

Students With High Needs Show Resilience Through Scaling Transformative Advanced Manufacturing Pathways (STAMP)

Introduction

AUTHORED BY

Sarah Hartwick

*Vice President of Education & Workforce Policy, Illinois Manufacturers' Association
Executive Director, IMA Education Foundation*

In spring 2022, the Illinois Manufacturers' Association (IMA) partnered with Education Systems Center at Northern Illinois University (EdSystems) to launch the Scaling Transformative Advanced Manufacturing Pathways (STAMP) initiative, made possible through grant support from the Illinois Department of Commerce and Economic Opportunity's Job Training and Economic Development program. STAMP seeks to support school districts and their postsecondary partners in aligning manufacturing pathways to Illinois' rigorous College and Career Pathway Endorsement framework, which includes strategic dual credit coursework and high-quality work-based learning. At the same time, STAMP aims to increase the number of students—particularly historically underrepresented learners—participating in manufacturing pathways and matriculating to postsecondary programs and the workforce.

More than 6,000 students in 29 high schools from eight Illinois regions participated in the first round of STAMP (2022–2025). During that time, EdSystems gathered manufacturing pathway enrollment data to better understand student participation demographics and patterns—learnings that will inform the second round of STAMP and the individual region's equity goals. This brief introduces an initial analysis of these data.

Illinois has a strong demand for a robust pipeline of skilled manufacturers. To that end, we must increase access to manufacturing pathways that incorporate

training for in-demand industry credentials. Industry credentials demonstrate a student's readiness for the workforce, ensuring they possess the technical and practical skills needed in modern manufacturing. This helps companies—and our state—remain competitive in a rapidly advancing field. In particular, encouraging underrepresented students to pursue manufacturing pathways and earn industry credentials helps address long-standing disparities in the workforce, provides greater access to high-paying, sustainable careers, and fosters more inclusive economic participation.

Modern manufacturing is an exciting, creative, and technology-driven field—something many students and their families don't realize. Through STAMP, more high school students are touring clean, high-tech workspaces. They're hearing from diverse guest speakers about the breadth of industries and career opportunities. They are getting hands-on through career exploration, team-based challenges, and internships or pre-apprenticeships—discovering that manufacturing requires complex problem-solving, collaboration, and design thinking. They can see how their own interests and gifts align with the industry's demands—and they're clear on how to transition into the field.

The IMA believes that expanding access to these opportunities through STAMP is critical to ensuring a skilled, diverse workforce that can support the future growth and competitiveness of Illinois manufacturing.

STAMP Data Analysis of Industry Credentialing

AUTHORED BY

Rouzbeh Rahai

Analyst of Data and Outcomes, Education Systems Center at Northern Illinois University

Students earning industry-specific skills and credentials while in school are better prepared to enter the workforce and grow in their careers. A recent study by the U.S. Census Bureau found that manufacturing workers with industry credentials earned on average \$2,000 more annually and were more likely to be employed than those seeking similar employment without such credentials (Brown et al. 2022). Moreover, there is ample employment availability; as of May 2024, the manufacturing industry has more than 500,000 unfilled positions nationally (U.S. Bureau of Labor 2024).

Manufacturing skills are a reliable pathway to economic opportunity. As college retention rates have dropped during and after the pandemic, especially for students from historically marginalized racial and economic groups (Howell et al. 2021), and as underemployment among college graduates is nearly 50% on average and greater for underrepresented groups (Strada 2024), industry-specific educational programs offer skills at a low barrier to entry that can help bridge the racial and gender-based economic gap. Yet, are students who face the most significant barriers to opportunity obtaining such skills that can positively shape their economic trajectories? Do persistence and success through skill-based learning programs differ for students in low-income households compared with their more economically stable counterparts?

Since spring 2022, [Scaling Transformative Advanced Manufacturing Pathways](#) (STAMP) has worked in partnership with Illinois school districts and their postsecondary and employer partners to prepare youth for in-demand, living-wage careers. STAMP has a special focus on recruiting and retaining historically marginalized populations, including youth who are Black, Latinx, female, and/or experiencing high economic needs. The focus is on developing high-quality college and career pathways from secondary to postsecondary and careers, which include robust work-based learning and acquiring in-demand industry credentials.

Overall Findings

- **61%** of STAMP students were designated as high needs.
- Learners with high needs were **1.45** times more likely to earn a credential compared to the overall student population.
- Learners with high needs earned **90%** of the total credentials in 2022–2023.
- Of youth with high needs, Latinx students earned **40%** of the credentials, while Black students earned **11%**, and white students earned **27%**.
- Of youth with high needs, Black female students and Latinx female students were **2.1** and **2.09** times more likely to earn a credential compared to the overall student population, respectively.
- 63 young women of color with high needs earned credentials in one year. This group can collectively generate **\$3.4 million** in additional economic return over a 30-year career, which can narrow income disparities in the long term.

