perhaps most challenging, says FAME founder Dennis Dio Parker, most American entry-level technical workers are "underskilled and not work-ready," lacking in soft skills and analytic ability and not competitive with entry-level workers in Europe and Asia.³⁵

Generally more skilled and better paid than ordinary production workers, industrial maintenance technicians are responsible for keeping a manufacturing facility operational and efficient, avoiding disruptive breakdowns and expensive downtime. Duties include equipment installation, testing, routine maintenance, preventive procedures, troubleshooting and repair work.

Entry-level technicians can earn \$40,000 to \$50,000 a year. After three years, according to FAME employers, many earn as much as \$65,000 or more.³⁶

BACKGROUND

The FAME AMT program evolved over nearly three decades of trial and error by Toyota and other manufacturing employers.³⁷ The Toyota Georgetown plant established its first prehire training in the late 1980s, building on a company culture that values personal behavior and lean manufacturing practices as if not more highly than technical expertise. From the start, the curriculum included employability skills and manufacturing efficiency. Already in the early 1990s, the program was geared to produce what the firm called "multiskilled" technicians, proficient across four essential trades: electrical, fluid power, mechanics and fabrication—a combination Toyota says can reduce its workforce needs by up to one-third.³⁸ Also in the '90s, the company added an on-the-job component, supplementing classroom learning with work experience in the factory.

In the early years, all training took place in-house: instruction paid for by Toyota, at Toyota, delivered by Toyota employees.

Three critical breakthroughs transformed the program in the early 2000s.

First, Toyota experimented with outsourcing its prehire training, partnering with several Kentucky community and technical colleges to provide the academic portion of the multiskilled curriculum for a fraction of what it cost at the company.

Second, around the same time, managers at the Georgetown plant began to rethink the notion of classroom learning, moving all instruction to a dedicated space configured to resemble a factory floor—no seats, no desks, no lecturing teacher—filled with state-of-the-art machinery. The rationale for this and many other features of the AMT program, including eight-hour days and year-round instruction: the student experience should resemble what trainees can expect to experience on the job as full-time workers.

Third and perhaps most significant, in 2008, Parker and an executive from the Kentucky Association of Manufacturers developed the idea of an employer collective: a group of companies with similar workforce needs that would come together to oversee and manage the training program. Over time, this would become FAME's most important, distinguishing feature. All consequential decisions at each location are made by a regionally based employer partnership. Member companies, often a mix of large and small, work together to choose the community college, recruit and select students, develop and approve curriculum, and more.

The Great Recession set the launch of the first employer collective back several years, and Toyota sponsored all 25 AMT students who began at Bluegrass Community and Technical College (BCTC) in August 2010. But in fall 2012, the first collective—Toyota and three other central Kentucky firms—partnered with BCTC to sponsor a first cohort of FAME students.

The idea spread quickly across Toyota North America. Over the next few years, Toyota manufacturing facilities in seven other states adopted the FAME model, recruiting nearby companies to form collectives. Soon, other employer groups not anchored by Toyota plants were following suit, coming together with guidance from Parker and the Kentucky department of economic development to establish independent FAME chapters.

Employers with similar workforce needs come together to manage the training program.

In 2014, Kentucky governor Steve Beshear took the concept statewide, bringing what were by then six Kentucky collectives under one umbrella. His most important step: some \$170 million in capacity-building investment at the state community and technical college system. He also named a statewide KY FAME board of directors and established a statewide degree track that could be readily adopted at any Kentucky community college where a collective sprang up.³⁹

Today, the FAME network stretches diagonally across the map of the southeastern US from West Virginia and Kentucky to Louisiana and Texas. Eight collectives include a Toyota factory in their membership; 19 do not. Most employers are classic manufacturers, but several are not. Jim Beam, L'Oreal and the H-E-B supermarket chain are among nonmanufacturing member companies that sponsor and hire industrial maintenance technicians. Enrollments have grown rapidly from just a handful of students in 2012. In the first seven years, some 600 trainees passed through the program. The current entering class numbers close to 400.

All 27 chapters have the same organizational structure. All have similar expectations for active yearly and monthly engagement by employer members. All follow a similar process in choosing and collaborating with a community college

partner. Colleges across the network teach the same three-pillared curriculum—technical skills, professional behavior and lean manufacturing practices. Students across the network meet the same academic standards and divide their time in the same way between school and work. Together, the 27 chapters make up an informal national network held together by annual conferences, organizational guidance, standardized professional development for teachers, shared templates for promotional material and more, including a robust esprit de corps.⁴⁰

HOW IT WORKS

Students. Unlike most of the community colleges where it is housed, FAME AMT is a selective program. Among the criteria for admission:

- Have a high school diploma or the equivalent.
- Have ACT, SAT or equivalent math scores near the top third of the distribution.
- Be college-ready—require no remedial work to meet college standards.
- Show initiative, grit and a strong desire to succeed in the program.
- Gender, racial and ethnic diversity strongly emphasized in student recruitment.

Employers. Employers are in the driver's seat at FAME AMT. This is the overarching principle that dictates virtually every aspect of the program. The number one customer is not the student; it's the employer. The ultimate goal is preparing workers with skills in demand among local employers. Members of the employer collective make every important decision about the program and its delivery. They:

- Choose the college partner, often through a selective process.
- Can terminate the relationship if the college doesn't meet employer standards.

- Require the college to teach the AMT curriculum and approve every course.
- Recruit and select students, visiting high schools, interviewing all applicants.
- Meet monthly with the college to make decisions about the program.
- Visit the college regularly to interact with students and evaluate student presentations.
- Structure the on-the-job experience at their companies.
- Determine wage levels for trainees—the FAME-recommended minimum or higher.
- Market the program to other employers, growing their chapter and seeding others.

Community colleges. FAME leadership encourages employer collectives to be demanding customers, setting the highest possible bar in their relationships with community colleges. Each college must:

- Sign a memorandum of understanding with the employer collective.
- Convert classroom space into a factory-floor-like advanced manufacturing center.
- Equip the center with state-of-the-art machinery, donated or purchased.
- Dedicate instructors, preferably hired out of industry.
- Adopt AMT curriculum, securing new accreditation if necessary.
- Adopt the AMT calendar: five straight semesters, eight hours a day.
- Adopt the AMT weekly schedule: two days at the college, three days at work.

- Structure learning as AMT prescribes: hands-on practice of content delivered online.
- Prepare students to earn associate degrees along with AMT certifications.

Curriculum. The three-pillared core curriculum is an essential feature of the program. Its goal: to prepare adaptable, analytic, “global best” manufacturing technicians who can maintain increasingly sophisticated manufacturing machinery and adapt to changing technology, solving unforeseen problems and communicating effectively. “The emphasis is on the person,” FAME leadership explains, “the technician, not the technology.”⁴¹ What students learn:

- Three equal parts: technical skills, professional behaviors and manufacturing best practices.
- Multiskilled technical preparation—electrical, fluid power, mechanical and fabrication.
- Technical content based on a factory task analysis reflects industry needs and standards.
- Professional behaviors including initiative, diligence, communication and teamwork.
- Five manufacturing practices, including safety, problem solving and workplace efficiency.
- Responsibility for maintaining safe, factory-like learning area as if in a working facility.
- Program goal: standardized skills, consistent quality—and core content is highly standardized.
- Technical instruction is geared to the community college calendar; progress in other areas is competency-based.
- There is extensive one-on-one instruction and coaching at the college and in the workplace.

Work-based learning. As in a classical apprenticeship, FAME aims to coordinate classroom learning with on-the-job experience. Employers,

college partners and students share responsibility for this coordination.

- Explicit goal: “Try before you buy”—companies aim to hire graduates.⁴²
- Companies are required to pay wages that cover tuition, books, fees, room and board.
- Each employer is responsible for structuring the workday at their company, and it varies from firm to firm.
- Companies are encouraged to assign each student an experienced mentor.
- Employers and colleges are encouraged to talk regularly about student progress.
- Students are expected to absorb and adapt to the culture of the firm where they work.
- Many firms offer post-graduation internships—an extra year—to teach company-specific skills.

Funding. FAME AMT is designed to be free for students, economical for companies and self-sustaining, with minimal government support. FAME leadership encourages employer collectives to cover their own costs. The rationale: the more funding comes from government, the less independence employers are likely to have. But the model leverages existing state subsidies for community college education, and several states have made robust investments in community college training facilities. Kentucky also offers ongoing in-kind help: legal services, marketing and promotional material.

- Wages cover college costs, students pay nothing additional and graduate debt-free.
- Cost to college and collective varies widely depending on local circumstances.
- Average cost per student for a company is \$60,000 over two years.⁴³

- Typical startup cost for a college using existing facility and equipment is \$300,000 to \$1.5 million.
- Employer collective is encouraged to furnish two robots—average total cost, \$50,000.
- Most colleges seek additional funding to purchase a manufacturing simulator—\$160,000.
- Annual cost if college hires new faculty is \$200,000.
- Two states have built new, dedicated training facilities to house the program—\$4 million to \$25 million investments.

Developing a pathway. AMT prepares high school graduates for jobs that do not require four-year degrees. But FAME leadership envisions the AMT experience as one step on a “hop-on, hop-off” career pathway that begins in pre-kindergarten and ends potentially in a master’s degree. To realize this goal:

- K–12 STEM curriculum provider Project Lead the Way helps recruit AMT applicants.
- A partnering university offers manufacturing business degrees—bachelor’s and master’s.
- Partnering universities offer a tailored manufacturing engineering program.
- Fifteen to 20 AMT graduates are currently enrolled in bachelor’s programs.⁴⁴
- First AMT student earned a business master’s in 2018.⁴⁵

METRICS AND RESULTS

FAME leadership envisions the program as a triple win, paying off for companies, colleges and students. The promise, if everything works as expected: companies will find they are able to hire better-skilled employees; colleges will be equipped to offer more sophisticated, successful career programs;

and students will walk away debt-free with a high-paying job. Six years after the launch of the first employer collective, standards and metrics are still evolving. Some results are in; others have yet to materialize or be measured.

Payoff for students. The clearest and best-measured result is the payoff for students. Successful completers graduate debt-free with an associate degree, an AMT certificate, an average of three short-term community college certificates and 1,800 hours of on-the-job experience. According to FAME leadership, graduation rates across the 27 existing college programs range from 70 to 95 percent, and all students who graduate do so on time—after five semesters—with the rest of their class.⁴⁶ Nationwide, the graduation rate for first-time, full-time community college students is 30 percent over three years.⁴⁷

Payoff for the company. According to FAME leadership, an average of 90 percent of those who graduate proceed to full-time employment at the company that sponsored them for earn-and-learn training.⁴⁸ Several FAME employers also report anecdotally that the performance of AMT graduates surpasses that of employees who have not gone through the program. Five years after the first AMT graduation, several Toyota facilities have promoted one or more alumni to the position of team leader—a promotion that managers say otherwise generally takes more than a decade.⁴⁹

Skills in demand industrywide? According to FAME leadership, little or nothing in the AMT technical curriculum is geared specifically to the automotive industry. “These skills are in demand across the manufacturing sector,” Parker says.⁵⁰

The core curriculum was developed at Toyota in the late 1980s and later verified by an independent, third-party analysis of the skills in demand at the Georgetown plant—a so-called Developing a Curriculum (DACUM) process conducted by the University of Eastern Kentucky in 2008. How DACUM works: a team of researchers questions a panel of six to eight high-performing incumbent workers to determine the tasks and skills that are

essential for each job, then develops an occupational profile that can be translated into curriculum.⁵¹ Yet, despite its Toyota roots, the FAME curriculum is now endorsed by more than 300 manufacturing companies, most of which do not make automobiles.⁵²

Third-party quality control. All trainees who complete the AMT program receive associate degrees from accredited community colleges. They also earn FAME-specific AMT certificates.⁵³ To date, FAME leadership has seen no need for independent accreditation or other third-party validation. But this may change as the program grows: state or federal agencies providing funding are likely to require some form of external quality assurance, either by the government or an independent employer group.

