EDUCATION AND EMPLOYMENT RESEARCH CENTER

Illuminating Economic Development in Community Colleges: Lessons from NSF ATE Grants

Michelle Van Noy and Radha Biswas

JUNE 2023

RUTGERS
School of Management
and Labor Relations

EDUCATION AND EMPLOYMENT RESEARCH CENTER

Illuminating Economic Development in Community Colleges: Lessons from NSF ATE Grants

Michelle Van Noy and Radha Biswas

JUNE 2023

About The Authors

Michelle Van Noy is the director of the Education and Employment Research Center at Rutgers University.

Radha Biswas is a researcher at the Education and Employment Research at Rutgers University.

Acknowledgments

The authors would like to thank the many people who contributed to this report. We are grateful to our colleagues on the project, Debra Bragg and Marilyn Berger, who provided ongoing advice and guidance for the project, as well as our research project advisory board members whose thoughtful suggestions guided this work. We also appreciate the input and advice from former NSF ATE project officers, Gerhardt Salinger and Liz Teles. We are particularly grateful to the many ATE grantees who participated in interviews and provided feedback on this report. We appreciate the feedback of colleagues on the analysis and earlier drafts, including Allison Forbes, Renee Edwards, Elizabeth Barnett, Andrew Weaver, and Aeron Zentner. At EERC, Tracy Cangiano, Bruce Duboff, Harrison Pauwels, and Delande Thompson, skillfully provided research support through various phases of the project, Angel Butts of The Word Angel LLC provided excellent editorial assistance, and Jade Zack provided excellent design support. The authors are solely responsible for any errors. The authors are grateful to the National Science Foundation for their financial support of this work.

Contents

Background

Technicians play a significant but sometimes underrecognized role in the American economy. As workers with technical education whose jobs involve the use of science, technology, engineering, and mathematics (STEM),[1] technicians fill roles across industries ranging from science and engineering to healthcare to auto repair. An important subset of technicians comprise the "skilled technical workforce" as defined by the National Science Board (NSB), which includes workers filling jobs in industries such as manufacturing; agricultural, environmental, bio- and chemical engineering; information technology; and nanotechnology (NSB, 2019). These workers provide essential support to implement and maintain the technical systems that undergird these industries, which are viewed as key drivers of economic development (NSB, 2019).

For nearly three decades, the NSF Advanced Technological Education (ATE) program has invested over $14 billion to prepare these workers through the support of community college technician education across the country (NSF, 2023). ATE grants promote faculty professional development, curriculum development, employer engagement, pathways development, student recruitment, and work-based learning for programs in a range of sectors (e.g., Becho et al., 2019; National Science Foundation, 2018). The work of the ATE program has most directly served two-year college-based credit bearing programs by promoting their connections to industry, supporting the recruitment of students from K12 systems, and strengthening transfer pathways to 4-year colleges and universities. However, little is known about how this funding and the programs it has supported have contributed to economic development.

Economic development typically refers to activities and systems that promote the growth and health of the economy by retaining or creating new jobs in an area (Galbraith, 1964; Malizia et al., 1999; Economic Development Authority, 2023). The focus of economic development is most often on the aggregate status of the economy and ways to keep that strong. At the same time, economic development can not only promote overall growth but also seek to ensure equitable economic prosperity. Through the lens of inclusive economic development, growth is viewed as promoting equitable economic opportunity to ensure that historically marginalized populations share in economic prosperity (Schmitt, Gutierrez, & Hooker, 2020; Dua et al., 2021). As institutions devoted to providing open access and workforce education, community colleges are particularly suited to align with inclusive economic development. Community colleges can determine how and whether to engage with certain workforce and economic development activities taking place in their geographic service areas with intentional awareness of the equity implications of such participation.

Community colleges are key institutions in providing technician education and strategically positioned to play a role in economic development in a variety of ways. Prior literature on community colleges and economic development point to a few key functions they can play (Katsinas, 1994; Grubb, et. al, 1997; Dougherty & Bakia, 1999; Young, 1997; Jacobs, 2012; Harmon et. al, 2022). The primary focus of community colleges is to provide

1 https://ncses.nsf.gov/pubs/nsb20198/the-skilled-technical-workforce

education and training for the workforce through a range of programs, including degree and short-term credential programs. Programs that educate technicians with skills needed to perform technical jobs serve an important role in creating a skilled workforce that is crucial to economic development. Without a skilled workforce, companies cannot grow and prosper—a central goal of economic development. Further, beyond this function, community colleges can support and promote the work of local businesses through activities such as incubators, entrepreneurship training, and facility and equipment sharing. Colleges may also be involved in regional engagement through strategic regional planning and stakeholder convening. Through these expanded efforts, community college technician education programs extend their role beyond education and training to include economic development. Further, another essential component to colleges' engagement in economic development is collaboration.

TABLE 1: SUMMARY OF COMMUNITY COLLEGE ECONOMIC DEVELOPMENT ACTIVITIES

Education and Training
• Courses & programs aligned with local workforce needs
• Customized training
Business Support
• Entrepreneurship training; small-business incubation and assistance
• Opening up facilities for use by local companies
• Technology transfer and applied research
Regional Engagement
• Conducting economic scans
• Participation in local economic planning/policymaking
• Assistance in attracting employers to the region
• Convening regional stakeholders

Source: HII Literature Review paper

To understand the potential contributions of ATE to economic development, we interviewed ATE grantees to identify specific ways their funded work was linked to economic development. This research was not intended to evaluate or assess the full economic development impact of ATE. Rather, it sought to identify ways that ATE grantees engaged in and contributed to economic development. By highlighting activities that were potentially linked to economic development, this research identifies approaches having a broader economic purpose. This examination of ATE grantees seeks to provide insights into how some community college technician programs have approached education and training in ways that were intentionally linked to regional economic development. This paper draws on the conceptual framework for examining community college education and economic development described in a previous working paper on this project (See Van Noy et.al, 2023). We begin this working paper with a discussion of the methods used to study ATE grantees and their activities that

were potentially related to economic development. We then examine ATE activities across all grantees before discussing in more depth the activities of a subset of grantees identified as having an enhanced emphasis on economic development. Finally, we provide detailed examples of economic development activities conducted by ATE grantees and offer recommendations for current and future ATE grantees interested in promoting economic development. By documenting possible activities that are oriented toward economic development, we aim to advance a conceptual framework to better assess the link between these activities and economic development outcomes.

Methods

To gather information on ATE grantees and their link to economic development, we conducted semi-structured interviews with ATE grantees. The original research was supplemented by existing survey data on ATE grantees. The following section describes the process for collecting interview data including the identification of grantees, interviews with grantees, the analysis of interview data, and research questions.

