Apprenticeships for the Modern World

How Employers Are Building America’s Workforce Through Competency-Based Work-and-Learn Programs

NATIONAL NETWORK
CONNECTING LEARNING AND WORK
Across the country, work-and-learn programs are proving to be an ideal approach for a wide array of businesses to meet their current workforce needs, while also building a strong pipeline for quality talent in the future. By harnessing industry-relevant, work-based learning, work-and-learn programs are allowing employers to help students and workers gain and demonstrate necessary skills and behaviors needed for workplace success. Apprenticeship, long a staple of job preparation in various trades, is one model of a work-and-learn program.

REGISTERED APPRENTICESHIP: STUCK IN THE 20TH CENTURY

The most widely known apprenticeship model is the Registered Apprenticeship Program, established in the 1930s through the National Apprenticeship Act and administered federally by the U.S. Department of Labor and State Apprenticeship Agencies. In a recently released report, Registered Apprenticeship Challenges and Solutions, the National Network of Business and Industry Associations (National Network) assessed the system and identified a series of challenges that demonstrate how the system has not kept pace with the new jobs of the modern economy.

As a time-based work-and-learn model with government-imposed requirements, Registered Apprenticeship does not apply to many sectors of the modern economy and discourages companies from participating. Today, too many employers in a wide range of business sectors find the Registered Apprenticeship Program overly bureaucratic, cumbersome and costly. As a result, employers are calling for a new version of apprenticeship that is competency-based – related directly to nationally portable, industry-recognized credentials and updated to the realities of the modern workplace.

SCHOOLS AND EMPLOYERS MOVE AHEAD

Apart from the government-administered system, many employers and industry sectors have developed and are implementing competency-based work-and-learn models that offer greater flexibility, utility and outcomes to students and workers alike. Competency-based models link success to the mastery of established skill sets, rather than to completing courses and on-the-job training based on a rigid – and often arbitrary – set of hours.

Competency-based work-and-learn models link an individual’s success to the mastery of established skill sets.

These emerging models allow participants to progress at their own pace suited to their personal learning style, so the training is more efficient and tailored to individual needs and employer requirements. While diverse approaches to workforce preparation abound, the highest quality models that are successful in preparing participants for work generally include the following core components in their design:

- **Blended Learning** – Multiple learning modes are available to engage an individual – including theory-based classroom instruction, simulations and online / distance learning, alongside work-based learning.

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1 Find out more about industry-supported work-and-learn models at: http://nationalnetwork.org/guidebook/
- **Credit for Prior Knowledge and Experience** – Individuals who have developed knowledge and skills through prior educational and work experience can receive credit for their demonstrated abilities.

- **Industry Skill Standards and Credentials** – Curriculum / training is based on industry skill standards, while third-party assessments (including industry credentials) measure and acknowledge individual proficiency.

- **Employment Arrangement** – Employers participating in the program provide work-based learning opportunities such as externships, pre-apprenticeships, clinical training / practicum and internships.

- **Mentorship** – Employer mentors support an individual during his or her work-based learning experience, providing guidance on company culture, specific position functions and workplace policies and procedures. In many cases, mentors help develop learning objectives for a mentee and assist in measuring his or her progress and proficiency.

- **Paid Work Experience and Advancement Opportunity** – An individual earns a wage during the work-based learning portion of the program. Work is either part- or full-time, usually paid and / or tied to academic credit with a secondary or post-secondary school partner. Wages and workplace responsibilities often increase at defined milestones determined by an employer based on an individual’s advancement.

- **Program Completion Certificates** – Individuals who complete the program receive nationally portable, industry-recognized credentials, program certificates and / or degrees that have demonstrable consumer and labor market value.
A NEW VISION FOR APPRENTICESHIPS: COMPETENCY-BASED WORK-AND-LEARN

The core components listed above in many ways define a quality, 21st-century apprenticeship. Working with community stakeholder partners, employers and industry sectors are building innovative partnerships to develop and deliver just these types of competency-based apprenticeship work-and-learn models. Examples include:

- Business sector collaborations composed of small- to large-scale companies pooling resources to support competency-based training approaches.
- Employers collaborating with secondary and post-secondary schools in their communities, regions and states to prioritize industry-specific, in-demand career tracks, supporting the development and delivery of specialized coursework and work-based learning experiences.
- Industry trade associations organizing programs in which their members participate through linkages to secondary and post-secondary educational institutions and in the delivery of work-based learning experiences.

The members of the National Network strongly support the competency-based, apprenticeship-like work-and-learn model as a 21st-century approach to workforce preparation. Combining concept-based learning with hands-on application in a real-world setting yields demonstrable outcomes for students, workers and employers alike. The following pages contain examples of emerging and successful models of industry-led competency-based work-and-learn programs that – while not universally labeled “apprenticeship” – are producing results for individuals, companies, communities and the nation. Taken as a whole, these models point toward a new vision for redefining and retooling competency-based apprenticeships for the modern economy.