The state of Kentucky is moving in this direction. According to Deputy Secretary for Workforce Development Josh Benton, starting in 2018, all AMT graduates in the state will be evaluated by a uniform assessment—a competency-based skills test developed and administered by an industry-backed, independent accreditor, the nationally recognized Automotive Technical Education Collaborative (AMTEC).⁵⁴ FAME leadership says it is encouraging other employer collectives in other states to consider requiring the AMTEC assessment.⁵⁵

The whole person. When FAME employers and educators gather at annual conferences and other network convenings, they tend to talk less about technical skills than about the character of AMT graduates—what they call “the whole person.” Few FAME gatherings are complete without one or more sessions designed to showcase students and give them an opportunity to display their personal and presentation skills.⁵⁶ Speakers may or may not be representative, but the program’s ideal is clear: maturity, poise, purpose, discipline, commitment—qualities, FAME member companies assert, of the highest value to employers.

COMPARED TO REGISTERED APPRENTICESHIP

Although many aspects of the FAME model resemble classical apprenticeship, network leadership maintains that the program is “apprenticeship-neutral”: individual employers may choose to register the training they offer on the job at the company or not, as they see fit.⁵⁷

Parker and Benton describe FAME as a parallel track, similar to registered apprenticeship but with additional advantages for employers—reduced paperwork, less bureaucracy, more flexibility to make changes. “Employers, not the government, have the final say on things that need to be modified,” Parker says.⁵⁸ According to Benton, this is what has allowed the program to grow as quickly as it has. “We want to serve our customers—the widest possible scope of customers,” he explains. “The rigidity of the registered apprenticeship model is part of what’s limiting its growth.”

The one exception in Benton’s eyes—the one advantage of registered apprenticeship—is the guidance it can offer small companies or those that have not provided training in the past, both of which often struggle to structure on-the-job work experience. “Not every company is Toyota,” Benton explains. “Not every company has a culture of work-based learning. Many lack the resources to plan in-house training.” Registered apprenticeship gives employers a ready-made, structured plan, coordinated with related classroom instruction.

FAME member companies that choose to register the training they offer at the firm participate in the collective like other members, making decisions about instruction and other activity at the community college. Registration and compliance with US Department of Labor or state apprenticeship agency requirements is independent and additional, something companies do alongside their participation in FAME. According to Benton, roughly 5 percent of 191 KY FAME member firms have registered their in-house training programs.

Among the similarities and differences between FAME and the traditional registered apprenticeship model:

Blends classroom and on-the-job learning.

Like apprenticeship, FAME envisions a student experience that combines robust, structured classroom learning with equally robust, structured on-the-job training at the company. As in a classical apprenticeship, FAME expects close coordination between the two components—including by experienced employees designated as mentors, who supervise each student's time on the job. But unlike a traditional registered apprenticeship program, FAME does not require employers to record or report training activities that take place at the firm.

Skills in demand across the industry. As in a registered apprenticeship, FAME envisions that students are learning skills in demand across the manufacturing industry—not just at one company, but nationally, if not internationally. The registered apprenticeship model looks to government, state or federal, to assess whether training programs are preparing students to an industry standard. FAME expects its employer collectives to make the determination—and modify the program if necessary.

Portable credential. Trainees in a registered apprenticeship program earn journeyman certificates, often sought after and well-regarded, but rarely standardized, making it difficult for a future employer or other third party to assess a worker's skills. AMT students earn associate degrees and community college certificates—often equally opaque to future employers, especially when students move from state to state. The state of Kentucky has sought for some time to add an additional metric—a more portable credential, recognized nationwide—and the new state requirement that all Kentucky AMT graduates sit for an AMTEC assessment moves the program toward a more transparent, standardized outcome.

Graduated wages. Unlike in a registered apprenticeship, FAME does not require employers to offer specified wage increases as trainees move through the program and learn additional skills. FAME sets a baseline: companies must pay enough to cover tuition and other college costs so that students graduate debt-free. In Kentucky, this dictates wages of at least \$12 an hour, and Benton estimates that the average across the state is \$14 to \$15.⁵⁹ FAME also encourages firms to offer additional performance incentives as students develop and demonstrate new skills.

The problem, according to Parker: “Not every company can afford to do that. Especially not small companies.” In keeping with FAME's core principle, once college costs have been met, the decision about how much to pay AMT trainees is left to employers.

CHALLENGES

Not yet 10 years old and growing, FAME faces an array of challenges, many of them driven by a desire to scale the program nationwide.

Organic growth. FAME employers maintain that the best way to grow the network is from the bottom up. Just as employers oversee and manage the program, this thinking goes, they should also take the lead in promoting it and recruiting other companies. “When the community college recruits the employers, it doesn't work,” one FAME member asserted at a recent network gathering. “If they or the state or someone else takes the initiative, that puts them in the driver's seat—and more than likely, companies won't get what they need out of the program.”⁶⁰

The challenge for the FAME network: relying on employer members to market the idea to other firms leaves a lot to chance. Most companies have limited time and resources, and without a more intentional growth strategy, the program may find it difficult to expand nationally. The state of Kentucky has struck a balance, according to

Benton, facilitating statewide growth while still relying on employer initiative and leaving essential decisions to new employer collectives.

Can other states follow suit? Can local chambers of commerce help? Or other employer associations? FAME leadership is looking for options that would permit continued bottom-up growth powered by employer initiative.

Quality assurance. A second challenge that comes with growth: maintaining quality across the network. Parker readily admits that some regional partnerships are better than others—more faithful to the FAME model and more effective in training students to the program’s high standards. Here too the program struggles to find a balance, maintaining standards and structure while allowing employers ample room to make their own decisions.

Small, selective, propelled by employer enthusiasm and peer-to-peer employer recruitment, FAME relied in its first five years largely on voluntary quality control. “Why would employers join,” Parker asks, “and then water down the standards that make the program successful?”⁶¹ This voluntary approach is unlikely to guarantee rigorous standards as the network expands.

The state of Kentucky has moved to address the challenge by adopting the AMTEC test—requiring all Kentucky FAME students to sit for a uniform third-party assessment. Among questions for the future: Is AMTEC the best, most appropriate third-party assessment? Will collectives in other states make it or another, similar test a requirement for students? Are other performance metrics needed, and if so, what should they be?

Other occupations, other industries. The last frontier for FAME: adapting the model to prepare students for other occupations and other industries—beyond industrial maintenance technician.

FAME leadership believes this is doable.⁶² Their argument: just one-third of the FAME curriculum is technical. The professional behaviors that

make up the second pillar of the program are in demand across economic sectors: initiative, diligence, communication skills, teamwork. So, Parker and others claim, are the lean manufacturing principles that the program calls “competitive practices”—critical thinking, problem solving, time management, workplace organization, workplace efficiency, productivity and safety culture.⁶³

The primary challenge for employer collectives in other sectors will be developing industry-specific technical content—ideally with a DACUM process or something like it to ensure that skills are up-to-date and in demand industrywide. One KY FAME chapter, in Owensboro, Kentucky, has developed a financial services curriculum.⁶⁴ Another chapter has piloted training for tool and die makers. The National Association of Manufacturers’ educational arm, the Manufacturing Institute, is considering adapting the AMT model for a broad spectrum of additional manufacturing occupations—welder, machinist, computer numerically controlled (CNC) programmer and others.⁶⁵

CONCLUSION

FAME AMT has won numerous awards in workforce education circles, local and national, and it is increasingly regarded as one of the best postsecondary job training programs in the US.⁶⁶ It combines the discipline and rigor of a traditional apprenticeship with more ample room for employer choice and more flexibility for companies. Much is required of participating employers but, because of the collective structure, much less than in a standalone apprenticeship at a single firm.

Many decisions still need to be made as the FAME network grows. But the core model developed nearly a decade ago at one company and now in use across 11 states would appear to hold lessons for anyone—employers, educators or policymakers—seeking to design effective earn-and-learn career education.

CASE STUDY

CIANBRO

AT A GLANCE

An industrial construction contractor recognized nationwide for the quality of its work, Cianbro maintains a broad spectrum of earn-and-learn training programs. Whether a four-week boot camp for new hires, one of the company's eight formal apprenticeship programs registered with the Maine Department of Labor or any of the firm's half-dozen widely varied unregistered, apprenticeship-style craft training options, all combine classroom learning with paid time on the job.

The builder prides itself on its training culture. It spends a significant share of its annual revenue on workforce development, and the value of training that combines class- or lab-based learning with practice in the field is an article of faith among executives and employees alike. But as a firm that performs many different kinds of work—building bridges, modernizing oil refineries, installing and maintaining power lines, standing up solar plants and wind farms—often on a tight schedule, the company prizes nothing more than flexibility.

The hallmark of its workforce development programs: though all start from the core principle of classical apprenticeship—that the best way to learn is coordinated theory and practice—no two Cianbro offerings are alike. The firm's apprenticeship-like training programs vary in length, in the sequencing of class or lab time and on-the-job work, in when and how trainees are assessed and in what credentials, if any, they earn. The company views this adaptability as its core competitive advantage—a combination of flexibility and quality that it says can be achieved only with unregistered earn-and-learn training.⁶⁷

LABOR DEMAND

From 2006 through 2011, the construction industry lost more than one million jobs, and many skilled workers dropped out of the building

trades, never to return.⁶⁸ Today, the sector is back in full swing, but many contractors are unable to bid on projects or finish them in a timely manner because of labor shortages.

According to the US Bureau of Labor Statistics (BLS), some 278,000 construction jobs stand empty today.⁶⁹ A leading industry group, the Associated Builders and Contractors, maintains the number is closer to 500,000, and according to the Construction Labor Market Analyzer, a data analytics firm, the sector will face a shortage of one million craft workers by 2020.⁷⁰ Whatever the number, the problem will likely get worse in coming years: the skilled crafts workforce is aging, and fewer and fewer young people show interest in going into the construction industry.⁷¹

Cianbro's training culture grew naturally out of its safety culture.

Complaints about labor shortages are commonplace across the sector, but as a versatile contractor that takes on a wide variety of jobs, Cianbro faces a unique set of challenges. Industrial, commercial and residential construction are effectively three different industries. Upgrading an oil refinery isn't just a bigger job than building a house; it also requires significantly different skills and a different level of sophistication. So too with the different trades, from drywaller to electrician to crane operator—some are more demanding than others and some face more severe shortages. Cianbro, which focuses on industrial and commercial projects, needs highly sophisticated workers and relies on a broad array of trades, from iron workers to instrumentation technicians.

Three of the firm's largest training programs prepare welders, riggers and pipefitters. Welders are the star athletes of the construction industry: it's a young man's job that requires a high level of

hand-eye coordination and physical agility. Pay varies widely from a national median of about \$40,000 a year into the six-figure range.⁷² Rigger is also a versatile occupation: any construction project that hoists heavy objects relies on riggers to get the job done safely and effectively. According to BLS, the median wage for riggers is nearly \$49,000 a year, but industrial riggers in certain areas of the country can earn double that and more.⁷³ Pipefitter is the most demanding of the three occupations, with a median wage of \$53,000, and an industrial pipefitter can command as much as \$70 an hour plus per diems and overtime.⁷⁴

Contractors across the country report shortages of welders, riggers and pipefitters—and predict rapid growth in all three occupations as the baby boom generation retires. Just 10 to 15 years ago, according to Cianbro, most people who applied for a welding position at the company passed the firm's pre-hire technical assessment. Today, not many skilled welders apply, and few applicants pass the test.

BACKGROUND

Considerably smaller than most of the nation's other leading industrial construction firms, Cianbro employs some 4,000 workers operating across 41 states.⁷⁵ Founded in the late 1940s by four brothers, all World War II veterans following in the footsteps of their father, an Italian immigrant who came to the US to work as a construction laborer, the Maine-based company prides itself on a culture in some ways reminiscent of an extended family.⁷⁶ An employee stock ownership plan gives workers a stake in the firm's productivity. The turnover rate is well below industry norms. The outgoing CEO, now chairman of the board, describes himself as a "safety fanatic," and he has spared no expense to ensure employee safety on the job.⁷⁷ It's a culture that has paid off well for the company—in a stellar national reputation, robust growth and a stream of large, high-profile jobs relatively unusual for a firm of its size.