Grantee types. We sought to include a variety of grantee types including projects and centers. Projects typically were grantees from a single institution working on an effort targeting innovation in their programs. Centers, which often including multiple affiliated college partners, tended to be broader in scope and focused on capacity building through outreach and recruitment, professional development, and curriculum development and reform. Some centers focused on a particular region, while others were nationally focused. Some national and regional centers evolved into resource centers that shared their work after their main activities were completed.

Identification of grantees. We identified grantees with a focus on economic development based on a review of grant abstracts from the NSF database of all ATE grants awarded and from input from experts in the ATE community. To review grant abstracts, we examined a full list of past and present ATE grantees downloaded from the NSF website from 1994 to 2019. We searched for keywords from the abstracts to identify preliminary grantees with strong alignment to industry or workforce development or a connection to economic development. We narrowed the list of grantees to the past five years to enhance our chances of interviewing individuals familiar with the ATE grants, resulting in a list of 32 grants. Recognizing the limits of abstracts in only conveying intent, we refined and expanded this initial list by reaching out to experts in the ATE community to identify grantees that had a potential impact on economic development, including former ATE project officers and members of our project advisory board. They suggested 36 grantees who were potentially highly engaged in economic development. Based on our analysis of ATE abstracts and these conversations, we compiled a total list of 39 ATE projects and regional and national centers that had received ATE funding to invite to participate in this research.

Interviews with grantees. We sent emails to the contacts from each grantee to invite them to participate in an interview. Of the 39 grantees we invited to participate, we conducted virtual interviews with 28 respondents from 23 grantees, including a mix of national centers, regional centers, and projects, as well as two non-ATE grantee organizations that were closely affiliated with grantees. Appendix A summarizes the organizational affiliations of the respondents who participated in interviews. The interviews were conducted online using Zoom between March 2022 and November 2022. They followed a semi-structured interview guide that covered the following general topics: grantee goals and activities, approach to industry alignment, collaborations with employers and other regional organizations, community outreach, and the grantee's role in economic development. The topics and the interviews were exploratory in nature and adapted to the particular focus of each grantee. Each interview was approximately one hour long and conducted and recorded via Zoom. The Zoom audio recording was transcribed using Otter AI software.

Analysis of interview data. The interviewers wrote detailed summaries of each interview, highlighting key points and takeaways from each interview. These summaries helped inform the conceptual development of the analysis by identifying key themes and concepts around economic development that were discussed by respondents. The initial analysis was exploratory and helped to guide a more focused analysis that used a structured template to summarize information from the interviews. The analysis template examined the following key issues with each grantee: intentionality of goals relative to economic development, organizations they collaborated with and the ways they collaborated, and activities related to aligning with industry, promoting business support, and promoting regional engagement. The issues from these focused write-ups formed the basis for the reporting on findings in this paper.

Survey data on ATE grantees. To supplement our interviews and provide more context on ATE grantees, we reviewed data available from the annual Western Michigan University EvaluATE survey of ATE grantees for the period of 2010 to 2018. Surveys from these years were selected because they offered the largest spread of years where the questions about the number of business and industry collaborations were comparable. We examined relevant data on industry engagement among ATE grantees in the annual evaluation survey.

Research questions. The link between ATE grantees and economic development can occur in a variety of ways that we sought to examine and describe through this analysis.

- To what extent do grantees articulate economic development as a goal?
- How do grantees approach industry alignment of their education and training activities?
- How do grantees engage in business support and regional coordination?

We discuss the findings associated with each of these questions in the sections that follow. Through the discussion of each section, we address how grantees engage in inclusive economic development to promote greater equity and opportunity.

Focus on Economic Development

While most grantees were focused on education and training to meet local workforce needs, few intentionally articulated economic development goals. As intended by the ATE program, all grantees indicated in some way that industry engagement and meeting workforce needs was an important aim of their work. Their focus with their programs was typically oriented toward specific industry areas, like advanced manufacturing, nanotechnology, biotechnology, or geospatial technology (see Table 2). Our review of grantee activities revealed that nearly all grantees reported they were involved in creating industry-aligned courses and developing curriculum or standards for their field of technician education. Additionally, nearly all reported that they regularly held advisory board meetings for their programs with local employers, and most also promoted some type of work-based learning experience for their programs via their grant, whether it be a formal learn-and-earn model or less formal work-based learning models. Many, though not all, reported that their program or related programs at their host institutions offered options for customized training for local employers. This range of activities is focused on the foundational community college role of providing education and training. Table 2 summarizes the focus of the grantees interviewed.

TABLE 2: GRANTEE FOCUS

Grantee Name	Focus
National Centers	
Building Efficiency for a Sustainable Tomorrow (BEST)	Develop and align standards and curriculum and provide faculty development in building automation and energy management systems.
Metropolitan Community College (Metropolitan–BEST)	Offer an Associate's of Applied Science (AAS) in Building Automation System within an older HVAC program.
Skills for Biomedical Emerging Technology Applications (BETA Skills)	Develop skills standards and curriculum and support regional industry through incubator and labs.
Center for Renewable Energy Advanced Technological Education (CREATE)	Develop curriculum and programs and provide faculty development to create a workforce for the green economy.
National Convergence Technology Center (CTC)	Create a process to update curriculum based on employer needs through the Business Industry Leadership Team (BILT) advisory model.
GeoTech Center (Geotech)	Translate skills needs into standards and curriculum to support faculty and program development across sectors using geospatial technology.
InnovATEBIO National Biotechnology Education Center (InnovATEBIO)	Support the growth of the biotech industry through workforce programs and an incubator to promote innovation and economic development.

