

Manufacturing Skills for
Connecticut:

Review of William M. Davies, Jr. Career and Technical High School's Machine Technology Program Lincoln, Rhode Island



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Background

This program review report includes observations and key takeaways from data collected as part of the Manufacturing Skills for Connecticut (MSforCT) project and is specific to the manufacturing program at William M. Davies, Jr. Career and Technical High School. Rhode Island's Manufacturing Extension Partnership (MEP), Polaris MEP, partnered with ReadyCT as part of the National Institute of Standards and Technology (NIST) grant to disseminate learning across New England. Davies was selected as the one program outside of CT to participate in this review. The report summarizes information gathered by WestEd between November 2020 and June 2021 through document reviews, surveys, and virtual site visits.

Manufacturing Skills for Connecticut Project Description ¹

Throughout Connecticut, significant gaps exist in the state's manufacturing workforce development system, most notably the dearth of comprehensive education, recruitment, and well-developed career pathways that, collectively, serve to connect industry to education. Rhode Island is facing similar gaps in the manufacturing workforce development system, especially in regards to broadening the participation in manufacturing career pathways. To address these issues [CONNSTEP](#), in partnership with [ReadyCT](#), the [Connecticut Business & Industry Association \(CBIA\)](#), and the Connecticut Manufacturers' Collaborative (CMC), designed the MSforCT project. The CMC includes all the major regional and statewide manufacturing member organizations across Connecticut, representing over 1200 manufacturing companies with tens of thousands of employees throughout all of Connecticut. CONNSTEP partnered with [Polaris MEP](#) to immediately expand the project's reach and kickstart Rhode Island's emerging manufacturing career pipeline.

Funded through a grant from the U.S. Department of Commerce National Institute of Standards and Technology (NIST), the MSforCT project (2020-22) aimed to increase and improve career pathways to advanced manufacturing within the K-12 school system. To better understand which programs and models are most effective, remove the silos in which promising programs are operating, and share best practices, the project proposed to:

- complete a comprehensive inventory and analysis of manufacturing career pathway programs and initiatives across K-12 schools/districts;
- conduct program reviews of a subset of programs; and
- build a web-based repository of effective career pathway programs and key criteria for the creation of new programs. This interactive website will also serve as an online community of practice accessible to school districts, business associations, students and families, postsecondary institutions, and other stakeholders.

CONNSTEP contracted with [WestEd](#), a nonprofit educational research, development, and service organization, to conduct the comprehensive inventory and program review. This report

¹ Project description adapted from [ReadyCT's Manufacturing Skills for Connecticut webpage](#) and [Manufacturing Skills for Connecticut Project Abstract](#).

summarizes only a portion of the data collected during the overall project period. Specifically, this report focuses on the engineering and manufacturing program at William M. Davies, Jr. Career and Technical High School, one of the 13 programs that were selected for program review, and includes information collected via a state-wide online survey conducted in January 2021 and a virtual site visit conducted in June 2021.

William M. Davies, Jr. Career and Technical High School

Regional Information

Manufacturers in Rhode Island account for 8.70% of the total output in the state, employing 7.84% of the workforce. Rhode Island has more than 1,400 manufacturing businesses. 86.5% of these companies employ fewer than 50 workers – they are small businesses with an outsized impact on the economy. Nearly one in 10 Rhode Islanders is employed by a manufacturer. In some ways, Rhode Island is a “melting pot” of manufacturers.” All 20 North American Industry Classification System (NAICS) groups are represented within the state, including jewelry, textiles, computers and electronics, shipbuilding, and transportation equipment.

District, School, and Program Overview

William M. Davies, Jr. Career and Technical High School is located in Lincoln, Rhode Island. Davies is its own local educational agency and the only state career and technical high school in Rhode Island. In the 2020-2021 academic year, there were 905 students enrolled at Davies. According to 2020-21 RIDE data², Davies is 53% female and approximately 35% white. English learners at Davies account for 2% of the school’s population, 59% of Davies’s students qualify for free and reduced lunch, and 7% identify as students with special education needs. In the 2018-2019 academic year, 65% of graduates entered college in the fall immediately following high school graduation. Please see Appendix F for quantitative student data gathered for this report.

Davies offers a total of four advanced manufacturing programs which include: Pre-Engineering, Machine Technology, Biomanufacturing Technology, and Electrical & Renewable Energy. The Pre-Engineering, Machine Technology, and Electrical programs at Davies were founded in 1970. The programs receive funding from Perkins V³ as well as the state of Rhode Island. Davies has articulation agreements with Johnson & Wales University, New England Institute of Technology, and the Community College of Rhode Island.

Program Inventory Review

With a primary focus on Connecticut, ReadyCT and WestEd worked together throughout fall 2020 to develop a comprehensive statewide inventory of K-12 Advanced Manufacturing

² Rhode Island Department of Education - [RIDE Data Center](#)

³ Perkins Collaborative Resource Network - [Perkins V](#)

Programs. To identify existing programs, WestEd used Google Forms and consulted with ReadyCT, the Connecticut State Department of Education (CSDE), Polaris, and industry partners. At the end of this effort, the team had identified over 140 programs related to advanced manufacturing. A list of all programs identified can be found in Appendix A.

