

Resources and Partnerships in Community College Manufacturing Technology Programs

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ABSTRACT

The Connecticut (CT) State Colleges and Universities' College of Technology (COT) and its Regional Center for Next Generation Manufacturing (RCNGM), a National Science Foundation (NSF) Center of Excellence, educate manufacturing technicians with necessary skills as needed by the manufacturing industry. The COT-RCNGM continuously broadens its partnerships with other community colleges, high schools and industry in New England and at the national and international levels to provide support and expertise to both students and educators in advanced manufacturing programs. The COT was founded in 1995 through state legislation to create and implement seamless pathways in engineering and technology. This system-wide collaboration of all twelve CT public community colleges, including seven state-of-the-art Advanced Manufacturing Technology Centers (AMTC) at CT's community colleges; eight public and private universities; technical high and comprehensive high schools; and representatives from industry, including the CT Business & Industry Association (CBIA) which represents 10,000 companies. The pathways have multiple points of entry and exit for job placement and stackable credentials for degree completion, including national certifications that have increased enrollments and created program stability.

The COT is led by the Site Coordinators Council that meets monthly and consists of faculty and deans from all COT educational partners and representatives from industry and government. The Council identifies and reviews new programs, concentrations, and certificates based on industry needs and creates seamless articulated pathways. Final approval is often completed within three months for immediate implementation, allowing a timely response to workforce needs. The COT-RCNGM partners with CBIA to conduct a biannual survey of manufacturing workforce needs in CT. Educators use the survey to identify curricular needs and support funding proposals for educational programs. Asnuntuck Community College, the original AMTC, was able to use industry data from the survey to help create new programs. The RCNGM partners with other NSF grants and entities such as the National Network for Manufacturing Innovation (NNMI). The COT-RCNGM produced DVDs profiling students who have completed COT programs and work in CT manufacturing companies. The Manufacture Your Future 2.0 and the You Belong: Women in Manufacturing DVDs are distributed nationally to increase knowledge of career opportunities in manufacturing. Finally, the COT-RCNGM organizes the Greater Hartford Mini Maker Faire

that brings together community members of all ages and backgrounds to share projects that promote interest in STEM fields. Participation in the Maker Movement led to involvement in a national network of Maker Faire organizers including a meeting at the White House where one organizer from each state was invited to attend and discuss the national impact of Makers.

Introduction

The Connecticut (CT) State Colleges and Universities' College of Technology (COT) and its Regional Center for Next Generation Manufacturing (RCNGM), a National Science Foundation (NSF) Center of Excellence, educate manufacturing technicians with necessary skills as needed by the manufacturing industry. The COT-RCNGM continuously broadens its partnerships with other community colleges, high schools and industry in New England and at the national and international levels to provide support and expertise to both students and educators in advanced manufacturing programs.

Discussion

The COT was founded in 1995 through state legislation to create and implement seamless pathways in engineering and technology. This system-wide collaboration of all twelve CT public community colleges, including seven state-of-the-art Advanced Manufacturing Technology Centers (AMTC) at CT's community colleges; eight public and private universities; technical high and comprehensive high schools; and representatives from industry, including the CT Business & Industry Association (CBIA), which represents 10,000 companies. The pathways have multiple points of entry and exit for job placement and stackable credentials for degree completion, including national certifications that have increased enrollments and created program stability. This model has led to NSF funding in 2004 to create the RCNGM and the award of New England Board of Higher Education's 2012 State Merit Award.

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Partnerships

The COT-RCNGM partners with business and manufacturing associations to ensure community college manufacturing program curriculum aligns with industry workforce needs. One example of this is the biannual survey of manufacturing workforce needs in CT that is conducted in partnership with CBIA. Educators use the survey to identify curricular needs and support funding proposals for educational programs. Asnuntuck Community College, the original AMTC, was able to use industry data from the survey to help create new programs including an additive manufacturing certificate that will be offered in its brand new manufacturing building, complete with a metal 3D printer.

The COT-RCNGM also partners with other NSF grantees, both locally and nationally, as a way to both stay informed about new technologies and new teaching

methodologies as well as to disseminate its own best practices. National partnerships allow for not only a greater exchange of information, but also a greater network when working toward policy changes or program implementation or improvements that should reach a greater population of students.

Manufacturing USA, formerly known as the National Network for Manufacturing Innovation (NNMI), serve as another form of national partnerships. The RCNGM is a partner on three NNMI institutes that are working to create collaborations among government, academia, and industry. Each institute focuses on a different technology within the manufacturing sector. Workforce development is a key component of the Manufacturing USA Institutes, making community colleges important partners for these initiatives.

The State of Connecticut legislature also created a Manufacturing Committee in 2016, which has been charged with creating a list of manufacturing programs at institutions of higher education in Connecticut. The Manufacturing Committee must also assess whether these programs meet the needs of industry and develop a list of best practices to help boards of education build relationships with local manufacturers for curriculum development.

Initiatives

The COT-RCNGM produced DVDs profiling students who have completed COT programs and work in CT manufacturing companies. The *Manufacture Your Future 2.0* and the *You Belong: Women in Manufacturing* DVDs are distributed nationally to high school and community college educators, counselors, and administrators to increase knowledge of career opportunities in manufacturing. Each DVD features an overview of modern manufacturing and student profiles. Each student profile discusses educational background and films them in their companies. Viewers are able to learn about the benefits and wide array of career possibilities in manufacturing.

Finally, the COT-RCNGM organizes the Greater Hartford Mini Maker Faire that brings together community members of all ages and backgrounds to share projects that promote interest in STEM fields. Participation in the Maker Movement led to involvement in a national network of Maker Faire organizers including a meeting at the White House where one organizer from each state was invited to attend and discuss the national impact of Makers. The COT-RCNGM has hosted three Mini Maker Faires, all hosted at Tunxis Community College, in partnership with CBIA. Over 3700 attendees have been able to experience hands-on engineering and technology projects while learning about programs offered at the Connecticut Community Colleges [1].

Conclusions

The COT-RCNGM has been able to utilize resources at both the local and national levels to develop and update manufacturing programs in the Connecticut Community Colleges. Resources include funding as well as partnerships that lead to curriculum, outreach models, and professional development models. One example of a local professional development model is the COT-RCNGM's faculty externship program. Community college and high school educators are able to complete a four-week externship at a local manufacturing company then create curriculum based on their experience. These resources and partnerships have also assisted the COT-RCNGM in creating their own resources and best practices to disseminate at the international level. Working together allows for quicker implementation of programs that will benefit students.

REFERENCE

Tunxis Hosts 3rd Annual Greater Hartford Mini Maker Faire (2017). Available at: <https://www.tunxis.edu/news/tunxis-hosts-3rd-annual-greater-hartford-mini-maker-faire-2/> (accessed 09 September 2017).