MassBridge:
Massachusetts Advanced Manufacturing Workforce Education Program

Community College's Role In Building Apprenticeships

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Report Background:
This report was developed for MassBridge, a program of the State of Massachusetts, with support from the Defense Department's ManTech program, to plan and develop advanced manufacturing education in community colleges. The report addresses effective practices for community colleges in creating apprenticeship programs with industry. Although it has a particular focus on advanced manufacturing, the recommended steps apply to other sectors as well.

Executive Summary

The Need:
Apprenticeships can offer unique opportunities to both students and employers. Many students entering the workforce are looking for "learn and earn" options -- hands-on, paid job training that complements their classroom education. Apprenticeships can lead to both industry credentials as well as community college credits, and a good-paying apprenticeship allows student workers to obtain college credits without the burden of debt. They are an attractive package for students: useful career skills, good pay, and valuable college credit.

Apprenticeships can also assist employers. Companies currently face a significant gap in obtaining the workforce with the skills they need. The manufacturing sector is expected to require two to four million new workers in the coming decade. The entry of advanced manufacturing – digital production, additive manufacturing, robotics, advanced materials, etc. – will require new sets of skills and a significantly better-trained workforce. What's true for manufacturing is true in many other sectors as well. Apprenticeships offer an important way for employers to obtain that upskilled workforce.

The Barriers:
Outside of construction, most employers aren't familiar with apprenticeships and there are significant barriers to implementing them. These include: poaching apprentices by other employers, lack of awareness of apprenticeships by both students and companies, the administrative burden of managing apprentice time and growth, regulatory paperwork and red tape, the cost of paying apprentices which employers must bear, and a continuing stigma against non-college career pathways. However, each of these problems can be overcome with well-designed programs. In fact, an effort to overcome them can turn apprenticeship barriers into significant positives not negatives.

"How-To" Steps for Community Colleges to Develop Successful Apprenticeship Programs:
Community colleges, in creating and supporting apprenticeship programs in close collaboration with industry, need to consider a series of implementing steps, summarized briefly below:

The Up-Front Decisions for Community Colleges to Make

- *Who should sponsor – the employer or the community college?* Either employers or community colleges can sponsor apprenticeship programs; in deciding, each needs to evaluate the roles it can best play in organizing and running the program.
- *How can community colleges get ready to implement apprenticeship programs?* Schools need to study and understand the basic components of a successful program, evaluate the labor market and employer needs for apprentices, inventory the school's assets in operating the programs, assess the departments and administrators that will be required to be involved, line up the school's leaders and departments to support the program, and identify a program champion at the school.
- *Finding funding for initiating apprenticeship programs* - Federal funding from the Department of Labor's Education and Training Administration and the Department of Education's student

aid programs can directly or indirectly support apprenticeship programs. Tax credits for apprentices are available in some states for employers.

- *Employer funding to offset community college apprenticeship program costs* – Depending on how tight labor markets are, some employers may be willing to offset community college costs for running apprenticeship programs.
- *Importance of a state apprenticeship office to assist community colleges and employers in coordinating programs* – Some states have set up offices to coordinate and support apprenticeship programs at their community colleges, and assist employers with the required paperwork. These can significantly reduce the burden of starting and running programs on both schools and employers.
- *Community Colleges need staff for running apprenticeship programs* – Schools will need dedicated staff for their apprenticeship programs, including for identifying participating employers and apprentices, working with companies, managing the paperwork, coaching and mentoring apprentices, and coordinating programs among academic departments.
- *Participating employers will seek consistency across a state for community college apprenticeship courses* – Employers will want program consistency across schools so they know what skills they are getting when they hire apprentices.
- *Schools should try to avoid the complexity of creating highly customized courses for smaller employers* – Highly varied programs make the education side of apprenticeship programs hard to administer and operate. While programs must reflect employer needs, they should be designed up front with groups of employers to meet their collective requirements rather than undergo extensive ad hoc modifications later on.

Working With Employers

- *Employers must be front and center in any apprenticeship program* – Community colleges with successful apprenticeship programs are uniform in emphasizing that employers should be the focus of apprenticeship program – they are paying and hiring the apprentices. This requires schools to provide personalized support and engagement with employers, with a point person assigned to them. Coordination on curriculum development is also key.
- *Employers are critical to scaling apprenticeship programs with other employers* – Employers listen most to other employers, and satisfied employers will help sell other employers on apprenticeships to enable these programs to scale up.

Finding Apprentices

- *Recruiting apprentices for apprenticeship programs* – Especially where a community college is sponsoring the apprentice, it may need to concentrate on the recruiting of apprentices; this role shifts somewhat where the company is the apprentice sponsor. But community colleges and companies can work together on multi-day "apprenticeship awareness" programs involving area high schools and time at companies. These should include sessions for parents. Social media, briefings for guidance counselors, and high school events are other approaches.
- *The employer-apprentice relationship has to start at the outset* - When community colleges sponsor apprentices the programs can tend to be front-end loaded, putting students into their courses first then trying to match them later with an employer. It should be the other way around – apprenticeships should start at the employer's facility and the community college program should be built around employer commitments.

Building an Employer Base

- *Reach small companies through industry associations, consortia and employer groups* - A single smaller firm will need only a limited and varying number of apprentices a year, but pulling together groups of small firms enables apprenticeship programs to operate at a scale that is practical for community college involvement. Working with industry associations and creating consortia of small companies to build a base employers involved in apprenticeships in different regions can be critical.
- *Link to companies through Workforce Boards and Manufacturing Extension Partnerships* - Workforce Development Boards backed by the federal Department of Labor operate in every state and offer job training and job assistance focused on unemployed and underemployed workers. Manufacturing Extension Partnerships (MEP) are also in every state, supported by the federal Department of Commerce and state funding, and work to bring new technologies and best practices to small manufacturers. The Workforce Boards and MEPs can be allies in connecting to small manufacturers, and the Boards can also help identify apprenticeship candidates.

Youth Apprenticeships and Pre-apprenticeships

- *Building Youth Apprenticeships and Pre-Apprenticeships at the High School Level* - Youth apprenticeships are a tool to break down the work-learn barrier at the high school level, bringing high school students, typically in their junior year, into part time apprenticeships with companies. Pre-apprenticeships can introduce students and career-shifting workers to a career field where they can test whether a potential career will suit them, and employers can evaluate whether the potential apprentice is ready and suited for the commitment of a full apprenticeship program. Both programs have significant potential value to both employers and employees, and community colleges can support and enable both programs.
- *Importance of Dual Enrollment to Youth Apprenticeships* - Dual enrollment allows high school students in apprenticeship programs to take the technical courses they need for their apprenticeships at community colleges tuition-free, a crucial youth apprenticeship program element. It can also help support pre-apprenticeships.

Working With Apprentices

- *Flexible community college scheduling to match employer needs* - Not only do community colleges need to integrate with employers to run effective apprenticeships, they need to be flexible in scheduling the delivery of their courses. Employers often want apprentices to work a 40-hour week and they also may have multiple shifts, so schools may have to adjust the time of their course offerings to fit these work schedules
- *Create a Path to Credit* - The college degree has become the critical credential for the American workforce, often determining successful lifetime career and earnings outcomes. Community college apprenticeship programs should offer college credit and college credentials for apprentices taking their courses, protecting their future career opportunities.
- *Embed industry recognized credentials into apprenticeship programs* - Another best practice for apprentices is to build appropriate industry-recognized credentials into degree credit programs that are part of the apprenticeship training. Again, this protects the apprentice's future career prospects

- *Community College role in wrap-around services for apprentices* - Providing "wrap around" services – which can include assistance through coaching and mentoring, as well as potentially transportation, and child care – is another best practice and important to successful apprenticeship programs.
- *Using online systems for tracking apprentice work progress, and managing enrollment and paperwork* – Smaller companies new to apprenticeship programs often need initial support with on the on-the-job training side of apprenticeship programs. Community colleges can help manage the paperwork not only for the instruction aside but for the employment side. The companies need to track hours and skill development for apprentices and community colleges can assist by applying a single online log-tracking platform across all the participating companies for the on-the-job training component, that tracks of total hours and training areas covered, skill development and assessment and provides alerts on training gaps.

Conclusion/Key Takeaways

Apprenticeships are an attractive option for students looking for a clear and lower-risk upskilling path, as well as those seeking career changes. While the US has lagged other countries in offering apprenticeship opportunities, the opportunities are starting to grow. Community colleges can play a key role. While the remainder of this report provides advice and examples for community colleges on implementing apprenticeships some key takeaways include providing engaged leadership and a program champion as well as listening to industry needs. Further, it's important to build awareness campaigns to attract apprentices and companies and set those apprentices up with a mentor or coach who can assist in their progression. Even with tight funding, staffing these programs is critical in order to form and collaborate with a consortia of employers, which in turn will help simplify the process for employers.

