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ALIGNING ADVANCED MANUFACTURING
PROGRAMS TO ADDRESS SKILL NEEDS:
A STUDY OF THE EMPLOYERS' ROLE

FINAL REPORT

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Introduction

This report identifies strong practices for aligning postsecondary education and training program content with the skill needs of employers in the advanced manufacturing sector. Advanced manufacturing employers grapple with skill gaps that hinder their businesses. Effective solutions to this challenge emerge when employers contribute essential knowledge and resources to improve education and training programs. As such, identifying and implementing innovative roles for employers to connect with the web of educational institutions, training providers, and public workforce systems is critical. This report establishes a framework for identifying exemplary practices, provides summary information, and presents key findings and recommendations for engaging employers.

Funding for this report was provided by the Community College Advanced Manufacturing Career Pathways Initiative, delivered by Achieving the Dream (ATD) with funding from the Arconic Foundation.¹ The goal of the initiative is to “strengthen the regional talent pipeline and close manufacturing skills gaps.” Achieving the Dream is a national non-government reform network of community colleges aimed at increasing student success, especially those who are underserved.² Launched by the Lumina Foundation in 2004, ATD became an independent nonprofit in 2010. Cuyahoga Community College (Tri-C) has been active in ATD since 2005 and has been considered an ATD Leader College since 2009. They have been involved with numerous ATD initiatives, including the Middle-Skill STEM Pathways Initiative, the Developmental Education Initiative, and PRESS for Completion. New Growth Group, LLC (New Growth) and MJ Crocker & Associates (MJ Crocker) were commissioned by Tri-C to develop this report.

New Growth is a workforce consulting group that mobilizes businesses and communities to solve workforce challenges. The organization has provided strategic planning, grant and resource development, operations support, and evaluation and analytics to over 100 workforce agencies, colleges, philanthropies, and nonprofit organizations throughout the country.

MJ Crocker & Associates is a consulting business founded in 2016 led by Dr. M. Judith Crocker. The organization provides services to mitigate workforce development challenges. With over 30 years experience in workforce and education programming, the organization works with educators and employers to develop and implement solutions.

¹ Achieving the Dream. (2017, October). Retrieved from <http://www.achievingthedream.org>

² Achieving the Dream. (2017, October). About Us. Retrieved from <http://www.achievingthedream.org/about-us>

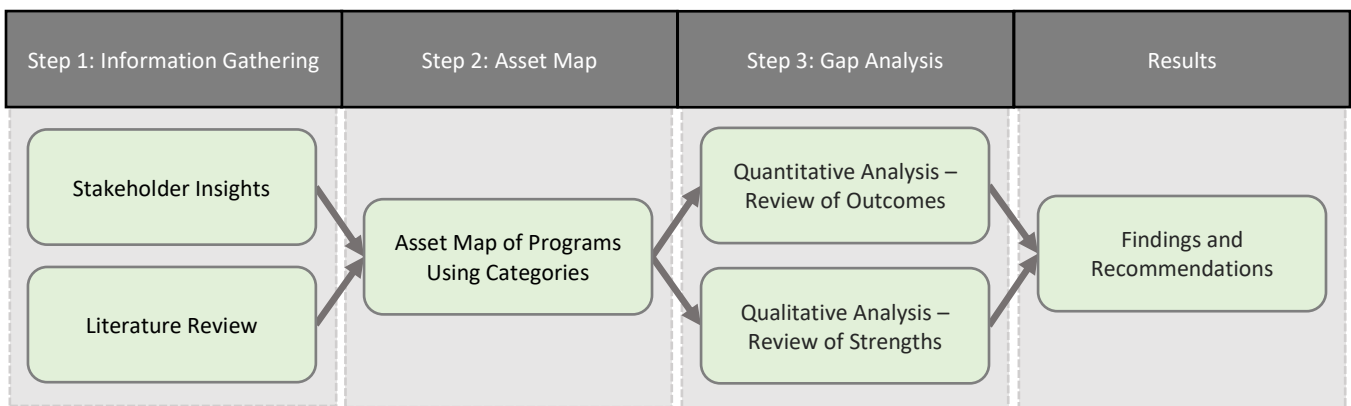
Methodology

Findings and recommendations in this report were developed via three key activities:

- **Information Gathering:** In-depth research of existing literature, plus information gathered via interviews with leading practitioners.
- **Asset Mapping:** Established a framework of effective elements of employer engagement and highlighted assets.
- **Gap Analysis:** Assessed program gaps using qualitative and quantitative methods.

A flow of activities is depicted in the table below.

Table 1: Flow of Activities



Step 1: Information Gathering

This report was developed from a combination of literature review and outreach to exemplary practitioners locally, throughout Ohio, and nationally. A review of employer-led workforce initiatives in Northeast Ohio was conducted. Although some initiatives offer the elements of a comprehensive employer engagement approach, they may not implement on-going, substantive activities related to workforce program development based on the employer engagement framework established in this report. WIRE-Net (Westside Industrial Retention and Expansion Network), MAGNET (Manufacturing Advocacy and Growth Network), MVMC (Mahoning Valley Manufacturers Coalition), and AWT (Alliance for Working Together), are four of the better-known employer-led organizations in Northeast Ohio. These organizations contribute elements of a comprehensive regional set of employer engagement activities and should be included in future efforts to improve regional connectivity to employers.

Subject matter experts, education providers, and intermediaries were interviewed about best practices in employer engagement. The table below summarizes the individuals contacted. A complete list of those contacted can be found in Attachment A.

Table 2: Individuals Contacted, by Role

Role	Number of People Contacted
Subject Matter Expert	9
College	14
Intermediary	14
Total	37

As a result of these activities, a list of manufacturing programs exemplifying significant employer engagement activities was compiled. The key programs identified are found in the table below.

