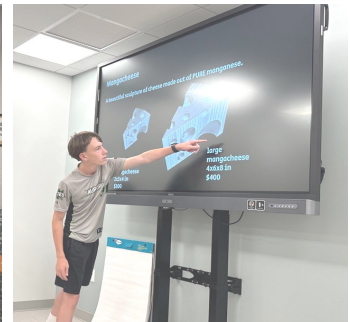


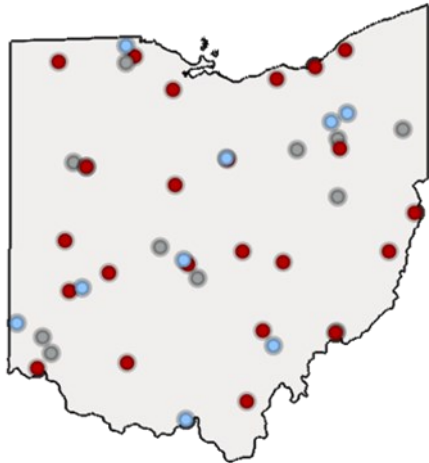
Ohio TechNet Guided Pathways for Youth FlexFactor Community of Practice



OhioTechNet
Celebrating 10 YEARS of Partnership and Innovation in Manufacturing & Tech Workforce

NEXT FLEX
CELEBRATING 10 YEARS OF HYBRID ELECTRONICS LEADERSHIP

OhioTechNet



Vision

The members of the Ohio Technical Skills Innovation Network, or Ohio TechNet, are nationally recognized for developing & implementing collaborative, inclusive, innovative solutions that meet manufacturing and tech workforce needs.

Mission

Ohio TechNet supports workforce development and academic professionals at Ohio educational institutions to incubate, develop and sustain innovative programming that accelerates growth of Ohio's manufacturing & technical workforce.

Purpose

Ohio TechNet partners benefit from peer-to-peer collaboration, technical assistance and access to resources, making program expansion and innovation at their institution more efficient, faster to implement and easier to sustain.

NextFlex®, America's Hybrid Electronics Manufacturing Institute, is a consortium of companies, academic institutions, non-profits, and state, local, and federal governments with a shared goal of advancing U.S. manufacturing of hybrid electronics.



NextFlex Learning Programs is the education arm of NextFlex. Its mission is to support and advance education and workforce development programs and outcomes within NextFlex and its greater U.S. hybrid electronics industrial base. Our vision is to lead the way in cultivating a highly skilled workforce that is prepared to excel in the dynamic fields of advanced manufacturing and hybrid electronics, fostering innovation and growth for US manufacturing.