The Micro Nano Technology Education Center (MN-TEC)	Build a network of employers and community colleges to incorporate new curriculum and support faculty development for micro- and nano tech programs.
National Cybersecurity Training and Education (NCyTE)	Develop curricula and facilitate faculty-employer engagement to support regional economic development.
National Center for Welding Education and Training (Weld-Ed)	Conduct outreach to high schools and update programs to keep up with changes in welding technology.
Regional Centers	
Center for Advanced Automotive Technologies (CAAT)	Work with employers and other stakeholders to develop and deliver programs in automotive manufacturing, product development, and service technicians as part of regional economic development.
Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM)	Work with consortia of employers and community colleges to build workforce to recruit and grow the automotive sector as part of the state's economic development goal.
Bishop State Community College (Bishop State–CARCAM)	Meet the need for process technicians in automated manufacturing through an integrated curriculum emphasizing lab instruction.
Florida Advanced Technological Education (FLATE) Center	Provide regional coordination to standardize curriculum and programs in the manufacturing industry in the state of Florida.
Center for Laser, Photonics, and Fiber Optics Education (LASER-TEC)	Create and update curriculum and conduct faculty development to support photonics, laser, and fiber optics industries.
National Center for Autonomous Technologies (NCAT)	Conduct curriculum development and program development for autonomous vehicle industry to support regional economic development.
Regional Center for Nuclear Education and Training (RCNET)	Create a talent pipeline from high schools and develop programs for sectors beyond energy using nuclear technology.
Support Center for Microsystems Education (SCME)	Provide curriculum and professional development for programs and create linkages between university and two-year programs.
Projects	
Atlantic Cape Community College (Atlantic Cape CC), unmanned aircraft systems	Provide a workforce for the emerging industry of autonomous vehicles.
Bridgerland Applied Technology College (Bridgerland), manufacturing technician	Ensure a regional workforce pipeline in manufacturing.
Chippewa Valley Technical College, WI (Chippewa CC), robotics training	Develop automated manufacturing and robotics workforce programs for regional food processing and other manufacturers.
South Central Community College (South Central CC), mechatronics careers	Design curriculum to teach lab-based courses for mechatronics program in rural area.
Central Community College (Central CC), Plastics Related Innovative Manufacturing Education (PRIME)	Change noncredit classes into a 12-credit-hour certificate in Plastic Engineering Technology.

Central Community College (Central CC), Mechatronics iMEC 2.0	Introduce four Mechatronic hands-on courses to high school students at a distance.
Lawson State Community College (Lawson State), industrial robotics	Create an updated industrial maintenance and electronics program.
Milwaukee Area Technical College (Milwaukee–BEST)	Bring together organizations to support students from underserved areas preparing for careers in sustainable facility operations.
North Dakota Welds Program (NDWELDs)	Create updated curriculum to prepare workers for new welding jobs.

Because many centers had an inherent focus on a region, they were more likely to articulate goals consistent with regional economic development activities. For example, the Center for Advanced Automotive Technology (CAAT), which operated as a regional center before becoming a resource center, articulated its intent to support regional economic development in its award abstract this way: "The CAAT partners with industry, education, government, and professional organizations to support local economic development." This intentionality was evident in CAAT's efforts to convince community colleges and universities, employers, state economic and workforce development agencies, and other regional entities to adopt new, updated workforce programs that enhanced the regional automotive industry's competitiveness. Another ATE grantee, Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM), started with a state economic development objective when auto companies moved into Alabama for manufacturing. To recruit these automotive companies, the state committed to ensuring there was a well-trained workforce and supported the development of CARCAM to meet this goal. This ATE grantee led community colleges and employers to collaborate on a certificate program in automotive manufacturing technology and to sponsor apprenticeships to transition workers from the textile industry into the automotive industry. Similarly, the national center InnovATEBIO is closely tied to the regional economy in which it is located; it serves the regional biotech industry through biotech workforce programs as well as the Austin Community College (ACC) Bioscience Incubator. Biotech is a key focus area of the economic development efforts in Texas.

Industry Alignment for Education and Training

How colleges align their education and training with industry needs is an essential element to economic development. In this section, we examine our interviews with ATE grantees about how they worked to align their programs with industry needs. We explore various strategies of engaging with industry to align education and training with industry needs in ways that may promote economic development. In addition, we investigate how colleges pursue these goals while also seeking to promote student needs and pursuing the goal of creating opportunity for underserved populations.

Grantees discussed working with businesses in industries that are strategically tied to the economy. When explaining the programs they offered, many grantees reported focusing on sectors that had a direct impact on the strength of their regional economy; in this context they reported working closely with employers that were seen as strategically important to their local regions. For example, the North Dakota Welds Program (NDWELDS), an ATE project, reported that while they catered to all kinds of employers, the area was home to large manufacturing facilities for the farming and construction industries, and these employers were a focus of their work. Similarly, Central Community College's (Central CC) Plastics Engineering Technology project is focused on agri-businesses and the meatpacking industry because companies like Cargill and Tyson are core parts of their regional economy. CARCAM and CAAT intentionally and strategically involved large employers in the automotive sector: CARCAM with Mercedes and Honda, and CAAT with GM, Chrysler, Nissan, Toyota, and Ford. They sought to engage these employers and to convene employer associations to promote workforce and economic development and strategically support the emerging workforce needs of the automotive industry.

Other grantees discussed how with their programs they sought to serve employers' strategic needs that spanned across industries and disciplines. For example, through their work with CARCAM, Bishop State Community College (Bishop State – CARCAM) sought to provide education for technicians who worked for the following types of employers: refineries, chemical plants, pulp and paper plants, power plants, textile industries, shipbuilders, and several other process technology–related industries. The Geotech Center (Geotech) also found ways to serve different industries as adoption of GPS-based technologies increased. The Center for Renewable Energy Advanced Technological Education (CREATE) found ways to keep up with changes in the regional renewable energy industry as it went through various shifts, starting with an emphasis on biofuels and later shifting to solar energy. The certificate in renewable energy it developed can be applied across a range of industries, including in the greening of traditional industries like construction. Through these intentional and strategic connections to the regional economy, these grantees connected their education and training to economic development goals.

Grantees reported they sought ways to collaborate across multiple employers to inform programs. Some grantees reported working with smaller companies who sought a skilled workforce when seeking input on their programs. For example, CAAT worked with a range of companies—large companies as well as smaller suppliers, parts makers, dealers, and repair shops, who provided various forms of education and training

for their workers. In a similar way, the Support Center for Microsystems Education (SCME) targeted the micro-electromechanical systems and semiconductor industries, which were bifurcated into very large, highly automated employers (e.g., Intel) and smaller regional firms and start-ups (3-D Glass Solutions). The demand for technicians came primarily from the national labs, smaller regionals and start-ups, so that is where the center placed more of its focus. Regional Center for Nuclear Education and Training (RCNET) used a consortium approach, pairing its community colleges with large "alpha" industry partners wherever possible as well as with medium and smaller employers. In addition to large utilities, RCNET also worked with small local businesses that aligned MRI machines and CAT scans and hired radiation protection graduates.

Another strategy to gain input in their programs was to work with larger national associations that brought together many employers in a specific industry. For example, National Center for Welding Education and Training (Weld-Ed) engaged with many employers through the American Welding Society (AWS), one of its key partners. AWS's large membership included 60,000 individual and 3,000 corporate members, mostly welders or welding inspectors. Weld-Ed's work focused on companies that employed welders as well as companies that provided equipment, personal protective equipment, or other materials to the welding industry. By bringing together multiple employers and taking a broader look at employer needs, grantees connected their efforts in education and training to regional economic development.