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I. Introduction: The Urgent Need for Apprenticeship Programs

Apprenticeships have attracted students looking for a clear path to a career and historically have aimed at a younger workforce.[1] The United States, however, has only a limited apprenticeship tradition. This is in contrast to many European nations. Germany, Switzerland, and Austria have long been the bellwether for the apprenticeship model, while the US has lagged in producing similar programs and results.

In Austria, for example, nearly forty percent of all teenagers will go directly from compulsory schooling into an apprenticeship program, and while some of these are geared toward lower-skilled work (retail, hairdresser, auto mechanic, and cook), they provide students with an immediate path to full employment. The German program offers 342 recognized trades (Ausbildungsberufe) with a range of skills for which an apprenticeship can be completed. As recently as the early 2000s, nearly half of all young people under the age of 22 in Germany had completed an apprenticeship.[1] In Switzerland, apprenticeship is the most common form of post-compulsory education and training, where students choose from approximately 230 possible professions. For example, most bankers in Switzerland's noted financial system were educated through apprenticeships not college. While US education and labor organization is different from these nations, an American version of an apprenticeship system could have major benefits in solving a deep workforce problem: the disconnect between work and education in the US Why hasn't the model evolved?

In the early 20th century, flagship employers in the United States boasted strong apprenticeship and incumbent employee education programs. One example, the Flint Institute of Technology in Flint, Michigan, was organized to teach automotive industry skills as early as 1919 and continued to do so when General Motors took it over in 1926, changing its name to the General Motors Institute (GMI). GMI focused on a unique co-op model combining education and work pioneered at the University of Cincinnati in 1907. At the time, over 11,000 students were enrolled at the school, with most going straight to skilled factory employment. However, these flagship apprenticeship programs at some major employers faded by mid-century and few remain today.

According to US Labor Department estimates, there were 636,000 registered apprentices in a range of fields in the United States in 2020 through programs run by labor unions or individual companies.[2] The number represents only a modest rise from the 490,000 apprentices in the early 2000s. And that's in an economy with more than 150 million jobs: the apprenticeships are less than 0.4 percent of the total US workforce. Contrast that with Germany, which has 1.5 million apprentices across all sectors in a workforce of 44 million, including in manufacturing.

Why are apprenticeships in the US still limited?

Decline in Federal Workforce Funding - Federal funding for employment training has fallen by half as a share of GDP compared to the mid-1980s, although in recent years there has been growing federal interest in workforce education.

Decentralized Labor Markets - Another reason apprenticeships have not expanded is that US labor markets are very decentralized, with limited information systems and relatively few regulations

and safety net features compared to other developed nations. Strong markets are based on strong information systems, and American labor markets have a weak information foundation. There are very few common qualification certifications so employers don't know what skills workers who apply to them have, workers don't know what skills they need to have, and educators don't know what skills to educate for. Since apprenticeship and formal training programs are often viewed as requiring some regulatory framework to provide assurances to participants, our practice of limited regulation, along with a missing information system, may be another factor.

Private Sector Unionization Decline - The one area where apprenticeships remain strong in the US is in the skilled construction trades, which continue to provide the bulk of apprenticeship numbers cited above. The Registered Apprenticeship Program run through the Department of Labor has long been dominated by construction, where a history of collaborations with construction unions has helped sustain it. While unions in other fields are interested in expanding apprenticeships, the underlying reality is that unions have been in a sharp decline in the US private sector, limiting the ability of unions to be partners.

Poaching - In addition, companies often aren't willing to invest in worker skills because competitor companies can poach these trained employees, avoiding their own workforce training investments. This can prevent a company from recapturing its training investment, discouraging it from investing in the first place. If employers in a region cooperate and share an apprenticeship program – if they all jump into the swimming pool together – this creates peer pressure that can offset the poaching problem – or even better lead to symbiotic hiring practices within a region. But a tradition of collaboration between employers is not well established in the US.

A Single Pathway – In the 1970s and 80s, an educational reform movement led states to shut down most of their vocational education, in favor of a single pathway, sending all students to college. Unfortunately, in subsequent years this shift to college education failed; only 37% of Americans over age 25 have college degrees.[3] There are a number of education reformers now calling for a departure from the single pathway of college education in favor of developing and delineating multiple paths that would give youth a better-connected route from school to solid jobs and careers. Employers along with community colleges and high schools would need to play a greatly expanded role in supporting these new paths.

Building multiple pathways from school to work to add to the single college pathway is a key effort, and apprenticeships can be a key element. The Pathways to Prosperity project identified the elements of a new system.[4] First, pathways to all major occupations would be clearly delineated at the outset of high school so students and families could see what courses and experiences would help them gain access to their sought-after fields. This would maintain a unique and positive feature of the US education system: keeping a number of doors open, and being forgiving, so students can keep trying even if they want to change their minds and shift to different career options.

Second, relevant work experience would be built into the new system. A workplace is the best place to experiment with career choices and is the best place to learn and practice the "21st-century skills" that will be vital to success in the emerging economy. Learning that is connected to work can also be critical in engaging students who are frustrated or bored with traditional high

school. Apprentices (and pre-apprenticeships, where students get an option to test a career field) could be central to this effort.

Third, new learning systems to help teach new technology skills, tied to the proper foundational skills, would be part of a new system. This means reviving skills-based education but avoiding past errors where many old vocational education programs were too often dumping grounds for students who couldn't cope with the college-preparation route.

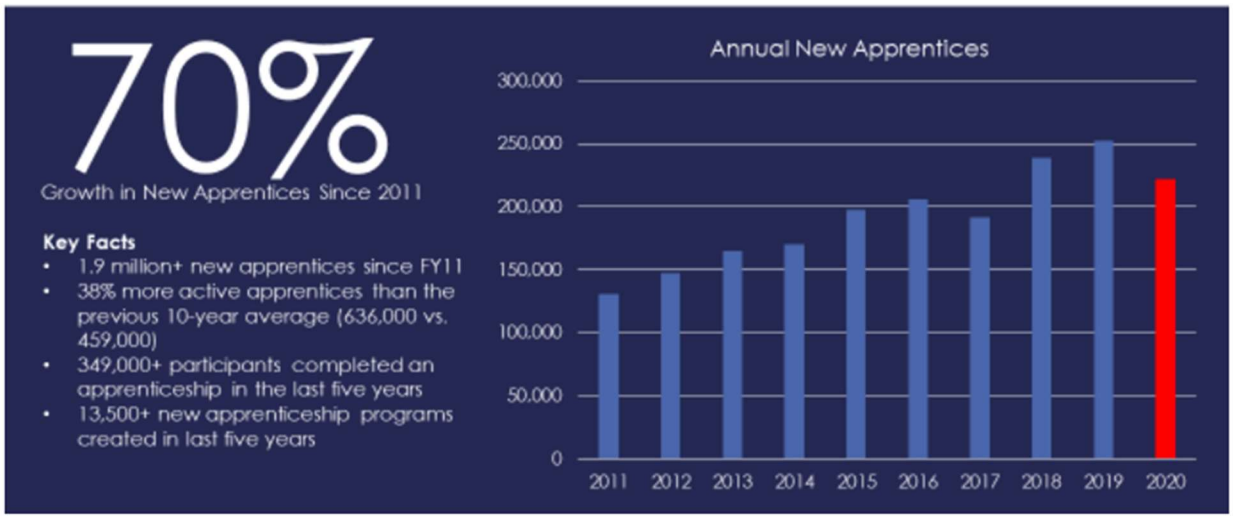
Fourth, improved career counseling would be required. The current system in both secondary schools and higher education is inadequate, and many young people are adrift. Pathways to Prosperity estimates that the average ratio of students to counselors in middle and high schools is nearly 500 to 1, creating a workload under continuous strain. Many counselors must focus on students' more immediate personal, psychological, and social problems and lack expertise in quality career advising. The broken labor market information system noted above only exacerbates the problems. Overall, students would need individualized plans that include career objectives, a program of study, degree and/or certificate objectives, and work-linked learning experiences.

A fifth point—in addition to those raised by Pathways to Prosperity—that is important to apprenticeships, is the need for "good governance" policies at the state or federal level to ensure that apprenticeships are not synonymous with cheap labor. Guideposts for setting up high-quality apprenticeship systems within a legal framework that establishes clear rights and responsibilities of the apprenticeship partners, and protections for apprentices themselves, while the content, testing, and certification rely on agreements between employers, apprentices or their representatives and educators. The Labor Department's registered apprenticeship system helps assure this, but if it is not used, alternative regulations and guidelines are needed.