Table 3: Key Programs with Employer Engagement

Program/Initiative Name	Location
Gateway Technical College CNC Boot Camp	Kenosha, Wisconsin
OH-PENN Manufacturing Collaborative	Lawrence and Mercer County, PA; Columbiana, Mahoning, and Trumbull County, OH
West Central Ohio Manufacturing Consortium (WCOMC)	West Central Ohio
Kentucky Federation for Advanced Manufacturing Education (KY FAME)	Kentucky (replicated in other locations)
MassMEP Manufacturing Advancement Center Workforce Innovation Collaborative (MACWIC)	Massachusetts
Custom Fit Utah College of Advanced Technology	Utah
Southern Arizona Manufacturing Partners (SAMP)	Pima County, AZ
Right Skills Now	Northeast Ohio (replicated in other locations)
Zane State Advisory Committee	Zanesville, Ohio
Ivy Tech/Conexus Indiana/Indiana Automotive Council	Indiana
Greater Memphis Alliance for a Competitive Workforce (GMACW)	Greater Memphis area, AR, MS, TN
Maryland MEP Boot Camp	Maryland

It should be noted that the above list only includes manufacturing-related programs. Other innovative programs that utilize employer engagement were reviewed, but not considered for the best practice synthesis. However, strategies used by non-manufacturing programs are mentioned throughout the report to enhance specific categories and strengths.

Step 2: Asset Map

Once the list of programs was gathered, they were reviewed to identify the employers' roles. A framework of five categories of employer engagement developed by the Urban Institute is described below.³ The Urban Institute framework focused on the relationship between employers and the public workforce system. The ways that employers communicate with community colleges are similar to the interactions that occur with public workforce systems. The categories have been adapted to better consider the different roles an employer can play while interfacing with educational institutions. These five categories are: Oversight; Program Design; Program Delivery; Hiring; Financial/In-Kind Resources. The table below defines each category and provides examples of each.

³ Spaulding, Shayne., and Martin-Caughey, Ananda. (2015, December). The Goals and Dimensions of Employer Engagement in Workforce Development Programs. *Urban Institute*.

Table 4: Categories of Employer Engagement

Category	Definition	Example
Oversight	Big picture engagement used to understand industry/occupation trends and employer networks broadly, and how it relates to a given training program	<ul style="list-style-type: none"> - Advisory boards - Curriculum committees - Networking sessions
Program Design	Engagement specifically utilized to enhance an educational program or career pathway	<ul style="list-style-type: none"> - Program content feedback - Entrance requirement advice - Material suggestions - General industry updates - Student recruitment
Program Delivery	Employer interventions that occur during program implementation	<ul style="list-style-type: none"> - Speaking engagements - Mock interviews - Mentorships - On-site training - Plant tours
Hiring	Post-completion activities that involve businesses and program completers	<ul style="list-style-type: none"> - Internships - Interviewing - Hiring
Financial/In-Kind Resources	Donations of money, materials, etc. to assist with educational training provider sustainability	<ul style="list-style-type: none"> - Monetary donations - Equipment purchases - Tuition reimbursement

The selected manufacturing education and training programs were analyzed on each category separately. Engagement in a given category was noted with a detailed description as to what the program did within each category. This process was repeated for all twelve programs.

Step 3: Gap Analysis

In order to assess the gaps, a framework from a report written by Jobs For the Future was utilized which identified the strength of employer engagement of each program. Programs were analyzed qualitatively using the strength of effective employer engagement to determine “high-impact” programs.⁴ These strengths demonstrate the depth and commitment of employer engagement. The table below lists examples of strong and weak employer engagement.

⁴ Wilson, Randall. (2015, January). A Resource Guide to Engaging Employers. *Jobs For the Future*.

Table 5: Strengths of Effective Employer Engagement

Weak Employer Engagement	Strong Employer Engagement
One-Time: - A single transaction, occurring once between parties	Continuous: - A long-term arrangement
Spotty: - Initiated for a single, specific time a college needs assistance	Strategic: - Created with specific outcomes in mind - Designed for replication and sustainability
Single Beneficiary: - Only advantageous to one organization or employer	Mutually Valuable: - Beneficial to students, employer, and college
Sole Representative: - Involving only one employer	Wide-Ranging: - Involving many different employers
One Issue: - Only involved in one category of employer engagement, designed to address one specific issue	Comprehensive: - Involved in multiple categories of employer engagement - Designed to address multiple needs/issues.
Superficial: - Only addressing a need on the surface of an issue	Intensive: - Addressing a need on a deeper, more substantive level
Strictly Job Placement: - Involving employers for hiring only	Empowering: - Involving employers from the beginning of an initiative, and encouraging them to be a leader for initiatives and participate throughout the process
Organizational Disconnect: - Not interfacing with different organizations, such as the public workforce system, industry organizations, etc.	Institutionally Varied: - Connecting with the various organizations that may enhance the program

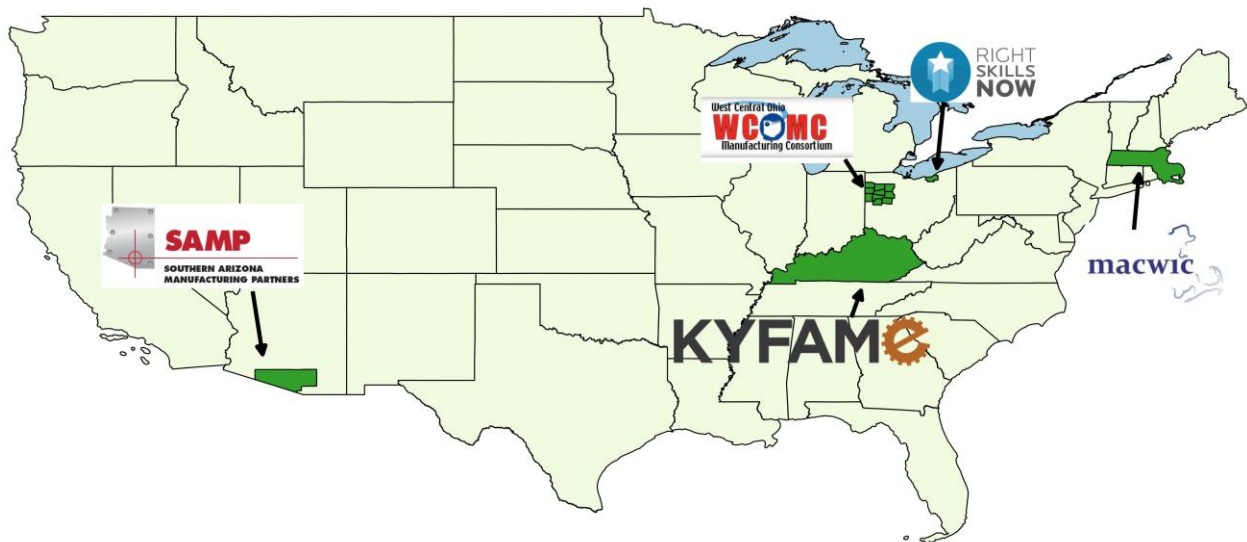
Quantitatively, programs were assessed using outcomes data, when available. The existence of outcomes data, regardless of results, was featured in strong programs with high engagement. Programs tended to track similar outcomes, including: number of students enrolled, number of students that completed, number of internships, number of graduates, number of hires, average wages, and number of hires that were retained in jobs.