Combining concept-based learning with hands-on application in a real-world setting yields demonstrable outcomes for students, workers and employers alike.

ABOUT THE NATIONAL NETWORK OF BUSINESS AND INDUSTRY ASSOCIATIONS

The National Network includes leaders in manufacturing, retail, professional and business real estate, health care, energy, construction, hospitality, transportation and information technology sectors, which represent the source of nearly 75 percent of projected U.S. job growth by 2020 (an estimated 30 million new jobs). These leaders are united in their commitment to help individuals understand and gain the skills they need to enter into and advance in the jobs of today and tomorrow. This unprecedented collaboration of typically competitive industries signals a commitment to support a better prepared and more fulfilled workforce. For more information, please visit www.nationalnetwork.org.

The National Network is made possible through support from Lumina Foundation and the Joyce Foundation.
Giving Chicago Students the IT Advantage

Accenture and City Colleges of Chicago’s Wright College: Training Students for Careers in Information Technology

MODEL SUMMARY

Charting new approaches to develop and recruit talent, Accenture collaborated with City Colleges of Chicago in 2016 to create a competency-based apprenticeship program for students studying through Wright College’s associate degree programs in information technology (IT). Accenture and Wright College worked together on multiple program components, including curriculum guidance, student mentoring and a yearlong corporate apprenticeship program that provided on-the-job learning and paid work experience through Accenture’s Chicago office.
PROGRAM DESIGN

Accenture believes it has a valuable role to play to help address skills gaps in local communities, mobilizing its workforce and convening partnerships to make a measurable impact in the economic vitality and resilience of individuals. In Chicago, where IT job growth is forecasted in the tens of thousands over the next decade, Accenture realized the importance of finding new sources of talent to meet local market needs.

Accenture’s interests dovetail with the City Colleges of Chicago’s College to Careers initiative that aligns each of the seven City Colleges with a high-demand career sector. Designated a Center of Excellence in Information Technology, Wright College enlisted partnerships with business leaders, such as Accenture, to further sharpen its curriculum and support work-based learning experiences for its students.

Accenture experts and Wright College faculty curated highly relevant classes on software and programming, infusing coursework with the latest IT theory and practice. The company advised on the development of value-added teacher-practitioner and networking opportunities for students to bolster connections between the college and Accenture professionals. The Accenture apprenticeship program is a yearlong, paid work experience for students to work alongside the internal IT team in the company’s Chicago office. Students rotate through departments, spearheading and supporting IT projects throughout the office.

NUTS AND BOLTS

- **New Talent Development Strategy:** While Accenture’s recruiting typically targets four-year college and university campuses, the partnership with Wright College represents a broadening interest within the company to become actively involved in associate degree programs. The company is working to influence program design and provide tailored work-based learning experiences to students through company-paid apprenticeships.

- **Curriculum Development:** Accenture consulted specifically on Wright College’s Cybersecurity and Coding & Data Analytics curriculum, ensuring core competencies and real-world scenarios infused the coursework.

- **Industry Credentials:** Depending on the pathway students pursue through Wright College’s Center of Excellence in Information Technology, they can earn valuable industry certifications, including CompTIA A+, CompTIA Network+ and Cisco Career Certifications.

- **Articulation:** City Colleges has transfer and articulation agreements with Chicago-area four-year colleges and universities, enabling students to transfer their City Colleges credit and continue their studies with additional degrees.

- **Employability Skills Development:** As far back as 2011, Accenture began offering job-readiness workshops to City Colleges of Chicago students, with company mentors working with students on resume writing, mock interview practice and presentation and networking tips. In 2017, Accenture opened a 100-hour online course emphasizing employability skills to all 90,000-plus students studying across the City Colleges system.

PROGRAM RESULTS

The program inaugurated in spring 2016 with a cohort of five Wright College students chosen to participate in a paid apprenticeship with Accenture’s Chicago office. Upon completing their yearlong apprenticeship, four transitioned to full-time roles in the company’s IT department. Doubling its commitment, Accenture added eight new Wright College students as full-time apprentices in summer 2017.

Building on the success of its Chicago program, Accenture has announced a commitment to eventually expand the number of apprenticeships to 25 per year.

TOOLS / RESOURCES

- City Colleges of Chicago College to Careers Focus Area: Information Technology
  http://www.ccc.edu/Pages/studentgps/information.html

- Accenture Corporate Citizenship Link: Skills to Succeed
Advancing Skills and Career Opportunities for Frontline Entry-Level Health Care Workers

MODEL SUMMARY

Norton Healthcare in Louisville, KY, the region’s leading health care provider, has built a culture of continual, lifelong learning, beginning with frontline entry-level employees. Norton participates in School at Work, a six-month basic skills program that provides blended learning through on-site and online instruction. Employees can also take advantage of the organization’s Elevating the Frontline Employees program designed to remove barriers for success personally and professionally.
PROGRAM DESIGN

School at Work, a program of Louisville-based Catalyst Learning, supports the development of foundational employment skills in entry-level health care sector employees, focusing on nurse aide, food service, housekeeping and environmental services positions. Employees apply to the program or are referred by their supervisor to review and refresh their skills in mathematics, reading, communications, customer service and patient safety, providing a foundation for further learning and career advancement. From there they can follow one of four career tracks: nursing, allied health, clerical or support services. The program is free to employees, and participants are paid for their time.