Survey and Site Selection Overview

WestEd researchers developed and disseminated an online survey to capture basic program data and inform the selection of programs to be reviewed.

Survey Development

The project team utilized several sources to develop a rubric to define high-quality, high-impact programs, including the Association for Career & Technical Education (ACTE)⁴, the Society of Manufacturing Engineers (SME) and SME Education Foundation⁵, the National Association of Manufacturers (NAM)⁶, and the U.S. Department of Labor, Employment and Training Administration⁷. Survey questions were then developed to mirror the rubric and focused on five broad categories:

- Curriculum Standards and Competencies
- Business and Community Partnerships
- Career Development Offerings
- Sequencing and Articulation
- Access and Equity

Survey Dissemination

WestEd administered an online survey to K-12 manufacturing programs from February 3, 2021 through March 12, 2021. A total of 47 schools responded providing information on 51 programs, representing a 33% response rate. A list of all survey respondents can be found in Appendix B.

Site Selection

The project team used a combination of survey responses, site demographics, and industry recommendations to identify the manufacturing programs that would be invited to participate in a program review of high-quality, high-impact manufacturing programs. Using the rubric created (see Appendix E) during the survey development phase, WestEd researchers scored and ranked each completed survey. A higher survey score indicated that, based on the rubric, the program was more closely aligned with elements of a high-quality, high-impact program. However, it is also important to note the limitations of this approach to identifying high-quality, high-impact

⁴ Association for Career & Technical Education (ACTE) - [12 Elements of a High-quality CTE Program of Study](#).

⁵ Society of Manufacturing Engineers (SME) & SME Education Foundation - [Four Pillars of Manufacturing Knowledge](#).

⁶ National Association of Manufacturers (NAM) - [NAM-endorsed Skills Certification System](#).

⁷ U.S Department of Labor, Employment and Training Administration - [Advanced Manufacturing Competency Model](#).

programs. The primary limitations are that the programs were chosen among only a sample of manufacturing programs that completed the survey; not all surveys provided complete responses; and surveys were completed by respondents playing diverse roles with differing levels of programmatic knowledge. Thus, the sample from which the team identified high-quality, high-impact programs is limited by self-selection and the self-reported nature of the data source. It is possible that other manufacturing programs not responding to the survey are indeed high-quality and/or the programs chosen among the survey respondents provided incomplete or inaccurate information.

In addition to survey rankings, the research team considered ReadyCT's input as it further analyzed the program list. To ensure that the sample included variation, the project team considered region, urban-rural classification, and socioeconomic and diversity indexes to select a list of finalists that were eligible to participate in the program review. Finally, stakeholder feedback was incorporated into the project team's finalist list. The goal was to identify a group of sites that consisted of both programs of interest to the CMC and programs that were willing and able to participate in the evaluation. The final list of CT programs selected for review can be found in Appendix C. The list of RI schools who were administered the survey, completed the survey, and were selected can be found in Appendix D.

Visit Overview

WestEd researchers conducted focus groups and interviews with stakeholders regarding William M. Davies, Jr. Career and Technical High School's Machine Technology Program during the week of June 7, 2021. Due to the ongoing coronavirus pandemic and travel restrictions, the activities were held virtually using an online video conferencing system. The purpose of the focus groups and interviews was to gather information on program characteristics and activities to supplement data captured via the survey. Additionally, the focus groups and interviews gathered information from key stakeholders about program strengths and challenges and solicited recommendations. The focus groups and interviews were tailored to stakeholders' roles as outlined below.

- An interview with the supervisor of career and technical education (CTE)
- A focus group with three business partners
- A focus group with three teachers
- A focus group with two students
- A focus group with four student support counselors

Program Review Results

The sections below synthesize information gathered through the program's documents, survey response, and virtual site visit. The results are organized by the framework that most influenced the site selection rubric—the 12 areas of high-quality CTE that were developed by the Association for Career & Technical Education (ACTE).

Summary by 12 Areas of High-Quality CTE

Standards-aligned and Integrated Curriculum

Davies offers a total of four advanced manufacturing programs which include: Pre-Engineering Technology, Machine Technology, Biomanufacturing Technology, and Electrical & Renewable Energy. The focus of this report is primarily the Machine Technology program, though information about the other three programs was also provided by participants and teachers from the Pre-Engineering and Biomanufacturing Technology Programs were part of the teacher focus group. Standards for these programs are determined by the school's governing Career and Technical Education (CTE) Board and its various sub-committees. These standards identify coursework and credentials students need to complete in order to be prepared for a career in the manufacturing industry.

The CTE supervisor at Davies is heavily involved with curriculum development. She attends all state meetings for standards and also chairs the manufacturing committee. Additionally, the supervisor involves teachers in the curriculum development process by asking for their input. She frequently visits classrooms and observes assessments to ensure that the content aligns with state standards.

The Machine Technology program prepares students for entry into the field of high-tech manufacturing. The standards are developed by the National Institute for Metalworking Skills, Inc. (NIMS) and guide the training curriculum. Students learn to operate a wide variety of machines and computer software currently used within the manufacturing industry. In this pathway, students learn skills such as blueprint reading, toolroom management, machine safety, and quality assurance⁸.