Cianbro's training culture grew naturally out of its safety culture. Until recent decades, construction

was among the most dangerous industries in America. Injuries were common; workers sometimes died on the job. Indeed, it was a death at Cianbro that drove the firm to launch an extensive safety training regime in the late 1980s, putting it in the vanguard of the industry, which has now largely followed suit.⁷⁸ Not long afterward, the company began to bid on bigger, more sophisticated projects farther from its New England base and realized that, like its safety culture, a better trained, more efficient crew could be a competitive advantage.

The firm views this adaptability as a competitive advantage.

The contractor had always done some training—traditionally, informal on-the-job spot training and mentoring. But the 1990s brought a more systematic approach.⁷⁹ At first, it was mostly partnerships with local high schools and community colleges. By the end of the decade, the firm was offering a few programs in-house. By 2007, it had built a small facility devoted to workforce development, the Cianbro Institute.

Last summer, the institute moved to a new site: a 40-acre campus that includes a welding shop, construction cranes and a simulated power substation with live high-voltage electrical lines.⁸⁰ The staff consists of 22 full-time instructors. Employees choose classes from a 40-page course catalogue.⁸¹ Offerings include new-hire orientation, safety training, manufacturer-mandated certification for equipment operators and, the jewel in the crown, what the company calls "developmental" programs—craft skills training.

The firm took a big step toward the flexible earn-and-learn model now at the heart of all its offerings in 2008, when it landed a job with Motiva Enterprises, owner of the largest oil refinery in North America, in Port Arthur, Texas.⁸² Motiva was expanding and upgrading the facility. Cianbro bid on and won a piece of the work: building a set of huge pipe modules, 40 feet wide by 60 feet tall

by 120 feet long, to be assembled in Maine and shipped by sea down the East Coast and into the Gulf of Mexico for installation in Port Arthur. It was a major contract, time was of the essence, and Cianbro needed to hire workers fast, adding some 250 pipe welders and 150 pipefitters in just three to five months.

Educators and other construction employers told the firm it couldn't be done. A traditional welder or pipefitter apprenticeship program can last four to five years—they are two of the most exacting and skilled jobs in the industry. And even as the US headed into the Great Recession, labor was scarce in central Maine.

Cianbro was undeterred. Its vision: it didn't need to teach trainees everything they would ever need to know about pipefitting or welding before putting them to work building modules—just enough to do the job at hand. Also, a second departure from standard practice, the firm decided to do away with the traditional earn-and-learn rotation—typically, in a classical apprenticeship, a few days a week in class coordinated with a few days on the job or, in the construction trades, on the job most days with classes in the evenings or on weekends. Cianbro's plan: a crash eight to 12-week course at a training facility, followed by immersion in the job—a consecutive rather than coterminous combination of classroom and on-the-job training.

An intensive recruitment campaign produced a first cohort of trainees, many if not most of them with little construction experience. The curriculum was the widely recognized industry standard: in each case—welding and pipefitting—a series of modules developed by the National Center for Construction Education and Research (NCCER) and offered nationwide at community colleges and other training centers. It takes most students a year or two to complete levels one and two of the NCCER curriculum in welding or pipefitting. Cianbro compressed the instruction into eight to 12 weeks—eight weeks for pipefitting, 12 for pipe welding—and paid trainees while they learned, although they never left the classroom or simulation lab.

At the end of eight to 12 weeks, trainees went to work as full-fledged members of a crew, making modules for the Port Arthur refinery. Workers continued to learn on the job, supervised by mentors and experienced coworkers. Then, after six months of work, those whose supervisors endorsed them for further training were offered the opportunity to return to the classroom: one day a week for the next year or so to finish the third and fourth levels of the relevant NCCER curriculum. Those who completed these programs took NCCER written assessments, earning certifications respected across the construction industry.

It's a combination of flexibility and quality the firm says can be achieved only with unregistered earn-and-learn training.

All in all, it took most trainees about 18 months to complete each program. Though shorter than a standard welder or pipefitter apprenticeship, these were hardly crash courses. As in any apprenticeship, workers combined time in class with time on the job, supplementing theoretical knowledge with hands-on practice and real-world responsibility. Graduates who passed the end-of-course performance tests earned nationally recognized NCCER certifications.

But unlike in a classical apprenticeship, many trainees were working as journeymen long before the programs ended—as soon as their supervisors vouched that their performance rose to the journeyman level. Meanwhile, thanks to the creative way it handled recruitment and training, Cianbro was able to complete the Motiva job on time and against all expectations, building 51 modules for the Port Arthur refinery before most of the workers the firm hired for the project completed their training.

Cianbro executives still talk about the Motiva program as a formative experience: it taught them it was possible to tailor the traditional apprentice-

ship model to suit their own needs, shortening, focusing and restructuring instruction if appropriate to train workers for a timely project. “The Motiva project reinforced our belief that a flexible, nimble, customized approach to training is the best approach for us,” explains Cianbro vice president of human resources Michael Bennett. “Individuals with no construction experience who had been flipping burgers and making sandwiches came into a program for just eight to 12 weeks and doubled their salary. Not only that, but we discovered later, they surpassed many of our most experienced veterans.”

A companywide assessment some time after the training ended showed that 14 out of 15 of the firm’s top-performing welders had come through the Motiva welding program.⁸³

Over the past decade, the Motiva experiment has spawned an array of training options at Cianbro. The pipefitter program was adapted the following year for a second cohort of trainees. The firm has established similar unregistered earn-and-learn preparation for more than half a dozen different skilled trades, and its recently launched four-week boot camp is based on a similar model. What they all have in common: some coordinated combination of class time, simulation lab and on-the-job learning. But they also vary in significant ways. Different combinations of these three core components are arranged in different sequences, some short, some long, some relatively similar to a classical apprenticeship, others quite different—all tailored to a job at hand.

Alongside these unregistered earn-and-learn options, Cianbro also maintains several registered apprenticeship programs. For many years, the firm resisted registering any of its offerings. The logic, according to Bennett: “We wanted the flexibility to do it our way. We wanted to be able to tailor our training to our specific needs—the specific job and the specific tasks required by our clients. Why invest time and energy teaching topics that have nothing to do with the project we’re training for?”

But two things changed in 2010—from the company’s perspective, a combination of carrot and stick. First came what Cianbro executives call “political pressure” to register. A former employee took a job in another state and needed to sit for that state’s licensure exam. To take the test, he had to provide evidence of appropriate training, and when Cianbro vouched for his instruction at the institute, executives were told it didn’t satisfy state requirements—because it wasn’t registered.

Cianbro was incredulous but realized resistance would probably be futile. This and other extrinsic incentives—privileges conferred by state and federal authorities on workers who have completed registered apprenticeships—were proving too strong to resist. Fortunately, in the firm’s view, not long after, the US Department of Labor rewrote its requirements for registration, opening the door to more flexible programs that measure competency rather than time spent in class to determine if a trainee is making progress.

Ultimately, for Cianbro, it was a strategic decision. Executives weighed the advantages and disadvantages and decided they should experiment with a registered earn-and-learn option. In the years since, the contractor has launched eight registered apprenticeship programs, including for ironworkers, electricians, crane operators, power line workers and substation technicians.

Still, the firm remains steadfast in its belief that flexibility is better, and executives chafe at what they see as irrelevant curriculum required in many registered programs. “A registered pipefitting program includes a whole module on plumbing,” Bennett explains. “An industrial pipefitter doesn’t need to know plumbing.” But over the years, for expediency’s sake, the builder has adopted a dual approach—a roughly even mix of registered and unregistered earn-and-learn training options.

HOW IT WORKS

Recruitment and screening. Like construction contractors nationwide, Cianbro struggles to find

enough workers. High recruitment standards add to the challenge but are viewed as essential to maintaining the firm's reputation for quality work.

- Six to eight recruiters visit schools nationwide, the firm participates in a wide range of recruitment activities.
- Experience not necessary, attitude is key—candidate must be willing to learn, willing to travel and a team player.
- Roughly 30 percent of applicants meet company criteria for hiring.
- Hiring cost: \$5,000 per worker—includes drug test, technical assessment and judgment assessment.
- No standard age, most are younger than 35.
- Roughly 60 percent of hires have some construction experience.
- Roughly 85 percent receive training beyond orientation and safety.
- Roughly 40 percent participate in a Cianbro earn-and-learn program.

Common across programs. The firm's unregistered earn-and-learn programs come in all shapes and sizes, but some common principles apply across the spectrum of offerings.

- Employees are paid to learn, including in class—receive wages and per diem as appropriate.
- Rule of thumb: more simulation lab than class, more on-the-job learning than simulation lab.
- Trainees spend a minimum four weeks a year in school or lab in addition to time on the job.
- All programs are competency-based, not time-based.

- Trainee progress is monitored and measured—written and hands-on assessments in the classroom, supervisors' evaluations in the field and a written evaluation when a worker moves from one project to another.
- The most important training metric: a field supervisor's endorsement that a trainee is ready for the next step.
- Supervisors meet regularly to coordinate classroom work and on-the-job learning.

Coordination of class and on-the-job training.

Common across programs: the company devotes considerable time and expense to monitoring the alignment between class or lab work and on-the-job training.⁸⁴

- Overseen by "steering committees"—one per earn-and-learn program.
- Members include senior managers, on-site supervisors, classroom and lab instructors.
- Meet every four to six months.
- Is the on-the-job experience covering all essential skills?
- Are trainees progressing?
- Do particular individuals need more time in class or more time to practice on the job?
- Is technology changing, and how should curriculum be modified to keep up?

Boot camp. The contractor's shortest earn-and-learn program, established in 2018, is designed to prepare selected new hires for more advanced training, registered and unregistered. Other entry-level workers receive just basic orientation and safety training—a two-day course.

- Four-week program to produce helpers for specific in-demand trades.

- Goal is to lay a foundation for further training.
- Starts from scratch with training on small tools, power tools, safety and first aid.
- Then, trainee chooses a trade and focuses on it for the rest of the program.
- Starting wage is \$12 an hour and on completion of program rises to \$16 an hour.
- After four weeks of classroom and lab instruction, trainees get on-the-job experience.
- Workers who succeed on the job are endorsed by supervisors for further training.
- Seventy percent of the first cohort completed the program and were retained as Cianbro helpers.
- Close to 50 percent of those retained have been endorsed to more advanced training.

Rigger. One of the Cianbro earn-and-learn offerings most similar to a classical registered apprenticeship, the rigger program cycles workers through alternating stints in class and on the job. Trainees who complete both components are eligible to earn nationally recognized third-party certifications, and it takes about three years to reach journeyman level. But even in this case, Cianbro has taken liberties with the classical model to design a program that suits the firm's unique needs.

- Ratio of on-the-job learning to class time is unusually high.
- Training starts with two days in class, followed by a year on the job.
- After a year, trainees endorsed by their supervisors may return to class for four days of advanced training.
- After advanced training and a total of three years on the job, trainees may sit for assess-

ments offered by the National Commission for the Certification of Crane Operators (NCCCO).

- Those who pass the assessments are certified as journeymen.
- Many journeymen continue training—further study and on-the-job experience.

Welder. One of Cianbro's most flexible and nimble earn-and-learn offerings, its welding program differs in a number of ways from a classical registered apprenticeship.

- Among the company's largest earn-and-learn programs.
- Among its most flexible offerings—multiple ways to progress.
- No class time—all lab and on-the-job learning.
- Progress is measured by in-house Cianbro assessments and certifications.
- Assessments are based on American Society of Mechanical Engineers (ASME) welding codes.
- Assessments are offered after units completed in lab—before experience in the field.
- Three levels of structural welding instruction take an average six to seven weeks in a lab.
- Four more advanced levels of pipe welding take a total 12 to 14 weeks in a lab.
- On-the-job experience occurs between lab stints as needed—no set duration.