There are a large number of students now entering the workforce looking for 'learn and earn' and hands-on training to complement their classroom education. The cost of college and corresponding level of student debt is a problem for many students seeking post-high school education. Apprenticeships allow students an opportunity to learn on the job from skilled and experienced mentors while helping to pay for their college-level courses.

Not only can apprenticeships help students, they can assist employers. Companies currently face a significant gap in obtaining the workforce skills they need. In manufacturing, an aging workforce is expected to require two to four million new workers in manufacturing in the coming decade. The manufacturing workforce is already upskilling and the entry of advanced manufacturing – digital production, additive manufacturing, robotics, advanced materials, etc. – will require new sets of skills and a significantly better-trained workforce.[5] Apprenticeships offer an important way for employers to obtain that upskilled workforce.

Over recent years, there has been growth in the number of new apprentices, aside from a recent downturn during the pandemic, as the chart below shows:



Source: https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020

Apprenticeships are now growing and can both help employers overcome skill shortages and create an attractive new career path for students. And by creating "learn and earn" options for students, apprenticeships can also help drive enrollment in community colleges. For example, Apprenticeship Carolina, a division of the South Carolina Technical College System, estimates it has created over 1,000 occupational pathways through apprenticeships, including advanced manufacturing.

II. Removing Barriers to Enable Successful Apprenticeships

Most people learn their jobs by training under experienced practitioners, and apprenticeships build in that approach. However, there are a series of barriers to forming a successful apprenticeship program that need to be lifted. Industries as a whole are reluctant to invest in quality education or "learn and earn" projects for several reasons, including the costs associated with these programs, as well as the paperwork registered apprenticeship programs require. The following is a brief summary of some of the barriers identified through research, and possible solutions to consider when building apprenticeships with industry partners.

1. *Poaching*: Companies, as noted above, are often unwilling to invest in worker skills because competitor companies can poach these trained employees, avoiding their own workforce training investments. However, if employers in a region cooperate and share an apprenticeship program this creates peer pressure that can offset the poaching problem. One solution, then, is to create a collaboration among the industries in the region who work together for the greater good of the regional economy. The Ohio Manufacturers Association provides an example of over 1,000 member companies working together on workforce issues. Part of that success comes from a strong apprenticeship system, with Ohio ranking first in the Midwest and third in the US in overall apprenticeship numbers. In addition, employers find that retention rates for employees who began as apprentices is often higher because they appreciate the support the employer provided for their training and initial employment

2. *Awareness*: One unfortunate barrier to apprenticeships is that most apprenticeship programs outside construction are new, so employers, workers and students are not aware of these programs or find them too late in their careers. While apprenticeships are generally thought of as a program for younger workers, one of the successes of these programs has been to retrain incumbent workers for new technologies and job opportunities. Digital marketing has the ability to reach a larger and broader audience, but students can also be reached through an in-person job fair, a billboard or traditional media, such as a radio advertisement. Amplifying the benefits of apprenticeships should be a goal for breaking the awareness barrier.

3. *Time Management*: While apprenticeships have the advantage of combining earning with learning. there are many students leaving high school who feel burdened by spending too much time studying to earn a living. Some have already started a family and are in low-paying, low-skilled work without a lifeline. Even a two-year program tailored to include study and work during evening hours can be too much of a burden, cutting into family time. One solution is allowing for more credential-based "competency" programs, when students get credit as soon as they can show required skills and knowledge, instead of education requirements based on set "seat time" based on semesters or terms. Apprenticeship programs, with on the job training elements and skills demonstrated through performance credentials, can more readily adopt to this approach than traditional semester-based academic programs. More work is needed to create competency-based certificate training that is organized in modules and can be acquired based on performance not set timetables and also stacked to help working adults keep building their skills, with credentials aligned with community college for-credit education programs. Further, more awareness of the

positive impact apprenticeships can have over the life of a person's career will help alleviate some of the stress from a time-management perspective.

4. *'Red-Tape:'* Nearly unanimously, interviewees spoke of employer (particularly smaller employer) concerns when they faced the paperwork for setting up registered apprenticeships. Paperwork, timekeeping, and skills tracking can be a crunch for already burdened employers. Having state apprenticeship offices and community colleges shoulder a significant amount of that burden can be very helpful to employers and help enable their participation.
5. *Employer Costs*: Germany's apprenticeship program is well-known and world-class. It is also expensive. It's estimated that on average, each apprentice in Germany has a net cost of over $5000 per year to train.[6] At the high end, that resembles the tuition for sending a student to an in-state two-year college. The expense is offset by the benefits to the firm of well-trained workers, but this takes time to realize and upfront costs remain an issue. Discussions with smaller employers in the US, where cost is a heightened problem, indicate that there are ways to offset these costs.[7] Apprentice salaries are the principal employer cost, so finding meaningful work that contributes to the firm's bottom line while still effectively training the apprentice is critical. Firms report that while initial months as the apprentice comes up to speed, are a net loss, a good program design turns those numbers around as the apprentice develops expertise. In addition, state tax credits for employers hiring apprentices also can offset employer costs.
6. *Stigma*: Too often, non-college pathways face a stigma.[8] Parents generally understand the long-term wage advantages of college education and many are reluctant to see their offspring pursue a non-college path. In manufacturing, the public is well aware of the sharp decline in manufacturing employment in the 2000s and don't see it as a safe career path. However, apprenticeship programs can get around this problem. They can lead to both industry credentials as well as community college credits, and a good-paying apprenticeship enables "earn and learn," allowing student workers to obtain college credits without the burden of debt. So, apprenticeships can offer an attractive package to overcome the non-college stigma: career skills, good pay, and college credit.

To summarize, there are numerous perceived barriers to successful apprenticeship programs, such as the ones we listed and others. However, each of these problems can be overcome with well-designed programs. In fact, an effort to overcome them can turn apprenticeship barriers into significant positives not negatives. Apprenticeships can help lead to a committed and stable workforce less subject to poaching. A solid awareness campaign for potential apprentices can help offset skill shortages. A modular, credential-based apprenticeship program can turn around time-commitment concerns. Employer concerns about apprenticeship paperwork can be managed by state apprenticeship offices and community college to make apprenticeships an attractive option for employers. Well-designed programs and state tax credit incentives can more than offset employer cost concerns. And the stigma against non-college pathways can be turned into a positive with apprenticeship programs that offer career training, income and college credit. The key to lifting these barriers is a well-designed apprenticeship program. The next section provides "how-to" steps for community colleges to consider in developing their programs.

III. "How-to" Steps for Community Colleges to Develop Successful Apprenticeship Programs

Community colleges, in creating and supporting apprenticeship programs in close collaboration with industry, need to consider implementing a series of steps set out in detail below. These program suggestions are grouped in categories: the up-front decisions community colleges need to make, working with employers, finding apprentices, building an employer base, youth and pre-apprenticeships, and working with apprentices.

A. Up-Front Decisions Community Colleges Must Make

1. Who should sponsor – the employer or the community college?

Education engagements between schools and industry can come in many forms, from part- or full-time internships that can be paid or unpaid and short or longer term, to full, long term apprenticeships registered with the Department of Labor. While all help break down the barrier between school and work, education and career, the latter offer some advantages to apprentices and employers. A long-standing risk of apprenticeships is that some employers could take advantage of them to underpay workers and provide minimal training. A registered apprenticeship sets up a contract between apprentice and employer, clearly setting out the responsibilities of each side. This can help assure, for example, that the employer will provide specific training and offer at least one pay raise as education steps are completed, and that the apprentice will work and study meeting scheduling and other obligations. Although this system does create paperwork, it also creates protections for both sides. Within this study the focus is particularly on registered apprenticeships.

There are two basic ways that community colleges can engage with registered apprenticeship programs. They can connect with companies where the firms are the sponsors of the apprentices while the community college provides the formal education portion of the program. Or, as a result of program changes in recent years, community colleges can sponsor the apprentices themselves, but be closely allied with employers. In both cases. the schools provide the formal education portion and the companies provide the on-the-job training. Either sponsorship approach can be beneficial.

South Carolina, for example, is unique in having a state-wide apprenticeship program at the community college level, but in its system, almost uniformly, companies sponsor the apprentices and the state's community colleges work with and support the companies. Amy Firestone of Apprentice Carolina says they have found this approach works best for them in part because the state has a small centralized state office that manages apprenticeships so that community colleges don't have to build this administrative capability themselves.[9] They worry that if the community colleges run their own programs, some employers that want to lead their own apprentice efforts could be left out, particularly when the college's education programs don't fit well with their particular needs.