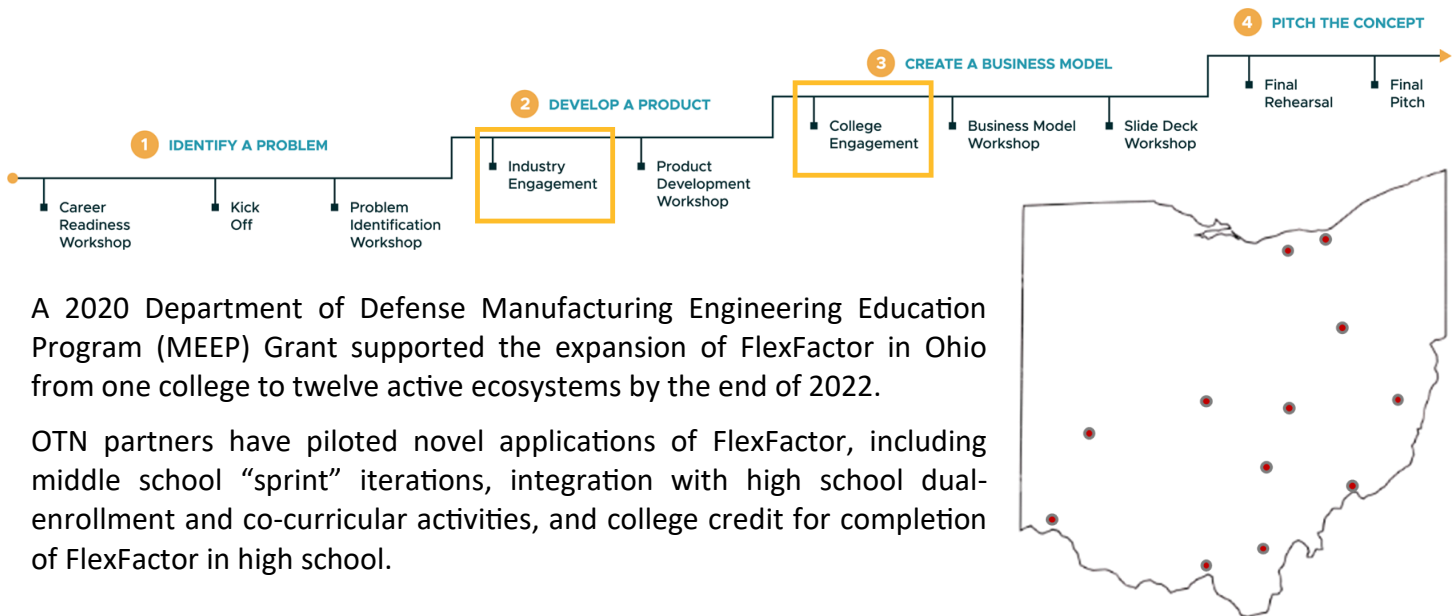
The Ohio TechNet FlexFactor Community of Practice and statewide expansion of guided youth pathways has been made possible by generous investments from the Department of Defense STEM office, through the Manufacturing Engineering Education Program (MEEP) and the National Defense Education Program (NDEP) Regional Community College Consortium.



Informing, Inspiring, Attracting, and Recruiting the Future of Advanced Manufacturing

FlexFactor is an outreach, recruitment, and STEM education program designed to familiarize K-12 students with advanced manufacturing technology, entrepreneurship, and the education and career pathways that can lead to a STEM career. Layered over an existing K-12 class, the program showcases the promise of these careers and helps students develop the critical thinking, creative reasoning, and problem-solving skills needed for future success. FlexFactor connects a wide range of stakeholders in the advanced manufacturing sector to help illuminate career opportunities in the field and orient students to the educational pathways that can lead them to those careers.

FlexFactor is coordinated and managed by a designated Program Manager who synchronizes activities across all relevant stakeholders in an ecosystem including K-12 schools, colleges and universities, and industry partners.



A 2020 Department of Defense Manufacturing Engineering Education Program (MEEP) Grant supported the expansion of FlexFactor in Ohio from one college to twelve active ecosystems by the end of 2022.

OTN partners have piloted novel applications of FlexFactor, including middle school “sprint” iterations, integration with high school dual-enrollment and co-curricular activities, and college credit for completion of FlexFactor in high school.