The combination of involvement in multiple categories of employer engagement, strength of employer engagement, and availability of outcomes data led to the identification of five programs that exemplified “best practices”.

Programs that Exemplify Best Practices

Through the process of evaluating programs, many successful manufacturing training programs were identified. The following five programs stood out:

Figure 1: Best Practice Program Locations



Right Skills Now is a national CNC Operations model program implemented at Cuyahoga Community College in Cleveland, Ohio that works directly with a local large manufacturing employer to meet training needs. This short-term (8-10 week) cohort-based program combines class time with paid internships, and flexible scheduling options for students. Once a student completes the program, the internship, and receives a NIMS industry credential they are usually offered a full-time position making approximately \$15/hr. This model has been adapted to involve several smaller employers each needing one or two candidates. It has been replicated by other colleges in Northeast Ohio.

Kentucky Federation for Advanced Manufacturing Education (KY FAME) is a statewide partnership of manufacturing employers and educators who work together to offer apprentice-style programs. Employer engagement occurs from student selection to placement, with input provided on curriculum content, and a 90%+ hiring rate once the five-semester program is complete. The FAME model is now a national program. For more information on FAME USA, visit: fame-usa.com. For more information on KY FAME, see the case study featured in this report.

West Central Ohio Manufacturing Consortium (WCOMC) is a membership organization that is managed by Rhodes State College in Lima, Ohio. Together, WCOMC and Rhodes run apprenticeship and pre-apprenticeship programs in advanced manufacturing. The personalized, 1-on-1 engagement with local employers, and the customizable training programs that arise from those relationships, are keys to their success. Students who complete any of the Manufacturing Basic, Intermediate, and Advanced pathways are guaranteed an interview referral, in addition to receiving weekly updates on job openings and job

fairs.⁵ Furthermore, WCOMC members are given access to records of all successful student completers which aids in identifying the local talent pool. In addition to customized workforce training programs, other short-term training focused on employer incumbent worker needs are offered.

Southern Arizona Manufacturing Partners (SAMP) is an industry-led manufacturing group, which partners with educational institutions and the public workforce system with a goal of promoting a world-class image of in-demand manufacturing careers. Companies communicate regularly with the Pima County Joint Technical District precision machining and manufacturing programs to develop and revise curriculum to align with employer needs.⁶ In addition, a positive perception of manufacturing is encouraged via classroom speakers and company tours. Students are then recruited from one of the Tucson-area schools to enroll in an 18-month internship program at Pima Community College. Partial funding may be provided by the statewide workforce development network Arizona@Work. After completing the program and receiving a NIMS credential, the college works with participating companies to place students.

Manufacturing Advancement Center Workforce Innovation Collaborative (MACWIC) is an employer-led advanced manufacturing initiative, led by the Massachusetts MEP, involving regional high schools, community colleges, and manufacturing-related organizations. The five-level Applied Manufacturing Technology program starts with basic work readiness training that target entry-level positions, and progresses up to an Associate in Science Degree. The competency-based program allows for multiple points of entry, as well as multiple learning formats at some levels (online or in-person) allowing for maximum flexibility for students. Most students find employment after completion of Level 3, that includes 11 college credits and an apprentice card. For more information on MACWIC, see the case study featured in this report.

⁵ Rhodes State College. (2018, February). West Central Ohio Manufacturing Consortium. Retrieved from <http://catalog.rhodesstate.edu/wedce/wcomc/>

⁶ Southern Arizona Manufacturing Partners. (2018, February). Retrieved from <http://www.sazmp.com/>

Findings

The process of identifying employer engagement best practice programs led to two types of findings. The first type applies to education and training providers and the second applies to employers. Education and training provider findings include employer engagement practices from the perspective of community colleges, and may also apply to public workforce systems, economic development organizations, or similar groups. Employer findings include engagement strategies conducted directly by a business.

Successful best practice programs were those that:

- Include employers who are actively involved in at least 3 of the 5 categories of employer engagement.
- Include employers who participate in activities with the college that are sustainable, strategic, continuous, and mutually beneficial.
- Identify, accomplish, and document program outcomes.

Employer Findings – Categories of Employer Engagement

The most common employer roles were in program design and hiring. Employers met with college staff reviewed program content and learning outcomes and achieved a consensus prior to start of the program. Employers identified the knowledge and skills needed to fill their positions or prepare individuals for job retention or promotion. Through guided conversations, learning outcomes and skill mastery were clearly defined and industry credentials selected if applicable and relevant to the content. One school met with participating employers, reviewed their current job descriptions, and provided assistance in updating and editing to better reflect skill needs, prior to identifying program content.

Regardless of the program content requested by employers, the need for soft skills was identified by all partners. These soft skills included: show up on time, drug free, ready to work, problem solve, work as a member of a team, communicate with peers and supervisor. These skills were included within the programs and competency was expected by the end of the training. Most offered opportunities to develop, practice, and master through class activities, internships, apprenticeships, and on-the-job training (OJT). Interviewers noted that employer engagement throughout the programs helped strengthen the development of soft skills. Programs such as Right Skills Now and KY FAME embedded these soft skills within their training.

In the more successful programs, employers were clearly engaged in program delivery and student recruitment. Some employer groups would participate in recruitment sessions to promote their companies and the positions available. Other programs required that employers sponsor participants so potential students were interviewed by company representatives prior to acceptance into the program. Employer partners provided staff/trainers to deliver portions of the course content, to model practices, or provide examples of how the content was used in their company. Tours of participating companies were also offered.

Oversight and financial resource functions held by employers were identified less frequently. Often in-kind resources were provided by company personnel teaching a class, through OJT, internship supervision, or occasionally donation of equipment and supplies. Partners that were part of a formal employer-led organization with a focus on workforce challenges often played a role in oversight of individual programs and ensured that there was active employer involvement from inception through completion and placement. The following programs exemplify this practice: Right Skills Now, KY FAME, WCOMC, SAMP, GMACW, the Maryland MEP Boot Camp, and the MassMEP MACWIC.

