

Promising Practices to Support the Development of K–12 Manufacturing Programs: Spotlight on Bristol Eastern High School’s Data

Background

The Manufacturing Skills for Connecticut (MSforCT) project, funded by the U.S. Department of Commerce National Institute for Standards and Technology, aimed to establish a menu of effective educational best practices that Manufacturing Extension Partnerships (MEPs) throughout the country, and manufacturers and school systems across CT and beyond, can use to establish and advance effective career pathways. [CONNSTEP](#), CT’s MEP representative, was the lead organization partnering with [ReadyCT](#), a statewide nonprofit focused on K–12 education and career-connected learning; [CBIA](#), CT’s largest business organization; the Connecticut Manufacturers’ Collaborative, a statewide, policy-focused collective composed of the nine major manufacturing associations within CT; and [WestEd](#), a non-partisan research, development, and service agency.

As part of the MSforCT project, WestEd executed a multistep process to identify 13 manufacturing programs with evidence of using promising practices intended to support high-quality programming. This process included developing a statewide survey; identifying all existing manufacturing programs across CT for survey administration; developing and using a rubric to rank manufacturing programs on their use of high-quality, high-impact practices; and considering site demographics and industry recommendations to choose the final 13 program sites. WestEd then conducted 13 program reviews which included interviews/focus groups with key program stakeholders and a review of student administrative data. Ultimately, the MSforCT project created numerous resources including [The MFG Skills-CT](#) website, a [Promising Practices guide](#), and [13 program-specific reports](#), including [Bristol Public Schools’ manufacturing program](#).

Bristol Eastern High School Manufacturing Program Data

The current summary of Bristol Eastern High School's manufacturing program data supplements the site-specific report. This document summarizes data from CT's Statewide Longitudinal Data System (SLDS): the Preschool Through 20 Workforce Information Network (P20 WIN). The data included all students enrolled in the high school during the 2018-2019 through 2020-21 academic year. At Bristol Eastern High School, manufacturing program students are defined as students taking at least one manufacturing program course. Manufacturing students are included in the overall school population in the tables below.

Table 1: Student Demographics, Academic Year 2020-2021

Student Characteristics	Manufacturing Program Students (n = 176)		Overall School Population (n = 1092)	
	n	%	n	%
American Indian or Alaska Native	*	*	*	*
Asian	6	3%	42	4%
Black or African American	9	5%	85	8%
Hispanic/Latino of any race	32	18%	266	24%
Native Hawaiian or Other Pacific Islander	*	*	*	*
Two or More Races	7	4%	40	4%
White	122	69%	654	60%
Female	20	11%	566	52%
English Language Learners	5	3%	44	4%
Students with Disabilities	43	24%	227	21%
Free/Reduced Lunch Eligible	65	37%	455	42%

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

The manufacturing program enrolled 176 students at Bristol Eastern High School in the academic year 2020-2021. White students made up a large majority of both overall school population (60%) and the manufacturing cohort (69%). Hispanic/Latino students of any race represented 18% of the cohort, which was lower than their overall enrollment (24%). Female students made 52% of the overall school population, however their participation in the manufacturing program was much lower (11%).

Table 2: Student Demographics, Academic Years 2018-2019 through 2020-2021

Student Characteristics	Manufacturing Program Students (n = 248)		Overall School Population (n = 1,700)	
	n	%	n	%
American Indian or Alaska Native	*	*	5	0%
Asian	8	3%	59	3%
Black or African American	17	7%	128	8%
Hispanic/Latino of any race	45	18%	410	24%
Native Hawaiian or Other Pacific Islander	*	*	*	*
Two or More Races	9	4%	64	4%
White	169	68%	1033	61%
Female	27	11%	862	51%
English Language Learners	10	4%	56	3%
Students with Disabilities	56	23%	354	21%
Free/Reduced Lunch Eligible	96	39%	737	43%

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

From the academic years 2018-19 through 2020-21, there were in total, 248 students in the manufacturing program. The demographic composition was similar to the 2020-21 data: White students represented two-thirds of the cohort members, which was higher than their overall enrollment (61%). The participation rate for Hispanic or Latino students of any race in the program (18%) was lower than in the overall population (24%). Female students were also underrepresented in the manufacturing cohort (11%) compared to in the overall population (51%).

Table 3: Academic Characteristics, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students (n = 248)					Overall School Population (n = 1,700)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
Attendance	148.8	165	28.8	181	44	146.1	163	33.1	181	0

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

Manufacturing students across cohorts (2018-19 through 2020-21) attended school on average 148.8 days (SD 28.8). This figure is similar to the average overall school attendance.