Norton hosts weekly classes at various health care campuses, where students engage in a range of activities, including online coursework and instructional videos. Students are paid for class time if it occurs during their normal shift.

Coaching is a core component of School at Work, where health care professionals interact with students to foster learning. At Norton, coaching occurs through its Office of Workforce Development, which operates a career center that employs a staff of six coaches to support employees at all levels. As part of the School at Work program and more broadly, Norton coaches assess employees’ skills and interests, provide career advice and financial education, inform staff of Norton’s education and training programs and identify career opportunities.

As an adjunct to the School at Work, employees can also participate in Norton’s Elevating the Frontline Employees program designed to bolster professional, financial and personal acumen. Subjects covered include basic computer literacy, business protocol, budget and retirement planning and personal resilience.

NUTS AND BOLTS

- School at Work – Norton’s Approach:
  - Development of a Long-Term Learning and Career Plan – Employees begin a career identification process by completing a self-reflection questionnaire that helps determine whether they would be better suited to pursue technical or non-technical schooling. Job recommendations are provided to employees that outline daily job tasks and responsibilities of various positions and detail the knowledge and skills necessary to succeed in those jobs.
  - Job Search and Educational Support – Norton coaches identify future job openings within the company and Louisville-region schools that provide necessary continuing education. Norton has relationships with numerous schools and offers financial assistance to students pursuing certificates and degrees.
  - Goal Development – Working with their coach, employees develop achievable goals that align with their chosen career path. They also identify the potential hurdles in meeting goals and develop strategies to address and mitigate risks.
  - Commitment to a Culture of Continual Lifelong Learning: Norton invests over $11 million a year on staff development as part of a systemic approach to identifying and developing its workforce. Norton continuously assesses staffing needs and collaborates with partners to deliver programs that make quantifiable impacts on the organization’s business. Norton’s comprehensive approach to career development is managed through its Office of Workforce Development, Norton University and the Institute for Nursing.

PROGRAM RESULTS

Data indicate that 69 percent of participants in Norton’s first six-month School at Work and Elevating Frontline Employees programs earned promotions and wage increases.

The National Fund for Workforce Solutions recognized Norton as a 2015 CareerSTAT Frontline Healthcare Worker Champion. Norton measured participation in the School at Work program, promotions and employees obtaining higher learning to earn this distinguished award.

Health care systems report that employees who have completed the School at Work program are more engaged, leading to improvements in employee performance, work productivity and advancement potential, as well as better health outcomes for patients.

TOOLS / RESOURCES

- Catalyst Learning Blog
  http://catalystlearning.com/blog
- School at Work
  http://catalystlearning.com/products/school-at-work
- Norton Healthcare: Using Workforce Investment to Drive Business Impact
  https://www.youtube.com/watch?time_continue=40&v=vSXJk84609k
Building Kentucky’s 21st-Century Skilled Manufacturing Workforce Through Apprenticeship-Style Work and Learn

MODEL SUMMARY

The Kentucky Federation for Advanced Manufacturing Education (KY FAME) is a partnership of regional manufacturers and higher education institutions that works to create a pipeline of highly skilled workers. It leverages apprenticeship-style educational programs that lead to advanced-manufacturing career pathways. The primary method to achieve this goal is through the Advanced Manufacturing Technician Program.
PROGRAM DESIGN

The Advanced Manufacturing Technician (AMT) Program is a dual-track, five-semester program that combines education with continuous real-world working experience through a partnering manufacturer. Once accepted into the program, students earn and learn by attending classes at a Kentucky Community and Technical College location two days a week and spending 24 hours a week with a leading manufacturer for a competitively-paid work experience. By program’s end, students have earned an associate degree in Applied Science in the Industrial Maintenance Technology-Advanced Manufacturing Technician Track and an AMT certification. They have also compiled 68 to 71 college credit hours and gained two years of work experience.

KY FAME employer partners recruit high-achieving high school graduates with STEM backgrounds, current employees and veterans to apply to the program. Employers commit to providing valuable work experience, including competitive pay – a minimum of $12 / hour, with some employers paying more – and increases at regular intervals as students advance through the program. Most students earn $25,000-$30,000 – enough to cover the cost of tuition.

Students study a broad range of subjects, including electricity, fluid power, mechanics, fabrication and robotics. Additionally, students learn common employability skills and behaviors such as attendance, communication, diligence, initiative, interpersonal relations, problem-solving, reliability and teamwork.

Upon completion of their associate degree, students have a variety of options available to them. Those who are ready to continue developing their craft can move to full-time employment. Others who wish to advance their education can seamlessly transition into a degree program in business or engineering.