Case Study – KY FAME

The Kentucky Federation for Advanced Manufacturing Education (KY FAME) is a network of over 125 companies and 10 colleges utilizing apprentice-style training to create a pipeline of skilled Advanced Manufacturing Technicians (AMT).

History

KY FAME originated with Toyota approaching the Kentucky Community and Technical College System to enhance technical and workplace education. Together, Toyota and Bluegrass Community and Technical College (BCTC) opened the “Advanced Manufacturing Center” and piloted a manufacturing program. In 2008, Toyota, the Kentucky Association of Manufacturers (KAM), and BCTC collaborated on the development of an employer collaborative, including on-the-job training and college coursework. In 2009, after multiple employers became involved with the concept, the Bluegrass Manufacturing Development Collaborative (B-MDC) was founded. The first cohort of students completing the AMT program in 2012 were met with sponsorship opportunities from Toyota, 3M, Central Motor Wheel of America, and GR Spring and Stamping. In 2013, the initiative became known as “KY FAME”, and in 2015 was incorporated as a non-profit statewide organization. Since conception, KY FAME has consistently seen successful enrollment, graduation, and job placement outcomes.

Utilizing All Categories of Employer Engagement

Key to the success of KY FAME is the numerous ways employers are involved with the program, from advising to financial assistance. Below are specific examples:

Oversight – As mentioned previously, this organization started with the coming together of a company, an industry association and a community college. Since then the employer input has only increased. New manufacturers have joined the member organization and committed to the AMT program format. Employers assist in advisory roles such as identification of skills in demand, and feedback on program content.

Program Design – Prior to program launch, employers commit to the program schedule, including alternating days of work and study. For the school portion of learning, employers are in charge of selecting each course, including general education, for the students.

Program Delivery – During the program, employer sponsors are extremely involved with the students. Aside from offering on-site training, they also serve as guest speakers, lead instructors, and mentors.

Hiring – KY FAME is a “pull” system, where students are selected to participate in the program in high school based on employer demand. Even prior to high school, marketing materials are distributed to elementary schools and middle schools, creating a positive image of manufacturing. Once a student completes the 2-year AMT program, there is a high probability that the student finds employment with the employer that sponsored them. In fact, over 90% of graduates were hired by their sponsored employer. If the employer is not able to hire a student, there are other businesses available to interview students.

Financial and In-Kind Resources – In the work/study program, students are compensated for their time by the employer. In addition, some employers pay a student’s tuition and fees.

For more information, visit: <http://kyfame.com> and KY FAME Annual Reports.

The table below describes unique employer engagement strategies that have been utilized with great success. These strategies apply to both manufacturing training programs, as well as those in other sectors.

Table 6: Unique Employer Engagement Strategies, by Category

Category	Unique Strategies
Oversight	<ul style="list-style-type: none"> - Zane State College, in Zanesville, Ohio, collaborated with Jobs For the Future to create an <i>Employer Advisory Council Resource Guide</i>. This guide describes ways to transform potentially monotonous meetings into meaningful, long-term substantive councils that have higher impact to the school, students, and employer.⁷
Program Design	<ul style="list-style-type: none"> - Employer members of KY FAME work with the school to develop training experiences while at the work site. Soft skills are embedded in the work-based learning experience. Attendance, teamwork, safety, and presentations to improve public speaking are stressed in both the classroom and worksite. - Right Skills Now begins with participating companies identifying specific skills needed and confirming match with college's proposed learning outcomes. Companies may participate in student selection and must commit to offering paid internships to completers.
Program Delivery	<ul style="list-style-type: none"> - Recognizing the different between an academic instructor and a practitioner, Rhodes minimizes academic language in its training, focusing on hands-on training and apprenticeships. In addition, for struggling students, Rhodes offers flexible tutoring hours to cater to unpredictable student lives. - Maryland's MEP Boot Camp, funded by Maryland's Department of Labor, Licensing, and Regulation's Employment Advancement Right Now (EARN), creates real-life situations from day one, embedding employability skills into the majority of the curriculum, and requiring drug tests of all students. Candidates who exhibit a lack of motivation or interest in the career path are removed from the program. - Los Angeles Trade-Tech Community College (LATTC) requires faculty members in their award-winning fashion program to have a minimum of 5 years industry experience and be currently engaged with the industry, ensuring up-to-date curriculum and job placement.⁸
Hiring	<ul style="list-style-type: none"> - WCOMC/Rhodes program graduates are guaranteed an interview referral. In addition, once a student finds employment, the initiative has retention strategies in place with both the college and the company. - The Skills for Life Marine Mechanics Training Program in Northwest Ohio has excelled in developing strong partnerships, specifically between the training provider and its business advisory group.⁹ As a result of the connectedness between the education partner and employers, trust has developed to ensure that students complete the program and are ready to work with the necessary skill sets. The instructor also facilitates a human resources role, assisting employers with matching students with businesses, which saves employers hiring and turnover costs.
Financial/In-Kind Resources	<ul style="list-style-type: none"> - Truck driving traditionally has issues with high turnover rates. As a solution Hinds Community College collaborated with KLLM Transport Services to develop a CDL driving school. KLLM Driving Academy has proven extremely successful with job placements, largely due to the fact that students are guaranteed a job as a KLLM driver, tuition-free, if they successfully complete a six-week internship and drive with KLLM for one year. In addition, the six-week internship can pay over \$500 per week.¹⁰

⁷ Endel, Barbara L. (2014, August). Employer Advisory Council Resource Guide. *Jobs For the Future*. Retrieved from <http://trcenter.vccs.edu/wp-content/uploads/2017/03/6-Zane-St-EAC-Resource-Guide-8.15.16.pdf>

⁸ Levin, J. S., Cox, E. M., Cerven, C., Haberler, Z. (2010). Recipe for Promising Practices in Community Colleges.

