

What are Some Innovative Approaches to Solving the Manufacturing Skills Gap?

By Michele Nash-Hoff

The Industry 4.0 technologies of Artificial Intelligence (AI), automation, Internet of Things (IoT), and robotics are transforming all sectors of our economy including manufacturing. Manufacturers are using these technologies to increase productivity and capacity, improve quality, analyze data, and improve worker safety. These technologies are actually creating more jobs within operations rather than reducing the number of workers. A 2024 [report from Deloitte and the Manufacturing Institute](#) “claims that manufacturers could need as many as 3.8 million new workers by 2033. Roughly 1.9 million of those could go unfilled if current labor gaps remain unsolved.”

Manufacturers need workers at every level, but especially in technical roles. Addressing the growing skills gap in manufacturing is a crucial task that requires a multi-faceted approach. Here are some strategies and innovative approaches that manufacturers can implement to bridge the gap:

1. **Collaboration with Educational Institutions:** Establish partnerships with schools, colleges, and technical institutions to develop a curriculum that is aligned with the needs of the manufacturing industry. This can include offering apprenticeships, internships, and hands-on training programs.
2. **Industry Partnerships:** Collaborate with other companies in the industry to develop joint training programs or share best practices. This can help in addressing common challenges and promoting a culture of continuous learning.
3. **Career Counseling:** Education and training institutions, as well as employers, can offer career counseling services to help individuals identify their strengths, interests, and career goals in light of technological changes. This guidance can aid in making informed decisions about education and training pathways.
4. **Personalized Learning Paths:** Utilize data analytics and AI to create personalized learning paths for employees based on their skills, interests, and career goals. This can help tailor training programs to individual needs, maximizing learning outcomes.
5. **Upskilling and Reskilling Programs:** Provide opportunities for current workers to acquire new skills or upgrade their existing ones through training programs. This can be done through online courses, workshops, and on-the-job training.
6. **Specialized Training:** Provide specialized training in emerging technologies like machine learning, robotics, and automation to help individuals transition into new roles and industries that are experiencing growth due to technological advancements.
7. **Microlearning Modules:** Implement bite-sized and interactive microlearning modules that employees can access on-demand. This approach allows for quick and targeted skill development, fitting into busy work schedules.
8. **Remote and Virtual Training:** Leverage remote and virtual training platforms to reach geographically dispersed employees and provide consistent training experiences. Virtual reality (VR) and augmented reality (AR) can simulate real-world scenarios for hands-on learning.
9. **Cross-Functional Training:** Encourage cross-functional training opportunities where employees can learn skills outside their immediate roles. This fosters a culture of collaboration, innovation, and adaptability within the workforce.
10. **Mentorship Programs:** Establish mentorship programs where experienced employees can coach and guide new hires. This can help in knowledge transfer and skill development among employees.

11. **Diversity and Inclusion Initiatives:** Encourage diversity in the manufacturing workforce by implementing programs that attract underrepresented groups, such as women and minorities. This can help bring in new perspectives and talent to the industry.
12. **Certification Programs:** Offer certification programs in partnership with industry organizations or educational institutions to validate employees' skills and expertise. This can enhance employee motivation and career progression opportunities.

With rapid advancements in technology reshaping the job market, it is essential for individuals to adapt and upskill through education and training to remain competitive in their careers.

1. **Skill Development:** Education and training programs can help individuals develop the skills needed to thrive in a technology-driven economy. This includes technical skills such as programming, data analysis, and digital literacy, as well as soft skills like problem-solving, adaptability, and creativity.
2. **Lifelong Learning:** Continuous education and training encourage a culture of lifelong learning, enabling workers to stay updated with the latest technological trends and job requirements. This ongoing development is essential in a world where job roles will constantly evolve due to new technologies.