Analysis

EdSystems' analysis focuses on a sample of 4,023 STAMP students for which we have complete demographic, school, and enrollment data. Sixty-one percent, or 2,434 students, were classified as having high economic needs¹ while 39%, or 1,589 students, were not classified as high-needs. While STAMP students earned a total of 1,314 credentials² during the 2022–23 school year, students with high needs earned 90% of the total credentials, or 1,188, while students without high needs earned about 10% of the total, or 126 (Table 1). The charts below capture total credentials earned by race and gender.

TABLE 1: Student counts and credentials earned by gender and high needs status

ECONOMIC NEEDS STATUS	GENDER	TOTAL STUDENTS	STUDENTS EARNING INDUSTRY CERTIFICATION	TOTAL INDUSTRY CREDENTIALS EARNED
High Need	Female	413	63	195
High Need	Male	2,021	328	993
Not High Need	Female	169	3	4
Not High Need	Male	1,420	75	122
Total		4,023	469	1,314

¹ High needs includes students classified as low-income by the Illinois State Board of Education, students living or attending school in a qualified census tract (QCT), or living or attending school in a designated zip code (DIA)

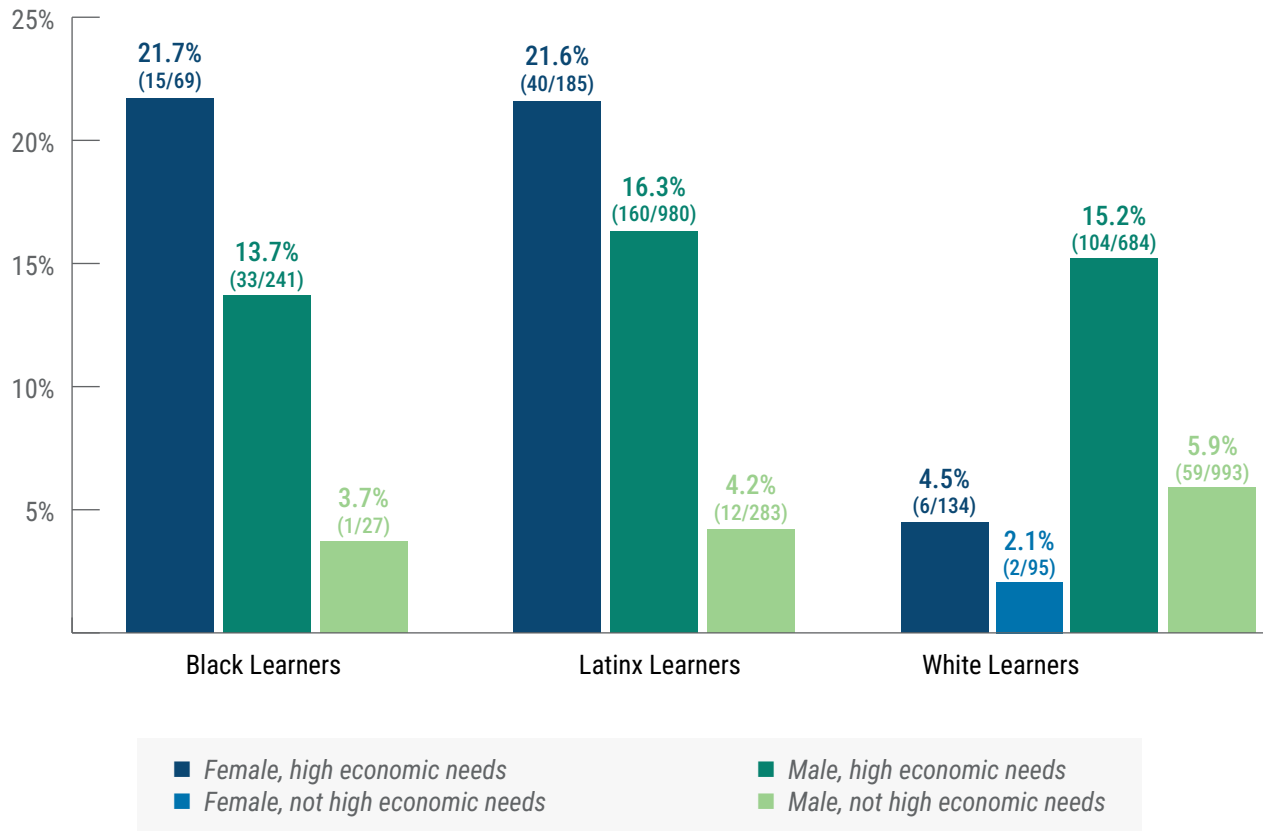
² Students can earn multiple credentials.