NUTS AND BOLTS

- **Manufacturer Partnership:** KY FAME is a collection of manufacturing-led, statewide chapters including more than 200 companies across the state, such as 3M Manufacturing, Bosch, General Electric, HAHN Automation, Mubea and Toyota. Local economic development and workforce organizations, such as the Northern Kentucky Tri-County Economic Development Corporation, also partner with chapters to advance marketing and recruitment activities to attract high school students and job seekers to consider advanced manufacturing careers.

- **Career Ready:** KY FAME graduates are poised to leverage career options. With over 1,800 hours already accumulated in on-the-job training and work experience, and with an AMT associate degree in hand, graduates can often continue working full time with their sponsoring employer. These are employers that are invested in students with whom they have already built strong relationships. Many of the graduates are put on the fast track for advancement and potential leadership positions.

- **Articulation to Four-Year Degrees:** After receiving their associate degree, many students choose to further their education and pursue a bachelor’s degree. Through a partnership with KY FAME and Northwood University, students can pursue a Manufacturing Management Bachelor of Business Administration degree. All earned AMT credits are transferable toward a degree, and courses can be completed online or on-site at Northwood’s Kentucky locations. The program enhances the skills already learned, offering the student a new perspective on business, manufacturing management, floor-level production and technical skills. Students can also work toward a degree in engineering at the University of Kentucky.

PROGRAM RESULTS

KY FAME began in 2008 with a small group of regional employers and now includes more than 200 employer members from across the state. The first cohort of KY FAME students began in 2010, with 12 students who were simultaneously working at Toyota and pursuing associate degrees at Bluegrass Community and Technical College. The program has grown as employers have witnessed the program’s success and potential benefits to their companies. In recent years, northern Kentucky has experienced growth in the demand for manufacturing jobs, and the program is now being adopted statewide.

As of August 2017, 232 students had earned AMT degrees, with more than 650 students enrolling in KY FAME-endorsed programs starting in the 2017 fall semester. The program enjoys a 98 percent graduation rate.

TOOLS / RESOURCES

KY FAME
www.kyfame.com

Think Kentucky – Cabinet for Economic Development
www.thinkkentucky.com/workforce
In response to increased demand, colleges and universities are developing residential property management (RPM) degree programs to prepare students to enter and advance in these careers. The National Apartment Association Education Institute (NAAEI) has partnered with Ball State University, the University of Alaska, Valencia College and Virginia Tech to develop a competency-based curriculum, layered with work-based learning, that leads to a degree and recognized industry credentials.
PROGRAM DESIGN

With 11,000 new jobs available in the U.S. property management industry each year, the need for RPM talent is at an all-time high. This trend is projected to continue, causing concern for many of the National Apartment Association’s (NAA) 73,000 members struggling to find and keep valuable employees.

NAAEI’s role is to promote the RPM programs and provide colleges and universities with technical support and curriculum resources, access to its credentials, connections to members and opportunities for students to attend NAA conferences.

While each of the RPM degree programs varies in course requirements, the integration of industry credentials and work-based learning underpins them all. Students earn NAAEI’s nationally recognized credentials in leasing and property management during their junior and senior years. Each of the university programs has an active advisory board and conducts career fairs and business events throughout the year.

Virginia Tech was the first college to offer a property management major, with many of its students choosing to minor in related fields. Internships are required, with most students completing two or more. Property management firms typically provide free housing for students during their internships.

Ball State and the University of Alaska later began offering RPM degree programs, housed under their Schools of Business. Students complete several internships during the summer or school year, with students opting to work in student housing or local property management firms.

Valencia College in Florida is an emerging program. It offers the first associate degree in RPM, incorporating NAAEI credentials, an internship requirement and an employer advisory board.

NUTS AND BOLTS

- **Curriculum Development**: NAAEI consults with colleges and universities to ensure core competencies and real-world scenarios are infused throughout the coursework and connect curriculum developers to industry subject matter experts.

- **Industry Credentials**: Students earn valuable industry credentials, including NAAEI’s National Apartment Leasing Professional and Certified Apartment Manager credentials.

- **Paid Internships**: Internships range from 180-400 hours (three to six credit hours), typically with advisory board members. Internships offer students exposure to all areas of property management, with most rotating among the various departments, some gaining both on-site property management experience and exposure to corporate management. Others have a focused on-site experience.

- **Career Fairs**: Each spring, the RPM programs host a career fair for students to secure internships or interview with prospective employers. These events often include student presentations and networking events to enable recruiters and advisory board members to get to know students and students to learn more about the companies.

- **Employer Advisory Boards**: Each RPM program has an advisory board that includes administrators and faculty, employers and local and national industry associations that guide faculty on industry best practices and curriculum updates. Advisory board members pay a fee to join each board, and those funds are used for scholarships and student study tours.

PROGRAM RESULTS

Enrollments continue to increase at existing programs, and anticipation is high for the new program at Valencia. Ball State fall 2017 enrollment in RPM majors was up 61 percent from fall 2016.