Pre-Engineering has one standard, which identifies coursework and mandatory credential exams to be taken upon graduation. Students must meet the criteria of the standard in order to officially complete the program. Students in the Pre-Engineering pathway must take pre-calculus and physics and meet the mandatory National Occupational Competency Testing Institute (NOCTI) credential requirement. Additionally, students must take Electronics Engineering Technology, Computer and Software Engineering, and Mechanical and Robotics Engineering as a part of the program.

The Biomanufacturing Technology program at Davies offers a four-year program to prepare graduates for entry into the cutting edge of science in Biotechnology. The curriculum is guided by the Northeast Biomanufacturing Center and Collaborative and the Community College of Rhode Island. The program focuses on laboratory skills and applications that are transferable to many different fields of science and industry⁹.

⁸ Davies Tech - [Machine Technology](#).

⁹ Davies Tech - [Biomanufacturing Technology](#).

The Electrical & Renewable Energy program at Davies is compliant with the National Electric Code, Occupational Safety, and Health Administration (OSHA), and the National Center for Construction Education and Research, and offers students a pathway to future employment in the electrical field. Through hands-on learning and classroom theory, students have the opportunity to learn residential, commercial, solar, and alternative energy wiring; industry motors and controls, conduit bending, circuit breaker panels, and industrial lighting among a host of other skills¹⁰.

Sequencing and Articulation

In the Machine Technology Program, courses are required to be taken in sequence; the first course of the sequence is offered in 10th grade. A total of 26 ¼ credits are required to graduate. All students must successfully complete all credits to meet core and technical area requirements. Prerequisite courses are not required, however, an entrance exam is required of all incoming 9th graders as the program at Davies is highly selective. The Stanford Ten Diagnostic Test (Complete Battery - Tasks 1) is the exam currently being used.

Davies has articulation agreements with a total of three local colleges, including two privately run postsecondary technical schools, Johnson & Wales University and New England Institute of Technology. Davies has an agreement with Community College of Rhode Island, a regional public community college. The partnership and agreements between Davies and the local colleges has been in effect for over 30 years. Teachers communicated that the Community College of Rhode Island (CCRI) is planning to shift to a dual enrollment format as opposed to articulation agreements, as dual enrollment is an easier way to attain college credentials.

Student Assessment

Davies offers a number of credentialing exams. Students take the NOCTI, NIMS and OSHA certifications in the Machine Technology program. Students have the opportunity to become certified in all nine programs including: maintenance operations, basic mechanical systems, basic hydraulic systems, basic pneumatic systems, electrical systems, electronic control systems, process control systems, maintenance welding, maintenance piping, electronics, CNC machining, and manual machining. Additionally, students take precision exams to earn certifications from the International Society of Certified Electronic Technicians.

Prepared and Effective Program Staff

Davies's faculty consists of highly skilled professional educators. Teachers are credentialed in the subject areas they teach and are required to receive a NOCTI certification by completing a hands-on skills test as well as a theory component. Teachers must also receive NIMS certifications in every area offered to students. The Machine Technology teacher is certified in all nine NIMS areas, enabling the students to pursue certifications in those areas.

¹⁰ Davies Tech - [Electrical & Renewable Energy](#)

Teachers engage in a variety of self-directed professional development offerings including trainings sponsored by Harvard University and a teacher collaboration network through LabXchange¹¹. Additionally, teachers have access to memberships within industry-related networks. Davies also provides in classroom support for teachers to improve teaching techniques. In the past, this service was provided by a contracted professional who helped adapt lessons to incorporate recent changes within the manufacturing industry.

Engaging Instruction

Students communicated that they were engaged in the shop program because of its hands-on learning experience. Students spoke highly of the instruction they received in budget and finance via QuickBooks. They also appreciated the Prepare Rhode Island¹² program that provided them with interview skills. Overall, students reported having a wealth of resources available to them; students shared that they received a great deal of support from their teachers. The two students interviewed were both graduating seniors with promising careers ahead of them. One student is pursuing a career in computer science and the other is beginning her career as a journeyman electrician.

Access and Equity

Students enrolled in the programs at Davies receive a wealth of supports. Technical teachers reach out to case managers of students with Individualized Education Programs (IEPs) in order to garner one-on-one support for students who need additional assistance. According to the teachers interviewed, there is currently sufficient staff to provide all of the necessary support. Positions are advertised on SchoolSpring. New teachers are provided with a teacher mentor along with an induction coach.

Facilities, Equipment, Technology and Materials

Davies's facilities are newly renovated. This renovation includes an update of equipment which was funded by a \$3.5 million investment from the state of Rhode Island. New items include robots and 3D printers, AC/DC power sources as well as soldering and pipe bending equipment. Students have access to three training labs equipped with milling machines, grinders, lathes and heat-treating equipment. The school also has a Computer Assisted Manufacturing (CAM) Lab with computer numeric controlled (CNC) lathes and milling machines. Teachers conveyed that it is easy to acquire funding from the state when necessary, and they have been able to have all their requests fulfilled.