Table 4: Standardized Assessment, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students (n = 186)					Overall School Population (n = 1324)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
English SAT	475.4	470	95.1	720	300	495.7	490	89.3	760	300
Math SAT	468.8	460	99.5	760	310	472.9	470	89.4	760	270

Across 186 manufacturing program students who took the SAT tests, the average score was 475.4 (SD 95.1) on the English section and 468.8 (SD 99.5) on the math section. On average, the manufacturing program students' scores were lower than the overall school population's average scores.

Table 5: Secondary Graduation Rate, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students		Overall School Population	
	n=271	%	n=2072	%
Graduated	183	67.5%	1459	70%

Across the manufacturing cohorts in all three academic years, 67.5% of the seniors graduated from Bristol Central High School. The overall school-wide graduation rate for the same years combined was slightly higher at 70%.

Table 6: Postsecondary Enrollment, Academic Years 2018-2019 through 2019-2020

	Manufacturing Students		Overall School Population	
	n=183	%	n=1459	%
Enrolled in CT Postsecondary Program	30	16.3%	334	23%
Enrolled in Out of State Postsecondary Program	9	5%	118	8%
No Record of Postsecondary Enrollment	144	78.7%	1007	69%

In total, 39 students from the manufacturing program entered postsecondary educational institutions and nine of them studied in out-of-state colleges. For the overall school student

population, 23% of the students who graduated from high school entered postsecondary programs in Connecticut, and another 8% in out-of-state institutions.

Table 7: Postsecondary Enrollment, By Institution Type, Academic Years 2018-2019 through 2019-2020

Institution Type	Manufacturing Students		Overall School Population	
	n=39	%	n=452	%
4-Year Institution	22	56%	290	64%
2-Year Institution	17	44%	162	36%
<2-Year Institution				

Most of the students across the manufacturing cohorts who entered the postsecondary educational system studied in 4-year institutions (56%). Another 44% were enrolled in 2-year programs. As for the overall school population, 64% of students in postsecondary education were in 4-year programs and 36% in 2-year colleges.

Table 8: Postsecondary Persistence - Y1 - Y2, Academic Year 2018-2019

	Manufacturing Students		School Population	
	n=39	%	n=452	%
Persistence	6	15.3%	106	23.4%

Persistence in postsecondary education was defined as an individual being enrolled in a postsecondary institution in the same year they graduated from high school and being enrolled in two consecutive fall terms in the institution. From all 39 students from manufacturing cohorts who were enrolled in postsecondary institutions, six met the persistence criteria (15.3%). In the overall school population, the persistence rate was 23.4%. The sample size for the manufacturing cohort was too small for comparison.

Promising Practices to Support the Development of K–12 Manufacturing Programs: Spotlight on Bristol Central High School’s Data

Background

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As part of the MSforCT project, WestEd executed a multistep process to identify 13 manufacturing programs with evidence of using promising practices intended to support high-quality programming. This process included developing a statewide survey; identifying all existing manufacturing programs across CT for survey administration; developing and using a rubric to rank manufacturing programs on their use of high-quality, high-impact practices; and considering site demographics and industry recommendations to choose the final 13 program sites. WestEd then conducted 13 program reviews which included interviews/focus groups with key program stakeholders and a review of student administrative data. Ultimately, the MSforCT project created numerous resources including [The MFG Skills-CT](#) website, a [Promising Practices guide](#), and [13 program-specific reports](#), including [Bristol Public Schools’ manufacturing program](#).

Bristol Central High School Manufacturing Program Data

The current summary of Bristol Central High School's manufacturing program data supplements the site-specific report. This document summarizes data from CT's Statewide Longitudinal Data System (SLDS): the Preschool Through 20 Workforce Information Network (P20 WIN). The data included all students enrolled in the high school during the 2018-2019 through 2020-21 academic year. At Bristol Central High School Manufacturing program students are defined as students taking at least one manufacturing program course. Manufacturing students are included in the overall school population in the tables below.

Table 1: Student Demographics, Academic Year 2020-2021

Student Characteristics	Manufacturing Program Students (n = 142)		Overall School Population (n = 1,190)	
	n	%	n	%
American Indian or Alaska Native	*	*	*	*
Asian	*	*	29	2%
Black or African American	7	5%	77	6%
Hispanic/Latino of any race	41	29%	391	33%
Native Hawaiian or Other Pacific Islander	*	*	*	*
Two or More Races	6	4%	45	4%
White	86	61%	647	54%
Female	22	15%	610	51%
English Language Learners	*	*	48	4%
Students with Disabilities	38	27%	240	20%
Free/Reduced Lunch Eligible	64	45%	567	48%

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

The manufacturing program enrolled 142 students at Bristol Central High School in the academic year 2020-2021. Of those students, 61% were White, which is slightly higher than in the overall school population. Hispanic/Latino students of any race comprised 29% of the cohort, which is slightly lower than in the total student population (33%). Female students, who represented 51% of the overall school population, participated in the manufacturing program at a much lower rate and made up 15% of the cohort.