It is typical for RPM students to receive several job offers after on-campus career fairs. Virginia Tech touts a 95 percent employment rate of its RPM students within three months of graduation.

Students from the University of Alaska had 90 and 93 percent pass rates on the two NAAEI credentialing exams in 2016 (8 and 16 percent above the national average).

TOOLS / RESOURCES

Virginia Tech

University of Alaska Anchorage
https://business.uaa.alaska.edu/property-management/

Ball State University

Valencia College
https://net1.valenciacollege.edu/future-students/degree-options/associates/residential-property-management/
Right Skills Now – Building Skilled, Credentialed and Work-Ready Manufacturing Talent

MODEL SUMMARY

The Right Skills Now initiative is a nationally recognized, fast-track training program to prepare students to enter machining careers in less than six months. The program provides students with college credit, five industry-recognized credentials and the opportunity to work at an accelerated manufacturing internship on a pathway to employment in a growing field.
**PROGRAM DESIGN**

According to industry forecasts, more than 3 million manufacturing jobs will likely be needed by U.S. manufacturers over the next decade, with 2 million of those projected to go unfilled due to the skills gap. To prepare workers for manufacturing sector career opportunities now and in the future, the National Institute for Metalworking Skills (NIMS), The Manufacturing Institute, ACT, Dunwoody College of Technology (MN), South Central College (MN), the Minnesota Department of Employment and Economic Development and manufacturing companies teamed up to develop Right Skills Now.

Right Skills Now is a 16- to 24-week hands-on training program providing industry-demanded, competency-based skills and credentials needed for the machining industry. Individuals interested in the program must first pass the ACT National Career Readiness Certificate, an evidence-based credential that certifies holders have demonstrated the essential skills for workplace success. Upon gaining certification, students register for the Right Skills Now program at a participating community college or technical school.

Through their studies, students earn up to 20 credits toward an associate or bachelor’s degree, four NIMS credentials and a Right Skills Now certificate. Students also serve in a paid, for-credit, six- to eight-week internship with an advanced manufacturing company, where they are mentored by skilled machinists and receive a company performance assessment.

**NUTS AND BOLTS**

- **NIMS Credentials:** Students complete performance and theory assessments associated with the Right Skills Now framework. Teamwork, critical thinking and problem-solving are emphasized in each of the courses, including hands-on experiences and practical application.

- **Course One: Measurement, Materials and Safety** – Students explore the basics in machining, raw materials, use of hand tools, safety and maintenance. Topics include an overview of measurement techniques, materials, safety, machine tool math, quality control and maintenance. Teamwork, critical thinking and problem-solving are emphasized.

- **Course Two: Job Planning, Benchwork and Layout** – Students learn the basics of hand tools and gain an understanding of drawings, manual machines and layout. Upon completion of this course, students are able to interpret drawing information, describe basic symbols and notation and interpret basic Geometric Dimensioning and Tolerancing feature control frames.

- **Course Three: Computer Numerical Control (CNC) Operator - Milling Level 1** – This course provides students with an introduction to basic milling operations. Students gain an understanding of manual and CNC milling practices, as well as knowledge in tooling, machining practices and applied mathematics.

- **Course Four: CNC Operator - Turning Level 1** – Students are introduced to basic lathe machine operations. Students gain an understanding of manual and CNC lathe turning practices, as well as knowledge in tooling, machining practices and applied mathematics.

- **Internship:** The six-to eight-week paid internship facilitates learning in a manufacturing environment. Expected learning outcomes are developed and approved as a cooperative learning contract among the employer, student and course instructor. As part of the internship, students are required to provide biweekly reports and make a final presentation to their class that demonstrates their individual competencies. Instructors make at least two site visits during the internship to assess student progress.

- **New Right Skills Now Pre-Apprenticeship Program:** The first implementation of Right Skills Now as a pre-apprenticeship program is occurring at Hanover, PA, high schools, beginning in fall 2017. The program feeds into the Hanover Area Chamber of Commerce’s new CNC Operator apprenticeship program. High school students begin as a pre-apprentice in their senior year, with the Right Skills Now framework structured around their high school machining class.

**PROGRAM RESULTS**

Nearly 30 schools nationwide offer the Right Skills Now program.

More than 5,000 Right Skills Now credentials have been issued to program graduates.

Manufacturing companies partnering through the Right Skills Now initiative often offer full-time employment opportunities to student completers.

**TOOLS / RESOURCES**

Right Skills Now
http://rightskillsnow.org
MODEL SUMMARY

The Southern California Regional Transit Training Consortium (SCRTTC) comprises 46 partners – multiple California transit agencies, community colleges, universities and public and private organizations – that develop and deliver industry-driven, competency-based training for the region’s transit industry workforce. The Consortium, which began offering training in 2004, has been a critical player in the region by serving the needs of small and large transit systems to train new workers and upskill their existing workforce.
PROGRAM DESIGN

SCRTTC was born of the need for a coordinated workforce development strategy within the transit sector. Rapid changes influencing bus fleet operators – especially in the adoption of clean-energy transit technologies such as diesel / electric, electric / zero emission and alternative fuels – require them to remain current with technology even as it advances. Additionally, California’s Cap-and-Trade Program – an emissions trading system to reduce greenhouse gas emissions from regulated industries – requires small- and large-scale bus operators to achieve continuous improvements from their fleets.