¹¹ Labxchange - <https://www.labxchange.org/>

¹² Prepare Rhode Island - [About](#).

Business and Community Partnerships

Davies has partnerships with a number of local businesses. Local business partners attend advisory board meetings, present at school events and offer internships. Students participate in internships with local manufacturers the summer between their junior and senior year. The state requires all students in Rhode Island to complete at least 80 hours of work-based learning. Students can complete these hours through a variety of opportunities with industry partners. Some internships are unpaid and end after the hours are completed, while others are paid and have the opportunity to turn into full-time employment after graduation. One business partner indicated they are looking for machinists while the others only require that students have basic skills. Ultimately, all partners are looking for students who are interested and engaged in the work.

One of the business partnerships at Davies is with Electric Boat. Davies is a General Dynamics/Electric Boat (GD/EB) partnered school in both Electrical and Renewable Energy and the Machine Technology programs. Students have the opportunity to participate in work-based learning placement in the Rhode Island facility during the summer following their Junior year. Successful students have the opportunity to continue with GD/EB upon graduation.

Davies provides a feedback form to partners to ensure that students are meeting expectations. Some partners assign mentors to students to help them adapt to the workforce and provide supports to keep students engaged. Partners communicated that students from Davies are prepared with basic experience and have a good understanding of safety. They also emphasized Davies' strong program leadership and curriculum content. Partners shared that scheduling could be improved by increasing student availability to five days a week. Lastly, partners noted that students' professional skills could be further developed; according to the business partners, Davies students seem less prepared professionally than students from other technical schools in the area. They noted presentation and business etiquette, specifically. However, a large number of employers continue to reach out to the school yearly for students. Students who do enter internships are recommended by their technical skills instructors for work-based learning. These teachers consider the student's technical skill set. The feedback form scores students on communication, collaboration, critical thinking, and professionalism. This helps to emphasize the importance of employability skills to students.

Student Career Development

Davies offers a wealth of career development opportunities. For example, program staff identified career education and awareness, career exploration, and career immersion opportunities to help students find work. Additionally, Davies has an office of workforce development and an advisory board that helps secure career development opportunities for students such as job shadowing and in-field work opportunities. Although the school does not typically hold career fairs, local community partners often come in to speak with students about opportunities within their given pathway.

Career and Technical Student Organizations (CTSOs)

Davies offers SkillsUSA on their campus. SkillsUSA is a nonprofit national education association, that serves middle-school, high-school and college/postsecondary students preparing for careers in trade, technical, and skilled service occupations¹³. The organization is student led, advisor facilitated, and takes the form of an afterschool program. Students have the opportunity to participate in competitions at the local state and national levels that showcase their career skills. Davies's SkillsUSA students have demonstrated their technical skills and knowledge over the years by winning 25 national medals and consistently ranking as one of the top groups of student performers in the New England Region¹⁴.

Business partners shared that student participation in career and technical student organizations are good to have but are not a requirement.

Work-based Learning

All students are required to have 80 hours of work-based learning upon graduating from the program. In addition to school credit, students are also able to participate in paid work-based learning positions. One of the students interviewed shared that they received hours for work-based learning through a Women in Technology organization founded by a teacher at Davies. Students also participated in internships through Prepare Rhode Island. In addition to internships, cooperative work education is also offered through partnerships with local manufacturers.

Data and Program Improvement

The state of Rhode Island is in the process of strengthening its data tracking; there is currently no longitudinal data system in the state. Davies has an alumni page but does not track students upon graduation. The alumni page is used to post job opportunities and at times industry partners request assistance from the district in reaching out to former graduates. Student data is used across the program to inform professional development, job placement, and career path tracking.

Final Reflections and Takeaways

The program at Davies finds strength in its funding, teacher expertise and program leadership. Local partners expressed their satisfaction with the program curriculum, as well. Another attribute is the Women in Technology program, sponsored by Microsoft. This was an after-school program run through the pre-engineering program that has increased Davies's female student population to over 40%. A noteworthy practice is the feedback process between business partners and the school which allows the two entities to address issues in a timely manner and maintain open lines of communication.

¹³ SkillsUSA - [About](#).

¹⁴ Davies Tech - [SkillsUSA](#).

Appendix A: Inventory of CT K-12 Advanced Manufacturing Programs, by District

Ansonia School District

Ansonia High School, Ansonia, CT

Berlin School District

Berlin High School, Berlin, CT

Bolton School District

Bolton High School, Bolton, CT

Bridgeport School District

Bassick High School, Bridgeport, CT

Bridgeport Regional Vocational Aquaculture School, Bridgeport, CT

Central High School, Bridgeport, CT

Fairchild Wheeler Interdistrict Multi-Magnet High School, Bridgeport, CT

Kolbe Cathedral High School, Bridgeport, CT

Warren Harding High School, Bridgeport, CT

Bristol School District

Bristol Central High School, Bristol, CT

Bristol Eastern High School, Bristol, CT

Brookfield School District

Brookfield High School, Brookfield, CT

Capitol Region Education Council

Academy of Aerospace and Engineering, Windsor, CT

Cheshire School District

Cheshire High School, Cheshire, CT

Clinton School District

The Morgan School, Clinton, CT

Colchester School District

Bacon Academy, Colchester, CT

Connecticut Technical Education and Career System (CTECS)