Collaborations with industry associations served a variety of purposes in terms of informing programs, from tracking industry trends and informing curriculum to faculty development and scaling up programs. As a regional center, RCNET worked with manufacturing associations to track information on industry trends to inform program development and to partner with the Nuclear Energy Institute to conduct labor market scans. Similarly, BEST worked with labor market information provided by the Building Intelligence Group, an industry networking organization, and CARCAM served as intermediary between the Alabama Automotive Manufacturers Association (AAMA) and 15 of Alabama's community colleges to manage a state scholarship in auto manufacturing. CARCAM reported that working with AAMA helped them significantly increase their reach with employers and increased program adoption. They also worked with the National Supply Chain Association to create a program in logistics. The Geotech Center worked with professional organizations at local, state, and national levels to create curriculum and provide faculty development in keeping with the needs of this rapidly evolving industry, as did the Center for Laser, Photonics, and Fiber Optics Education (LASER-TEC). InnovATEBIO worked with state Biosciences Institutes around the nation to disseminate trends and needs in the biotech industry, and BETA Skills worked with biomedical trade associations in states where the ATE grant had a presence. Bishop State – CARCAM worked with the Gulf Coast Industry Alliance, which consisted primarily of process-related manufacturers, and the Gulf States Shipping Consortium, which represented the region's shipbuilding industry. Metropolitan–BEST worked with industry groups such as HVAC Excellence and the Association of Controls Professionals to identify and share labor market information.

Grantees sought ways to develop strategic relationships with employers to help with curriculum development and ensure graduates better meet industry needs. National Convergence Technology Center (CTC) created a process to collect employer input for developing and updating curriculum that is a prime

example of employer involvement that has been adopted by many other ATE centers and projects. Its Business and Industry Leadership Team (BILT) model utilizes a highly structured process that requires industry partners to serve as subject matter experts and co-leaders in curriculum development. BEST demonstrated a different industry-driven model by asking employers for detailed descriptions of what technicians needed to know for day-to-day operations. This process clearly articulated basic requirements for employment and revealed the need for more hands-on learning in the context of major workforce demands arising from sustainability imperatives. CREATE made efforts to co-design curriculum with employers as part of their process to align curriculum to standards given a high degree of variation in prior curriculum.

For some grantees, regional coordination efforts with industry supported hands-on learning among students. InnovATEBIO's role in establishing and operating the ACC Bioscience Incubator made it a stakeholder in the regional biotech ecosystem while at the same time providing vital hands-on learning opportunities to students of ACC's biotech programs. Students learned installation maintenance, calibration, troubleshooting, and inventory training at the incubator, and employers hired them as interns. This hands-on work pushed students to higher levels of skill, according to the PI, which made the incubator an important resource for regional employers, who often used the incubator as a source for technicians. CARCAM's original school-to-work program, which was started with Honda, created opportunities for students to work in their field of study by giving students work in plants two days a week and leaving other days free to attend school. This allowed students to get hands-on experience with employers' equipment and process while continuing their education. As CARCAM engaged more community colleges through the state and became an intermediary between the AAMA and the Alabama Community College System, the school-to-work program grew. Over CARCAM's life cycle, 127 companies in the state started offering co-ops or apprenticeship programs that became the basis for many hands-on and work-based learning programs in the state, all of which are now overseen by the Alabama Office of Apprenticeships.

Grantees promoted inclusive economic development by prioritizing outreach to high-need communities. Many respondents mentioned the important role that community colleges played in providing access to economic opportunity via their technician programs. Some grantees reported efforts in these areas that were particularly targeted and intentional. CTC worked with community colleges on outreach to underserved populations. They hosted a Diversity Summit with 10 community colleges that developed approaches to implementing programs for specific student populations including female, Latino, and Black students. They promoted the strategic development of programs to help recruit students into technician education programs. LASER-TEC cited a need for conscious targeted outreach to underserved populations with a focus on community outreach, especially with high schools. It found that instructors and other faculty needed to be advised and trained to address the full range of assistance—both academic and nonacademic—students often need to succeed in programs and gain the skills required for upward mobility and quick entry into the labor market. South Central CC, based in a rural area, conducted active outreach with local high schools with a focus on recruiting underserved populations, which were mostly Hispanic. They also aimed to increase the participation of girls in their Mechatronics Technology Education program. Chippewa Valley Technical College's

robotics and integrative learning programs were seen as valuable economic-opportunity providers for rural students who would not otherwise get access to advanced equipment and training opportunities.

RCNET reported they intentionally sought to make their programs more accessible. As part of that effort, they removed the college algebra requirement, embedding contextual math into the program and making tutoring available to students. These changes were challenging, as they had to go through accreditation bodies, but they were implemented by 11 community colleges across the nation. RCNET also developed STEM videos and social media featuring nuclear technician women at work to attract high school girls to the field (https://youtu.be/4QH-D4_FK18).

High schools are a pipeline to the workforce, providing community colleges with an opportunity to engage students who have been historically underserved in technician programs. Weld-Ed targeted students interested in welding by offering faculty development workshops to high school instructors. These workshops increased teacher knowledge and awareness of the field and produced outreach materials for high school students on new kinds of welding jobs and manufacturing, including a portal and publications like Careers in Welding.[2] South Central Community College's (South Central CC) mechatronics project worked with high schools to build a workforce pipeline for local underserved students, primarily the Hispanic student population, to pursue community college enrollment and consider careers in manufacturing. To do so, the program dismissed any prerequisites and encouraged students to take math and science before they decided to study mechatronics. RCNET conducted outreach with high schools and noted that they successfully recruited underserved students of color and women into the nuclear technician workforce. They also developed a career portal for outreach and cited their use of peer recruitment videos through a YouTube channel, Girls in STEM. CAAT worked with an employer partner, Continental AG, to train women engineers to deliver a course on robotics to Girl Scouts. These regional efforts created stronger workforce pipelines to support regional economic development.

2 https://careersinwelding.com

Business Support and Regional Engagement

This section reports on findings about economic development focused on business support and regional engagement. These activities extend the traditional education-and-training function of community college technician education programs and move them to look ahead and be responsive to labor market conditions.

Small-business incubation and entrepreneurship training were included in a few grantees' efforts to promote businesses in technician fields while supporting their technician education programs. A few grantees reported they had established incubators on campus that promoted small business and provided opportunities for their students to learn by engaging with industry. InnovATEBIO reported that ATE centers like Bio-Link, which preceded InnovATEBIO as a national center; its regional offshoot in Austin, the AC2 Bio-Link Regional Center; and other ATE grantees were influential in their development of the ACC Bioscience Incubator that serves regional biotech businesses. That incubator was used by start-ups; the companies paid a low charge to be on the bench, essentially paying for the maintenance of facilities. Use of the technology was free, and students in ACC's biotech certificate or degree programs worked as interns paid by the community college to maintain and operate the equipment. In addition, employers could hire interns to meet their own staffing needs and support instruction at the community college. The incubator leveraged the Center's expertise, and both InnovATEBIO and the incubator played a synergistic role in the region's vibrant biotech ecosystem.