With industry and academic partners, SCRTTC has developed more than 29 courses over a 14-year period, each rooted in a process that involves transit sector subject matter experts actively identifying highly specialized technical training required by SCRTTC transit agencies. SCRTTC-certified instructors teach the courses to incumbent workers at transit agency locations, where their agency often sponsors the training, as well as to students through 16 college and university partners.

Students learn through interactive coursework and laboratory exercises, testing their knowledge and skills on commercial bus system components, including electrical, brakes, heating and air conditioning and engines. The course roster includes Occupational Health and Safety Administration safety principles and leadership training. SCRTTC issues certificates of completion to student trainees.

SCRTTC established an eight-week paid summer internship program to attract high school and community college students to the field. The program enables SCRTTC transit agency members to work in their communities, mentoring students through technical training in bus maintenance and repair. Students receive a stipend of $3,250 for their work, certificates of completion and opportunities for employment by their sponsoring transit agency.

NUTS AND BOLTS

- **Needs Assessment / Skills Gap Analysis:** SCRTTC received initial funding from the Federal Highway Administration, which supported a needs assessment and skills gap analysis to determine transit agency training needs. The assessment uncovered fundamental facts: many agencies did not have workforce training programs for maintenance operations, and training available through industry suppliers was inadequate. Assessments exposed a system-wide challenge – worker retirement. Moreover, advances in technology, especially in alternative fuels such as compressed natural gas, zero-emission electric and hydrogen fuel-cell buses mandated by the state, were challenging bus maintenance operations.

- **Industry-Validated Coursework:** Courses are built through a unique beta process. SCRTTC assembles a panel of subject matter experts – including educators, transit agency personnel and trainers – to develop coursework. Courses are piloted to validate competencies and test for content and rigor. If 25 percent of the instructional materials need to be modified, the course must begin the beta process again. Completed courses move through a train-the-trainer stage, where instructors from program partners are taught to deliver the course. Instructors and courses are then certified by the SCRTTC. The beta process takes between six to eight weeks if materials already exist, or about 14 weeks if coursework needs to be built from the ground up. SCRTTC markets the courses, collects data on program outcomes and produces student completion certificates.

- **Certification:** Students completing SCRTTC coursework often move on to earn an ASE Certification issued by the National Institute for Automotive Service Excellence (ASE).

- **Board Composition:** The SCRTTC board consists of 21 members, including 10 transit members, seven college members, two private industry members, one labor member and one association member.

- **Scholarships:** The James A. Ditch Educational Fund, administered by SCRTTC, awards funding to students pursuing educational paths and subsequent careers in transportation, including operations, fleet maintenance, planning and administration. Since the program was launched, $50,000 in scholarships have been awarded.

PROGRAM RESULTS

71,404 hours of training have been delivered, with nearly 5,000 students trained.

The program has expanded from Southern to Central and Northern California.

SCRTTC recently partnered with California State University and Long Beach City and San Diego Miramar Colleges under a California Energy Commission contract to offer distance-learning coursework.

SCRTTC was awarded the California Transit Association’s Transit Innovation Award for this unique system-wide approach to training.

TOOLS / RESOURCES

Southern California Regional Transit Training Consortium

[www.scrttc.com](http://www.scrttc.com)
Constructing a Well-Trained Workforce

The Industrial Company (TIC), a heavy industrial construction company headquartered in Englewood, CO, has been training craft professionals to fuel its operations since its founding in the 1970s. The company’s current training capabilities are centralized in the state-of-the-art 150,000-square foot Craft Training Center in Aurora, CO, offering employees an academy model for craft and management training using the National Center for Construction Education and Research (NCCER) training system.
PROGRAM DESIGN

Through the Craft Training Center, TIC sponsors company trainees nominated by their supervisors. The company covers full wages, subsistence and room and board for trainees while they take part in intensive training over a three-week period. Covering 150 hours of instruction, trainees split their time between classrooms and laboratories. Trainees return each year for up to four years for additional instruction, with the goal of obtaining NCCER Certified Plus status – the highest NCCER credential available – or earning a state license in their chosen craft. To become Certified Plus, an individual must successfully complete both the written assessment and performance components of NCCER’s National Craft Assessment and Certification Program.

Training occurs through a variety of craft-focused academies, including: electrical, pipefitting, welding, carpentry / concrete, millwright, structural steel, instrumentation, rigging / bull rigging, surveying and crane operation. Technical and management courses, up to a week in length, are also available in: field engineering and operations; quality basics and management; welding management; equipment management; quality assurance / quality control; pipe, mechanical, electrical and structural steel; and formworks.