A. I. Prince Technical High School, Hartford, CT

Bristol Technical Education Center, Bristol, CT

Bullard-Havens Technical High School, Bridgeport, CT

E. C. Goodwin Technical High School, New Britain, CT

Eli Whitney Technical High School, Hamden, CT

Ella T. Grasso/Southeastern Technical High, Groton, CT

Emmett O'Brien Technical High School, Ansonia, CT

H. C. Wilcox Technical High School, Meriden, CT

Harvard H. Ellis Technical High School, Danielson, CT

Henry Abbott Technical High School, Danbury, CT

Howell Cheney Technical High School, Manchester, CT

J.M. Wright Technical High School, Stamford, CT

Norwich Technical High School, Norwich, CT
Oliver Wolcott Technical High School, Torrington, CT
Platt Technical High School, Milford, CT
Vinal Technical High School, Middletown, CT
W. F. Kaynor Technical High School, Waterbury, CT
Windham Technical High School, Windham, CT

Coventry School District

Coventry High School, Coventry, CT

Cromwell School District

Cromwell High School, Cromwell, CT

Danbury School District

Danbury High School, Danbury, CT

Darien School District

Darien High School, Darien, CT

Derby School District

Derby High School, Derby, CT

East Granby School District

East Granby High School, East Granby, CT

East Haddam School District

Nathan Hale-Ray High School, Moodus, CT

East Hartford School District

East Hartford High School, East Hartford, CT
Synergy Alternative High School, East Hartford, CT
Woodland School, East Hartford, CT

East Haven School District

East Haven High School, East Haven, CT

East Lyme School District

East Lyme High School, East Lyme, CT

Eastern Connecticut Regional Educational Service Center (EASTCONN)

Quinebaug Middle College, Danielson, CT

Ellington School District

Ellington High School, Ellington, CT

Enfield School District

Enfield High School, Enfield, CT

Fairfield School District

Fairfield Ludlowe High School, Fairfield, CT
Fairfield Warde High School, Fairfield, CT

Farmington School District

Farmington High School, Farmington, CT

Glastonbury School District

Glastonbury High School, Glastonbury, CT

Granby School District

Granby Memorial High School, Granby, CT

Greenwich School District

Greenwich High School, Greenwich, CT

Griswold School District

Griswold High School, Griswold, CT

Groton School District

Robert E. Fitch High School, Groton, CT

Guilford School District

Guilford High School, Guilford, CT

Hamden School District

Hamden High School, Hamden, CT

Hartford School District

Hartford Public High School, Engineering & Green Technology Pathway, Hartford, CT
Pathways Academy of Technology & Design, East Hartford, CT

Killingly School District

Killingly High School, Killingly, CT

LEARN

Connecticut River Academy, East Hartford, CT

Lebanon School District

Lyman Memorial High School, Lebanon, CT

Ledyard School District

Ledyard High School, Ledyard, CT

Madison School District

Daniel Hand High School, Madison, CT

Manchester School District

Manchester High School, Manchester, CT

Meriden School District

Francis T. Maloney High School, Meriden, CT
Orville H. Platt High School, Meriden, CT

Middletown School District

Middletown High School, Middletown, CT

Milford School District

Joseph A. Foran High School, Milford, CT
The Academy, Milford, CT

Milford School District

Jonathan Law High School, Milford, CT

Monroe School District

Masuk High School, Monroe, CT

Montville School District

Montville High School, Oakdale, CT

New Britain School District

New Britain High School, New Britain, CT

New Canaan School District

New Canaan High School, New Canaan, CT

New Haven School District

Metropolitan Business Academy, New Haven, CT
Riverside Education Academy, New Haven, CT

New Haven School District

Engineering - Science University Magnet School, West Haven, CT
Wilbur Cross High School, New Haven, CT