BETA Skills supported an incubator at Forsyth Community Technical College that housed three start-ups, along with companies that used the labs for a low fee and utilized students as employees. In addition, the grantee facilitated the use of an ATE-funded piece of high-resolution equipment by employers for training at these labs. NCAT included an entrepreneurship component in their advancement of unmanned aircraft systems or drone technology and worked closely with a partner, the University of North Dakota, that is the home of an incubator and an entrepreneurship center. The incubator led to the development of many start-up companies, including Sky Scopes Inc., now one of the leading companies in the nation specializing in unmanned aircraft systems. Instead of creating incubators, some grantees and community colleges opened their own facilities for employer use. For example, SCME utilizes the University of New Mexico Manufacturing Training and Technology Center clean room for professional development of 2-year faculty and more recently, technician students as part of the ATE's supplemental funding for Undergraduate Research Experiences; local start-ups also use the cleanroom for research and development as well as University researchers.

As part of efforts to directly support business, a few grantees reported they offered entrepreneurship training. As part of an emerging industry, Atlantic Cape's program on drone technology included a focus on entrepreneurs because they form a significant part of this industry's landscape. BETA Skill's programs for the biomedical workforce were complemented by entrepreneurship training and support services for start-up businesses hosted at Forsyth Technical and Community College. NCAT's UAS technician workforce program supported Grand Sky business park, and the incubator at University of North Dakota, a close partner of NCAT, provided strong impetus for attracting start-ups and entrepreneurs in this rapidly growing field. InnovATEBIO

reported that its incubator was increasing its focus on providing start-ups with entrepreneurship-related services and workshops on marketing and communication. Florida Advanced Technological Education (FLATE), through its partnership with fellow ATE grantee FloridaMakes (the Florida Manufacturing Extension Partnership), worked closely with entrepreneurs and small businesses to provide them with various business-related services.

Grantees provided leadership to support regional economic development efforts by supporting economic research on industry-specific trends. Most grantees reported doing some economic scans as part of their ATE grant. Some research included a particularly intentional focus on economic development planning. For example, NCyTE commissioned an economic development report to understand the impact of the Center of Academic Excellence in Cybersecurity designation on economic development in Whatcom County. The report was started by one entity and finished by a public workforce entity, the Seattle Jobs Initiative. It also commissioned a workforce study on cybersecurity student job placements. RCNET brought in a national agency, Nuclear Education Institute, to do a labor market study. They also worked with local economic development agencies to provide information on businesses and workforce needs, particularly those of small businesses. Further, RCNET worked with community colleges to use their data to adopt criteria ensuring no school should oversaturate the market by doing a "supply chain balance" each year. Weld-Ed published research on the welding industry's workforce trends and education on a regular basis and provided technical consulting to community colleges to generate welding occupation demand reports customized for every US region. InnovATEBIO worked regularly with the Coalition of State Biosciences Institutes to publish annual trends in biotech (https://www.weld-ed.org/educator-resources/).

Some grantees worked with universities to promote innovative uses of technology and connections to broader economic development goals. While many grantees reported collaborations designed to promote more seamless transfers from two- to four-year programs, an important goal for well-functioning technician education programs, a few grantees reported collaborations to help test technologies and improve learning for technicians and engineers alike. RCNET reported working for several years with Florida International University (FIU), a major hub for the Department of Energy, to embed technicians in summer internships at universities and create paid placements in labs across the nation to test new technologies and help accelerate products. Similarly, Weld-Ed worked closely with another NSF-funded center focused on welding research at The Ohio State University (OSU). Through the partnership, graduate students worked with employers to help solve issues in welding processes or materials, and community college welding students got paid internships at OSU to work with graduate students. The project allowed the community college technician students to test out technologies that the graduate students were developing and give feedback on the development process. This helped graduate students' research as they learned about how their technology would be used in the field by technicians, and community college technician students gained experience working with new technology and being part of a research-and-development effort. Similarly, SCME brought community college students into their clean rooms at the University of New Mexico for exposure to equipment and to learn to work with engineers testing and implementing their designs.

Further these connections with universities sometimes provided work experience for students and generated employment opportunities in the region. MN-TEC partnered with national labs and universities, facilities that

tend to use a lot of undergraduate students as "research techs." They also reported partnerships with regional universities wherein community college students were given two weeks or a month of experience working inside a clean room. National Center for Autonomous Technologies (NCAT) collaborated closely with the University of North Dakota on transfers. It also provided workforce development support for the university and its incubator, which in turn launched a start-up, Sky Scopes Inc., that became a major employer in this sector. In addition, both NCAT and the university reported being key stakeholders in Grand Sky, a business park developed through a regional partnership spearheaded by the Grand Forks Airbase and major defense companies.

Other grantees reported a range of ways they engaged in innovation with universities. BEST Skills, established at Laney Peralta Community College before relocating to the University of California–Berkeley, had a long-standing relationship with university-based centers that fostered technological development and innovation: for example, the Lawrence Berkeley National Laboratory and the California Institute for Energy and Environment, both based at UC Berkeley, were important partners. Bishop State–CARCAM was actively seeking even more ways to collaborate with the University of South Alabama. They reported that they were considering inviting the university to send its students to the community college to train on their more advanced equipment and were also considering faculty exchanges. All these examples demonstrate how collaborations can form bridges between four-year institutions and community college technicians, which regional efforts can further connect to economic development initiatives.

Many grantees reported collaborations with regional economic development organizations, regional industry associations, or community-based organizations. Although only a few grantees specifically articulated economic development goals for their activities, many grantees interacted with these organizations in a range of ways that promoted economic development for their regions. Several grantees reported they worked with multiple organizations on economic development efforts such as securing support and leadership from state-level entities. CAAT, for example, worked with multiple entities including the Michigan State Economic Development Corporation and the state's Department of Labor & Economic Opportunity, and enlisting workforce development office (MI Works) as part of a partnership for a regional collaborative. They also worked closely with the Michigan Alliance for Greater Mobility Advancement, a consortium that included original equipment manufacturers, tier suppliers, educational institutions, workforce organizations, and state government to address the automotive industry's skills and training needs. Skills for Biomedical Emerging Technology Applications (BETA Skills) worked with the North Carolina Biotechnology Center, a non-profit, public-private partnership that receives half its funding from the state legislature, and with the regional workforce agency called the Piedmont Triad Partnership. Similarly, the plastics engineering technology project at Central CC worked closely with their state's Department of Labor as well as with regional economic development and workforce development entities to get a seat at the table when a new business entered the area. Metropolitan Community College, which is affiliated with the BEST Center (Metropolitan–BEST), engaged several public organizations, including the City of Omaha, local workforce development boards, the Bureau of Economic Development, and the unemployment agency.