⁹ Fee, Kyle, Klesta, Matthew, Nelson, Lisa. (2016). Addressing Employment Needs through Sector Partnerships: Case studies from across the Federal Reserve's Fourth District. *Federal Reserve Bank of Cleveland*. Retrieved from <https://www.clevelandfed.org/en/newsroom-and-events/publications/special-reports/sr-20160815-addressing-employment-needs-through-sector-partnership.aspx>

¹⁰ KLLM Driving Academy, Inc. (2018, February). Retrieved from <https://www.kllmdrivingacademy.com/jackson.php>

Throughout the interview process it became clear that employers have to be proactive and ready to collaborate. Companies in each case were willing to identify goals and needs and engage with peers and partners to explore challenges and creatively seek solutions that are in the best interest of all stakeholders. Strength of employer engagement increased when employers were willing and committed to the final product, the training participants who have mastered the content and are now candidates for employment and/or promotion. For example, WCOMC has willing and committed employers who promise to interview program graduates.

In some programs, if the graduates do not meet the minimum skill level required by the employers, both partners need to seriously review the entire process and identify what led to the unsatisfactory results. MD MEP's boot camp removes students who do not demonstrate the willingness to be effective workers, such as poor attendance, attitude, or inability to pass a drug test. This filtering of students ensures that graduates are well-suited for employment.

Employer participation in data gathering was an important factor. Presence of program outcomes was critical in this assessment. Strong programs may exist, but if there are no outcome data or it is minimal, the performance of the program cannot be validated. The Right Skills Now program tracks students progress from enrollment through full time employment. Outcomes are regularly reviewed with the employer to identify potential challenges and strategies to improve outcome metrics.

The programs that demonstrated successful outcomes tended to have employers actively involved in at least three of the five categories assessed. When employers are involved in design, delivery, recruitment, and hiring, program outcomes were more likely to be captured and demonstrated. The extent to which programs exhibit effective qualities influences their sustainability, strength, and impact. How they engage and to what extent it is ongoing, effects the overall relationship with the partners.

Best practice programs included employers actively engaged in the majority of the categories identified in the Urban Institute report as well as exhibiting a majority of the strengths for effective employer engagement included the Jobs For the Future report. This substantive and ongoing involvement addresses potential problem areas, and leads to completion of training and successful placements.

Employer Findings – Strengths of Employer Engagement

All of the programs reviewed possessed many of the strengths identified for effective employer engagement. The most successful were those noted above where there was a formal manufacturer-led organization as a partner with the school. The organization had clear goals related to workforce and a plan for implementation and ongoing activities. In some cases the school facilitated the meetings and assisted with organizing activities. In others, the organization clearly was leading the work but connected with the school and engaged them in a leadership role.

Programs that delivered a range of content based on employer needs were more sustainable than those focused on only one subject area. Through the partnership, schools were able to be involved from the onset and work in tandem with the employers to clearly identify the need and desired outcome and design programming leading to those goals. Content designed to prepare new workers, as well as upskill current workers, can be offered through this process.

Employer-led organizations working as partners with the schools can lead to a sustainable relationship and effective and impactful programs. Clarity around roles and responsibilities, and regular meetings with open discussion and a problem-solving approach will ensure that the curriculum content will remain relevant and lead to qualified candidates for current and future jobs.

Case Study – MACWIC

The Manufacturing Advancement Center Workforce Innovation Collaborative (MACWIC) is an industry-driven workforce training initiative, managed by the Massachusetts Manufacturing Extension Partnership in collaboration with Quinsigamond Community College and Wooster Polytech Institute.¹ The Applied Manufacturing Technology pathway program ends with an Associate in Science degree. It includes numerous entry- and exit-points and online learning options, throughout the flexible training to allow for situations ranging from developmental education to incumbent worker upskilling.

Utilizing Strengths of Employer Engagement

The MACWIC project possesses many of the strengths of employer engagement. Examples are provided below:

Strategic – Since the initiative is driven by the MEP, any specific workforce training need is quickly heard via the various regularly scheduled employer committees.

Mutually Valuable – The program interfaces smoothly with not only employers, but multiple organizations across the state. Partners include organizations in economic development, workforce development, and education. Monthly executive committee meetings ensure all parties are benefitting from the partnership.

Wide-Ranging – The initiative started in 2012 with a small group of manufacturing employers, the MEP, the Associated Industries of Massachusetts, and the Manufacturing Advancement Center. Since then, MACWIC has grown to 225 member companies, who account for nearly 30,000 workers.

Intensive – Employers are deeply engaged with curriculum development, from the creation of new courses, to sequence of courses, to course materials. Furthermore, companies engage in apprenticeship and OJT at later stages of the pathway. MACWIC has also responded to employer needs for incumbent worker training.

For more information on the MACWIC program, visit: <http://www.macwic.org/>

Education and Training Provider Findings

Throughout the data gathering and interview process, the importance of the need for a strong relationship between employers and education partners was very clear. For example, SAMP was initiated by a group of manufacturers who approached the Tucson-area high schools, community college, and public sector workforce organization to enhance the regional workforce. Several interviewees commented that communication between the providers, public workforce system, other support organizations and employers needs to be ongoing and substantive to make a difference. Furthermore, a commitment to work together long-term was noted as critical. SAMP has maintained relationships since its foundation in 2012 and has intentions to stay committed in the future.¹¹

Through the process of identifying best practices, it became clear that high engagement of partners influenced program sustainability, strength, and impact. When colleges involve not only the employers, but also other colleges with similar programs/strategies, workforce organizations that specialize in the relevant field, or K-12 school districts to generate interest in young students, program strength and longevity increases. Right Skills Now, through a variety of partnerships with different organizations, is now replicated in other colleges.

¹¹ Araiza, A.E. (2014, August 20). Tucson manufacturers' group launches website. *Arizona Daily Star*. Retrieved from http://tucson.com/business/local/tucson-manufacturers-group-launches-website/article_f04392fa-28b2-11e4-9ec8-0019bb2963f4.html

A plan to track outcomes helps to demonstrate program success. Providing measures such as enrollments, completions, hires, and job retention assists in identifying areas where the program is strong and where improvements can be made. A continuous improvement strategy, where all partners come together to determine what worked and what did not, leads to students getting the best education, and employers getting a qualified workforce. KY FAME develops annual reports based on information collected from the partners, which is then used for continuous improvement.

Engaging with employers to identify knowledge and skills needed for both current and future positions ensures curriculum alignment with market needs. Often skills identification can be difficult, and schools can assist with the process by clarifying similar needs among companies and matching the needs with specific learning outcomes.

Quantitative Findings

Program quality was analyzed on outcomes data, in addition to categories and strength of employer engagement. It should be noted that existence of outcomes data in any capacity is more likely in an exemplary program. Programs that document their results demonstrate their success in achieving their goals. Outcomes data was collected from a variety of sources, including evaluation reports, program websites, and stakeholder insights. Typical outcomes available for the majority of programs include enrollments, completions, internships, hiring, retention, and average wages of hires.