Participating High Schools

- Chicago region:
 - Bowen High School, District 299
 - Prosser Career Academy, District 299
- Elgin region:
 - Hampshire High School, CUSD 300
 - Streamwood High School, SD U-46
 - South Elgin High School, SD U-46
- Sauk Valley region:
 - Amboy High School, CUSD 272
 - Ashton-Franklin Center High School, CUSD 275
 - Fulton High School, CUSD 2
 - Rock Falls High School, Township HSD 301
 - Sterling High School, CUSD 5
- Northwest suburban region:
 - Buffalo Grove High School, Township HSD 214
 - Elk Grove High School, Township HSD 214
 - John Hersey High School, Township HSD 214
 - Palatine High School, Township HSD 211
 - Prospect High School, Township HSD 214
- Rolling Meadows High School, Township HSD 214
- Schaumburg High School, Township HSD 211
- Wheeling High School, Township HSD 214
- Peoria region:
 - Manual High School, Peoria SD 150
 - Pekin Community High School, CSD 303
- Quad Cities region:
 - Moline Sr. High School, CUSD 40
 - Rock Island High School, SD 41
 - United High School, Township HSD 30
- Rockford/Belvidere region:
 - Belvidere High School, CUSD 100
 - Belvidere North High School, CUSD 100
 - Jefferson High School, SD 205
- Western suburban region:
 - East Leyden High School, CHSD 212
 - Ridgewood Community High School, CHSD 234
 - West Leyden High School, CHSD 212

Compared with their own race, high needs, and gender groups, students earned credentials at different rates. Twenty-one percent of Black and Latinx females with high needs earned credentials within their groups; comparatively, 4.5% of white females with high needs earned credentials. Black, Latinx, and white males with high needs earned credentials at similar rates (between 13–15%) (Figure 1).

FIGURE 1: Proportion of Students Earning Credentials by Race/Ethnicity,³ Gender, Economic Need



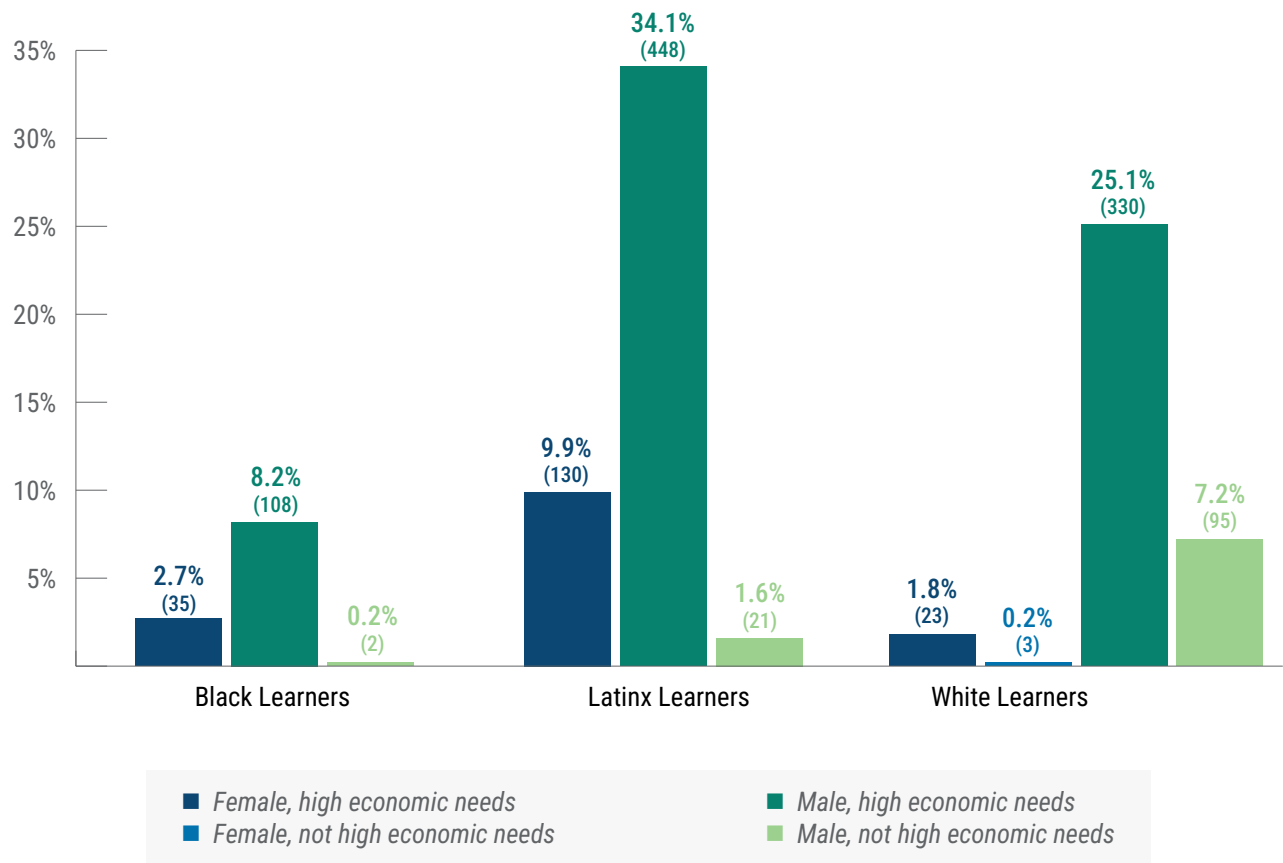
As shown in Table 1, students with high needs are earning the majority of credentials. The proportion of total credentials (1,314) earned differs by race/ethnicity, economic need, and gender groups. Latinx students with high needs earned 40% of the total credentials, Black students with high needs earned 11%, and white students with high needs earned about 27%. Within these groups, female Latinx students with high needs earned 10%, female Black students with high needs earned nearly 3%, and female white students with high needs earned nearly 2% of all credentials (Figure 2).