New London School District

New London High School, New London, CT

Newtown School District

Newtown High School, Sandy Hook, CT

North Stonington School District

Wheeler High School, North Stonington, CT

Norwich Free Academy

Norwich Free Academy, Norwich, CT

Old Saybrook School District

Old Saybrook High School, Old Saybrook, CT

Plainfield School District

Plainfield High School, Plainfield, CT

Plainville School District

Plainville High School, Plainville, CT

Plymouth School District

Terryville High School, Terryville, CT

Portland School District

Portland High School, Portland, CT

Regional School District 1

Housatonic Valley Regional High School, Falls Village, CT

Regional School District 4

Valley Regional High School, Deep River, CT

Regional School District 5

Amity Regional High School, Woodbridge, CT

Regional School District 7

Northwestern Regional High School, Winsted, CT

Regional School District 8

RHAM High School, Hebron, CT

Regional School District 10

Lewis S. Mills High School, Burlington, CT

Regional School District 12

Shepaug Valley School, Washington, CT

Regional School District 15

Pomperaug High School, Southbury, CT

Regional School District 16

Woodland Regional High School, Beacon Falls, CT

Regional School District 17

Haddam-Killingworth High School, Higganum, CT

Regional School District 18

Lyme-Old Lyme High School, Old Lyme, CT

Regional School District 19

E. O. Smith High School, Storrs, CT

Rocky Hill School District

Rocky Hill High School, Rocky Hill, CT

Seymour School District

Seymour High School, Seymour, CT

Shelton School District

Shelton High School, Shelton, CT

Simsbury School District

Simsbury High School, Simsbury, CT

Somers School District

Somers High School, Somers, CT

South Windsor School District

South Windsor High School, South Windsor, CT

Southington School District

Southington High School, Southington, CT

Stafford School District

Stafford High School, Stafford Springs, CT

Stamford School District

The Academy of Information Technology, Stamford, CT

Stonington School District

Stonington High School, Stonington, CT

Stratford School District

Frank Scott Bunnell High School, Stratford, CT

Stratford School District

Stratford High School, Stratford, CT

Suffield School District

Suffield High School, Suffield, CT

Thomaston School District

Thomaston High School, Thomaston, CT

Thompson School District

Tourtellotte Memorial High School, North Grosvenordale, CT

Torrington School District

Torrington High School, Torrington, CT

Trumbull School District

Trumbull High School, Trumbull, CT

Unified School District #1

State of Connecticut Department of Correction, Wethersfield, CT

Vernon School District

Rockville High School, Vernon, CT

Wallingford School District

Lyman Hall High School, Wallingford, CT

Mark T. Sheehan High School, Wallingford, CT

Waterbury School District

Waterbury Career Academy, Waterbury, CT

Waterbury School District

Crosby High School, Waterbury, CT

John F. Kennedy High School, Waterbury, CT

Wilby High School, Waterbury, CT

Waterford School District

Waterford High School, Waterford, CT

Watertown School District

Watertown High School, Watertown, CT

West Hartford Public Schools

Conard High School, West Hartford, CT

William H. Hall High School, West Hartford, CT

West Haven School District

West Haven High School, West Haven, CT

Westbrook School District

Westbrook High School, Westbrook, CT

Wethersfield School District

Wethersfield High School, Wethersfield, CT

Windham School District

Windham High School, Windham, CT

Windsor School District

Windsor High School, Windsor, CT

Windsor Locks School District

Windsor Locks High School, Windsor Locks, CT

Wolcott School District

Wolcott High School, Wolcott, CT

Woodstock Academy

The Woodstock Academy, Woodstock, CT

Appendix B: CT Advanced Manufacturing Program Survey Respondents, by District

Ansonia School District

Ansonia High School, Ansonia, CT

Bridgeport School District

Bassick High School, Bridgeport, CT

Bristol School District

Bristol Central High School, Bristol, CT

Bristol Eastern High School, Bristol, CT

Cheshire School District

Cheshire High School, Cheshire, CT

Colchester School District

Bacon Academy, Colchester, CT

Connecticut Technical Education and Career System (CTECS)

Bristol Technical Education Center, Bristol, CT

Bullard-Havens Technical High School, Bridgeport, CT

Eli Whitney Technical High School, Hamden, CT

H. C. Wilcox Technical High School, Meriden, CT

Harvard H. Ellis Technical High School, Danielson, CT

Platt Technical High School, Milford, CT

Vinal Technical High School, Middletown, CT

W. F. Kaynor Technical High School, Waterbury, CT

Coventry School District

Coventry High School, Coventry, CT

East Granby School District

East Granby High School, East Granby, CT

East Haddam School District

Nathan Hale-Ray High School, Moodus, CT

East Hartford School District

East Hartford High School, East Hartford, CT

East Haven School District

East Haven High School, East Haven, CT

Eastern Connecticut Regional Educational Service Center (EASTCONN)