Several grantees were actively involved in attracting employers to their region. Incubators are an important way to foster business development in regions. InnovATEBIO reported that the ACC Bioscience Incubator was a vital part of the regional biotech ecosystem and a way to attract start-ups. Similarly, NCAT reported that the business park that they supported, Grand Sky, was a rapidly growing space intended to attract employers and entrepreneurs to the region. Other grantees were part of community colleges that were actively engaged with efforts to attract businesses. Bridgerland Applied Technical College's manufacturing technology program participated in local efforts to bring companies to the region—a rural area where the manufacturing sector was viewed as a particularly important growth sector. Central CC worked with the state's workforce and economic development entities to have a seat at the table when new employers entered the area. CREATE reported that while changing consumer and business behavior undergirded the shift to renewable energy in the region, the presence of a well-trained workforce and the availability of training was a key attraction for businesses.

Most grantees reported some degree of convening regional stakeholders. Many grantees reported actively participating in regional convenings. Some were led by other entities, and some were convened by the grantees themselves. NCAT was an active participant in the regional partnership associated with Grand Sky. While they did not play a lead convening role in that partnership, they engaged with many large employers individually through that affiliation. Similarly, CARCAM positioned itself as an intermediary between the AAMA and 15 of Alabama's 24 community colleges to facilitate the pipeline of workers needed by the automotive industry. And, Bishop State–CARCAM worked with a wide range of stakeholders, including workforce development and economic development groups, industry associations, high schools, and community-based organizations, but not necessarily in a convening role. BETA Skills also was not in a convening role but worked closely with many entities including the Regional Biotechnology Center, the Chamber of Commerce, the regional workforce agency the Piedmont Triad Partnership, and Goodwill. CAAT, in its role as a regional center, provided an example of a grantee acting in a highly engaged manner with employers to lead a multi-employer effort. They reported bringing together economic development organizations, government, multiple employers, community colleges and universities, employer associations, industry groups, and other stakeholders. The grantee reported being in the process of convening a multistakeholder regional partnership to expand their programs to all community colleges in Michigan using both ATE and state economic development funding. This partnership involved leading employers including Ford, GM, Toyota, and others, as well as Michigan Works (the public workforce development agency), the State of Michigan Economic development Corporation, the Society of Automotive Engineers, and four universities.

National Cybersecurity Training and Education (NCyTE) acted in a convening role between its host institution and employers, partnering with a regional employer (Anvil) to use the company's facilities and providing opportunities for students to work while learning. The program also involved faculty learning and training for the employer's staff, leveraging NCyTE and the community college's expertise and resources. They also created a special course to serve regional industry needs, which may factor into attracting employers and aiding economic development. Lawson State, in Alabama, set up manufacturing production lines, checked regularly with its employer partners to find out whether they wanted their technicians to come in and attend classes, and ensured that those needs were accommodated.

Some grantees engaged in particularly strong industry collaborations that aligned with regional engagement. As discussed in the prior section, colleges engaged with employers in a range of ways. Prior research has demonstrated that employer engagement can range from relatively passive to much stronger and more established relationships involving codesigning curriculum, convening partnerships between employers and community colleges, and leading regional multi-employer efforts (Wilson, 2015). A few grantees stood out as strong examples of how convenings can be done with an eye for regional economic development. We briefly describe these regional coordination efforts here. Each is discussed in further detail in a companion report with in-depth discussions of each of the following:

- CARCAM brought together industry and employer associations with a coordinated network of community colleges and universities as well as both workforce development and economic development agencies. They reported this collaborative approach helped build a network to share issues and questions and to address the state's goal of attracting and growing the automotive industry for regional development in a coordinated manner.
- CAAT worked to build a regional collaborative to expand their programs for automotive industry systems technicians to all community colleges in Michigan. To do so, they brought together a group of 10 community colleges with automotive industry backgrounds; leading automotive employers, OEMS, suppliers, and dealers; state workforce development and economic development agencies; universities; and community organizations.
- InnovATEBIO convened regional stakeholders around biotech, including universities, high schools, the state's economic development entity, and biosciences groups, with the goal of developing the sector. Their incubator, a big part of the regional biotech ecosystem, attracted and supported start-ups and also provided hands-on learning experiences for students.
- FLATE built out a statewide articulation system to create a pathway from workforce development programs created for and with industry into academic programs. By working closely with community colleges, employers, and the state's workforce and economic development agencies, they developed a system that scaled up workforce capacity for the state's manufacturing sector.

Collaborations

To begin to put these grantees in context, we examine collaborations among all ATE grantees based on the annual EvaluATE survey. The survey gathers information on the many potential industry and economic development stakeholders that ATE grantees reported. EvaluATE survey data show that grantees reported more collaboration between community colleges and business and industry than with other partners. In 2018, ATE grantee responses to the EvaluATE survey revealed a mean of 16.4 collaborators from business and industry and 15.5 from other education institutions compared to markedly lower numbers of collaborators (means of 4.0 or lower) from within the host institution, public agencies, and other ATE grant projects. The median numbers of collaborators reveal similar trends, with community colleges reporting five business and industry collaborators and two collaborators from within their own or other educational institutions (see Table 3).

TABLE 3: NUMBER OF COLLABORATIONS AMONG ATE GRANTEES, BY TYPE

Collaborator	Mean 2010	Mean 2018	Median 2010	Median 2018
Business/industry	16.1	16.4	6	5
Within your host institution	4.1	4.0	3	2
Other education institutions	14.1	15.5	4	2
Public agencies	3.5	3.0	2	0
Other ATE grants	3.9	3.0	2	1

Source: EvaluATE survey, 2010 and 2018, N=248

The reported amount of collaboration with business and industry varied significantly across grantees. The EvaluATE survey provides more insights into the variation across community colleges in their number of business and industry collaborators. The median number of reported business and industry collaborators is lower than the mean, at five business and industry collaborators. Indeed, fully half of grantees reported having five or fewer collaborators from business and industry, including the 25 percent who reported having only one. Very few grantees reported having a large number of business/industry collaborators. For 2018, for example, one grantee reported having 500 collaborators, but only about 20 percent of grantees reported having as many or more than the mean number of business and industry collaborators (16.4).