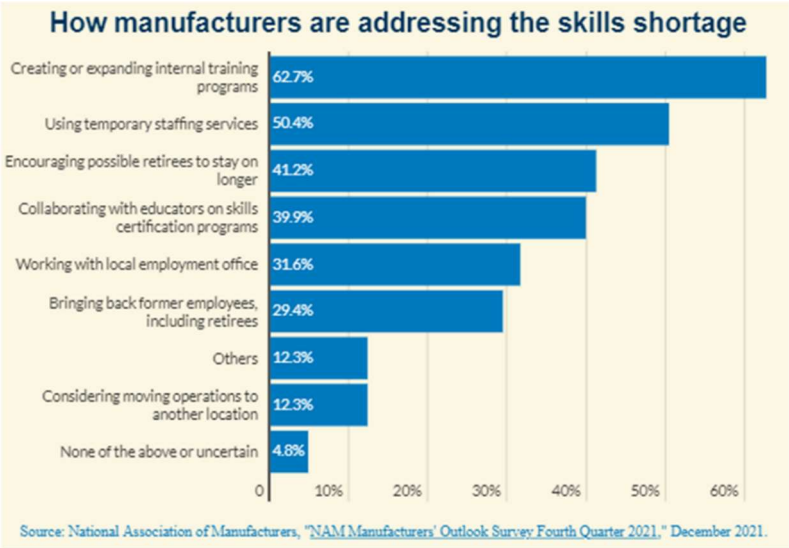
Conversely, Harper College in Illinois runs its own program as the apprentice sponsor, enabling it to build a team of faculty and administrators to support a sizable program. It was an early leader in making community college sponsorship work. Kathleen Canfield of Harper feels this approach works best for them.[10]

Chad Bridgman, of Sinclair Community College in Ohio, notes that its program is now three years old, and that Sinclair was one of the first ten schools in the state to sponsor registered apprenticeships.[11] Sinclair found that assuming the responsibilities for administering the program removed an administrative burden on the industries in their area and enabled more firms to participate. The school navigates the paperwork, and works with the companies to find the right match for the roles of each in working with apprentices. Sinclair provides the behind-the-scenes staff who make sure the students are attending classes and showing up to work, providing a safety net of support. It also works as the human resources manager, working hand-in-hand with industry to move apprentices along in their work/learn journey. The school has found that companies are not in as strong a position to provide this kind of overall support. Sinclair is also shifting its apprenticeship program to competency-based assessments as opposed to requirements for completion of course hours or terms, to help fit employer needs and enable apprentices an opportunity to receive credit for skills they have already acquired at work.

Either approach, employer sponsorship with community college collaboration or community college sponsorship with employer collaboration, can work. Each depends on the level of commitment the employers and schools want to make.

2. How should community colleges prepare to implement apprenticeship programs?

Manufacturing companies are facing serious gaps in their ability to fill skilled jobs. However, apprenticeship approaches in manufacturing are not yet widespread. When asked about their strategy, manufacturing leaders don't specifically name apprenticeships, perhaps so uncommon in the industry. Instead they reference internal training programs and hiring temporary staff to plug holes, as the table below indicates:[12]



So, apprenticeships will generally be a new step for both most employers and schools. If community colleges want to grow their collaborations with manufacturers to build apprenticeship programs, what steps do they need to consider at the outset?

A study for the Department of Labor by the American Association of Community Colleges (AACC) provides guidance for community colleges on how to get ready for supporting apprenticeship programs. The report was prepared through close consultation with a consortia of 106 community colleges. Drawing from the report as well as a discussion with leaders of the AACC project, some key findings are summarized below.[13]

First, *community colleges must have a clear understanding of the basic components of a registered apprenticeship program*. These include strategies for paid positions with wage progressions at participating companies, for on-the-job training at firms, for related training instruction, for mentorship for apprentices, and for credentials that accompany the program.

Schools also need to *determine labor market and industry partner needs,* which include assessing current labor market needs in the region, reviewing how these labor market needs can be addressed through apprenticeship programs, and ensuring that area employers understand what an apprenticeship means to their companies. Part of this assessment means finding out whether employers have a positive or negative association with registered apprenticeships. If negative, the college needs to decide whether it can successfully market and change these attitudes about registered apprentice programs. Should the school decide it will implement a program, the school should first determine whether employer partners will agree to support the development of a registered apprenticeship program and hire registered apprentices. If local employer partners express the need for specific job areas and occupations and an interest in registered apprenticeship programs, this is a clear signal for the colleges to move ahead.

Once establishing the need for the program*, a community college should then conduct an inventory of its existing assets* – from administrative capacity to relevant courses – to determine the college's ability to meet the labor market and company partner needs. This inventory can be used to gauge the college's readiness and capacity by identifying its existing tools to support these programs. Assets may also include existing relationships that will be needed, both inside and outside the school. including with regional companies, its administrative and faculty talent base and their fit to company partner needs, available equipment given the types of participating firms, existing curriculum and courses, and financial resources available to support the new program. If funding is a barrier, there is an existing and growing list of grants that could potentially support burgeoning apprenticeship programs across the country (discussed below).

The school will need to *assess the components and departments that will support the apprenticeship program's development and adoption*. These will vary, but include managing program admission and enrollment, recruitment and marketing, company relations, financial support, needed faculty involvement and training, and forming a workforce development office or department.

When assessing these elements, community colleges need to consider *whether the school's leadership and executive team will back the program.* It is important that the school's leaders make

clear to the college's internal and external community that it will focus on and invest in the registered apprenticeship program. Another key question to evaluate is *the extent that current courses and programs fit the needs of employer partners*, including in associate degree, certificate, or non-credit programs.

If there are gaps, the college needs to decide how should those be filled, through a collaboration between the college and the employers participating in the apprenticeship program. The faculty and dean of the specific programs involved need to be willing to work on the apprenticeship initiative. Only if the faculty agree can such an endeavor succeed. In addition, the college's admissions team, which is an integral part of all types of outreach activities both inside and outside of the college, needs to be supportive.

Finally, many schools find that *there needs to be a college champion to lead and execute the apprenticeship initiative*, who is innovative and a problem-solver.[14]

3. Finding funding for initiating apprenticeship programs

There is federal funding available that can directly or indirectly support apprenticeship programs. The Department of Labor's Education and Training Administration (ETA) in the recent past has had appropriated funding or funding available through H1B visa fees, for grants, offered through a series of initiatives: the American Apprenticeship Initiative ($100 million initiated in 2015),[15] Scaling Apprenticeships ($184 million initiated in 2019)[16] and Apprentices Closing the Skills Gap ($100 million initiated in 2020). For example, ETA in 2022 has had an Apprenticeship Building America grant program totaling $113 million.[17] The Department's Workforce Innovation and Opportunity Act (WIOA) funding can assist in training incumbent workers as apprentices, its on-the-job training can help pay employer training costs, and its individual training accounts can help cover new apprentice training, with funding decisions made at the state and local level.

At the Department of Education, funding is available through the Perkins Career and Technical Education Act,[18] through Pell Grant tuition assistance to students in college credit programs,[19] through Federal Work Study programs for part time work while in college courses, and through TRIO Student Support Services[20] for students from disadvantaged backgrounds. The range of federal programs available for apprenticeships is summarized in an ETA "Playbook."[21] The American Association of Community Colleges recommends community colleges consider "braided" funding approaches when building apprenticeship programs, combining federal program support, both to institutions and students, with state and local programs (such as for economic development. workforce tax incentives and workforce funding) and with employer support, as well as possible foundation and other organization support.[22]

Many states have established tax credits or tuition assistance for their employers to promote apprenticeships.[23] For example, starting in 2019, Massachusetts has offered a Registered Apprentice Tax Credit (RATC) to promote the expansion of registered apprenticeships into healthcare, technology, and manufacturing sectors. Employers in these sectors may be eligible for up to a $4,800 credit per qualified apprentice. Specifically, eligible employers that employ

registered apprentices may apply for tax credits of up to $4,800 or 50% of wages paid, whichever is less, for each apprentice who meets the RATC program guidelines. Employers are eligible for up to $100,000 in credits each calendar year, and are eligible to apply for RATC once their apprentices have been employed for 180 days in a given calendar year.[24]

4. Employer funding to offset community college apprenticeship program costs

While Pell Grants and other programs can offset tuition costs for apprentices in technical programs that offer college credit, some community colleges ask employers to pick up remaining tuition costs. Harper College in Illinois, which helped innovate community college sponsorship of apprenticeship programs, has long been successful in making this work. Rebecca Lake, who founded the program at Harper, noted that it built a significant program, where employers funded four full-time and four part-time administrators. She worked to set a price for the school's education and services support that fit the employer's needs.[25] Kathleen Canfield of Harper notes that some employers push back about paying both the apprentice's wages and the college's program support but that the success rate of apprentices in completing the program and their retention rate staying in jobs has justified the expenses.[26]

Lorain County Community College has 600 apprentices in its programs with employers and the participating firms cover tuition costs. Christin Cooney of Lorain also notes that cost sharing from employers works when employers see the program's success.[27] Lorain, however, does not ask employers to support the administrative cost of the registered apprentice paperwork, viewing that as a service cost it must absorb. At San Jacinto College in Houston, Texas, a community college that has built a major apprenticeship program, firms are responsible for apprentice tuition, although they can obtain assistance in covering the costs. Sarah Janes of San Jacinto comments that apprenticeships can be key to strong employee retention rates, a major issue for participating employers that justifies administrative charges to them.[28] Mentoring is, she says, in turn, important to good apprenticeships, and covering tuition helps ensure employer commitment to the program including for mentoring. All of these schools have had well-established and recognized apprenticeship programs.