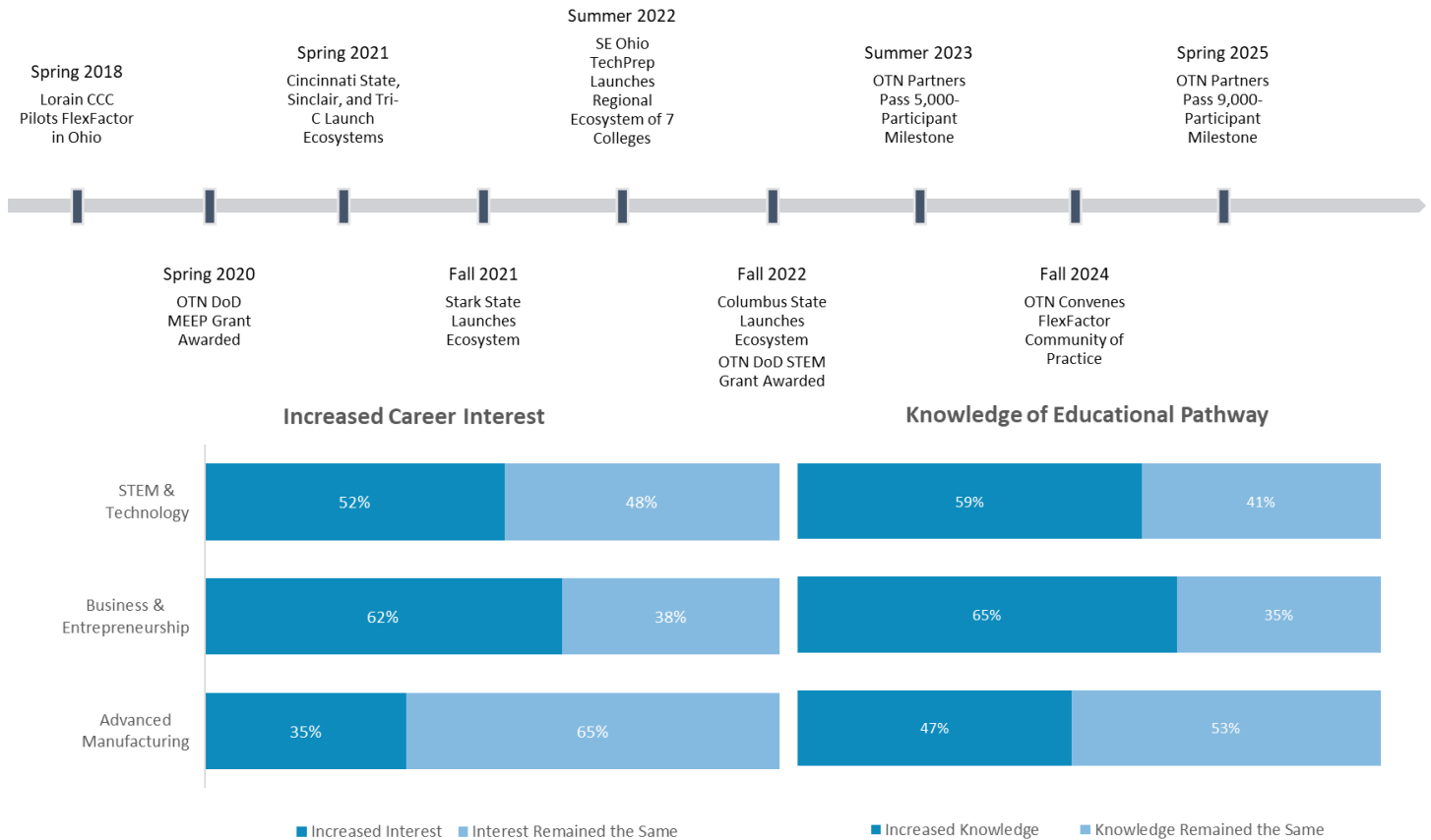


Gabriel Degler’s interest in robotics and engineering inspired him to enroll in an advanced engineering systems class during his junior year of high school, where he participated in FlexFactor. Gabriel enjoyed brainstorming solutions to identified problems and conceptualizing a hardware product enabled by hybrid electronics with his small team. During the competition, they presented a pitch to a panel of representatives from business, technology, and academia, with his team moving on to the regional competition at Sinclair Community College.

The following year, he was invited to speak at the FlexFactor competition, where he met a representative from Yaskawa Motoman, a manufacturer of industrial robots. Through this networking opportunity he was able to apply and be hired for a position building robotics and programming.

Gabriel now works as an Automation Technician at Yaskawa Motoman, after completing on-the-job training building on his high school work toward certifications. He credits his experience in FlexFactor for exposing him to new experiences and broadening his prospects.