Of the programs that were identified as having substantial employer engagement, about half tracked detailed outcomes data. Other programs had a handful of outcomes metrics available, but not formalized or at the same depth. Participation in the employer-driven programs that featured outcomes data was generally high, possibly due to targeted recruitment efforts. Enrollment sizes for the training programs vary, but typically include small cohorts of less than 20 students. Programs that had high employer engagement, paired with a system for tracking outcomes, were able to document completion rates averaging about 75%.

For programs with outcomes tracking mechanisms, a 90% hiring rate was commonplace. Starting wages for new hires ranged from about \$13/hour up through nearly \$30/hour. Job retention is often more difficult to track, since the students are no longer connected with the training provider. However, for the schools that were able to track job retention, retention rates are around 80%. This high number may be attributed to workforce retention strategies in place, particularly for underserved populations. Regular student follow-ups assist in documenting student success.

Summary

In order to address the changing workforce demands in manufacturing, employers must be engaged in a substantive way on an ongoing basis. Employer-led organizations with strong leadership and clear goals are necessary for a successful partnership. Employers must be willing to work with schools to ensure high quality, relevant instruction is delivered. They should assist with recruitment, program development, delivery, and most importantly placement of individuals who invest time and money in the program. Participation of company Subject Matter Experts (SMEs) and individuals involved in OJT such as department leads and supervisors ensures that the content will be relevant and lead to the knowledge, skills, and abilities required for the jobs.

Schools should be ready to engage employers on an ongoing basis to ensure that the program design and curriculum content they offer will prepare candidates to meet their needs. Providing opportunities

for faculty to interact with company HR, training, and supervisory associates assures open communications that can be beneficial as workforce needs change. This can lead to a continuous improvement practice that facilitates adjustments in program content, structure or format when needed. Schools that had staff identified as a primary representative and point of contact for employers were better able to address their workforce needs.

Employer-led training programs can create long-term, sustainable connections with partners leading to successful workforce solutions. All partners have to recognize their role in the process and be willing to actively participate to address the workforce challenge.

Recommendations

The following are recommendations for employers and educators seeking to effectively align advanced manufacturing programs to address skill needs. Some may be already in place in many companies and community colleges, however, the partners may lack the ongoing commitment to sustain the initiative over time. A critical mass of employers engaged on a continuous basis will ensure that programming is responsive to changing needs and focused on providing career positions to job-seeking individuals.

Although not easy to implement, the following recommendations may be helpful for employers and educators seeking to improve the effectiveness of their workforce education and training programs.

Employer Recommendations

Employers must be true, active partners in the relationship for it to be successful and sustainable. The employer-led organizations must have sufficient structure to be responsive to member needs. In some cases, there may be several organizations focused on specific sectors, i.e. auto manufacturers or aerospace manufacturers each working with the school to identify and address common needs within their membership. Following are some of the things that employers should consider to effectively engage in developing workforce solutions:

- Join and/or develop an employer-led organization with a workforce focus.
- Assume a leadership role and be willing to participate in convening and facilitating dialogue.
- Support development of a structure for the organization to maintain ongoing interactions. This could include quarterly general meetings with related topics or committees established and convened based on specific needs.
- Identify staff who could provide support and coordinate a leadership team. and regular meetings.
- Participate in school advisory committees.
- Bring other employers to the table to ensure validity of content and broaden regional impact of training.
- Be willing to commit time of SME and other key staff as needed to develop and validate content and learning outcomes and assist with instruction.
- Commit to OJT, internship experiences and filling vacancies with program graduates.
- Establish a competitive wage recognizing the students' investment of time and money and increased value to the company.
- Make contributions such as scholarships and donate equipment or materials.
- Provide data to document successful student outcomes regarding employment, retention, and advancement.
- Participate in regular meetings to assess current program success and explore skill needs emerging as a result of new technologies and changing production processes.

Educator Recommendations

Educators must be committed to the process and the goals of the employer-led organization. They must be willing to participate in convenings, listen, and work as a partner to develop solutions. Following are some key activities they can do:

- Identify key staff person/office to be single point of contact, act as a liaison between the college, other potential partners and employers, and lead the school team.

- Be prepared to look beyond the usual and develop solutions leading to candidates to fill current and projected future vacancies.
- Create an internal team that includes administration, faculty, and other key staff as needed.
- Commit to participating as a partner with companies to listen to needs, assess current environment, and consider future projected needs.
- Assist with job description review and job analysis to ensure needed knowledge and skills are clearly identified.
- Explore new content, delivery modes, etc. to meet employer needs.
- Facilitate employer meetings and discussions.
- Engage other partners, i.e. public workforce system, CBO's to support students while participating in training.
- Work with a large individual employer to customize training or connect smaller companies with similar needs and challenges.
- Introduce models and research findings that may impact program development and student outcomes.
- Assist employers in identifying future workforce skill needs and developing program content to address these needs.
- Engage peer institutions as part of the conversation to help employers access existing training content to quickly respond to needs.

A step-by-step employer engagement playbook provided in Attachment D is intended to be used as a guide for implementing the recommendations above. The playbook describes the roles that education, employers, and other stakeholders could play to grow relationships from an advisory role to a strategic partnership, utilizing the findings reached in this report.

Conclusions

Workforce education and training programs are much more likely to be successful if they have strong employer engagement. Programs designed to prepare individuals for jobs leading to careers require input from the employers who will be hiring these individuals. The desired knowledge, skills, and abilities for jobs continue to change and evolve with both internal and external influences. Positions change based on new products and processes and new ways of doing business. Advances in technology and automation influence job performance expectations. Engaging employers in the conversation early in the process and maintaining it on an ongoing basis is critical to program success.

Community colleges play a key role in developing the future workforce. They need to constantly be exploring new and different ways to prepare individuals for the changing workforce demands. Employers consistently reference the desire for "soft skills" in their new hires. Workforce training programs need to provide opportunities for individuals to develop and master these skills in tandem with the specific technical skills needed for the job. This is even more important for the underserved populations who often seek education from community colleges. Students who may be the first in their family to participate in higher education often face challenges academically and also struggle to have the financial and economic resources needed for success.