METRICS AND RESULTS

Cianbro has three different ways to track employees' skills and on-the-job performance.

The first, most basic metric is safety-related. New hires, trainees and experienced workers alike are

expected to report all safety incidents, large and small, no matter where and when they occur—including when the worker is off the clock. Field supervisors collect this information daily and relay it to more senior staff.⁸⁵

Second, alongside this internal safety tracking, Cianbro relies on a variety of external, third-party-validated standards to evaluate workers' craft skills. Different external bodies work differently, and certifications vary from trade to trade. NCCER and NCCCO assess workers directly and certify their abilities. ASME provides requirements for welded products and sets welding standards for industrial construction contractors. NCCER also accredits training programs, and ASME certifies companies that meet its guidelines.

'Industry-recognized programs are the best tools available to the industry.'

Cianbro is certified by ASME. The Cianbro Institute is accredited by NCCER. All instructors at the institute are master craftsmen, accredited as trainers by NCCER. And trainees in most of the builder's craft skills development programs sit for assessments by one organization or another. In the past three years, 335 trainees in a variety of trades have passed NCCER assessments. Some 200 aspiring riggers earn NCCCO credentials each year. Welders sit for Cianbro's own internal welding assessments, which are based on ASME codes, and over the past two years, the company has issued 700 welding certifications, allowing some 90 percent of welding trainees to graduate from the lab-based portion of the program and join a crew in the field.⁸⁶

Still, even with this reliance on third-party metrics, Cianbro executives and training staff warn against setting too much store by external quality control. "Just because you have a driver's license doesn't mean you know how to drive—or drive well," says

one senior trainer. Bennett concurs: "I'm not going to rely solely on an external test or a previous contractors' educational program. Ultimately, it's Cianbro that's responsible for the quality of our workers' welds. We hold the risk and the liability. So we have to weld to our own standards, and it's our responsibility to verify the competency of our workforce."⁸⁷

Third, and perhaps the most important metric at Cianbro, are in-the-field evaluations—case-by-case, qualitative assessments by supervisors and clients in a position to observe workers on the job.

Supervisors monitor craftsmen's skills and performance and report their assessments up the chain of command. Most construction projects are relatively short-term; most Cianbro employees work on several jobs over the course of a year. And when they move from one project to another, their supervisor is expected to fill out a detailed evaluation, reporting any skills gaps that need to be addressed. Supervisors also endorse high-performing workers for advancement, recommending them for additional training or the opportunity to sit for an assessment that could lead to a certification and a higher-paying job.

Clients' evaluations can be even more exacting. Many of the companies that hire industrial construction contractors regularly test workers' performance on the job. The gold standard for welding is an X-ray weld—meaning even an X-ray can find no flaw in the product. And when that test is applied, Cianbro reports, 97 to 98 percent of its welds are accepted by the client.⁸⁸

Less rigorous but also telling, Cianbro has won more medals than any other contractor at the Associated Builders and Contractors' annual national craft championships.⁸⁹

COMPARED TO REGISTERED APPRENTICESHIP

Cianbro executives and training personnel feel they are in an ideal position to compare registered apprenticeship with unregistered, appren-

ticeship-style craft training. The builder maintains at least a half-dozen of each kind of offering and regularly moves programs from one column to the other, registering a previously unregistered training option or vice versa.

Bennett and his team see pluses and minuses to both kinds of preparation. But by and large, in their view, the benefits of registering are extrinsic—business and regulatory advantages. The benefits of unregistered training, in contrast, are intrinsic to the craft training mission—teaching and learning skills.

For Cianbro, as for other construction contractors that bid on federal government projects, maintaining a registered apprenticeship program confers a financial advantage. On government work, as on other jobs, builders invariably use a mix of more and less qualified workers, from laborers to master craftsmen. But the Davis-Bacon Act mandates that contractors pay all workers on a federal job at least the journey-level wages mandated for the region by the US Department of Labor—unless the employee is enrolled in a registered apprenticeship program. In that case, it's permissible to pay them a wage more appropriate for their skill level. Like most federal construction contractors, Cianbro routinely takes advantage of this provision.

The steepest challenge for policymakers is quality control.

Even more valuable to Cianbro than the Davis-Bacon wage exception is the advantage that registered apprentices often enjoy when applying for occupational licensure. In some states—including several New England states where Cianbro does a lot of business—only workers who have successfully completed a registered apprenticeship can sit for licensure exams. And even craftsmen who earn licenses in states without this requirement can find themselves unable to work in a state that views formal

apprenticeship as a prerequisite to licensing. “This is the main thing that drives us to register our programs,” Bennett explains. “We have projects all over the US. We can’t afford to have our workers stopped at a state border.”⁹⁰

In some ways, Bennett notes, the company’s experience registering its programs has helped bolster its training culture. “We track all trainees,” he says, “and measure their progress with the same yardsticks. Registering adds no value there.” But much as the firm prefers targeted training programs tailored to the job at hand, in some cases, managers appreciate the more comprehensive scope of a registered program. “If the curriculum is fully relevant to industrial construction, it can make for a well-rounded employee,” one senior trainer explains. Registering also provides management with a useful internal tool. “We tell field supervisors that things have to be done this or that way—the state requires it.”

Still, in the end, Cianbro leadership is unequivocal. “Industry-recognized programs are the best tools available to the industry right now,” Bennett told members of the US House of Representatives in 2017.⁹¹

His logic: industry-driven programs are more flexible and likely to be better suited to the job at hand. Workers “learn what they need to know and no more than they need to know,” getting out into the field sooner and earning journeyman status, he says. “This doesn’t mean they stop learning at that point,” Bennett maintains. “Most of our workers come back later for further training. But it doesn’t all have to happen at once, at the start of their time with the company.”

Still another critical advantage, according to Cianbro Institute staff: a flexible, unregistered program can prepare a multiskilled worker competent to practice several trades—welding and pipefitting, for example, or rigging and ironworking.

Bottom line, says Bennett: the Cianbro training culture represents a “different mindset” than the

attitude at companies that prefer a registered approach. "Our training is project driven. It's also business driven. We make the program fit what we do—no unnecessary skills, no unnecessary time. We think that's better for the company, but also for the trainee—more productive for everyone, including the worker who wants to get out onto the job and earn better wages as soon as possible."

CHALLENGES

Cianbro executives seem confident that they've found a mix of programs—some registered, some unregistered, some shorter, some longer, for unskilled and highly skilled employees—that works for them.

Somewhat less clear, and perhaps more of a challenge for policy than for the New England builder: is Cianbro's approach replicable? How can policymakers incentivize other firms to adopt a training culture like the one that prevails at Cianbro—committed to workforce development, ready and willing to spend money on it and maintaining the highest standards of quality, all with minimal government regulation?

The steepest challenge is quality control. Cianbro is committed to quality and works hard to maintain it. But not all firms do, or can be counted on to do so in exigent circumstances. And policymakers seeking to promote a freer, more flexible approach to training must grapple with quality assurance.

Cianbro executives express skepticism about the role government can play to incentivize additional training or guarantee quality.

The builder's approach owes little or nothing to government incentives. Both its goals and its standards tend to be internally generated. Management decides what workforce development the firm needs and what constitutes quality. And internal Cianbro metrics may or may not be relevant if the worker leaves the company: third-party certifications issued by NCCER and NCCCO are fully portable and recognized across

the industry, but few contractors outside the state of Maine recognize a Cianbro welding certification, for example.

The contractor chafes at the divergent standards most state and federal officials apply to registered and unregistered earn-and-learn training. "Just put us on a level playing field," Bennett urges. Whether what's at stake are grant opportunities, licensure tests or college credit for workers who complete a training program, Cianbro trainers want equal recognition. "We want the same standing with the same advantages as registered apprenticeship programs," a senior instructor says.⁹²

Yet Cianbro managers are hesitant about the prospect of additional government oversight. "Why are we creating a new government program to manage unregistered apprenticeship?" Bennett asks. "What we have is working fine. We don't need another entity regulating and overseeing it."

The question for policymakers: can this circle be squared? Without some kind of industrywide metrics or outcomes-driven standards, it's hard to imagine state or federal government conferring the same advantages on unregistered as registered earn-and-learn offerings. Government recognition—and government support, on any scale—implies a government guarantee of quality: quality training and, at the end of the process, qualified employees.

When pressed about external measures of quality, Cianbro managers point to the resources the company commits to training and also the third-party tests it uses to establish minimal performance thresholds. But in the end, the firm's focus isn't policy, and the standards it cares about most are its own. "We believe what we're doing is right for our organization," Bennett says. "We're developing competent professionals. They work safe. They work as a team. And they're building high-profile, high-stakes projects across America. That's good enough for us."

CONCLUSION

Whether or not Washington can find a way to scale a more flexible, business-driven approach to earn-and-learn training, the Cianbro experience holds lessons for anyone—other companies and policymakers—trying to understand employer-provided workforce development.

At the simplest and most basic level, the New England builder is proof positive of the payoff to training. Some three decades ago, Cianbro management grasped that a better-trained, more highly skilled workforce could be a competitive advantage, and the firm is still reaping the rewards—robust growth, a reputation for quality, high levels of employee engagement and more. The contractor's choices make it a classic exemplar of what some researchers call a "high-road company." Although it spends considerably more than many comparable firms on employee training

and other benefits, it has found the investment to be more than worth the cost—and the company's profits are competitive with those of its peers.

A second and equally important lesson: the core principles of the classic apprenticeship model can be applied successfully to shorter, simpler training programs, less expensive for sponsoring companies and easier to implement. Cianbro's entry-level boot camp, just four weeks long, exemplifies what can be done. The program combines classroom learning with on-the-job experience. Trainees are paid to learn. Instructors and field supervisors coordinate closely to make sure nothing essential—no needed skills and no individual trainees—falls through the cracks. But unlike many registered apprenticeship programs, which can be expensive and unwieldy, beyond the reach of small and medium-size companies, the Cianbro boot camp all but invites replication on a broader scale.

CASE STUDY

FAIRVIEW

AT A GLANCE

Fairview Health Services, the second-largest private-sector employer in Minnesota, fields some 34,000 doctors, nurses and support staff at 12 hospitals and more than 100 clinics across the state.⁹³ A national leader in health care employee training, the system supplements virtually nonstop recruitment with a strategy its staff call “grow your own”—several registered apprenticeship programs, pipelines to bring disadvantaged local residents into health care professions and upskilling to promote food service and janitorial staff to entry-level allied health jobs, among other initiatives.⁹⁴

The system’s human resources leadership is strongly committed to registered apprenticeship.⁹⁵ As one of the first major US employers to launch an apprenticeship program in a field that had not traditionally relied on that approach, Fairview won recognition from the Obama White House and two Obama-era US Department of Labor apprenticeship grants totaling more than \$1 million. Still, devoted as it is to the traditional model, in some occupations, for some trainees, Fairview prefers unregistered earn-and-learn training.

Among the most successful of its unregistered options: a six-month program for operating room nurses that combines class time, clinical labs and on-the-job experience and can lead, after two years, to an accredited national certification.

LABOR DEMAND

Nursing is a profession with a long cyclical history of surpluses and shortages. Today, there is no national shortage—nursing schools are keeping pace with nationwide demand.⁹⁶ But nursing is a vast, varied field: there are dozens of categories of caregivers differentiated by level of education and certification, medical specialty, the type of patient served and the type of department or facility

where the individual is employed—hospital, nursing home, specialty care clinic or other venue.⁹⁷ Supply and demand for nurses also varies by geographic region, and many states are experiencing shortages—sometimes severe shortages—of particular specialties.

Registered nurses (RNs) make up about 80 percent of the profession, according to the US Bureau of Labor Statistics, and nearly three million RNs are employed in the US today. Openings are expected to grow by 15 percent in coming years—more than twice as fast as the national average for all occupations.⁹⁸ And wage rates suggest that Minnesota may be among the states experiencing RN shortages: it’s the only state not on the East or West Coast where the mean annual salary for registered nurses is in the \$75,000 to \$100,000 range—well above the national average of \$70,000.⁹⁹

A subset of registered nurses, operating room nurses (ORNs) are among the specialties in short supply virtually everywhere. Also known as perioperative nurses, they number about 160,000 in the US today. Demand for their services is growing as the population ages and outpatient surgical clinics proliferate.