NUTS AND BOLTS

- **Dedicated Training Center:** In 1991, the company opened its first dedicated Craft Training Center in Steamboat Springs, CO. In 2016, the Center moved to a new state-of-the-art training facility in Aurora. The Center includes 10 full-time employees and combines indoor and outdoor classroom and lab space, including five craft classrooms, four management classrooms, five craft labs totaling 27,000 square feet including three bridge cranes, 18 welding booths and 10 electrical booths, as well as a cafeteria and conference room. Outdoor space, totaling 100,000 square feet, supports a crane course, steel erection and rigging structures and a concrete and formworks yard.

- **Commitment to Industry-Validated Training:** In 1996, TIC and several other contractors in the United States supported the organization of NCCER, a not-for-profit education foundation that provides a competency-based workforce development system for craft, safety and management professionals in the construction and maintenance industries. Delivered in nearly 6,000 training locations across the country, the NCCER system includes accreditation, instructor certification, standardized curriculum, registry, assessment and certification, supporting company and organizational workforce training needs.

  - **Industry-Recognized Certifications:** Trainees are eligible to earn the following certifications:
    - NCCER Certified Plus
    - National Commission for the Certification of Crane Operators
    - Electrical State License
    - Crosby Rigger Certificate
    - American Society for Nondestructive Testing Level II Certifications

- **No Obligation:** Employees who attend TIC’s training are not obligated to stay with TIC or repay training costs if they pursue other employment.

PROGRAM RESULTS

Through the Craft Training Center, TIC expects to train up to 3,400 employees annually.

TIC’s craft professional training, career development planning and mentoring serve as an incentive for employee growth and retention. In the past 24 months, TIC has delivered over 52,000 NCCER course completions and almost 4,000 NCCER credentials of level completion.

TIC is committed to providing a safe and positive work environment that fosters employee development, advancement and success. TIC employees are provided the resources, training and support that allow them to take full ownership of their craft professional careers. Trained employees are rewarded based on their performance and are offered many opportunities for advancement.

TOOLS / RESOURCES

Nationally Accredited Craft Training & Development

National Center for Construction Education & Research
www.nccer.org
Manufacturing Success in Central Ohio

The Modern Manufacturing Work Study Program – Building Ohio’s Advanced Manufacturing Talent Pipeline

MODEL SUMMARY

Manufacturing is a critical component of Ohio’s economy, yet the divide between the need for workers and students earning relevant training and degrees has strained manufacturers, particularly in central Ohio. In response, Columbus State Community College, Columbus-area high schools and local manufacturers partnered to create the Modern Manufacturing Work Study Program.

Creating a seamless path from high school to employment, the program provides students the opportunity to expand their knowledge of science, technology, engineering and math (STEM) foundational skills as they work with an area manufacturer and take college courses toward an associate degree.
PROGRAM DESIGN
In 2012, Columbus State Community College, Honda and other small and large advanced manufacturers partnered to thoroughly examine the school’s electro-mechanical technology program, supporting a redesign of the curriculum to industry standards and to meet the needs of Columbus-area manufacturing employers.

In 2013, Columbus State began partnering with area high schools, with either a Project Lead The Way national project-based STEM curriculum or other STEM curriculum, to start building the Modern Manufacturing Work Study Program. A four-day Advanced Automation Institute was created, offering interested students their first in-depth exposure to the Electro-Mechanical Engineering Technology major, including a tour of Honda’s manufacturing facilities. Seven students enrolled in the program in its inaugural year.

The Modern Manufacturing Work Study Program has continued to expand annually in scope and partnership with additional area high schools, enabling students to dual-enroll in Columbus State while completing their high school studies. Through a five-semester program, students are introduced to multiple employers and begin working on-site three days a week, learning through a powerful combination of theory and applied training while pursuing their studies the remaining two days toward an Associate of Applied Science in Electro-Magnetic Engineering Technology. Since the students are advancing in their studies, they come prepared to add value on their first day of work. Students earn between $15-$19/hour depending on the company, enough to defray much of the cost of their college coursework.

NUTS AND BOLTS
- **Continuous Partner Collaboration:** Columbus State’s labs include the latest equipment, while faculty stays abreast of changing technology and evolving industry standards through close collaboration with partner companies to ensure students are learning the latest technical skills.
- **Theory and Applied Learning:** Throughout the five-semester program, students receive intense instruction in fluid-power, electrical, mechanical and robotic systems. Students focus solely on their coursework and lab instruction in the first semester of the program. For the second semester, in addition to their studies, students interview with manufacturers in anticipation of beginning their part-time work-based learning during their remaining semesters.
- **Mentoring:** During their work-based learning, students interact with a company mentor, helping them to understand the company’s culture. In some cases, retiring employees serve as mentors. Columbus State has developed a training module to support company mentors in their role with students.
- **Articulation:** Four-year colleges, such as Miami University, provide articulation agreements that allow Columbus State graduates to earn a bachelor’s degree.
- **Employment Prospects:** Many partner companies hire the graduates for full-time positions, putting students on a promising career path.