Progressing along a pathway that includes work and school will contribute to the students' success on the job and in the classroom. If students can earn while continuing their education, they will early-on reap the benefit of their investment in time and money and will be more likely to persevere.

Forward thinking advanced manufacturing companies look not only at the skills needed for today but consider and anticipate those that may be needed in the future. Schools that partner with employers to clearly identify current and future skills will develop programs leading to qualified candidates to fill vacancies now and be prepared for new demands in a changing work environment.

The information and program examples provided in this report offer insights into strategies and approaches leading to successful workforce and education programs. Achieving the Dream schools are well on their way to making a difference in the lives of their students. Continuing to engage and strengthen the employer's role in their programs has the potential to significantly make a difference in the lives of their students and the economy in their region.

Attachments

Attachment A: Contact List

Contact Name	Organization
Ed Strong	Corporation for Skilled Workforce
Mason Bishop	WorkED Consulting
Margo Meyer	Rhodes State College
Paul Turner	Bluegrass Community and Technical College
Debby Combs	Combs and Assoc. LLC; Partners for a Competitive Workforce; Advanced Manufacturing Workforce Development Coalition
Kerry Wells	MD MEP
Leslie Parady	MassMEP
Scott Ellsworth	Scott Ellsworth Consulting; MSSC Senior Advisor to Ohio
Melissa Allcock	West Kentucky Community and Technical College
Gary Zirulnik	Henry Ford College
Anna Patterson	Columbus State Community College
Tim Duffy	Cleveland Industrial Training Center
IMEC MEP in Chicago	Illinois Manufacturing Excellence Center
Wisconsin Regional Training Partnership	Wisconsin Regional Training Partnership
Marilyn Barger	Florida Advanced Technological Education Center
Mary Ann Pacelli	Manufacturing Extension Partnership, National Institute of Standards and Technology, US Department of Commerce
Janice Urbanik	Partnership for a Competitive Workforce
Dennis Parker	Toyota North America, FAME USA
Amy Waldbillig	Cincinnati State Community and Technical College
Kerrie Carte	WSOS Community Action Commission
Bret Holmes	Utah College of Applied Technology
Toni Neary	Haas Tower-Morris Group
Craig McAtee	National Coalition of Advanced Technology Centers
Brent Weil	Manufacturing Institute
Vearl Turnpaugh	Ivy Tech Community College
Doug Durliat	West Central Ohio Manufacturing Consortium
Laura Busey,	Blue Ridge Community and Technical College
Rick Reeder	Palm Beach State College
Howard Drake	Polk State College
Katherine McClelland	Manufacturing Institute
Deborah Davidson	Gateway Technical College
Southern Arizona Manufacturing Partners (SAMP), Pima Community College, AZ	Southern Arizona Manufacturing Partners (SAMP), Pima Community College
Cheri Rice	Ohio Department of Higher Education
Jesse Simmons	Simmons Supply Chain, LLC; SCOKI
Josh Benton	Kentucky Cabinet for Economic Development
Greg Timberlake	North Central State College

Attachment C: Resource List

Title	Author
2011 Annual Report - Putting People Back to Work	Jane Addams Resource Corporation
A Resource Guide to Engaging Employers	Randall Wilson
Addressing Employment Needs through Sector Partnerships: Case studies from across the Federal Reserve's Fourth District	Kyle Fee; Matthew Klesta; Lisa Nelson
America's Next Manufacturing Workforce: Promising Practices in Education and Skills Building	MForesight: Alliance for Manufacturing Foresight
Bootcamps for Manufacturing	National Coalition of Advanced Technology Centers
Building a Vision for All Students	KnowledgeWorks
Building America's Skilled Technical Workforce	The National Academies of Sciences, Engineering, Medicine: Committee on the Supply Chain for Middle-Skill Jobs: Education, Training and Certification Pathways; Board on Science, Technology and Economic Policy; Board on Higher Education and Workforce; Policy and Global Affairs; Board on Science Education - Division on Behavioral and Social Sciences; National Academy of Engineering
Building Effective Employer Relations	Linda Dworak-Munoz
Closing the Advanced Manufacturing Talent Gap	Chitra Javadekar; Elizabeth Watson; Valerie Kapilow; Marina Bograd; Phara Boyer; Ibrahim Zeid; Claire Duggan
Connecting community colleges with employers: A toolkit for building successful partnerships	Elizabeth Mann
Connecting People to Work: Workforce Intermediaries and Sector Strategies	Maureen Conway and Robert P. Giloth
Employer Advisory Council Resource Guide - A Guide Developed for Zane State College Faculty Leading Employer Advisory Councils	Barbara L. Endel, PhD
Employer Engagement Pilot Project	Pam McDonough; Manny Rodriguez; Jackie Edens
Employer Involvement in Workforce Programs	Burt S. Barnow; Shayne Spaulding
Erie Regional Manufacturer Partnership Strategic Action Plan - 2016	Thomas P. Miller & Associates
Great Companies, Great Jobs Action Lab	MIT and The Hitachi Foundation
Moving Apprenticeship into Manufacturing's Future: Industrial Manufacturing Technician	Rhandi Berth; Laura Dresser; Emanuel Ubert
OH-PENN Manufacturing Collaboration 2016 Action Plan	Thomas P. Miller & Associates
Pathways to Student Success: Case Studies from the College and Career Initiative	Laurance J. Warford
Right Skills Now - Providing Skilled, Credentialed and Work-Ready Manufacturing Talent Now	National Network
Soaring Demand: Meeting Talent Needs in the Aerospace Sector	Manufacturing Institute and Arconic Foundation
The Future of Jobs and Jobs Training	Lee Rainie and Janna Anderson
The Goals and Dimensions of Employer Engagement in Workforce Development Programs	Shayne Spaulding and Ananda Martin-Caughey
The Recipe for Promising Practices in Community Colleges	J. S. Levin; E. M. Cox; C. Cerven; Z. Haberler

Attachment D: The Employer Engagement Playbook

A Guide for Community Colleges to develop meaningful employer relationships leading to successful workforce development programs.

This Playbook was developed as a result of a study contracted by Cuyahoga Community College as part of the Achieving the Dream Community College Advanced Manufacturing Career Pathways Initiative. The research conducted for the "Aligning Advanced Manufacturing Programs to Address Skill Needs: A Study of the Employer's Role" report resulted in the identification of categories that describe the roles that employers play in their interactions with community colleges and other workforce partners.

