

Equipped for Success: Hands on Learning in the Colorado Helps Advanced Manufacturing Program

Overview: The Colorado Helps Advanced Manufacturing Program (CHAMP) was a four-year, U.S. Department of Labor Trade Adjustment Act-funded project under which seven community colleges, a technical college, and a four-year university worked with employers to develop a pipeline of qualified advanced manufacturing workers.

The Rutgers University Education and Employment Research Center (EERC) participated in CHAMP as a third-party evaluator, assessing how the program worked and how successful it was in meeting its goals. As part of its evaluation, EERC looked at the way CHAMP incorporated new equipment and hands-on learning opportunities for students.

Implementation Strategies: CHAMP schools relied on four main strategies for increasing hands-on learning opportunities:

- *Setting strong goals*—One of CHAMP's central goals was to train students to operate the types of equipment they could expect to see in the workplace. Schools adjusted their course content and purchased new equipment accordingly.
- *Aligning individual approaches with collective goals*—Each CHAMP college had the leeway to purchase equipment and redesign courses to fit its own objectives and local employer needs. In keeping with the overall goals of the program, most chose to create learning environments that replicated a manufacturing shop floor.
- *Sharing curriculum*—The Colorado Community College System hired a team of instructional designers to help instructors at CHAMP schools develop courses, put them online, and make them openly accessible. Some colleges chose to hire their own instructional designers.
- *Involving employers in purchasing decisions*—Some schools consulted with industries partners about what equipment to purchase. In some cases, they decided to purchase equipment their partners were not currently using (e.g. a 3-D printer) in order to “stay ahead of the curve.”

Challenges: CHAMP schools encountered several challenges in their efforts to increase hands-on learning opportunities:

- *Adjusting to new curriculum*—Incorporating the new curriculum into the classroom was taxing for instructors. Some were given the time-consuming task of developing additional course material specific to their school. Some schools did not purchase all equipment covered by the shared curriculum and had to adjust their own courses accordingly, in some cases multiple times.
- *Finding instructors*—Some schools lacked instructors with expertise in the new equipment, and most lacked instructors with expertise in multiple types of equipment. In some cases, the technology was

so advanced that only a few people in the area couple operate it, and hiring them proved cost-prohibitive. Some instructors had the necessary expertise in the equipment but no teacher training. Others had been out of their field for some time, and their skills were no longer sharp or up to date.

- *Renovating space*—All nine schools needed to renovate classroom space in order to accommodate new equipment. Four underwent major renovations, which came with significant delays. In some cases, renovation was approved during the school year but, for safety reasons, had to wait until students were on break. In others, completed renovations proved unsuitable once the equipment arrived and had to be modified.

Impact on Schools and Students: The new equipment and redesigned curriculum changed the schools and the educational experience of students in a number of ways:

- More equipment meant more hands-on learning time for each student.
- Students acquired more marketable skills, gained confidence in their abilities, and positioned themselves to find jobs with good pay and opportunities for advancement.
- New foundational courses (e.g. blueprint reading) brought together students studying in different disciplines, mirroring the manufacturing workplace.
- New course formats allowed students with work and family responsibilities to experience hands-on learning at night and on weekends.
- New courses focused on specialized equipment helped schools recruit current workers.
- Interest in the new equipment led to increased enrollment.
- Employers expressed support for the schools' new programs and a need to innovate in order to make the best use of students' state-of-the-art education.

Looking Ahead: Maintenance costs for the recently purchased equipment can be considerable. Some schools were training instructors to maintain the equipment, while others were teaching students to do it. Staff at some schools expressed concern that, while the equipment purchased under CHAMP should be usable for a long time, it will be difficult to keep pace with new technology in the absence of grant funding. Nonetheless, most schools plan to add more new equipment, some to further expand their facilities. They are all considering what the rise of automation in the manufacturing industry means for their work.

To find out more about CHAMP's provision of hands-on learning and EERC's evaluation of the program, visit <http://smlr.rutgers.edu/content/colorado-helps-advanced-manufacturing-program-champ-evaluation>.