PROGRAM RESULTS
Sixty students enrolled in the program in 2017 through 22 high schools and 11 area employers, nearly doubling 2016 figures.

One hundred percent of student graduates have received full-time job offers in the field, with salaries ranging from mid-$50,000 to mid-$60,000.

TOOLS / RESOURCES
Honda Opens Factory Doors to Students on National Manufacturing Day
https://ohio.honda.com/article/honda-opens-factory-doors-to-students-on-national-manufacturing-day

Columbus State Community College
https://www.cscc.edu/modernmanufacturing
Ohio State Dots the “i” in Real-World Instruction

The Ohio State University’s Experiential Entrepreneurship Education Program – Uniting College Academics and Work-Based Learning through Corporate Partnerships

MODEL SUMMARY

A new program of The Ohio State University’s Center for Design and Manufacturing Excellence in the College of Engineering ties college-level academics to real-world learning opportunities. The Experiential Entrepreneurship Education (E3) Program, launched in August 2017, provides students the opportunity to engage in a structured industry and entrepreneurial work-based learning experience that enhances their academic program, ensuring that graduates leave the university with work-ready skills.
PROGRAM DESIGN

Established in 2014, the Center for Design and Manufacturing Excellence (CDME) operates within Ohio State's College of Engineering and Office of Research, providing the university's industry partners with integrated design, commercialization and manufacturing solutions. Utilizing the technical talents and experience of the university's faculty and centers in collaboration with full-time staff engineers, CDME's mission is to support small and mid-sized regional manufacturing companies in bringing their innovations to market. The E3 Program puts Ohio State students into the mix to respond to the demands of manufacturers seeking new talent, while fueling students' growing interest in applied innovation.

E3’s first cohort of 30 student employees, mostly engineering majors, works part-time at CDME in the innovations lab, which has full design, rapid prototyping and light manufacturing capabilities. Students are hired employees, working up to 16 hours a week during the academic year with central Ohio manufacturers. Students are mentored by a host of industry professionals with extensive engineering, business development and marketing backgrounds.

Ultimately, students can earn up to 2,000 hours as paid employees during their academic program, while also pursuing their studies and apprenticing under CDME engineers and program managers to develop creative solutions to real-world business challenges on behalf of CDME corporate partners and clients.

NUTS AND BOLTS

■ Paid Positions: Students are paid standard university wages for work completed on industry projects throughout the program, which aids in offsetting the costs of their academic programs.

■ Certification Programs: In addition, students have the opportunity to participate in industry-recognized certification programs that promote experiential learning and hands-on education. These programs are offered in collaboration with industry partners to prepare students to work on the project teams. Training is offered in the areas of integrated systems design (LabVIEW), data capture and systems integrity (ThingWorks), robotics and advanced manufacturing (Rockwell Automation) and data analytics and visualization (SAS), among others.

■ Career Placement: Through the live projects, participating students develop close working relationships with industry partners, providing accelerated career opportunities, including internships, priority access to hiring managers and enhanced placement and advancement potential.

■ Calling All Students: E3 leverages existing facilities, equipment, experience and operations of Ohio State's colleges, departments and research centers, attracting a diverse representation of students from across a broad range of majors. Sophomore, junior, senior and graduate students are encouraged to apply to the E3 program.

■ Industry Involvement: The program has attracted interest and investment from central Ohio manufacturers both large and small, including startup businesses. FANUC, a global leader in manufacturing automation and robotics, has made a sizeable commitment to the Center in advanced manufacturing training. National Instruments is offering systems engineering software licenses and training for E3 students, while Honda has provided a significant amount of equipment and numerous student internship opportunities. CDME will serve as a partner training site for FANUC and National Instruments clients in the region. Other partners include Honda, Lincoln Electric and Rockwell.

PROGRAM RESULTS

Current predictions forecast 150 students enrolled in the program in 2018.

TOOLS / RESOURCES

Center for Design and Manufacturing Excellence
https://cdme.osu.edu/e3-program/experiential-entrepreneurship-educational-program
About the National Network of Business and Industry Associations

The National Network includes leaders in the manufacturing, retail, professional and business, real estate, health care, energy, construction, hospitality, transportation and information technology sectors, which represent the source of nearly 75 percent of projected U.S. job growth by 2020 (an estimated 30 million new jobs). These leaders are united in their commitment to help individuals understand and gain the skills they need to enter into and advance in the jobs of today and tomorrow. This unprecedented collaboration of typically competitive industries signals a commitment to support a better prepared and more fulfilled workforce. For more information, please visit nationalnetwork.org.

The National Network is made possible through support from Lumina Foundation and the Joyce Foundation.

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- Manufacturing Skill Standards Council
- National Apartment Association Education Institute
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- National Institute for Automotive Service Excellence
- National Institute for Metalworking Skills
- National Restaurant Association Educational Foundation
- National Retail Federation Foundation
- Transportation Intermediaries Association
- Western Association of Food Chains