These variations make sense in the broader context of the ATE community as one considers the diversity of scope, funding levels, and types of projects and centers funded by NSF. Projects range in funding levels from $350K to $650K, generally over 3 years. Centers may be funded for as much as $7 million, usually distributed over five years for initiatives with an intended regional or national impact. Small projects with more limited funding tend to focus on revising a specific academic program or providing professional development for faculty. Mature

projects can secure multiple rounds of funding whereas newer ones often start with a modest scope and much more limited ATE dollars. Given the vast differences across the many projects and centers, their goals, scope, staffing, and funding levels, it is not surprising that there are significant differences in the number of industry partners reported by grantees.

This variation in industry partners and collaborations may also point to the potential variation in the degree to which grantees engage in economic development activities. To some extent, it may be driven by their grant scope and funding, which implies opportunities to promote economic development through changes in how grants are structured.

Conclusion

ATE grantees have long been engaged in improving their education and training, a core part of ATE's goal. Yet, as part of that effort, how these grantees support regional economic development is lesser known and understood. Part of the challenge to understanding the economic development role of technician education is the need to understand how economic development is carried out in the context of these programs. There is a strong overlap between the colleges' education and training function and economic development. Understanding where and how education and training is done in a way that most strongly supports economic development goals may provide additional insights into the roles community colleges can play in technician education. Our findings showing examples of ATE grantees whose projects had a strong focus on conducting education and training in a way that is broadly aligned with industry needs but whose work also extended into other arenas of economic development may provide insights for other community college technician education programs to follow.

Industry alignment and the collaborations that go with it are important to economic development. ATE grantees, particularly ATE centers, provided examples of partnerships with industries and employers that are strategically important to regional economies. Community colleges both led and were active participants in many of these broader regional efforts. Further, ATE grantees and their community college partners engaged in activities that served employers through entrepreneurship programs and incubators and supported regional planning and business development. In this way, the community college technician education programs discussed in our analysis showed how ATE programs can play an active role in economic development through businesses and regional engagement. Important questions for examination in the future include how community college efforts to align industry needs with meeting community needs and promote economic opportunity for marginalized communities.

As policymakers, higher education leaders, and technician educators seek ways to promote stronger and more inclusive economies with more equitable opportunities for good careers, finding ways to extend education and training to more economic development and strategic alignment with regional economies will be essential. An important first step is to articulate how community college technician education programs are engaged in economic development and understand some of the approaches colleges are using to do so. With these examples in mind, more community colleges may be able to expand and supplement their current work to promote economic development. In this way, community college technician education programs can build a stronger economy and promote opportunity for the regions in which they reside and serve.

References

Becho, L. W., Wingate, L. A., Gullickson, A., & Marshall, V. A. (2019). *ATE annual survey: 2019 report*. Evaluation Center, Western Michigan University.

Dougherty, K. J., & Bakia, M. P. (1999). *The new economic development role of the community college*. Columbia University, Community College Research Center.

Dua, A., Julien, J. P., Kerlin, M., Law, J., Noel, N., & Stewart, S., III (2021). *The case for inclusive growth*, McKinsey. https://www.mckinsey.com/industries/public-and-social-sector/our-insights/the-case-for-inclusive-growth

EDA. (2023). Key definitions. https://www.eda.gov/archives/2021/performance/key-definitions/

Galbraith, J. K. (1964). *Economic development* (Rev. ed.). Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674333062

Grubb, W., Badway, N., Bell, D., Bragg, D., & Russman, M. (1997). *Workforce, economic, and community development: The changing landscape of the entrepreneurial community college*. Office of Vocational and Adult Education. https://eric.ed.gov/?id=ED413033

Harmon, H. L., Bergeron, L. J., & Johnson, J. D. (2022). Engaging community colleges in rural development: A meta-synthesis of doctoral dissertations. *Community College Review*, 50(3), 316–338. https://doi.org/10.1177/00915521221087280

Jacobs, J. (2012). The essential role of community colleges in rebuilding the nation's communities and economies. In J.E. Lane (Ed.) & D.B. Johnstone (Ed.). *Universities and colleges as economic drivers: measuring higher education's role in economic development*. SUNY Press.

Katsinas, S. G. (1994). A Review of the literature related to economic development and community colleges, *Community College Review* 21(4), 67. https://doi.org/10.1177/009155219402100408

Malizia, E. E., & Feser, E. J. (1999). *Understanding local economic development*. Center for Urban Policy Research.

National Science Board. (2019, September). *The skilled technical workforce: Crafting America's science & engineering enterprise* (Report No. NSB-2019-23). https://www.nsf.gov/nsb/publications/2019/nsb201923.pdf

National Science Foundation. (2018). *Advanced technological education impacts: Twenty-five years of advancing technician education*. https://atecentral.net/downloads/3916/ATE_Impacts_2018-2019.pdf

National Science Foundation (2023). *Awards database*. https://www.nsf.gov/awardsearch/

Schmitt, A., Guttierez, A., and Hooker, S. (2020). *Inclusive economic development: Good for growth and good for communities*. Jobs for the Future. https://www.jff.org/resources/inclusive-economic-development-good-growth-and-good-communities/

Van Noy, M., Biswas, R., Barger, M., & Bragg, D. (2023). *Lessons in community college economic development from NSF ATE*. Education and Employment Research Center.

Wilson, R. (2015). *A resource guide to engaging employers*. Jobs for the Future. http://www.jff.org/publications/resource-guide-engaging-employers

Young, J. W. (1997). Community economic development through community colleges. *New Directions for Higher Education*, 97.

Appendix A

TABLE A1: ORGANIZATIONAL AFFILIATION OF RESPONDENTS

Organization/Grantee Name	Grantee Type	Institution, State	ATE Grant Award Numbers
National Center			
Building Efficiency for a Sustainable Tomorrow (BEST) Center	National center turned national resource center	UC Berkeley, CA, formerly Peralta Community College District Office, Oakland, CA	(Most recent) National center award (#1700705); Resource center award (#2202180)
Metropolitan Community College (Metropolitan–BEST)	Community college affiliated with national center	Metropolitan Community College, Omaha, NE	Affiliate. No independent ATE award. Using Last Award # of BEST National Center (#1700705)
Center for Renewable Energy Advanced Technological Education (CREATE)	National center	Madison Area Technical College, Madison, WI	National Resource Center Award (#2000714)
National Convergence Technology Center (CTC)	National center	Collin County Community College, Frisco, TX	(Most recent) National Center Award (#1700530)
GeoTech Geospatial Resource Center (Geotech)	National center turned national resource center	Kentucky Community & Technical College System, Del Mar College, Versailles, KY	(Most recent) National Center Award (#1700496); Resource Center Award (#2202038)
InnovATEBIO National Biotechnology Education Center (InnovATEBIO)	National center	Austin Community College, Austin, TX	National Center Award (#1901984)
Austin Community College (ACC) Bioscience Incubator	Other non-ATE grantee, affiliated with InnovATEBIO	Austin, TX	NA
The Micro Nano Technology Education Center (MNT-EC)	National center	Pasadena City College, Pasadena, CA	National Center Award (#2000281)
National Cybersecurity Training and Education (NCyTE)	National center	Whatcom Community College, Bellingham, WA	(Most recent) National Center Award (#2054724)
Skills for Biomedical Emerging Technology Applications (BETA Skills)	Project and national center	Forsyth Technical Community College, Winston-Salem, NC	ATE Project. Award (#1800909). CO-PI on InnovATEBIO (#1901984)