Quinebaug Middle College, Danielson, CT

Glastonbury School District

Glastonbury High School, Glastonbury, CT

Griswold School District

Griswold High School, Griswold, CT

Hamden School District

Hamden High School, Hamden, CT

Hartford School District

HPHS Academy of Engineering & Green Technology, Hartford, CT

LEARN

Connecticut River Academy, East Hartford, CT

Lebanon School District

Lyman Memorial High School, Lebanon, CT

Madison School District

Daniel Hand High School, Madison, CT

Manchester School District

Manchester High School, Manchester, CT

New Britain School District

New Britain High School, New Britain, CT

Plainfield School District

Plainfield High School, Plainfield, CT

Plainville School District

Plainville High School, Plainville, CT

Regional School District 16

Woodland Regional High School, Beacon Falls, CT

Regional School District 8

RHAM High School, Hebron, CT

Rocky Hill School District

Rocky Hill High School, Rocky Hill, CT

South Windsor School District

South Windsor High School, South Windsor, CT

Stonington School District

Stonington High School, Stonington, CT

Suffield School District

Suffield High School, Suffield, CT

Thomaston School District

Thomaston High School, Thomaston, CT

Thompson School District

Tourtellotte Memorial High School, North Grosvenordale, CT

Torrington School District

Torrington High School, Torrington, CT

Unified School District #1

State of Connecticut Department of Correction, Wethersfield, CT

Wallingford School District

Lyman Hall High School, Wallingford, CT

Waterbury School District

Waterbury Career Academy, Waterbury, CT

West Hartford Public Schools

Conard High School, West Hartford, CT

William H. Hall High School, West Hartford, CT

Windham School District

Windham High School, Windham, CT

Windsor School District

Windsor High School, Windsor, CT

Appendix C: Final List of CT Programs Selected for Review

Bacon Academy Manufacturing at Bacon Academy Colchester School District, Colchester, CT
Bristol Manufacturing Production Pathway at Bristol Central & Bristol Eastern High Schools Bristol School District, Bristol, CT
Early College Advanced Manufacturing Program at Connecticut River Academy LEARN Regional Education Service Center, East Hartford, CT
Precision Machining Technology at Eli Whitney Technical High School Connecticut Technical Education and Career System (CTECS), Hamden, CT
Hamden Engineering Careers Academy at Hamden High School Hamden School District, Hamden, CT
Intro to Manufacturing at Lyman Hall High School Wallingford School District, Wallingford, CT
Manchester Public Schools Manufacturing Program at Manchester High School Manchester School District, Manchester, CT
Academy of Manufacturing, Engineering & Technology (MET) at New Britain High School New Britain School District, New Britain, CT
Manufacturing for Industry: YMPI with EWIB at RHAM High School Regional School District 8, Hebron, CT
Manufacturing Pathway at Tourtellotte Memorial High School Thompson School District, North Grosvenordale, CT
Precision Machining Technology at Vinal Technical High School Connecticut Technical Education and Career System (CTECS), Middletown, CT
Manufacturing Academy at Waterbury Career Academy Waterbury School District, Waterbury, CT
Career and Technical Education at Windsor High School¹⁵ Windsor School District, Windsor, CT

¹⁵ Windsor High School declined to participate in the program review.

Appendix D: RI Program Inventory, Survey Respondents, and Selected Program

Inventory of RI K-12 Advanced Manufacturing Programs, by District

North Kingstown School District

North Kingstown High School, North Kingstown, RI

Warwick Public Schools

Warwick Area Career and Technical Center, Warwick, RI

William M. Davies, Jr. Career and Technical High School

William M. Davies, Jr. Career and Technical High School, Lincoln, RI

RI Advanced Manufacturing Program Survey Respondents, by District

North Kingstown School District

North Kingstown High School, North Kingstown, RI

William M. Davies, Jr. Career and Technical High School

William M. Davies, Jr. Career and Technical High School, Lincoln, RI

Final List of RI Programs Selected for Review

William M. Davies, Jr. Career and Technical High School's Machine Technology Program
Lincoln, RI

Appendix E: Scoring Rubric

Category Name	Full Question	Response Required to Receive Point	Related High-quality CTE Program Element	Element-Weighted Score	Non-Weighted Score
Identified Student Populations	Has your program identified student populations in your vicinity that are typically underserved educationally or underemployed due to educational, economic or other barriers?	Yes	Access and Equity	0.3333333333	1
Identified Root Causes	Has your program identified the root causes of identified gaps in participation and performance of these student groups?	Yes	Access and Equity	0.3333333333	1
Orgs to Support Access & Equity	Has your program utilized any organizations and/or resources to support your efforts related to access and equity?	Yes	Access and Equity	0.3333333333	1
Business Partnerships	Is your program involved in any business partnerships?	Yes	Business and Community Partnerships	0.5	1
Community Partnerships	Is your program involved in any community partnerships (i.e., partnerships with nonprofit organizations, public agencies, and/or government offices)?	Yes	Business and Community Partnerships	0.5	1

Category Name	Full Question	Response Required to Receive Point	Related High-quality CTE Program Element	Element-Weighted Score	Non-Weighted Score
CTSOs	Has your school established one or more Career and Technical Student Organizations (CTSOs)?	Yes	Career and Technical Student Organizations (CTSOs)	1	1
Age: > 5 Years	Calculated age using starting year provided	> 5 Years	Data and Program Improvement	0.5	1
Program Data	Please describe the types of data the program collects and how data are used.	Response Provided	Data and Program Improvement	0.5	1
Specialized Facilities	Please describe any specialized facilities, equipment, technology, and/or materials available to program participants. Please provide any relevant website links or documentation.	Response Provided	Facilities, Equipment, Technology and Materials	1	1
Staff PD	Do program staff have opportunities to participate in professional learning activities specific to advanced manufacturing?	Yes	Prepared and Effective Program Staff	1	1
Sequenced Courses	Does the program structure require students to take courses in a SEQUENCE (e.g., Advanced Manufacturing Technology I, Advanced Manufacturing Technology II, Advanced Manufacturing Technology III, etc.)?	Yes	Sequencing and Articulation	0.3333333333	1