Yet according to annual surveys by the Association of periOperative Registered Nurses (AORN), the profession faces a daunting wave of retirements: more than half of practicing perioperative nurses are more than 50 years old, with nearly 15 percent in their 60s.¹⁰⁰ And training remains in short supply: though many nursing schools offer an overview of skills required in the operating room, few offer in-depth training of the kind Fairview administrators say they require of their perioperative staff.

Perioperative nursing calls on a broad range of skills. It’s a demanding, high-stress job, requiring someone with the energy and focus to work in an

environment where life is on the line and brusque, exacting surgeons expect perfect performance. It also requires teamwork. There are often a half-dozen professionals in the operating room during a procedure: from the surgeon and the anesthesiologist to an unlicensed surgical technician, along with several different kinds of nurses. When things go wrong or a patient's status changes, members of the team may communicate with nothing more than a glance, and the circulating preoperative nurse may be called upon to coordinate a split-second change of course. Still a third requirement, as the chief advocate for the patient and liaison to the patient's family, ORNs need people skills—empathy and an aptitude for interpersonal communication.¹⁰¹

Operating room nurses are in short supply virtually everywhere.

In a field where credentialing is highly valued—just look at the welter of initials in any accomplished nurse's signature—perioperative nurses have some leeway, and their qualifications vary. They must be registered nurses, and most hospitals prefer RNs with bachelor's degrees. Like all nurses, they maintain state licenses that must be renewed every two years—an unrelenting regimen that requires continual training. On top of that, AORN offers an accredited national certification, also based on continuing education—a Certified Nurse Operating Room (CNOR) credential. But estimates suggest that only about 20 to 25 percent of perioperative nurses maintain CNOR certifications.¹⁰²

With or without the credential, operating room pay is generally good. Nurses work for hourly wages and often make a commitment to put in a certain number of hours each pay period. Though many nurses work part time, preoperative nurses among others frequently put in substantial overtime, and they're usually required to take "on-call" hours, making themselves available on nights or weekends, ready to come in on a moment's notice

for an emergency surgery.¹⁰³ All of this adds up, according to nurses and hospital administrators. Most estimates put median annual pay for operating room nurses in the \$60,000 to \$75,000 range.¹⁰⁴ And according to Beeth, total compensation, including overtime and on-call pay, can easily top \$100,000.

BACKGROUND

Several different trends and traditions led Fairview to unregistered earn-and-learn training for operating room nurses.

The first is Fairview's grow-your-own approach, now some three decades old and deeply ingrained.¹⁰⁵ Not all hospitals choose this path: many rely on nursing and medical schools or lean heavily on international hiring—immigrant nurses from the Philippines and elsewhere. But Fairview's size and the scope of services it offers make the demand for talent incessant, and the system tries to use every tool at its disposal, including a variety of training and education programs estimated to cost some \$99 million a year.¹⁰⁶

Fairview vice president of talent acquisition Laura Beeth calculates that she faces more than 1,400 openings a day across the system. They range from doctors and nurses to counselors for the system's mental health facility—the largest in the Midwest—and pharmacists for its prescription program, also one of the biggest in the region. Beeth fills about 165 jobs a week, only to watch another hundred-plus open up. And over the years, she has developed an array of strategies, short-term and long-term, to deal with these unending, widely varied labor needs.

One of her simplest stratagems is temporary workers: she hires 400 a week, including doctors, then works to persuade them to stay on as permanent hires. Another tactic: recruiting disadvantaged young people from Twin Cities neighborhoods. Fairview maintains summer camps for high school students and scholarships for adults attending community college. Diversity is a key criterion: the system

wants a staff that reflects its patient population—and as is, the ratio is far from aligned. Another major focus: promoting from within by upskilling existing employees—janitors and food service staff training to be medical assistants and surgical technicians—on Fairview time, with instruction paid for by Fairview.

A second factor that points Beeth toward earn-and-learn training: it's a long tradition in health care, particularly nursing. "On-the-job learning is part of our DNA," she says. "We've been running de facto apprenticeship programs for decades, long before they were called apprenticeship."

'On-the-job learning is part of our DNA. We've been running de facto apprenticeship programs for decades.'

This history starts in the Civil War era, when the increasing complexity of medicine required doctors to begin leaning on female assistants and the first nursing education emerged—usually a year or two of job shadowing at a local hospital. There was little or no class time; training was anything but standardized. Trainees often worked for free, grueling 12-to-18-hour shifts, six or seven days a week, until they qualified as registered nurses. Programs were systemized somewhat in the early 20th century, but as late as the 1960s, the majority of RNs still learned their profession at so-called "diploma nursing schools"—hands-on, on-the-job training in a hospital setting, where you earned a hospital diploma but no college or university degree.

The second half of the 20th century brought increasing professionalization and, with it, more academic training—standardized curriculum and for-credit courses, first at two-year colleges and then in a four-year setting. As recently as 2008, only about a third of RNs had bachelor's degrees.¹⁰⁷ In 2010, an influential Institute of

Medicine (IOM) report showed that bachelor-degree nurses, or BSNs, delivered safer, more reliable health care, and the institute called on the profession to aim for 80 percent BSNs by 2020.¹⁰⁸ The percentage of more educated nurses has risen sharply in the years since, but it still falls short of the IOM goal—and even with this increasing professionalism, much nursing training still takes place on the job.

No matter what degree nursing schools confer, they still teach a broad array of general skills, exposing students to as many different career options as possible but rarely going very deeply into any particular specialty. That further training invariably falls to employers: a hospital or other venue, where nursing graduates work for months or years under the supervision of preceptors—more experienced nurses who work alongside them, teaching them the ropes and helping them perfect hands-on techniques.

Bottom line: even as the profession has changed dramatically, becoming more professional and requiring more extensive, more sophisticated formal education, hands-on, on-the-job training remains an integral part of how nurses learn.

Operating room nurses are no exception. Though the job has grown more specialized and technically sophisticated, if anything, the need for on-the-job experience has increased through the years. But at the same time—the third trend driving Fairview toward the earn-and-learn model it relies on today—informal job shadowing and preceptor supervision is no longer seen as enough. The changing demands of the job require a more systematic, coordinated approach.¹⁰⁹

Twenty-five years ago, Fairview had no program to train periop nurses. When an opening occurred, a nurse was hired and sent to a local technical or community college. Courses were short—a brief overview of the subject—and once classes were over, the trainee returned to the hospital for what could be several years of supervised on-the-job experience before they were qualified to work

independently. In the mid-1990s, as the Fairview system grew, Beeth decided she needed something better—a more structured, more reliable program she could offer in-house to a cohort of trainees.

A national search led her to the Colorado-based Association of periOperative Registered Nurses. A full-service trade association with 275 chapters and 42,000 members nationwide, AORN offers an array of services—everything from a peer-reviewed journal to lobbying, plus extensive training resources.¹¹⁰ Beeth zeroed in on Periop 101—a standardized curriculum that combines class time with clinical labs and on-the-job experience under the supervision of a preceptor. No one called it apprenticeship, and this was long before Beeth joined the vanguard of nontraditional employers launching registered apprenticeship programs. But it was in fact apprenticeship in everything but name.

Curriculum is offered online. Fairview supplements it with classroom discussions, lab demonstrations, videos and other learning aids, as well as time on the job.¹¹¹ Originally stretched out over a year, this formal instruction—class and lab—now takes about six months. Students commit to a two-year work contract, and they're paid full-time, including for the hours they spend in class. Those who don't complete two years on the job must repay Fairview for the full cost of training. But most see their commitment through to the end, and nearly 20 years later, Beeth estimates that 80 percent of periop nurses currently employed at Fairview have come up through the AORN program.

HOW IT WORKS

Recruitment and screening. Periop 101 is highly selective, requiring admission to the program and an offer of employment from a hospital human resources department—one of five participating Twin Cities Fairview hospitals.

- The program is open to new hires and Fairview employees recommended by supervisors.
 - Among the most important criteria: a strong desire to work in the operating room.
 - Application process: extensive job shadowing and an interview by a panel of judges that includes hospital HR staff.
 - More than 25 people apply for every slot, and acceptance is conditional on a job offer from a hospital.
 - In years past, trainees had an average 10 years' nursing experience; strong desire to work in the OR is now seen as more important than experience.
- Curriculum.** The bedrock of the program—the key to its success—is the AORN curriculum, accepted nationwide as the industry standard. AORN regularly surveys its 42,000 members on the practices they use and what they find effective in the operating room, producing a curriculum that the organization calls “evidence-based.”¹¹²
- Curriculum in use in 2,500 hospitals and ambulatory surgical clinics nationwide.
 - Twenty-six online modules, 30 to 70 pages each.
 - Modules include sterilization and disinfection, surgical draping and wound closure.
 - Updated regularly based on feedback from trainers and input on practice in the field.
 - Curriculum comes with videos, chapter tests, a final exam and online tracking of student progress.
 - Also included: a train-the-trainer module for instructors.
 - Fairview pays a biennial fee—\$30,000 for up to 50 trainee slots.
- Students must be licensed registered nurses, with bachelor's degrees preferred.

Classroom instruction. Fairview periop training staff pride themselves on the thoroughness of their instruction—spread over six months as opposed to a few weeks at some colleges—and what they add to the curriculum, including a variety of hospital experiences and exposure to working health care professionals.

- Fairview offers the program twice a year, typically four to 10 trainees per cohort.
- Course unfolds over 118 highly scripted days—eight hours a day, five days a week.
- First eight weeks are spent almost exclusively in class and lab, with later weeks almost exclusively on the job at a hospital site.
- Fairview supplements online modules with in-class review, discussion, skills demonstrations and practice.
- Frequent guest lecturers include hospital staff and equipment manufacturers.

Coordination of class and on-the-job learning.

The on-the-job component of the program begins in earnest after students have completed most of the AORN modules. This work-based experience is not formally coordinated with classroom learning, but it must meet exacting operating room procedural standards.

- Trainees assist at actual surgeries—not just shadowing, but performing basic duties.
- Each student is assigned a preceptor who watches them closely and intervenes when necessary.
- Coordination of classwork and hands-on learning is informal—there’s no training for preceptors.
- Most Fairview preceptors have come up through the program and know the curriculum.

- Trainees are encouraged to take responsibility for coordinating their own classroom learning and clinical practice—telling preceptors when they want or need exposure to a particular task.

Work commitment. Periop 101 students agree to work for a Fairview hospital for at least two years—well after qualifying as operating room nurses. Those who fail to honor this commitment pay a steep price.

- Students are full-time employees, earning a regular RN salary.
- They commit to two years on the job, or more if they choose to work less than full time.
- Either Fairview or the student may opt out of the agreement up to four months into the training.
- Students who opt out after four months must reimburse Fairview for the full cost of the program—\$8,000 plus interest.
- After two years, students are guaranteed a permanent job in the Fairview system.

Milestones. Periop 101 students earn recognition for completing the AORN curriculum. They also accumulate continuing education credits that help them maintain their RN licensure. A nationally recognized specialty certification is available after two years on the job, but relatively few nurses choose to sit for the test.

- End-of-course exam, taken online and benchmarked by AORN, is widely regarded as a national standard.
- Graduates earn 41.7 continuing education contact hours—more than enough to maintain RN licensure.
- Two years after graduating, students are eligible to sit for an assessment leading to a nationally recognized, accredited CNOR certification—a highly sought mark of distinction.

- Once earned, CNOR certification must be revalidated every five years—through contact hours, continuing education or retesting.
- Fairview encourages ORNs to take the test, offering financial incentives.
- Relatively few qualified trainees choose to sit for the exam.
- Nationally, some 34,000 of 160,000 periop nurses hold CNOR certifications.¹¹³

METRICS AND RESULTS

Periop 101 is a highly selective program, but most of those who are admitted complete the training and land jobs in hospital operating rooms.