FlexFactor in Ohio—Seven Years of Collaborative Impact



Increased interest among Ohio FlexFactor students in careers and knowledge of educational pathways leading to careers in STEM & Technology, Business & Entrepreneurship, and Advanced Manufacturing

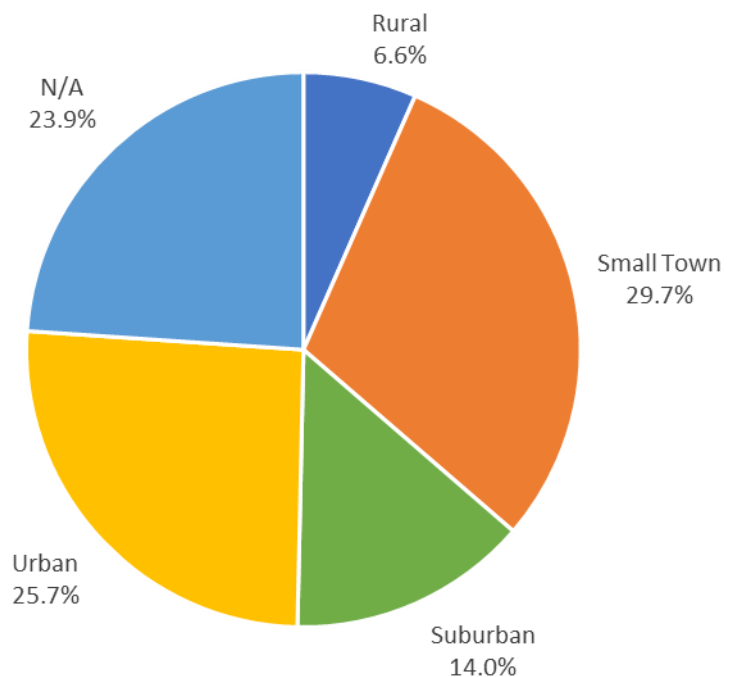
Since 2018

10,224
Participants

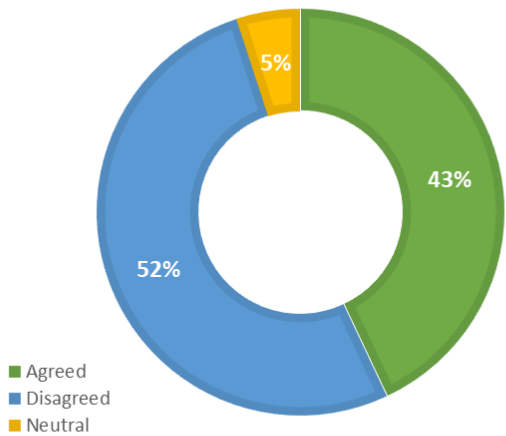
123
Industry Partners
and Stakeholders

520
Iterations

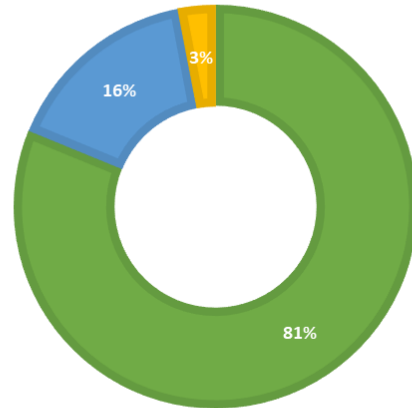
Share of Ohio FlexFactor Students by K12 District Community Profile



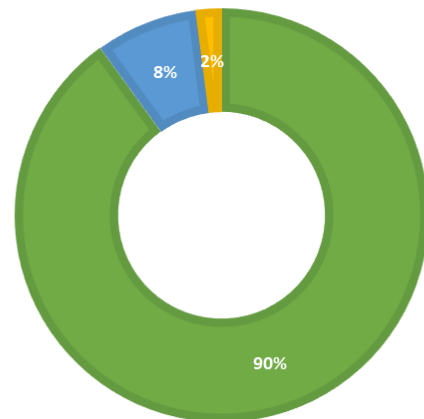
MORE LIKELY TO ATTEND THE FLEXFACTOR
LEAD COLLEGE



MORE AWARE OF CAREER OPPORTUNITIES IN THE
STEM AND ADVANCED MANUFACTURING SECTOR



DEVELOPED SKILLS THAT PREPARED ME TO BE A
BETTER STUDENT OR PROFESSIONAL



8% of Ohio FlexFactor students are military-connected, compared to 1% of all K-12 students in Ohio