National Center for Welding Education and Training (Weld-Ed)	National center turned national resource center	Lorain County Community College, Elyria, OH	(Most recent) National Center Award (#1400351); Resource Center Award (#2000539)
Regional Center			
Center for Advanced Automotive Technologies (CAAT)	Regional center turned regional resource center	Macomb Community College, Warren, MI	(Most recent) Regional Center Award (#1801150); Resource Center Award (#1902369)
Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM)	Regional center	Formerly at Gadsden State Community College, Anniston, AL	Last Regional Center Award (#1003203) Sunset
Bishop State Community College (Bishop State–CARCAM)	Community college affiliated with CARCAM	Bishop State Community College, Mobile, AL	Affiliate. No independent ATE award. Using Last Award # of CARCAM (#1003203)
Office of Apprenticeship	Other non-ATE grantee, affiliated with CARCAM	Alabama CC System	NA
Florida Advanced Technological Education (FLATE) Center	Regional center	Hillsborough Community College, FL	Last Regional Center Award (#1204751) Merged into Florida Makes
Center for Laser, Photonics, and Fiber Optics Education (LASER-TEC)	Regional center turned regional resource center	Indian River Community College, Fort Pierce, FL	(Most recent) Regional Center Award (#1700352); Resource Center Award (Award #200016)
National Center for Autonomous Technologies (NCAT)	National center	Northland Community and Technical College, MN	National Center Award (#1902574)
Regional Center for Nuclear Education and Training (RCNET)	Regional center	Indian River State College, Fort Pierce, FL	Regional Center Award (#1600558)
Southwest Center for Microsystems Education (SCME)	Regional resource center turned regional support center	University of New Mexico, Albuquerque, NM	ATE Regional Resource Center Award (#1205138); Support Center (#1700678)

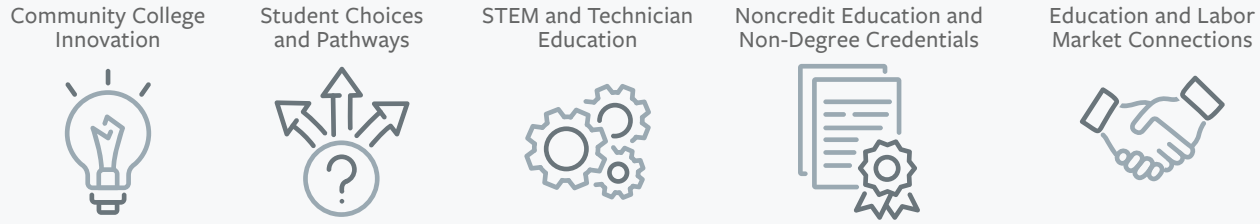
Project			
Atlantic Cape Community College (Atlantic Cape CC), unmanned aircraft systems	Project	Atlantic Cape Community College, NJ	ATE Project Award (#1801014)
Bridgerland Applied Technology College (Bridgerland ATC), automated manufacturing technician	Project	Bridgerland Applied Technology College, UT	ATE Project Award (#1801154)
Chippewa Valley Technical College, WI (Chippewa CC), robotics training	Project	Chippewa Valley Technical College, WI	ATE Project. Award (#1937661)
South Central Community College (South Central CC), mechatronics careers	Project	South Central College, MN	ATE Project Award (#2037491) jointly awarded with Central CC, NE
Central Community College (Central CC), iMEC 2.0 and plastics engineering technology	Project	Central Community College, Columbus, NE	ATE Project Award (#1902354); Also Co-PI of Joint Award (#2037491) with South Central College MN for Mechatronics
Lawson State Community College (Lawson State), industrial robotics	Project	Lawson State Community College, Bessmer, AL	ATE Project Award (#2000682); Was affiliated with CARCAM
Milwaukee Area Technical College (Milwaukee–BEST)	Project	Milwaukee Area Technical College, WI	ATE Project. Award (#2201667); Affiliated with BEST Center
North Dakota Welds Program Weld-Ed (NDWELDs)	Project, affiliated community college with Weld-Ed	North Dakota State College of Science	ATE Project. Award (# 1700493); Affiliated with Weld-Ed

About

The Education and Employment Research Center

Rutgers' Education and Employment Research Center (EERC) is housed within the School of Management and Labor Relations. EERC conducts research and evaluation on programs and policies at the intersection of education and employment. Our work strives to improve policy and practice so that institutions may provide educational programs and pathways that ensure individuals obtain the education needed for success in the workplace, and employers have a skilled workforce to meet their human resource needs. For more information on our mission and current research, visit smlr.rutgers.edu/eerc.

EERC Areas of Focus



Rutgers' School of Management and Labor Relations

Rutgers' School of Management and Labor Relations (SMLR) is the leading source of expertise on the world of work, building effective and sustainable organizations, and the changing employment relationship. The school is comprised of two departments—one focused on all aspects of strategic human resource management and the other dedicated to the social science specialties related to labor studies and employment relations. In addition, SMLR provides many continuing education and certificate programs taught by world-class researchers and expert practitioners.

SMLR was originally established by an act of the New Jersey legislature in 1947 as the Institute of Management and Labor Relations. Like its counterparts created in other large industrial states at the same time, the Institute was chartered to promote new forms of labor-management cooperation following the industrial unrest that occurred at the end of World War II. It officially became a school at the flagship campus of the State University of New Jersey in New Brunswick/Piscataway in 1994. For more information, visit smlr.rutgers.edu.

Rutgers Education and Employment Research Center

Janice H. Levin Building
94 Rockafeller Road
Piscataway, New Jersey 0885
smlr.rutgers.edu/eerc | Email: eerc@smlr.rutgers.edu

RUTGERS
School of Management
and Labor Relations