There's little question about the relevance of the instruction or the rigor of the metrics used to evaluate students. AORN standards are industry-tested and undisputed in nursing circles. Hiring hospitals also have every reason to be exacting. Yet very few students wash out or fall by the wayside—testimony to the rigor and efficacy of the training.

The challenge: persuading more graduates to earn a nationally accredited credential.

The first important milestone occurs four months into the program—the cutoff point for trainees who are not succeeding or have learned they aren't cut out for the operating room to drop out of training and reimburse the hospital. Fairview administrators say that fewer than 10 percent of trainees make this decision.

A second benchmark: the end-of-course exam, which is standardized and administered online by the curriculum provider, AORN. Students are given three chances to pass. Some 90 percent succeed the first time. Those who fail are shown

the questions they got wrong and tutored by instructors. According to Fairview staff, virtually 100 percent pass eventually and graduate from the program.

Nearly all—98 percent—remain on the job after graduation. Fairview does not track retention after completion of Periop 101, but according to Beeth, once nurses go to work in the operating room, very few leave before retirement.¹¹⁴

Over 17 years, 245 Fairview nurses have graduated from Periop 101, and Beeth estimates that 80 percent of the ORNs working in the system's hospitals have come up through the program.

COMPARED TO REGISTERED APPRENTICESHIP

Beeth works hard to keep up with the national debate about workforce issues, and she first caught wind of emerging interest in registered apprenticeship at a meeting of the National Governors Association in 2015. Among the featured speakers were representatives from the German and Swiss embassies in Washington, advocating a registered approach for sectors like health care that hadn't traditionally relied on it, and Beeth immediately saw an opportunity. Among other things, it was clear this was a growing trend and that it would mean additional funding for training programs.

Beeth had no idea how arduous a path it would be. Developing the program wasn't difficult. She focused in on one of Fairview's most pressing needs. The lion's share of Fairview nurses—especially its nonwhite nurses—have only associate degrees, and hiring policies mandated by the 2010 Institute of Medicine directive on bachelor-degree nurses were threatening to drive them out of the system's hospitals to lower-paying, lower-prestige nursing-home jobs. Beeth's answer was a registered apprenticeship program to upgrade associate-degree nurses (ADNs) to BSNs, earning them not just a journeyman certificate, of questionable value in the health care sector, but a bachelor's degree.

The challenge was primarily political—what Beeth now describes as “an incredibly complex process” of recruiting allies and securing their buy-in. She mapped the competencies required for bachelor-degree nurses onto college curricula, coordinated accreditation at 26 Minnesota colleges, solicited support from 13 unions and enlisted the state’s 17 workforce development boards to help get the word out about the new program. This paved the way for state approval and \$850,000 of state funding. Then, in 2015 and 2016, came two US Department of Labor apprenticeship grants totaling \$1,225,000—part of the Obama administration’s push to expand registered apprenticeship in nontraditional fields.¹¹⁵

Fairview’s Periop 101 earn-and-learn training would gain little or nothing from being registered.

In 2018, Fairview added two new registered programs, one for medical assistants, the other for surgical technicians. A third is on the way in 2019—for graduate-level specialty nurses. As of December 2018, 148 Fairview employees were enrolled in registered apprenticeship training.¹¹⁶

Still, committed as she is to registered apprenticeship, Beeth doesn’t believe it’s for everyone—not always necessary for the job or appropriate for targeted trainees—and there are no plans to register Fairview’s ORN earn-and-learn training.

Among other reasons, Periop 101 is a relatively short program. Institutions offering the AORN curriculum can stretch or compress it to meet any schedule, and at Fairview it once took a year to finish. But more than a decade of experience has taught administrators that this isn’t necessary—six months is enough to complete the modules and all that Fairview adds to them, including lectures, videos, in-class discussion, skills demonstrations and more than 16 weeks of intensive on-the-job training with a preceptor.

A second reason not to register, according to Beeth: ORN trainees don’t need the wraparound supports she feels are necessary for ADNs and those training for an entry-level position like medical assistant. “You have to have different strategies for different people,” she says. Nurses training to be ORNs are highly educated, motivated and self-sufficient.

Registering the program might confer some additional advantages, including state and possibly federal funding. But Fairview maintains an ample workforce development budget, and Beeth has found other ways to pay for Periop 101 and another unregistered earn-and-learn program offered at Fairview, for health care information technology workers. The widely respected AORN curriculum guarantees that Fairview’s periop training meets industry standards. Decades of experience with preceptor-guided, on-the-job learning lend method and structure to the hands-on component of the program. So Beeth sees no intrinsic reason to put it through the registration process—registering is unlikely to improve either content or delivery.

Her one concern: in contrast to the associate-degree nurses who complete Fairview’s ADN-to-BSN apprenticeship, most Periop 101 students don’t earn an accredited credential. Their only path to certification requires sitting for the CNOR exam, and most choose not to do so.

CHALLENGES

Fairview’s unregistered earn-and-learn Periop 101 training is a highly successful program, targeted to the giant health care system’s unceasing needs and worth the investment and effort for nine out of 10 nurses who enroll.

The two essential elements that make it a success: AORN’s time-tested and widely respected industry-recognized curriculum and Fairview’s long experience with informal preceptorship—using untrained but experienced employees to mentor trainees on the job in the operating room.

In another setting or another sector with no tradition of mentoring, perhaps it wouldn't work as well to rely on a similarly unstructured on-the-job approach. But this does not appear to be a problem at Fairview.

The challenge at Minnesota system, if there is one, might be persuading more periop graduates to earn a nationally accredited credential. It's something of an issue for Beeth: "We're developing our employees," she says, "and we want them to come away with credentials—credentials that will be recognized everywhere, at any setting where they choose to work."

What isn't clear: just why so few Periop 101 graduates or other ORNs nationwide choose to sit for the CNOR exam. Fairview instructors say taking the test is expensive, also a "hassle" and a "big time commitment." Two years after completing formal training, nurses seeking certification must brush up on the curriculum and take a high-stakes online test, then continue with additional training or retesting every five years to keep their credential current.

One alternative—one potential answer for the concern about credentialing—might be to require certification for all operating room nurses. But the fact is neither nurses nor hospitals nationwide—even hospitals as sophisticated and demanding as Fairview—seem to view the accredited certification as essential. So perhaps the concern is unfounded; perhaps the AORN curriculum and its end-of-course test are all that's needed to guarantee quality.

CONCLUSION

Fairview Health Service's unregistered earn-and-learn training for operating room nurses is a classic apprenticeship program in everything but name. Students combine classroom learning with on-the-job experience. The highly structured curriculum meets exacting industry standards respected nationwide. Trainees are paid to learn, in class as well as on the job. And although the program is relatively short—just six months in duration—the CNOR requirement that graduates spend two years on the job before attaining an accredited credential suggests that the training is in fact commensurate in length with many registered apprenticeships.

Laura Beeth's work developing earn-and-learn training, registered and unregistered, for Fairview points to a strange paradox. Despite more than 150 years of history using on-the-job training to produce highly paid professionals, health care is considered a sector with little or no familiarity with apprenticeship. True, American hospitals and clinics have little experience with registered apprenticeship. But surely that's not the same thing as no experience—and perhaps the categories need some rethinking.

The essential lesson from Fairview: the core principles of the classic apprenticeship model can be applied successfully to shorter training programs, structured somewhat differently, that do not fit the mold required for registration or choose not to submit to the arduous, consensus-building process it entails. Fairview's Periop 101 earn-and-learn training would gain little or nothing from being registered. But it's hard to see how it could be substantially improved, and it ought to be recognized and replicated on a broader scale.

CASE STUDY

MERCEDES-BENZ OF ARLINGTON

AT A GLANCE

One of the oldest and largest Mercedes-Benz dealerships in the US, Mercedes-Benz of Arlington, Virginia, employs some 300 people, 50 of them technicians, just across the Potomac River from Washington, D.C.¹¹⁷ Like most auto dealers, the family-owned franchise struggles to hire technical talent, even as automotive technology grows more digitally sophisticated and many of the firm's existing technicians age toward retirement.

Under the leadership of longtime service and parts director Stan Rodia, the dealership plays an active role in an Automotive Youth Educational Systems (AYES) high school internship program offered at a local secondary career and technical education center. AYES is a national initiative, developed some 30 years ago at General Motors and adopted by an industry consortium that includes most of the major manufacturers operating in the US—GM, Chrysler, Volkswagen, Toyota, Honda and Nissan, among others—and the National Automobile Dealers Association (NADA). In Arlington, the program works with local employers—dealerships and independent repair shops—to offer earn-and-learn opportunities to some 20 high school students each summer.

Tinkering with dad's old lawnmower is no longer enough to prepare you for the job.

But Mercedes-Benz of Arlington has also gone a step further. Inspired by the AYES program and eager to take it to the next level—not just career exploration for high school students, but also a full-fledged talent pipeline for the dealership—two veteran service technicians have created a second initiative. Just a few years old but already

producing impressive results, it's a one-year earn-and-learn offering for entry-level technical talent that can lead to certification as a Mercedes-Benz systems technician, a highly skilled, high-paying job in demand nationwide.

LABOR DEMAND

Roughly half of the 640,000 automotive service technicians employed nationwide work at authorized dealerships.¹¹⁸ But whether the operation is a corporate franchise or an independent mom-and-pop shop, the same truth applies—an automotive service business is its employees. According to industry estimates, the average service tech generates some \$1,000 in gross revenue a day, so if a technician's job goes unfilled for 90 days, the opportunity cost for the employer is \$90,000.¹¹⁹

According to the US Bureau of Labor Statistics, the median wage for automotive service technicians is \$19 an hour, or roughly \$40,000 a year.¹²⁰ But rates are higher at dealerships and in affluent suburban locations, and at most shops, techs are paid by the job rather than the hour—an arrangement that often increases their take-home pay. Manufacturers estimate the "flat rate," or how long each type of repair—say, a brake pad replacement—typically takes. If a tech can do it faster, the shop calibrates his pay accordingly. At Mercedes-Benz of Arlington, an entry-level Mercedes certified technician earns \$25 an hour, pay rises with seniority, and it's not unusual for top performers to complete the equivalent of 60 to 70 flat-rate hours of work a week—for total compensation of more than \$75,000 a year.¹²¹

Even so, the labor outlook is discouraging—industry sources use the word "dire." BLS estimates that service tech job openings will grow by 6 percent in coming years.¹²² The industry predicts that more than half of experienced technicians will retire by 2024.¹²³ Turnover is punishing: half of all certified entry-level techs leave their job within

two years.¹²⁴ A typical luxury car has some 150 electronic control units—more computing power than the original NASA lunar lander.¹²⁵ But the old stereotype persists: the auto mechanic as “grease monkey.” A 2016 industry survey found that most of the existing workforce would not “recommend the career to a friend”—and according to many human resources managers, it’s not a job that interests most millennials.¹²⁶

The auto industry has been working for decades to improve automotive career preparation and upgrade the quality of service technicians. It was one of the first industries in the US to develop nationwide job standards and credentials for technical workers—the Automotive Service Excellence (ASE) certifications that roughly half of automotive employers now require of employees.¹²⁷ Leading manufacturers, national and state dealer associations and an array of other ancillary businesses, including tool makers and specialty service franchise chains, support the ASE testing and credentialing system, which calls on technicians to train, retrain and retest through their working lives. And many of the major manufacturers have developed training and credentialing regimes of their own that mirror or build on ASE’s.

General Motors CEO Jack Smith had spent time in Germany, where he saw and admired the classic German apprenticeship model.

Thousands of high schools and colleges nationwide teach to these credentials—ASE certifications and those maintained by manufacturers. Many automakers offer upskilling in-house. Mercedes-Benz, for example, maintains its own high school internship program, a registered apprenticeship and five proprietary training facilities across the US.¹²⁸ A new rule of thumb in the industry: the better paying and more prestigious the job, the more likely it is to require a credential. And at most shops, only workers with current

manufacturer certifications can repair or replace parts under warranty.