In contrast, Charleston's Trident Technical College, when it worked with a group of small companies to set up its youth apprenticeship program, felt employers, particularly smaller ones, would view paying both apprentice wages and tuition as a barrier, so it found other ways to offset tuition costs, including through fund-raising by the area Chamber of Commerce to support the apprentice program.[29]

It appears that colleges with more established programs, and corresponding track records with employers that sponsor apprenticeships, may be most successful in having the participating companies offset their tuition and administrative costs. Where companies are sponsors and manage more of the administration, and where programs are new, such offsets may be less available. Regional market demand for skilled workers may be another factor that affects the willingness of companies to contribute.

5. Importance of a state apprenticeship office to assist community colleges and employers in coordinating programs

A number of states have found that forming a state-level apprenticeship office, focused on facilitating apprenticeships between employers and community colleges across a state, can be a key to growing the program. Some examples of state efforts follow below.

Apprenticeship Carolina is a division of the state's community college system formed to grow the apprenticeship model in South Carolina at the community college level. It has built a statewide apprenticeship program that has supported 40,230 apprentices since 2008 with 871 active employer-sponsored registered apprentice programs, 36 partnerships, 29 pre-apprenticeship programs, and a growing program of youth apprenticeships, supported by the state's 16 technical colleges.[30] South Carolina markets its strong apprenticeship program as central part of its economic development strategy to attract and grow companies in the state. Apprenticeship Carolina has eight staff positions in total, with staff at both a central office to serve the whole system and in four different regions to work with local technical colleges. They help companies and technical colleges with program implementation, managing the Department of Labor's apprenticeship paperwork for companies, making it easier for them to manage. They also work to encourage new company sponsors and to connect them with the colleges. In turn, they advise the colleges on best practices for apprenticeship programs and assist them in running their programs. The technical colleges have their own staff for these programs, as well, with a lead point of contact in each technical college named by the college's president. Amy Firestone of Apprenticeship Carolina says there is also now an active statewide apprenticeship peer group that meets regularly and shares program ideas and contacts.[31]

ApprenticeshipNC, which is part of North Carolina's community college system, operates as an intermediary at the state level, arranging employer and community college apprenticeship programs, with both employers and community colleges serving as apprentice sponsors. It has worked on forming consortia of employers, building thirteen of these across the state. According to Kathryn Castelloes of ApprenticeshipNC, the consortia operate like a club, with membership fees and each consortia has its own website.[32] While single firms, particularly smaller firms, may have ups and downs in the numbers of apprentices they need as their business ebbs and flows, working with groups of employers helps stabilize numbers. She recommends the consortium approach which helps assure, year to year, that community colleges have enough apprentices to make their program numbers work. It also creates business involvement and leadership in the program. ApprenticeshipNC reported 8,212 apprentices in registered apprenticeship programs in 2019 (pre Covid), with 755 in youth and pre-apprenticeships.[33]

The Kentucky Community and Technical College System (KCTCS) apprenticeship program is new to the state - only two years old - and initially obtained Department of Labor funding for support. It has a small central team to manage and build it, with one person at each of the 16 colleges in the system. Diane Jarboe of KCTCS reports it offers three basic apprenticeship services: recruiting apprentices from students at participating colleges, offering apprenticeship mentoring (a key to the program), and handling all of the paperwork for the participating

employers, including a one-page contract between employers and apprentices.[34] The central state office has been critical in standing up the program through the states' colleges and employers.

Colorado is another state that has created a central office to promote apprenticeship adoption. Its Department of Labor and Employment formed a State Apprenticeship Agency in 2021 to accelerate the development of apprenticeship programs in the state, to support apprentices and employers, and to help coordinate efforts of state agencies, both at the Department and working with the state's community college system.[35]

Apprenticeships are complex programs to run, involving apprentices, employers and schools. Having a support group at the state level to help community colleges as well as employers to take on and systematize the government paperwork requirements and to support and advise on program management, appears to be a best practice.

6. Community Colleges need staffing to run apprenticeship programs

While central state staffing can be important, community colleges also need their own staff to help build and manage apprenticeship programs. As noted above, the American Association of Community Colleges has found that in implementing apprenticeship programs, community colleges need to have coordinated efforts from admissions departments, deans and faculty participating in the program, strong support from the college leadership, and, in particular, an on-campus champion for the program to pull these elements together.

For example, Sarah Janes of San Jacinto College in Texas notes that community colleges have to promote apprenticeship programs with employers, arrange the employer and apprentice links and programs, and coach the apprentices on their school and employment work. They have found they need a staffer assigned to "employer facing" tasks and another staffer assigned to the "student facing" tasks, which are very different jobs. They have developed a program across their region for training these campus apprenticeship coordinators using Perkins Act funding.

7. Participating employers will seek consistency across a state for community college apprenticeship courses

An example of how one group of community colleges tackled the need for greater consistency across their apprenticeship courses comes from Texas. Sarah Janes of San Jacinto College reports that regional employers were concerned with inconsistency in apprenticeship programs across the region's community colleges, with unclear quality standards.[36] They weren't sure what training and skills students from different schools had when they applied for jobs. San Jacinto and other colleges worked with the Texas Workforce Commission,[37] which pulled together small and mid-sized companies and college faculty to look at registered apprenticeship skills approved by the Department of Labor and to see where they fit into community college courses approved by the state. In the first year of the review, the group worked through 20 different apprenticeship programs in eight colleges, and this past year it has reviewed two more, in health care and information technology areas. The arrangement created a collegial environment between schools and employers, and the Texas Higher Education Coordination Board and the Texas Workforce

Commission have signed off on the findings and carry them on their websites. Schools in Texas now crosswalk certifications across the state with comparable courses across the state so that state employers know what skills applicants are getting. The apprenticeship program has grown to twenty industries with nine community colleges in the Gulf Coast region in Texas.

Ohio provides another approach for addressing this program inconsistency issue. Christin Cooney of Lorain County Community College's apprenticeship program noted that Ohio, like most states, has a long tradition of independent community colleges, with no statewide system for adopting curriculum.[38] That turned out be a significant challenge with participating state employers and, in turn, for the state community colleges. Cooney and others worried that community college programs would be displaced by much more uniform and consistent commercial online manufacturing education providers. So, Lorain and other schools worked with the Ohio Manufacturers Association (OMA) to encourage consistency between community college apprenticeship and other technical programs. This effort became a mechanism for more consistency across school programs. In turn, the colleges and OMA developed Ohio Tech Net, a collaborative effort across the state's community colleges for sharing new programs and approaches.

8. Schools should try to avoid the complexity of creating highly customized courses for smaller employers

While some schools report that they have in the past created apprenticeship program courses that were customized for particular employers, they often had to go back to the school's deans to make sure they had a degree program that fit the customized education.[39] Because it was difficult for community colleges to set up special programs for particular employers, they found it was better to have employer input on courses at the outset of a course design and updating process than trying to create special versions of established courses or new specialized courses. It proved be difficult as well as expensive for some schools to scale up ad hoc customized models. Customized programs can work for a major employer with an assured supply of apprentices from year to year – Lorain County Community College, for example, has a customized program for Ford, which has an assured program with the school of 100 apprentices a year.[40] But this is much more difficult with smaller employers providing uneven numbers of apprentices.

A best practice, then, for schools is not to offer too many curriculum options, with too many boutique manufacturing elements for faculty to manage, and too many tracks to administer. In the end, most companies want a set of solid job skills in a program, where companies were involved in the up-front course design. Involving companies as a group at the outset in designing the program and courses is much easier way to manage program development than adding specialized elements for companies later.