Through an analysis of a number of community college workforce education and training programs, it was concluded that successful best practice programs were those that:

- Include employers who are actively involved in at least 3 of the following 5 categories of employer engagement (Oversight, Program Design, Program Delivery, Hiring, Financial, In-Kind Resources)
- Include employers who participate in activities with the college that are sustainable, strategic, continuous, and mutually beneficial.
- Identify, accomplish, and document program outcomes.

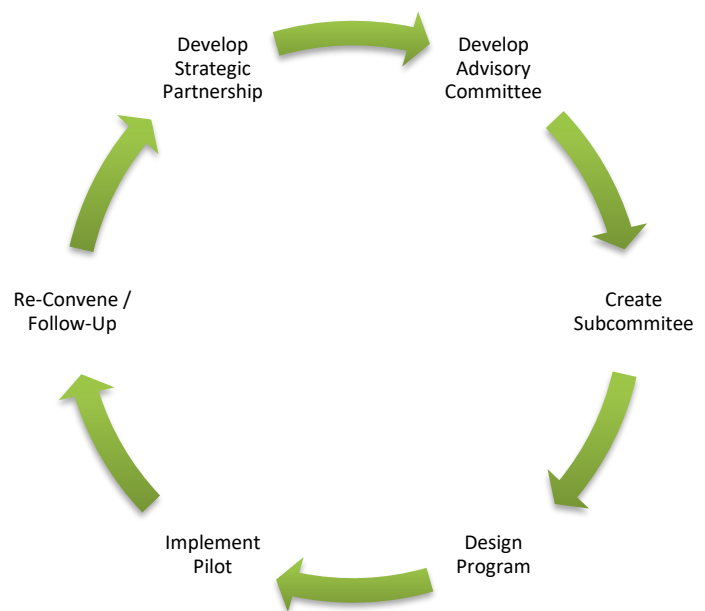
The Playbook is designed to help community colleges assess their status in relation to best practices and work with their employer and other workforce related partners to strengthen and enhance their efforts to better meet the current and future needs in their service area. It represents many of the recommendations emerging from the initial study. The six functions (Develop Advisory Committee, Create Subcommittee, Design Program, Implement Pilot, Re-Convening/Follow-Up, and Develop Strategic Partnership) indicate the stages where employers can actively participate in the workforce development process. The employers' role is described in each stage as well as those that should be played by the college and the other workforce partners. The specific activities are noted for each category. Background information and more details are provided in the report.

Since the product of the workforce development effort is a qualified candidate for the career positions, factors related to recruitment, selection, and retention are included in this Playbook. The student is critical to program success and all the partners must have a role in ensuring a successful outcome.

A continuous improvement strategy is key to the overall success, and is symbolized via the Employer Engagement "Cycle". The strategic partnership activities will ensure that there is a process in place for a feedback loop with existing committees, leading to replication and sustainability. The detailed actions that can occur at each step are found on the next page.

Community colleges that use this Playbook with employers who accept their responsibility in this process will have not only successful workforce development programs, but a relationship that will be sustainable and beneficial to all stakeholders over time.

Figure 2: Employer Engagement Cycle



Function	Develop Advisory Committee	Create Subcommittee	Design Program	Implement Pilot	Re-Convene / Follow-Up	Develop Strategic Partnership
College Role	<ul style="list-style-type: none"> Develop Advisory Committee Facilitate discussion to identify needs, then analyze based on common needs of all employers Rank based on urgency and most common needs Secure employer commitment for substantive participation, including Subject Matter Experts (SMEs) to develop training programs 	<ul style="list-style-type: none"> Establish subcommittees that specialize in the different facets of a program, include SMEs In-depth analysis of common knowledge and skills needed in companies Confirm critical mass of employers to support training a student cohort Clarify employer expectations for student abilities and characteristics 	<ul style="list-style-type: none"> Develop and/or enhanced curriculum content to meet employer needs Include college faculty, adjunct, retention specialist, career coaches, program developers, and employers Develop program Reconvene subcommittee, confirm content, design format Secure commitment for ongoing involvement and internships Determine industry credential related to content 	<ul style="list-style-type: none"> Determine funding source Assess, interview, select students Deliver the program Ensure access to student support services for underserved populations, monitor and address barriers 	<ul style="list-style-type: none"> Review outcomes data to determine effectiveness and impact such as hiring, retention, etc. Determine if program revisions needed in content, format, recruitment, selection, delivery, student follow-up Review student progress. Look at traits of most successful students 	<ul style="list-style-type: none"> Efforts made throughout lifespan of the initiative for continuous improvement feedback loop Share and possibly replicate with other colleges and/or other employees Facilitate ongoing engagement with employers Assess sustainability of model, identify other content areas Replicate and adapt process based on employer need and college capacity
Employer Role	<ul style="list-style-type: none"> Participate in advisory committee Provide information on current and future needs Discuss relationship between content of current programs and employer needs Commit to substantive involvement by key personnel 	<ul style="list-style-type: none"> Determine specific knowledge, skills, and abilities needed Identify industry credentials currently being used Clarify and validate job descriptions to ensure they describe KSAs needed for the jobs 	<ul style="list-style-type: none"> Review proposed content / format / delivery structure Confirm match of training outcomes to employer workforce needs Accept selected industry credentials as learning outcomes for training 	<ul style="list-style-type: none"> Offer internships Provide feedback/reports to college on student progress Offer tours, speakers, SMEs, for class participation Conduct mock interviews Assist with student selection 	<ul style="list-style-type: none"> Provide data on outcomes Recommend revisions to address issues Suggest other employers to become engaged and participate in workforce development 	<ul style="list-style-type: none"> Recognize and promote value of participation with college Identify single point of contact for communications and interactions between college and company Commit to ongoing participation with college on workforce development
Partner Role	<ul style="list-style-type: none"> Identify potential students, target population for introduction to training option 	<ul style="list-style-type: none"> Participate as needed to connect with potential students and support services 	<ul style="list-style-type: none"> Identify , confirm, recruit pools of potential students Recommend funding options 	<ul style="list-style-type: none"> Provide support services to students Communicate with instructors and employers on behalf of students 	<ul style="list-style-type: none"> Participate in follow-up meetings to provide data and recommendations to improve all program aspects 	<ul style="list-style-type: none"> Commit to ongoing involvement as appropriate to offer input on future training programs and access to target populations