Table 2: Student Demographics, Academic Years 2018-2019 through 2020-2021

Student Characteristics	Manufacturing Program Students (n = 184)		Overall School Population (n = 1,841)	
	n	%	n	%
American Indian or Alaska Native	*	*	*	*
Asian	5	2%	55	3%
Black or African American	11	5%	119	6%
Hispanic/Latino of any race	55	29%	582	30%
Native Hawaiian or Other Pacific Islander	*	*	*	*
Two or More Races	7	4%	67	4%
White	106	60%	1015	56%
Female	28	13%	910	50%
English Language Learners	5	2%	72	4%
Students with Disabilities	44	22%	377	19%
Free/Reduced Lunch Eligible	91	49%	906	49%

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

In combined data of the academic years 2018-19 through 2020-21, total enrollment in the manufacturing program was 334 students. White students more represented in the program compared to the overall enrollment, while Hispanic and Latino students of any race participated in the program at a comparable rate as the overall school population. As in 2020-21, a lower rate of female student participation in the program was observed across the three years.

Table 3: Academic Characteristics, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students (n = 334)					Overall School Population (n = 3504)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
Attendance	145.3	160.5	30.3	180	53	145.0	162	33.0	180	0

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

Manufacturing students across cohorts (2018-19 through 2020-21) attended school on average 145.4 days (SD 30.3). This figure is similar to the average overall school attendance, which was 145 days (SD 33).

Table 4: Standardized Assessment, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students (n = 146)					Overall School Population (n = 1,506)				
	Mean	Median	SD	High	Low	Mean	Median	SD	High	Low
English SAT	471.4	485	84.1	610	260	493.6	490	94.5	760	200
Math SAT	470.0	460	86.7	710	310	477.4	470	90.5	780	200

Of the 146 manufacturing program students who took the SAT tests, the average scores were 471.4 (SD 84.1) on the English section and 470 (SD 86.7) on the math section. On average, the manufacturing program students' English and math scores were lower than the overall school population's average scores.

Table 5: Secondary Graduation Rate, Academic Years 2018-2019 through 2020-2021

Metric	Manufacturing Program Students		Overall School Population	
	n=116	%	n=1,918	%
Graduated	97	84%	1,568	82%

Across the manufacturing cohort, 84% of students who were eligible for graduation (i.e., seniors) in all three academic years graduated from Bristol Central High School. The overall school-wide graduation rate for the same years combined was 82%.

Table 6: Postsecondary Enrollment, Academic Years 2018-2019 through 2019-2020

	Manufacturing Students		Overall School Population	
	n=97	%	n=1,568	%
Enrolled in CT Postsecondary Program	22	23%	390	25%
Enrolled in Out of State Postsecondary Program	3	3%	125	8%
No Record of Postsecondary Enrollment	71	74%	1053	67%

In total, 25 students from the manufacturing program entered postsecondary educational institutions, 22 of whom studied in colleges in Connecticut. In the overall school student population, 25% of the students who graduated from high school entered postsecondary programs in Connecticut, and another 8% studied in out-of-state institutions.

Table 7: Postsecondary Enrollment, By Institution Type, Academic Years 2018-2019 through 2019-2020

Institution Type	Manufacturing Students		Overall School Population	
	n=25	%	n=515	%
Overall				
4-Year Institution	15	60%	362	70%
2-Year Institution	10	40%	153	30%
<2-Year Institution	0	0%	0	0%

Out of all manufacturing cohort students who entered the postsecondary educational system, 60% studied in 4-year institutions and 40% were enrolled in 2-year programs, as compared to 70% and 30% respectively for the overall school population.

Table 8: Postsecondary Persistence - Y1 - Y2, Academic Year 2018-2019

	School Population	
	n=515	%
Persistence	139	26.9%

Note: There was not enough data to calculate and report the persistence rate for manufacturing cohort students.

Persistence in postsecondary education was defined as an individual being enrolled in a postsecondary institution in the same year they graduated from high school and being enrolled in two consecutive fall terms in the institution. In the overall school population, the persistence rate was 27%.