B. Working With Employers

1. Employers must be front and center in any apprenticeship program

Community colleges are uniform in stating that employers must be the focus of successful apprenticeship programs.

Leaders of the Colorado program note that personalized support for employers is a key to successful apprenticeships.[41] They have developed an outreach program to help employers with apprentice registration using an "apprenticeship development form" that walks through all the information the employer needs, so the employers see all the pieces, and identify the resources they will need. The process aims to reduce the employer burden, connecting the employer with the collaborating community college and providing working links with the state's labor department so that registration works smoothly. They warn that while community colleges may think they have good relations with employers, apprenticeship programs must be truly employer driven.

Lauren Smith, state director for New Hampshire with the Department of Labor, notes that apprenticeships are not an "off the shelf" program. They require engagement with employers, which is not about selling a pre-existing program to employers, but rather helping to develop the product.[42] San Jacinto College reports that colleges must listen very carefully to industrial partners because it is truly a partnership.[43] This means that colleges must have a point person to work with the employer as well as an active advisory committee with strong employer involvement and continuous dialog. In general, the interviewees responded that they believe schools should never say "this is how we do it" to a company, that never works; companies will need programs that fit their needs.

Chad Bridgman of Sinclair Community College of Ohio reports that it's not only about listening to industrial partners, employers need to help drive the curriculum development. There are multiple actors involved, so balance is also required to develop a program that fits students as well as the needs of industry partners, and fitting both to each other.

2. Employers are critical to scaling apprenticeship programs with other employers

Todd Berch, who directs Connecticut's apprenticeship program, notes that employers will sell the value of apprenticeship program to other employers.[44] Employers tend to trust most the reactions and experience of other employers. If the apprenticeship program works well, they will become the cheerleaders for expanding the program, he notes. Rebecca Lake, who built the apprenticeship program at Harper College found that it was much harder to find participating companies than apprentices.[45] To do it, Harper, which sponsors its apprentices, hired retired company officials who could speak to other companies to encourage their participation. In effect, they became a salesforce setting up information sessions with firms.

Charles McNeil, who supports Puerto Rico's apprenticeship program for the Department of Labor, has also found that communication between employers is critical to growing the program.[46] They hold "accelerators" at area hotels for employers, bringing in large employers and other current employer sponsors to promote the value of apprentices to potential new company participants. At these events they hold a kind of "Apprenticeship 101" that explains to employers how the program works and how to navigate the paperwork, and they break down the steps to participate. The Labor Department 's regional office in effect becomes a free consultant to manage the paperwork for employers.

C. Finding Apprentices

1. Recruiting apprentices for apprenticeship programs

Apprentice recruiting depends on how particular programs are structured. If a community college is sponsoring the apprentice, it may need to concentrate more on the recruiting of apprentices, while in employer-sponsored apprenticeships, companies undertake more of the recruiting role Various approaches to recruiting apprentices into programs are summarized below.

Dan Ortego of Lake County College's apprenticeship program in Illinois hosts a five day "apprenticeship awareness" program for sixty interested students from nine area high schools during the schools' annual spring break.[47] Students apply to participate in the program and are accepted into it based on a review process. They go through industry and faculty presentations on the program during the week and take advantage of the equipment and hands-on technology at the college. Each student receives a $250 stipend for their time. During the Covid pandemic, the program went online, but Lake County found it still worked. The awareness program has led to a strong base for the college's apprenticeship program.

Becky DeMatteis of Apprentice Ohio finds that job fairs, social media and videos are key for apprentice recruitment. They market through a combination of these media, and also by going to company sponsors and having their apprentices tell their stories to help promote the idea of apprenticeships. Materials on the program go out through social media and YouTube, as well as through newsletters. Apprenticeship "signing days" are another approach, highlighting for apprentices, their families and companies the importance of the opportunity. They also have signing days for their pre-apprenticeship programs. In addition, they hold school assemblies, hold talks with students, and send them videos on what apprenticeship life is like and the advantages of solid jobs that enable in apprentices to afford a home and car as well as further schooling without debt within a few years. They find they need buy-in at the high school student level for the program. Having a college staff person who can prepare materials and distribute them through social media such as TikTok and Instagram is also important.

On the employer side, Siemens in North Carolina is a large firm that makes extensive use of apprentices and runs a significant apprentice development program. It provides an example of how a major firm committed to apprenticeships organizes a program for them. According to Dawn Braswell of Siemens, they have built a nine-month recruiting and development process.[48] Siemens recruits the potential apprentices the company is interested in hiring both from community college manufacturing programs and from area high schools. The company comes into the schools to recruit in the fall, often through job fairs. The students see a video on the company and Siemens sends a graduate of the apprenticeship program at the company to do the recruiting. This graduate is not far in age from the students and because of experience with the program, can explain how it works, as well as the benefits of a good job with a strong company.

Next, the apprentice recruits come into Siemens for a one-week orientation in March and April where they take math and critical thinking tests and the company sees how they do on teaming and cooperation tasks. This narrows the pool down to those eligible for the firm's pre-apprenticeship

program. This pre-apprenticeship is paid and lasts six weeks in the summer, with the students taking two courses at nearby Central Piedmont Community College and shadowing workers, learning basic tasks, on the factory floor. The key test for Siemens is whether the students is engaged and involved, and asking questions. At the end of the summer, Siemens' program leaders see the students' grades from the community college courses, and talk to their supervisors about the students' performance in areas like teamwork, initiative, and engagement. Of the approximately 30 students that start the program Siemens offers full apprenticeships to approximately four.

Braswell believes that even for those not selected it's a valuable program. The participants complete two community college courses and are paid well for the summer, learning the basics of new skills. During the subsequent actual apprenticeship, Siemens pays apprentices for 40 hours per week of work and they receive full benefits after the first year, with Siemens paying for community college tuition, books, and a good salary. Braswell reports that Siemens works very closely with the area community college and maintains almost continual communication. Siemens has been a member in the past of Apprentice 2000, a group of North Carolina employers that work together to help foster apprenticeship programs. While Siemens has a much more in-depth program than most employers, its program is an example of what a committed employer can undertake.

2. The employer-apprentice relationship has to start at the outset

The Colorado apprenticeship program has found that some community colleges that sponsor apprenticeship tend to be front-end loaded, putting students into their courses first and trying to match the student later with an employer. They find that instead, the employer relationship has to start at the outset with the apprentice. Community colleges need to work with employers on the program content, and Colorado finds that trying to adjust content later, after courses are underway, doesn't work well. In turn, students are more inspired when they see the immediate work and income opportunity, and their coursework will appear much more relevant. Postponing experience with employers leads to student frustration. If an apprentice turns out to be not quite ready, she or he can be moved into a pre-apprenticeship, which provides an opportunity to explore the new employment field.

D. Building an Employer Base

1. Reach small companies through industry associations, consortia and employer groups

Kathryn Castelloes reports that ApprenticeNC has used consortia of small companies to build a base of employers involved in apprenticeships in different regions.[49] Although a single smaller firm will need only a limited number of apprentices a year, pulling together groups of small firms enables apprenticeship programs to operate at a scale that can support stronger programs and community college involvement. There are now thirteen employer apprenticeship consortia across the state. These are operated like clubs, with membership fees to help support the regional effort, and each has a website on its programs.

New Hampshire also uses a consortum model.[50] It has many smaller companies that aren't interested in the paperwork and organization tasks associated with the programs. However, they

have found that industry associations can run apprenticeship programs, arranging for member company participation and centralization of administrative functions. Grouping smaller employers helps make apprenticeship programs manageable for these firms.

2. Linking to companies through Workforce Boards and Manufacturing Extension Partnerships

There are 593 Workforce Development Boards supported by the US Department of Labor located in every state and territory, that provide extensive job training and job assistance programs with a focus on unemployed and underemployed workers. According to David Cruise, CEO of the Hampden County Workforce Board in Massachusetts, workforce boards can identify potential apprentices coming through their short-term training programs for basic skills, and hand them off to apprenticeship programs for more in-depth training. Another example is Lorain County Community College's apprenticeship program, which works closely with Ohio's workforce boards. Their company board members provide a major source of information on apprenticeship needs at firms, and help guide what companies want from community college apprenticeship programs.

Manufacturing Extension Partnerships (MEPs) offer another means to reach companies for apprenticeship programs. MEPs are supported by US Department of Commerce and by matching state funding, with programs in every state to reach small and mid-sized manufacturers with new manufacturing processes and technologies. It is the industrial equivalent of the agricultural extension program and its extension agent network in rural counties, but MEP is for small manufacturers. The MEPs can play a significant role in identifying smaller manufacturing firms that could connect to apprenticeship programs. In one state, Florida, the potential of the linkage between the state's MEP program and workforce education efforts became so strong that the state's leading program for developing advanced manufacturing technology education programs in community colleges, Florida Advanced Technological Education (FLATE), has merged with Florida Makes, the state's MEP program.[51] Both see the opportunity to develop apprenticeships and workforce education programs together. The example suggests the opportunities for MEP, community college and industry collaborations around apprenticeships.