Category Name	Full Question	Response Required to Receive Point	Related High-quality CTE Program Element	Element-Weighted Score	Non-Weighted Score
Credentials	Which of the following industry-recognized credentials does your program offer?	At least 1 selected	Sequencing and Articulation	0.3333333333	1
Credit that Articulates	Which of the following opportunities to earn credit that articulates to the next level of education does your program offer?	At least 1 selected	Sequencing and Articulation	0.3333333333	1
Industry-Recognized Standards & Competencies	Does your program's curriculum incorporate industry-recognized technical standards and competencies (e.g., NIMS, AWS, MSSC, etc.)?	Yes	Standards-aligned and Integrated Curriculum	0.25	1
Employability Skill Standards	Does your program's curriculum incorporate employability skill standards, such as problem solving, critical thinking, teamwork, communications, interview skills, and workplace etiquette, that help students succeed in the workplace?	Yes	Standards-aligned and Integrated Curriculum	0.25	1
Publicly Available Standards	Are program standards publicly available and accessible?	Yes	Standards-aligned and Integrated Curriculum	0.25	1
Curriculum Reviewed Regularly	Is the program's curriculum reviewed regularly?	Yes	Standards-aligned and Integrated Curriculum	0.25	1

Category Name	Full Question	Response Required to Receive Point	Related High-quality CTE Program Element	Element-Weighted Score	Non-Weighted Score
Career Development	Which of the following career development opportunities does your program offer?	At least 1 selected	Student Career Development	1	1
Work-based Learning	Which of the following work-based learning opportunities does your program offer?	At least 1 selected	Work-based Learning	1	1
Total Possible Score:				10	19

Appendix F: Quantitative Data

Data received from Davies included all students enrolled in the high school during the 2020-21 academic year. During the 2015-16 academic year through the 2019-20 academic year, only data for students identified as seniors in each respective year was provided. Manufacturing program students included in the analysis are students in the machining pathway only.

Table 1: Student Demographics, Academic Year 2020-21

Student Characteristics	Manufacturing Program Students (n = 62)		Overall School Population (n = 931)	
	n	%	n	%
Asian	*	*	16	1.7
Black/African American	16	25.8	206	22.1
Hispanic	15	24.2	367	39.4
Native American/Alaskan Native	*	*	9	1.0
White	29	46.8	333	35.8
Female	12	19.4	490	52.6
English Language Learners	*	*	19	2.0
Special Education	6	9.7	59	6.3
Free/Reduced Lunch Eligible	23	37.1	399	42.9

Note: Cells with fewer than five students are noted with an asterisk and are restricted from reporting.

Manufacturing program students' demographic characteristics in the 2020-21 academic year were similar to those of the overall school population in the 2020-21 academic year. However, the most noticeable difference was the representation of female students in manufacturing programs. There is a difference of approximately 30 percentage points when considering the share of female students in the manufacturing program compared to female students in the overall population.

Table 2: Student Demographics, Academic Years 2015-16 through 2020-21

Student Characteristics	Manufacturing Program Students (n = 111)		Overall School Population (n = 1,867)	
	n	%	n	%
Asian	*	*	22	1.2
Black/African American	22	19.8	385	20.6
Hispanic	30	27.0	747	40.0
Native American/Alaskan Native	*	*	18	1.0
White	56	50.5	695	37.2
Female	16	14.4	936	50.1
English Language Learners	6	5.4	56	3.0
Special Education	11	9.9	124	6.6
Free/Reduced Lunch Eligible	44	39.6	960	51.4

Notes: Cells with fewer than five students are noted with an asterisk and are restricted from reporting. This table includes all students in all grades during the 2020-21 school year and includes only students identified as seniors in school years 2015-16 through 2019-20.

Manufacturing program students' demographic characteristics from 2015-16 through 2020-21 were similar to those of the overall school population from 2015-16 through 2020-21. Similar to the findings in Table 1, there is a difference of approximately 30 percentage points when considering the share of female students in the manufacturing program compared to female students in the overall population.

Table 3: Attendance, Academic Years 2015-16 through 2020-21

Metric	Manufacturing Program Students (n = 97)					Overall School Population (n = 1,633)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
Attendance	158.5	173	35.4	180	2	160.5	171	29.8	180	2

Note: Attendance is defined as the total number of days attended in a given school year, which is 180 days.

Manufacturing program students, on average, were not different from the overall school population in terms of school attendance.

Table 4: Standardized Assessment, Academic Year 2020-21

Metric	Manufacturing Program Students (n = 20)					Overall School Population (n = 342)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
English SAT	468.5	455	60.0	650	400	481.7	480	73.0	780	330
Math SAT	438.0	440	59.4	590	310	452.8	450	70.0	700	200

Note: SAT scores were the only test score provided and only included for the 2020-21 academic year.

Students in the overall school population earned over 10 points higher on both English and Math SATs compared to their peers in the manufacturing program.

Table 5: Secondary Graduation Rate for Seniors, Academic Years 2015-16 through 2020-21

Metric	Manufacturing Program Students (n = 68)		Overall School Population (n = 1,137)	
	n	%	n	%
Graduated w/ Diploma	61	89.71	1,015	89.27

Note: Only students identified as seniors during each academic year were included in the analysis.

Students in the manufacturing program and in the overall school population have almost identical graduation rates with less than one percentage point difference between the two groups. This includes only graduating seniors from each 2015-16 through 2020-21.