By analyzing likelihoods, in addition to frequencies, we understand the chances that high-needs groups will earn industry credentials, offering insights into potential correlations. Likelihoods can help reveal where student characteristics are leading to resilience despite facing societal obstacles.

To assess the relative likelihood of earning a credential, we looked at the difference in credential attainment between a specific subgroup and the overall population. For example, in STAMP, 15 Black females with high needs earned at least one credential while 54 did not, giving us a relative attainment rate of about 28% (15/54). For the overall population, including high needs and non high needs, 469 students earned a credential while 3,554 did not, resulting in an attainment rate of about 13% (469/3,554).

³ Focusing on Black, Latinx, white groups as they attained the vast majority of credentials.

FIGURE 2: Proportion of Total Credentials Earned by Race/Ethnicity, Gender, and Economic Need



To compare these rates, we calculate how much higher the attainment rate is for the subgroup compared to the overall population. This comparison shows that Black females with high needs in the program are twice as likely to earn a credential than the overall population (calculated as $15/54$ divided by $469/3554$, which results in 2.1).⁴

The resilience demonstrated by students with high needs helps underscore the significant impact of targeted educational programs that can lead to substantial academic and economic gains for marginalized groups. A conservative estimate suggests that earning a credential boosts earnings by \$2,000 annually (Brown et al. 2022). Over a 30-year career, this would be an additional \$60,000 per student.

STAMP regional teams helped 63 high needs women of color earn credentials in one year. If each of these 63 women earns an additional \$60,000 over a 30-year career, this group can collectively generate nearly \$3.8 million in additional economic return. Collective earnings would become considerably more if the scale reflects multiple years of STAMP. This substantial increase in collective projected earnings is important for narrowing racial income disparities and fostering long-term financial stability for marginalized communities.

⁴ Calculation is based on odds ratios, which is a statistical measure used to quantify likelihoods by analyzing the strength of association between two events. The odds ratio (OR) was calculated to compare the likelihood of earning a credential between high needs student subgroups and the overall student population using the formula: $OR = (A/B) / (C/D)$, where for each race and gender group:

A: The number of students with high needs in a specific race and gender group who earned a credential.

B: The number of students with high needs in the same race and gender group who did not earn a credential.

C: The number of students (across all, high needs and non-high needs) who earned a credential.

D: The number of students (across all, high needs and non-high needs) who did not earn a credential. The overall odds ratio was similarly calculated by comparing the total counts of high needs students who earned and did not earn a credential with the corresponding counts for the total student population.

References

Brown, V., Carrick, G., Jones, M. R., Pharris-Ciurej, N., Voorheis, J., & Walker, C. (2022). The impact of manufacturing credentials on earnings and the probability of employment. Retrieved from [census.gov/ces/wp/2022/CES-WP-22-15.pdf](https://www.census.gov/ces/wp/2022/CES-WP-22-15.pdf).

Howell, J., Hurwitz, M., Ma, J., Pender, M., Perfetto, G., & Wyatt, J. (2021). College enrollment and retention in the era of COVID: Fall 2021 update on continued pandemic impacts. Retrieved from research.collegeboard.org/media/pdf/college-enrollment-retention-pandemic-impact-fall-2021.pdf.

Strada, Burning Glass Institute, & Strada Institute for the Future of Work. (2024). Talent disrupted: Underemployment, college graduates, and the way forward. Retrieved from burning-glass.com/research-project/talent-disrupted-strada/.

U.S. Bureau of Labor Statistics. (2024). Manufacturing: NAICS 31-33. Industries at a glance. Retrieved from [bls.gov/iag/tgs/iag31-33.htm](https://www.bls.gov/iag/tgs/iag31-33.htm).