These two federal programs, the workforce boards and MEPs, are both active in workforce development and manufacturing, and can play a significant feeder role, working with employers for supporting apprenticeship programs. And, as noted, the boards can also help identify apprentice candidates on their own.

E. Youth Apprenticeships and Pre-Apprenticeships

1. Building Youth Apprenticeships or Pre-apprenticeships at the High School Level

Youth apprenticeships are a tool to break down the work-learn barrier at the high school level, bringing high school students, typically in their junior year, into part time apprenticeships with companies. Trident Technical College in Charlestown was a pioneer in creating a youth apprenticeship program in South Carolina in cooperation with area employers, particularly smaller manufacturing employers.[52] Students spend their mornings at their high schools, where their employers often insist they take math and science courses. In the mid-afternoon they go to Trident

Tech, taking technical courses. In the later afternoon they work at their company, and also can work during summers and school breaks and sometimes on Saturdays. While high school can be a disruptive period for many students, these student apprentices are taken out of their high school environments in mid-day and placed first into a much more mature college atmosphere, where the average community college age is 29, and then into a workplace where worker ages are in the 30s and older. This tends to lead to a much mature outlook and to foster new career perspectives.
The benefits go not only to the apprentices. Small companies that are competing in an increasingly thin job market against major "brand-name" employers, found that starting an apprenticeship program in high school created more loyal employees who were more likely to stay with the company that taught them their skills and provided an early employment opportunity. So, the program apparently helps with job retention. Trident Tech played the central organizing role in the youth apprenticeship program but relied on building strong relations with leaders at area high schools and with employers. A number of other states are working on youth apprenticeship approaches, including in Minnesota, Tennessee, Kentucky and Michigan, with a range of programs, some full registered apprenticeships as in South Carolina, and others more like internships.

South Carolina has been attempting to grow its youth apprenticeship program to areas outside Charleston and this process offers a number of lessons.[53] Youth apprenticeships work particularly well in rural areas. Students in these regions tend to leave their communities immediately after high school, but apprenticeships with local companies are a way to encourage them to stay, so have been taken up by local high schools and technical colleges. Youth apprenticeships depend on the willingness of school districts, which manage programs in their area high schools, to participate. If the school district already has Career Technical Education (CTE) programs, as is sometimes the case in more urban districts, the district may be less interested in adjusting its existing program to accommodate a potentially competitive program. While apprentices in this program who are under age 18 fall outside the restrictions of child labor laws, some companies may face issues of insurance costs for those under age 18; this can be remedied by starting the apprenticeship at age 18, typically in the senior not junior year.

An apprenticeship represents a major career commitment. Often, however, students and workers contemplating career changes who are considering apprenticeships will be uncertain whether they want to pursue an apprenticeship in a particular field. Or employers will be unsure whether a potential applicant will have the background and be ready for a full apprenticeship. A pre-apprenticeship can provide an exploratory experience for students to test an apprenticeship field, as well an provide an opportunity to employers to evaluate full-apprentice applicants. These programs can be at the community college or high school level and provide a paid introduction to a career field for varying periods, from weeks to months. They can also provide a period for intensive remedial work that may be needed for a student for a full apprenticeship. But it is important, as a Colorado Labor Department official has noted, not to have pre-apprenticeships to nowhere; they should directly lead to actual apprenticeships.[54]

2. Importance of Dual Enrollment to Youth Apprenticeships

Dual enrollment enables high school students to take college-level courses while still in high school. This requires partnerships between school districts and community colleges and the colleges must allow high school students to enroll and gain transferable college credits. Frequently, states provide funding to cover the community college tuition for dual enrollment high school students. Dual enrollments have tended to enable high-achieving students to accelerate their studies, and also tended, therefore, to exclude many from lower income backgrounds with less education background or preparation.[55] However, apprenticeship programs could open up opportunities, and dual enrollment can be a critical factor to enable youth apprenticeships to work. The dual enrollment programs are key to allowing high school students in apprenticeships to take the technical courses they need for their apprenticeships at community colleges, a crucial program element.[56] They can also help support pre-apprenticeships.

F. Working with Apprentices

1. Flexible community college scheduling to match employer needs

Deborah Kobes of Jobs for the Future points out that not only do community colleges need to integrate with employers to run effective apprenticeships, they need to be flexible in scheduling the delivery of their courses.[57] Employers often want apprentices to work a 40 hour week and they also may have multiple shifts around 8 hour or longer work schedules, so schools have to adjust the time of their course offerings to fit these work schedules. Community colleges are inherently more flexible with their schedules than four-year schools and Kathryn Castelloes of Apprentice NC notes that community college frequently can offer technical courses both at night and on weekends.[58]

2. Create a Path to Credit

The college degree has become the critical credential for the American workforce, often determining successful lifetime career and earnings outcomes. Those without it tend to have much more economic difficulty and more limited career options.[59] While the college degree does not represent particular skill qualifications, it is a broad-based credential that has widespread recognition. Non-credit programs that do not lead to college credit (and potential college diplomas) therefore limit the future career opportunities available to apprentices. Deborah Kobes of Jobs for the Future notes that although it is often easier for community colleges to organize non-credit courses for employers, it is important for the long-term well-being of apprentices that their technical courses can earn credit.[60]

3. Embed industry recognized credentials into apprenticeship programs

Another best practice in apprenticeships is to build appropriate industry-recognized credentials into degree credit programs that are part of the apprenticeship training. In manufacturing, there is a plethora of credentials and credentialing systems. Some employers in a given region accept some and not others, creating a high degree of regional variation. Particularly in areas where certain

credentials are accepted, it can be useful for apprentices to have industry-recognized credentials and they should be built into for-credit apprenticeship programs working with community colleges. Deborah Kobes of Jobs for the Future notes that even if apprentices don't finish a degree program, if industry credentials are part of the program, they still have that credential to demonstrate their skills.[61] Our prior research also found that industry recognized credentials can serve as useful on-ramps and off-ramps to continuing education, allowing individuals to earn degrees over longer periods of time, while harvesting occupational and wage benefits from each period of learning along the way. [62]

4. Community College role in wrap-around services for apprentices

Providing "wrap around" services – which can include assistance such as coaching and mentoring, transportation, and child care – is another key to successful apprenticeship programs. Rebecca Lake, founder of the apprenticeship program at Harper College in Illinois, states that in addition to teachers, an academic coach who serves as an academic advisor and helps students stay on track with the course work part of an apprenticeship, can be quite important to apprenticeship success.[63] Each coach can manage a group of students in a number of courses.

Catherine Canfield of Harper states that coaching is the most important factor in apprentice completion.[64] Apprenticeship programs need good coaches to work with students, communicating with them frequently to help them keep up with their courses. Although Harper sponsors registered apprentices, this coaching role is also key where employers are the sponsors and community colleges the collaborators. The Kentucky Community and Technical College system refers to this role working with the apprentice as mentoring. They find it critical to their program and vital to keeping students in the program.[65] San Jacinto College in Texas also finds mentoring vital to program retention rates, a critical factor as employers consider apprenticeship programs.[66] The mentoring role can also extend to the workplace; employers will need to ensure that apprentices have mentors at the workplace for the work side of the apprenticeship.

Although coaching and mentoring for apprentices appear at the top of the list of the schools we talked to, they are not the only wrap around services that can make a difference to apprentices. Assistance on transportation and child care can make a difference, as well, especially for adults who must balance work and learning with family responsibilities.

5. Using online systems for tracking apprentice work progress, and managing enrollment and paperwork

Christin Cooney of Lorain County Community College notes that it can be a significant challenge to assist businesses with on the on-the-job training side of apprenticeship programs, particularly when they are starting up their programs. The companies want community colleges to help manage the paperwork and organization, not only for the instruction aside but for the employment side. Companies, particularly smaller ones new to apprenticeships, face challenges ensuring the needed rigor and consistency in the on-the-job training side of apprenticeships. While the community college can't fully manage the employer side, Cooney suggests it can assist by applying a single online log-tracking platform used across all the participating companies for the on-the-job training component, which keeps track of total hours and training areas covered and provides alerts on

gaps. It is important for consistent programs as well as ease of administration, she states, that all the participating employers working with the community college are using the same online tracking platform. It also reduces the effort, delays and potential data loss inherent in paper-based systems. There are several online providers of these apprentice software platforms, so there are choices available. Lorain is hoping to move to more competency-based education and away from "seat time" measurement, which would help simplify this employer apprentice hour and task tracking.