In California, several community colleges offer training programs in manufacturing skills to help individuals gain the necessary knowledge and expertise for careers in the manufacturing industry. Here are several community colleges in California known for providing training in manufacturing skills:

1. **American River College** (located in Sacramento) has programs in Welding Technology and Precision Machining that focus on the skills needed for manufacturing industries.
2. **Chaffey College** (located in Rancho Cucamonga, San Bernardino County), offers a Manufacturing Technology program that covers topics like blueprint reading, machining, and computer-aided design (CAD).
3. **El Camino College** (located in Torrance, L.A. County) offers programs in Engineering Technology that include courses in manufacturing processes, materials, and quality control.
4. **Foothill College** (located in Los Altos Hills) offers programs in Advanced Manufacturing Technology that provide hands-on training in areas such as CNC machining, welding, and industrial maintenance.
5. **Sierra College** - With campuses in Rocklin, Grass Valley, and Tahoe-Truckee, Sierra College offers a Mechatronics program that combines mechanical and electrical engineering skills essential for modern manufacturing processes.

Orange County

1. **Fullerton College** offers programs in Advanced Manufacturing Technology that cover various aspects of manufacturing processes and technologies.
2. **Orange Coast College** (located in Costa Mesa) provides training in Industrial Automation Technology, preparing students for careers in automated manufacturing systems.
3. **Santiago Canyon College** (located in the city of Orange), provides training in Industrial Technology with a focus on manufacturing-related courses such as machining and industrial automation.

Riverside County:

1. **Norco College** provides training in Advanced Manufacturing and Mechatronics, preparing students for careers in high-tech manufacturing industries.
2. **Riverside City College** offers programs in Manufacturing Technology that include courses in CNC machining, tooling, and industrial safety.

San Diego County:

1. **MiraCosta College** offers extensive certificate program including Automation Technician, Electromechanical Technician, Electronics Technician, Machining, PLC Technician, Robotics Technician, and Welding
2. **Miramar College** provides training in Advanced Manufacturing Technology that covers topics such as manufacturing processes, materials, and automation.
3. **San Diego City College** offers programs in Manufacturing Engineering Technology with a focus on CNC machining, CAD/CAM, and quality control.

These community colleges in California are just a few examples of institutions that offer training and certificate programs in manufacturing skills to equip individuals with the knowledge and hands-on experience necessary for careers in the manufacturing industry training. Many states are now providing training in manufacturing jobs through their community colleges. Previously, I have written articles about training available at community colleges in North and South Carolina, North Dakota, Ohio, Kentucky, and Texas.

Another way to increase the number of future manufacturing workers is to start training in high schools. Since its founding in 2011, [SME PRIME[®]](#) (Partnership Response in Manufacturing Education), the signature program of the SME Education Foundation has been partnering private industry with academia to build custom manufacturing and engineering programs in high schools across the country — providing equipment, curriculum, teacher training, and student scholarships along with funding for manufacturing-related extracurricular activities and program sustainability. SME PRIME is the most comprehensive manufacturing and engineering program for high school students in the country.

SME PRIME is provided at no cost to high schools, and the curriculum is tailored to meet local manufacturers' needs and aligned with state educational standards. The SME Foundation staff coordinates program development, alleviates administrative burdens, and provides ongoing financial support provided to sustain program longevity.

There are now 112 PRIME schools in 23 states serving 10,000 students annually. The success of this program is significant because 91% of PRIME seniors choose manufacturing/engineering post-graduation from high school. There are only six high schools in California, so there is plenty of opportunity for more high schools to become PRIME schools.

Incorporating these innovative approaches and strategies will help organizations build a future-ready workforce equipped with the skills, knowledge, and capabilities needed to thrive in an evolving business landscape. Implementing these innovative approaches and strategies will help the manufacturing industry work towards closing the skills gap and ensuring a well-trained workforce for the future. By investing in education and training programs that cater to the evolving needs of the workforce, society can better equip individuals to navigate the challenges and opportunities brought about by automation and artificial intelligence.