Lorain County Community College's Bridges to Success program helps high school seniors decide what is next after graduation, and build an action plan. The 2021-2022 academic year pilot program introduced more than 20 Avon High School students to career pathways leading to industry recognized credentials and in-demand careers in advanced manufacturing, computer and information technology, healthcare, and business and entrepreneurship.

Vince Ventresco says his experience in Bridges to Success introduced him to LCCC and confirmed the college would be part of his next step. "It was a no-brainer for me. The Bridges to Success Program really showed us all the majors and pathways in the school. I picked the MEMS [Micro Electromechanical Systems] program - I would say that was due to the FlexFactor program." After graduating from high school, Vince enrolled in the MEMS Associate's Degree. After spending the summer of 2024 with five other LCCC students interning for Intel Corporation, Vince is now working to complete his Bachelor of Applied Science in Microelectronic Manufacturing.



2025 FlexFactor Program Manager Listening Sessions

GOAL OF LISTENING SESSIONS:

- **Increasing K-12 School Participation**
 - **Short-term Goal:** Immediate action steps to enhance participation and engagement.
 - **Long-term Goal:** Strategies for continued growth and success of workforce accessibility. Identifying innovative workforce solutions and understanding the needs and contributions of an alternate workforce, including underrepresented or emerging demographic groups.
- **Exploring Current Key Stakeholders**
 - Identifying your current list of key stakeholders.

RESULTS:

- Key takeaways include the importance of integrating targeted programs like CCP classes and bootcamps, addressing funding and staffing gaps, and leveraging tools like STEM kits to better engage students. While the program excels in relationship-building and offering versatile approaches to education and career readiness, structural challenges such as limited institutional funding, tracking outcomes, and gaining administrative buy-in persist.

RECOMMENDATIONS: Develop a Strategic Action Plan

- **Prioritize Challenges:**
 - Seek grants or institutional funding to address resource gaps.
 - Organize training sessions for educators to improve classroom engagement.
- **Set Goals & Present Findings:** Create measurable objectives, such as increasing CCP integration by X% or launching new bootcamps in Y months.

RECOMMENDATIONS: Marketing and Communication

- **Parental, Educator and Community Outreach:** Emphasize the benefits of the program through newsletters, presentations, and community events. Use success stories and testimonials to attract more schools, teachers, and students to the program.
- **Social Media:** Create content and posts for the Program Managers to share on social media. Examples can be Share visuals of hands-on STEM activities, bootcamps, and student success stories to boost program awareness.
- **Utilize Mentorship with Internal Strengths of Project Managers:**
 - *Relationship Builders, SME in sprints for recruitment, classroom experience through a teacher's training, data collecting, matriculation best practices of high school students to the community college, CCP to Tech Seal and workforce transportation strategies.*



Case Study: Sinclair Community College – FlexFactor as a Recruitment Tool

Sinclair Community College, located in Dayton, Ohio, partnered with several school districts in and around its service area to implement the FlexFactor program for students across southwest Ohio. A primary objective of this initiative was to increase student matriculation into Sinclair Community College. To achieve this, the FlexFactor program coordinator and project team collaborated with the college’s Institutional Research department to track students from program enrollment through post-graduation, assessing their decisions regarding postsecondary education.