Another best practice is to streamline the apprentice application and enrollment process. Lorain, for example, has found that it is most efficient to assemble a small team that leaves campus to do the program application at the participating company. That way, students don't have to come to the college and meet with the numerous staff in different areas, including financial aid, academic programs, and academic advisors. Instead, the school's apprenticeship program packages all this up and performs it at the company with the apprentices, using a team that regularly comes out to firms to organize the program for new apprentices as well as for the company. This sets into place at the outset all of the program enrollment steps and processes for management of transcripts, records and academic communications, including text book ordering. Lorain staffs its apprenticeship business team with representatives from academic advising, admissions, the bursar's office and other school functions, so that the campus know-how is in one place and readily accessible. Although many of these roles on the school's apprenticeship team are only part-time, having this group of expertise available is key to scaling apprenticeship programs.

IV. Conclusion – Key Takeaways

Apprenticeships are an attractive option for students who want a clear path to a career as well as for those seeking to change their career path. Germany, Switzerland, and Austria have long been the bellwether for the apprenticeship model, while the US has lagged in producing similar programs and results. But apprenticeship opportunities are starting to grow in the US and community colleges can play a key role.

Our numerous interviews with employers, community college educators, policy experts, and the apprentices themselves, identified a series of best practices for community colleges to help create and successfully maintain a strong apprenticeship program, set out in the above section. But what are some of the key takeaways from this more detailed discussion?

1. *Engaged and Passionate Leadership:* Buy-in from community college and department leadership, government agencies, and higher education boards is key. The most successful programs are those that have champions in place who care deeply about finding the right jobs and access to those jobs for the workers who benefit the most.

2. *Listen to Industry Needs:* There is a clear need for community colleges to connect with industry and for a collaborative, open-communication relationship with industry partners in forming apprenticeship programs. Regional consortia or associations of industry leaders can help drive the creation of and support for apprenticeships.

3. *Earn and Learn*: the education and work worlds are deeply divided in the US and apprenticeships can be a critical way to bridge the gap, leading directly to careers. They can lead to industry credentials as well as community college credits, and a good-paying apprenticeship allows student workers to obtain college credits without the burden of debt. Apprenticeships, then, can offer an attractive package: career skills, good pay, and college credit.

4. *Awareness:* Apprenticeships will grow only if both students and companies are aware of the opportunities the offer. One important aspect of creating a successful program is for a collaboration between industry and educators to build a regional employer base and market apprenticeship opportunities to students as early in their learning as possible.

5. *Replicate Successful Models*: There are many successful apprenticeship programs now thriving in the US and internationally. By connecting with the right program leaders in schools and companies and employing their strategies, building and maintaining a successful program is significantly more obtainable. Many of these strategies are set out in the previous section, but linking to those that lead them can be key in designing a program.

6. *Mentorship:* Much like academic success, successful apprenticeship programs rely on pairing workers with mentors, both on-the-job and on the education side, to guide the learner through the education process, and as they transition from apprentice to full-time

employee. The most successful programs take mentorship seriously and match apprentices with education coaches and incumbent workers to form lasting relationships.

7. *Dedicated Staff:* While the cost can be high, having dedicated staff at the school to offer support to students as well as to related to companies can have an enormous impact on the success of the apprenticeship program. Schools that had a larger staff dedicated to apprenticeships reported better retention and completion rates.

8. *Form Collaboratives*: Partnering by community colleges with industry associations and consortia, workforce boards, Manufacturing Extension Partnerships and high school leaders can be critical in building networks to form and support apprenticeship programs. Holding monthly or quarterly meetings with industry and other key partners to discuss upcoming staffing needs, future funding opportunities, and curriculum needs will assist in creating programs that support the local economy.

9. *Focus On the Apprentice Experience*: Apprentice focus is pivotal to a successful program. Making the on-the-job and education sides work in sync for the apprentice is key. Mentoring and coaching on the job and in the education, program can be key to retention, keeping apprentices on track for career success.

10. *Pre-apprenticeships and Youth Apprenticeships*: Pre-apprenticeships are a way to let students test career options and for employers and cooperating schools to ensure that students are adequately prepared for full apprenticeships. Several states are finding ways to incorporate youth apprenticeships into high school programs, through collaborations between high schools, community colleges and companies. These collaborations with area high schools, industry and education leaders can appeal to students who need better approaches for future career paths.

11. *Systematize the process*: Community colleges need to develop a standard approach for their apprenticeship programs that is easy to scale up and replicate for new employers. Within a standard approach, some custom modules for industry partners can then be slotted in without disrupting the underlying model.

12. *Simplify the process for employers*: Many employers, especially small ones, resist apprentice programs for fear of paperwork and bureaucracy. Apprenticeship offices at the state level, and at the community colleges can play a role in reducing this barrier by managing the upfront paperwork and introducing straightforward online tracking systems so that employers only need to list hours and report progress.

The US workforce training system needs more apprenticeships. The need is especially urgent for middle-skill and technology-focused occupations such as advanced manufacturing technicians. This is a real opportunity for community colleges. Building apprenticeships programs can generate many benefits. The "earn and learn" model is more attractive to many students than the traditional "learn-then-potentially-earn" model of two-year programs. This can open new sources of revenue for educational institutions while serving an unmet need in the labor market. Beyond the immediate benefits of apprenticeships, the tight connections these programs build with

employers can increase the flow of incumbent workers to traditional credit and non-credit programs, while also helping to ensure the whole curriculum remains aligned with industry needs.

Building apprenticeships is not easy. It requires strong focus to create employer relationships, design programs, and streamline administrative processes. But community colleges can play an essential role to make apprenticeships attractive (and possible) for a large number of small employers that currently see the apprenticeship model as too burdensome to do on their own. Community colleges can play several different roles in the apprentice process, but each approach requires building internal roles, external collaborations, and overall management processes to make the training system work well.

This report, based on extensive interviews with leaders of effective apprenticeship programs, is a practical guide to managing the apprenticeship process for community colleges. It provides a step-by-step process, with numerous examples, to help you start and grow an effective apprenticeship program. With effort and focus, community college leaders can create transformative programs that benefit students, educators, employers, and the whole community.

Appendix A

List of apprenticeship experts consulted during our research:

Name	Title	Organization
Jennifer Worth	Senior Vice President, Academic & Workforce Development	American Association of Community Colleges
Jennifer Carlson	Co-Founder, Executive Director	Apprenti
Amy Firestone	Vice President	Apprenticeship Carolina
Becky DeMatteis	Program Administrator	Apprenticeship Ohio
Kathryn Castelloes	Director	ApprenticeshipNC
Kristen McKenna	Dean, Workforce and Economic Development	Bunker Hill Community College
Helen Carpenter	Apprenticeship State Expansion Grant Coordinator	CO Department of Labor and Employment
Kathleen Canfield	Director, Job Placement Resource Center	Harper College
Deborah Kobes	Deputy Director, Center for Apprenticeship	JFF
Diana Jarboe	Apprenticeship Project Director	KCTCS
Chrissy Cooney	Apprenticeship Director	Lorain County Community College
Patrick Mitchell	Director, Apprenticeship & Work-based Learning	MA Executive Office of Labor and Workforce Development
David Cruise	President, CEO	MassHire Hamden County Workforce Board
Brian Norris	Executive Director	MassHire Merrimack Valley Workforce Board
Todd Berch	Apprenticeship Manager	Office of Apprenticeship of the State of CT
Paula Compton	Assistant Vice Chancellor	Ohio Higher Education
Kathie Manning	Dean, Center for Workforce Dev. & Continuing Education	Quinsigamond Community College
Dr. Rebecca Lake	Apprenticeship Consultant	Rebecca Lake Consulting
Sarah Janes	Associate Vice-Chancellor, Continuing and Professional Dev.	San Jacinto College
Dawn Braswell	Head of Apprenticeship North America	Siemens
Chad Bridgman	Director of Work Based Learning	Sinclair College
Bernard Treml	Regional Director, Office of Apprenticeship	US Department of Labor
Charles McNeil	Deputy Regional Director, Office of Apprenticeship	US Department of Labor
Michael Blatt	State Director, New Jersey	US Department of Labor
Lauren Smith	State Director, New Hampshire	US Department of Labor
Melisa Stark	Commissioner of Apprenticeship Programs	Utah Department of Workforce Services
Jillian Walsh	AVP Director of Apprenticeship	Zurich

ENDNOTES:

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[46] Discussion with Charles McNeil, Department of Labor, Jan. 29, 2022.
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