The bottom line for technicians: tinkering with dad’s old lawnmower is no longer enough to prepare you for the job. Technical training is imperative at the start of your career, and most experienced service workers, even at mom-and-pop shops, spend some time each year retraining and often retesting to keep current with changing technology.

BACKGROUND

Stan Rodia first heard about the AYES program in the late 1990s at an annual convention of the National Automotive Dealers Association. Then a 20-year veteran of the industry, already an institution at Mercedes-Benz of Arlington, Rodia liked the idea of finding a way to give back to his community. He contacted the nonprofit coordinating the AYES program, just then taking off nationwide, about the possibility of sponsoring some interns. The organization sent a representative to Arlington to explain what it would entail. Next steps led to the Virginia Department of Education, then a string of local school boards and finally, in what seemed like an endless series of phone calls and meetings, more than a dozen local automotive employers.

Everywhere Rodia turned, there were obstacles. Curriculum for the classroom portion of the program was available off the shelf, developed by the sponsoring nonprofit and approved by the state. But no local high school wanted to bother organizing internships, and only a few other local employers expressed interest. Rodia persisted, undeterred, badgering high schools, haranguing employers and persuading Mercedes-Benz corporate to donate a vehicle and some equipment to the Arlington Career Center, a nearby, publicly funded career education facility that trains students from several local high schools.

Before it could offer the program, the center had to secure permission from the state and be ac-

credited by the organization that maintains ASE certifications for professional technicians, the National Automotive Technicians Education Foundation (NATEF). It took two years and a lot of arm twisting by Rodia and others, but finally in summer 2000, three Arlington automotive employers hosted a first, small cohort of interns for 12 weeks of on-the-job learning.

Rodia was an early adopter—in 1998, AYES was still new and unproven, the brainchild of legendary General Motors (GM) CEO Jack Smith. During his ascent at GM, Smith had spent time in Germany, where he saw and admired the classic German apprenticeship model, and in 1995 he announced that GM would experiment with a “school-to-work transition strategy,” not as ambitious as full-fledged apprenticeship, but a way to expose students to the automotive industry and ease the stigma associated technical careers.¹²⁹ It began as a GM pilot—just a few schools and dealerships. But by 1998, 14 other manufacturers had bought into the idea, now renamed AYES, and established a nonprofit to run the program, already being offered at more than 60 schools nationwide.¹³⁰

More than two decades later, AYES is an institution in the automotive industry. The two-year program combines classroom instruction with mentored internships. After a year of classroom exposure, students spend 320 hours on the job, earning competitive salaries from participating employers. They learn the fundamentals of automotive technology but also employability skills—how to write a résumé, handle themselves at a job interview and get along with other, adult employees in a real-world work environment. In the second year of the program, they sit for ASE student certification exams, somewhat less demanding than the association’s professional credentialing assessments, but otherwise similar in approach.

Part of what makes AYES remarkable is its national reach and scale. Some 45 states have approved the curriculum, offered now at 350 NATEF-accredited high schools. More than 3,500 participating employers hire AYES interns. And some three

dozen major corporate partners—manufacturers, equipment makers, franchisors and others—support the initiative.¹³¹

The nonprofit that administers the program, recently renamed the ASE Education Foundation, has developed an arsenal of tools and techniques that make it easy to launch a local partnership and help maintain standards nationwide. This quality control starts with a standardized curriculum updated regularly by the same industrywide consultative process used to update and administer ASE credentialing. Also critical: NATEF accreditation of sponsoring high schools, a rigorous, multistep process that often takes as long as a year. Other tools available to high schools and sponsoring employers include how-to videos, online guides, standardized time sheets and evaluation forms, advice about legal matters, state policy templates and a national competition for student scholarships.¹³²

Hinken has created a scaffolding to structure the experience.

No doubt, offerings vary somewhat across schools and companies, and the ASE Education Foundation keeps no data on student outcomes. But Rodia says he has had few problems maintaining consistency over the years.

A 40-year veteran of the automotive industry, Mercedes-Benz of Arlington shop manager Doug Hinken supports the firm’s participation in AYES. He sees it as valuable career exposure for students and a chance for the franchise to take a first look at potential future employees. But over the years, Hinken came to believe that more was needed—not just a pre-apprenticeship program, no matter how good, but also a bona fide talent pipeline designed for adults, to deliver qualified technicians for the dealership.

One of his primary motives was frustration. He’d watched the same, predictable attrition year after year: not enough AYES graduates chose to

pursue automotive careers, and the recruits who did—former AYES interns and others hired at the dealership—often didn't last on the job because of the haphazard way they were trained once they signed on as employees. "They were put with an experienced tech," he recalls, "and told to work alongside him. But there was no structure, no curriculum, no evaluations—no clear path to the kind of skill and expertise we need. Far too many people fell through the cracks. It was a lost opportunity for everyone."

Hinken's solution, a few years in the making, was a homegrown, unregistered earn-and-learn program for entry-level automotive technicians. Some come out of AYES, others from a local community college, still others from a nearby for-profit trade school. The program builds on the firm's old, informal onboarding approach: now, as then, each new hire is assigned to work alongside an experienced employee. But unlike in the past, Hinken has created a scaffolding to structure the experience. What newly hired techs do on the job is coordinated with online Mercedes-Benz training modules. Regular evaluations determine progress through a preplanned curriculum. Mentors are chosen more carefully than in the past, and a new incentive system gives them a financial stake in trainees' progress.

The program is not yet two years old—a second cohort of 10 trainees is just coming into the home stretch. But Hinken says 70 percent of those who have gone through the training are still working at the dealership—and that their productivity is comparable to that of considerably more seasoned technicians.

AYES—HOW IT WORKS

Recruitment. Staff at the dealership and the Arlington Career Center agree: a key goal of the AYES program is to teach students career skills—writing a résumé, sitting for an interview, holding a conversation with an adult. And the dealership's top criterion for applicants is motivation—whether or not they make a determined effort to secure the internship.

- Program is open to Arlington Career Center sophomores, juniors and seniors.
- Must have a 3.0 GPA and a good attendance record.
- Students job shadow at several participating employers before applying.
- Candidates create a résumé, complete an application, collect recommendations and sit for interviews.
- Participating employers interview applicants, and the program administrator matches candidates with companies based on mutual preferences.
- Of 120 students enrolled in the Arlington Career Center automotive program, 30 qualified last year to sit for AYES interviews, and 19 were selected by participating employers.
- Mercedes-Benz of Arlington takes one or two interns each summer.

Curriculum. What gives AYES credibility among Arlington employers and educators: it's the industry standard.

- Students spend 90 minutes a day at the Arlington Career Center for a combination of classes and shop time, including safety training.
- Only NATEF-accredited high schools may offer the program.
- Among the features evaluated for accreditation, which must be renewed every five years: the school's automotive shop and equipment, the quality of instructors and the rigor of the curriculum.
- Arlington offers three levels of instruction in two automotive subject areas—automotive technology and automotive collision repair.

- Standardized curriculum approved by the state of Virginia aligns with industry-recognized NATEF standards.

Work-based learning. Work experience varies from shop to shop, but according to Rodia, participating employers collaborate to maintain standards for the program.

- Interns work full-time, five days a week, for eight weeks, usually during the summer between their junior and senior years.
- The wage agreed upon by participating Arlington employers: \$10 an hour.
- No prescribed curriculum or progression of tasks, but it's expected that assignments will be more than menial chores.
- At Mercedes-Benz of Arlington, interns assist experienced techs with oil changes and other basic tasks.
- A core goal for the dealership: countering the stigma attached to automotive work by exposing interns to the career potential in the industry.
- During the internship, Arlington managers are also scouting for potential future employees, looking for diligence, responsibility and what automotive technicians call "good hands"—technical dexterity.

Coordination of classroom and on-the-job learning. Relatively little coordination is seen as necessary to guarantee career exposure.

- Mentors receive a few hours of orientation at the Arlington Career Center.
- Program coordinator visits each employer once or twice during the summer to oversee implementation.

Follow-up. Neither the dealership nor the career center expect all interns to choose careers in the auto industry. But a path exists, and over the years, a number of students have shown continued interest.

- Some interns continue to progress through automotive training at Arlington Career Center—levels two or three.
- Level two and three students sit for ASE student certification exams.
- Some interns—perhaps 25 percent, according to the career center—continue to put in hours at the shop where they interned after school or during holiday breaks their senior year.

NEW-HIRE PROGRAM—HOW IT WORKS

Hinken's new-hire training program is similar to AYES in some respects, different in others. Trainees are older. The program is more structured. The subject matter is more challenging: mostly, automotive diagnostics—a topic not touched on in most AYES internships. And the stakes are higher, for both the dealership and trainees.

Recruitment. Vetting is thorough, befitting vetting for a permanent job at the dealership.

- New hires' preparation varies widely—from walk-ins with little or no formal automotive training to well-prepared graduates of a nearby automotive trade school.
- Applicants undergo several interviews, a background check, a drug test and observation during a half-day on the job.
- Top criteria for acceptance: basic technical knowledge, diligence, a demonstrable work ethic and enthusiasm about working in the automotive industry.
- Average age: 20 to 25.

Formal instruction. Formal instructional units required of all new Mercedes-Benz technicians provide a foundation for the program, albeit one viewed by many mentors and trainees as less significant than the hands-on learning.

- An online series of proprietary modules, 30 to 180 minutes each—guided learning with embedded evaluations.
- Four in-person courses must be taken at a Mercedes-Benz training center, usually, for Arlington technicians, in New Jersey or Florida.
- Much of what's taught, online and in-person, is manufacturer-specific—equipment, procedures and diagnostic routines in use only at Mercedes-Benz dealerships.
- Trainees must complete all the manufacturer's training to be certified as Mercedes-Benz system technicians—a sequence that can take up to two years to finish.

Work-based learning. The heart of the new-hire program is on-the-job training designed by Hinken and fellow technician Eddie Peniche—a structured sequence of hands-on units, accompanied by intensive mentoring.

- Each trainee is assigned a mentor, who determines their workload and oversees them closely—sometimes, in the beginning, devoting as much as half a day to one-on-one supervision.
- Progression through the program is standardized and highly structured—a unique in-house ordering of the topics covered by the manufacturer's online modules.
- Program is competency-based, and the mentor determines when the trainee is ready to work independently.
- Average time in on-the-job training: six to nine months.

- Trainees are paid an hourly wage—between \$10 and \$22 an hour depending on prior preparation and performance on the job.
- Those who complete the program graduate from hourly wages to commission-based pay and earn a significant raise, followed by a second bump when they complete the manufacturer's formal training.
- Strong incentives encourage trainees to complete both parts of the program—commission-based pay, granted on completion of the hands-on training sequence, and certification, conferred at the end of the Mercedes-Benz instruction.

Mentoring and coordination of instruction. The value of the program depends on the caliber of its mentoring. Hinken chooses mentors carefully and rotates them out of the lineup if they do not meet expectations.

- Mentors receive no formal preparation, but all have been through Mercedes-Benz training—it's required for certified technicians.
- Trainer and trainees are jointly responsible for progressing through the mandated series of units.
- Monthly evaluations assess trainee's progress—a yardstick for both trainer and trainee.
- Mentors work with Hinken and Peniche to determine when trainees are ready to attend courses at a Mercedes-Benz training facility.
- A core goal of the program: that trainees test out of as many of the manufacturer's in-person modules as possible, saving time and money at the training facility.
- Financial incentive for mentors: their commission is based on the number of flat-rate hours completed each week by them and their trainees, minus the hourly wage they as trainers pay the trainees.

- Trainee's hourly wages rise over time, creating an incentive for his mentor to complete instruction in a timely way.

METRICS AND RESULTS

The AYES program and Mercedes-Benz of Arlington's homegrown earn-and-learn training differ in many respects. One is a national program widely recognized in the industry; the other, a fledgling experiment at a single dealership. They also serve very different purposes: casual career exposure for high school students versus professional preparation and certification of highly paid, brand-backed technicians.

But what the two programs have in common is as important as their differences: not just the combination of formal instruction and hands-on learning, but also a reliance on widely respected industry standards to structure the sometimes informal training offered on the job at the dealership.

The formal instruction offered in both programs is highly standardized: content, pedagogy and performance metrics validated by an external authority.

NATEF curriculum is a gold standard recognized across the automotive industry. Not all employers nationwide require employees to maintain ASE certifications, and even those that do generally view the credentials as a first step—a theoretical foundation that must be augmented with hands-on training. But there is little question that the curriculum captures current practice, teaching rudiments required across the industry—and ASE student certification is recognized nationwide as a first step toward proficiency and professionalism.

So too with Mercedes-Benz certification. As with most auto manufacturers today, the company's procedures and protocols are highly brand-specific. But they are standardized across the brand, portable nationally and internationally—and few people doubt the rigor of Mercedes-Benz standards.

Bottom line, both training programs at the Arlington dealership stand on strong foundations—occupational standards well-regarded across the automotive industry.

Trainees in both programs strive to meet these external standards, and both initiatives lead to rigorous external evaluations. But neither program relies exclusively on these standardized metrics. In both cases, other less tangible outcomes seem as, if not more, important—in one case, career exposure and, in the other, hands-on technical prowess.

AYES. Success or failure in the AYES program can be measured by two key metrics: sitting for and passing ASE student certification tests, generally taken during the student's senior year, and, a less tangible yardstick, continued interest in working in the automotive industry.

According to the Arlington Career Center, in 2017, 67 percent of level two and three AYES interns passed the ASE brakes exam, and 44 percent passed the assessment in light repair and maintenance.¹³³

The formal instruction is highly standardized and validated by an external authority.

As for continued interest in the industry, Arlington Career Center principal Margaret Chung reports mixed results—but maintains that's to be expected. Not all students are in fact aiming for automotive careers, she explains, pointing to the example of an aspiring engineer who participated in AYES because he wanted some exposure to hands-on technical work before enrolling in a postsecondary engineering program.

The career center does not track student employment after graduation, but Chung says she sees a variety of outcomes. A handful of program graduates go back to the shop where they interned, some for short stints, others longer.

A second group builds on the AYES experience to enroll in further technical training, automotive or some other kind, at a local trade school or community college. For still others, like the aspiring engineer, the program is just one elective among many they take in high school.¹³⁴

Stan Rodia agrees. He estimates that 30 percent of the interns hired at Mercedes-Benz of Arlington over the years have made careers in the automotive industry. But this is not, in his view, cause for concern. “The program is as much about the world of work—getting their feet wet in the world of work—as about technical training for a specific industry,” he says.

New-hire program. Success or failure in the Arlington dealership’s homegrown new-hire program can be measured by three key metrics: retention at the dealership, certification as Mercedes-Benz systems technicians and how well graduates perform on the job, as measured by commission pay rates.

The program is new—not quite two years old—so numbers are small, and it’s hard to compare graduates to other new hires. But according to Hinken and Peniche, seven of the 10 trainees in the program’s first cohort are still working at the dealership. Four of those seven have been certified by Mercedes-Benz, with the rest on their way to completing the manufacturer’s new-hire instruction.

Ready-made curriculum and off-the-shelf standards make it much easier for the company.

More important for Hinken and Peniche—the most telling benchmark, in their view—is how many hours of flat-rate revenue new graduates can generate in a 40-hour work week. The goal for the program: at least 35 hours of revenue when a newly minted technician first begins to operate independently. Not all program graduates rise to that standard in their initial weeks. But Peniche

says that virtually all eventually surpass it, soon completing the equivalent of at least 40 to 45 flat-rate hours, and some are already earning more than 55 hours.

COMPARED TO REGISTERED APPRENTICESHIP

No one at Mercedes-Benz of Arlington sees a need to register the dealership’s new homegrown earn-and-learn program. “I don’t see why that would be advantageous,” says Rodia. “If the government isn’t going to subsidize it, why get them involved?” Hinken agrees. “My program is new,” he notes, “but it’s working fine. I don’t need anybody’s help.”

As for AYES internships, no one at the dealership or the Arlington Career Center would argue that they rise to level of full-fledged apprenticeship. But both educator and employer seem satisfied with the program as is. They see no need for additional structure or standards—no need to qualify as a formal apprenticeship or pre-apprenticeship.

As both AYES and the dealership’s homegrown new-hire training program demonstrate, the core principles of the classical apprenticeship model can be applied fruitfully in a variety of circumstances.

Both AYES and the homegrown program combine formal learning with hands-on experience. Both are based on portable skills standards. Both offer trainees an opportunity to earn nationally recognized professional certifications. Trainees in both programs get paid to learn. The pay scale for Hinken’s new-hire training is closely geared to experience and proficiency, and AYES interns who continue in the industry can expect rising compensation. Bottom line: both programs check all the boxes required of a classical apprenticeship, yet neither is registered.

Both programs also hold broader lessons for earn-and-learn workforce development, registered or unregistered.

One of AYES's greatest strengths is its scale—the continued growth made possible by easy replicability. Much employment training in the US today, formal and informal, is sui generis—a successful local experiment difficult or impossible to reproduce elsewhere. And despite concerted efforts by two presidents, it has proven difficult to scale registered apprenticeship in America.

The ASE Education Foundation, in contrast, has found a way to grow and keep growing—and still maintain its standards nationwide. The key is a simple, standardized model: occupational standards kept current by an accrediting body respected across the industry and the rudimentary but practical tools that ASE makes available to employers and educators—day-to-day operational aids as basic as time sheets and evaluation forms.

The Arlington dealership's homegrown program offers another, perhaps complementary lesson. As Hinken's experience shows, employers don't necessarily need outside help or an external model to launch an effective earn-and-learn program. It's hard to imagine the Arlington initiative working as well as it does without Mercedes-Benz training modules. But the key to the program's effectiveness—as, if not more, important than the formal instruction provided by the company—is the scaffolding Hinken and Peniche have created for on-the-job learning in the franchise's service department.

The key ingredients of their success: a structured series of hands-on units, regular evaluations and an ingenious incentive system, based on graduated pay increases, that motivates trainers as well as trainees. Both Hinken and Peniche are technicians by profession, not educators. But together, they demonstrate what can be done by a committed employer seeking to craft an earn-and-learn initiative that suits its circumstances and labor market needs.

CHALLENGES

The obstacles Stan Rodia encountered two decades ago when he set out to launch AYES

training at Mercedes-Benz of Arlington still stymie workforce education in virtually every industry. Many employers and educators are reluctant to try something new. Other Arlington automotive employers weren't sure they needed an additional talent pipeline; local educators balked at taking on additional responsibility—especially, responsibility outside the school building. Neither group trusted the other, and both sides were reluctant to go beyond what they knew.

The AYES model is designed to overcome this reluctance. Ready-made curriculum, off-the-shelf standards and other handy tools make it much easier to launch a program. Even so, the challenge remains, and the only antidote is leadership—determination and persistence of the kind Rodia provided in Arlington.

Employers don't necessarily need outside help to launch an effective earn-and-learn program.

Another question that might be asked about AYES: what exactly is and should be the goal? As the Arlington experience shows, there's an important difference between career exposure and career recruitment, and measuring the program by how many young people it brings into the automotive industry may or may not be the appropriate metric.

Neither Mercedes-Benz of Arlington nor the Arlington Career Center seems to view recruitment as a central aim. And the lesson may be not to overburden a successful initiative with unlikely or implausible goals. Rodia's more modest but important objectives are to teach teenagers what it means to work and kindle interest in some sort of technical career, automotive or other.

The dealership's homegrown new-hire earn-and-learn program is also deeply dependent on leadership—Hinken's vision and determination, Peniche's operational input and management's

willingness to permit and pay for the experiment. This dependence is both a strength and a challenge. It's what's made the program possible in the first place and why it's showing promise. But leadership cannot be taken for granted. It's hard to imagine the Arlington new-hire program without Hinken or Peniche or someone like them, and no thought has been given yet to scaling or replicating the initiative.

CONCLUSION

Taken together, the two earn-and-learn training programs offered at the Arlington dealership teach yet another important lesson—about the variety of career education needed to develop talent even at a single, relatively small business in a single industry. Companies and workers, in Arlington and elsewhere, need a multiplicity of offerings: career exposure, new-hire training, upskilling for existing employees and, as technology changes, lifelong instruction to help all workers, young and old, keep current. The resulting programs vary widely across many

dimensions: length, intensity, standardization, the sophistication of the subject matter, the mix of formal and informal instruction, where instruction is offered and more.

What the Arlington experience teaches: the core principles of classical apprenticeship can be applied to many if not most of these training initiatives. Technical workers need some theoretical knowledge—formal instruction based on industry standards. But this foundation almost always works best when combined with hands-on learning—intentional, structured, on-the-job experience that builds cumulatively toward mastery and beyond.

Mercedes-Benz of Arlington's one female trainee, Nacely Lovo, explains how it works: "There was lots of shop time at the trade school where I studied. But in the end, even that is artificial—not the same as real experience. And the teacher there never really knew what I could or couldn't do. Here, it's different. My mentor Eddie is making sure I don't skip a step along the way."¹³⁵

APPENDIX I

EMPLOYER ROUNDTABLE PARTICIPANTS

Jefferson Community and Technical College

Louisville, Kentucky

March 27, 2018

Dan Belcher

National Center for Construction
Education and Research

Steve Cousins

Home Builders Institute

Jim Ellwood

International Code Council

Allison Gerber

Annie E. Casey Foundation

Dean Hamrick

Fluor

Nicole Heimann

German American Chamber
of Commerce South

Robbie Heinrich

Dana Corporation

Pamela Howze

National Fund for Workforce Solutions

Stacey Hughes

Logan Aluminum

Tamar Jacoby

Opportunity America

Donny Jones

Chamber of Commerce of West Alabama

Nicole Koesling

Volkswagen

Robert Lerman

Urban Institute

Michael McLauchlan

Haskell

Todd Nickens

Kentucky Department of Education

Dennis Dio Parker

Toyota

Keisha Powell

Fairview Health Services

Tom Richardson

National Institute for Automotive Service
Excellence

John Rico

Rico Computers Enterprises

Jeff Rodenberg

Casey Industrial

John Schehl

National Roofing Contractors Association

Ilker Subasi

Volkswagen

Jamie Van Voorhis

Jacobs

APPENDIX II

REGISTERING AN APPRENTICESHIP PROGRAM

- A variety of entities—companies, colleges, nonprofits, unions and joint labor-management committees, among others—may “sponsor” apprenticeship programs.
- In half the states, sponsors register with a state agency. Elsewhere, they register with the US Department of Labor.
- Sponsors that operate in several states can sometimes register with the federal government. In other instances, they must seek approval from more than one state agency.
- Each sponsor works with a state or federal representative to develop a detailed plan for the program.
- Two key components of the plan: how on-the-job training, or “work processes,” will be structured and who—a college, a union, an employer or other training provider—will offer related classroom instruction.
- Sponsors of programs in occupations that have not traditionally relied on apprenticeship training must demonstrate that the job is “apprenticeable”—a process that requires input from several employers in the industry.
- Time-based programs require 2,000 hours of on-the-job training, and most stipulate an annual minimum of 144 hours of classroom instruction.
- Competency-based programs are based on skills frameworks, often developed by a third party and tailored by the program sponsor.
- Plans specify and quantify the tasks apprentices will perform on the job—for example, 100 hours of safety training or 200 hours with a particular tool or machine.
- Programs specify how they will address equal opportunity employment goals and commit to a formula for raising wages as trainees acquire relevant skills.
- Approval can take anywhere from a few weeks to a year or more and sometimes requires extensive negotiation between the sponsor and the approving agency.
- Sponsors are required to keep records on each apprentice.
- Registered programs have ratio requirements, mandating the number of highly skilled journey-level workers for each apprentice. These ratios vary by state and are higher for hazardous occupations.

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737 8th Street, SE
Suite 201
Washington, DC 20003

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