This case study presents data for students from the 2022 and 2023 graduation cohorts who participated in FlexFactor, tracking their matriculation into Sinclair Community College one year after completing the program. These results are compared to a historical cohort of students from the same high schools who graduated before the implementation of FlexFactor. This analysis includes aggregate data from the following schools and courses:

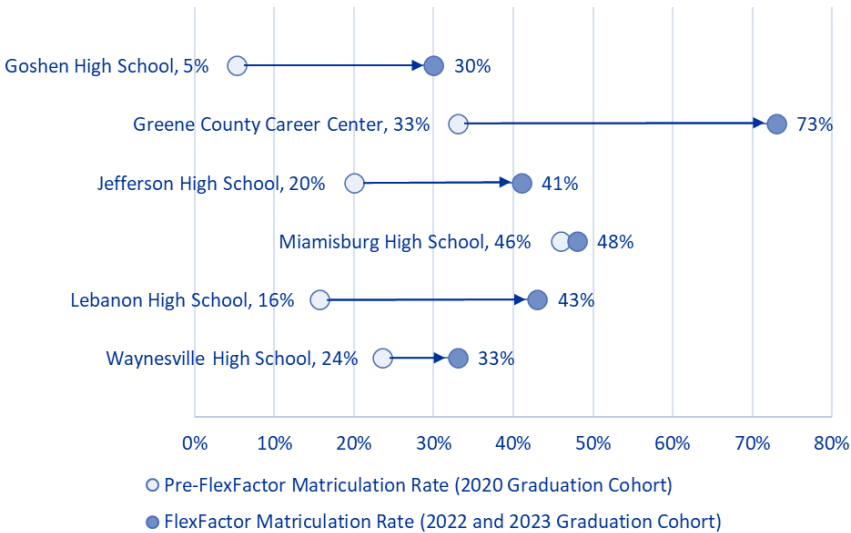
The accompanying graph demonstrates that all six schools experienced improved direct-entry matriculation rates to Sinclair Community College following exposure to FlexFactor, with an average matriculation rate of 46%. This represents a **23-percentage point increase** compared to the 2020 graduating cohort's average matriculation rate of 24% pre-FlexFactor. The most significant improvement was observed at Greene County Career Center, where the matriculation rate increased from 33% pre-FlexFactor to 73% among FlexFactor students.

While pinpointing the exact causes of this increase is challenging, several contributing factors may have influenced students' decisions to enroll at Sinclair Community College after graduation:

- **College Credit:** Sinclair has established a process allowing students to earn college credit upon completing the FlexFactor program. This early start on their college education may incentivize students to continue their academic journey at Sinclair.
- **College Awareness:** The FlexFactor model includes an Education Day, where students visit the college and familiarize themselves with the institution. This experience may enhance students' awareness of Sinclair as a viable postsecondary option.
- **Program Awareness:** FlexFactor highlights the importance of STEM and advanced manufacturing careers. Over the course of the program, students gain greater awareness of the manufacturing-related educational pathways offered at Sinclair and the well-paying job opportunities available in these fields.

School	Course
Goshen High School	Engineering
Greene County Career Center	Engineering
Jefferson High School	Sociology/Elective
Miamisburg High School	Careers
Lebanon High School	College & Career Exploration
Waynesville High School	Careers

Changes in Matriculation Rates, Pre- and Post-FlexFactor



Aggregate data was collected from the following schools: Shawnee High School; Goshen High School; Green County Career Center; Xenia High School; Piqua High School; Jefferson High School; Miamisburg High School; Lebanon High School; and Waynesville High School. Through numerous conversations with the FlexFactor program coordinator, it was determined that only Goshen High School, Greene County Career Center, Jefferson High School, Miamisburg High School, Lebanon High School, and Waynesville High School would be considered for the analysis. Shawnee High School and Piqua High School are located closer to different community colleges, skewing community college awareness and recruitment results. Early Xenia High School FlexFactor implementation was slow due to a new teacher and new school involvement and was considered not representative of the Sinclair FlexFactor process.

Case Study — Lorain County CC: College Credit, Persistence, and FlexFactor

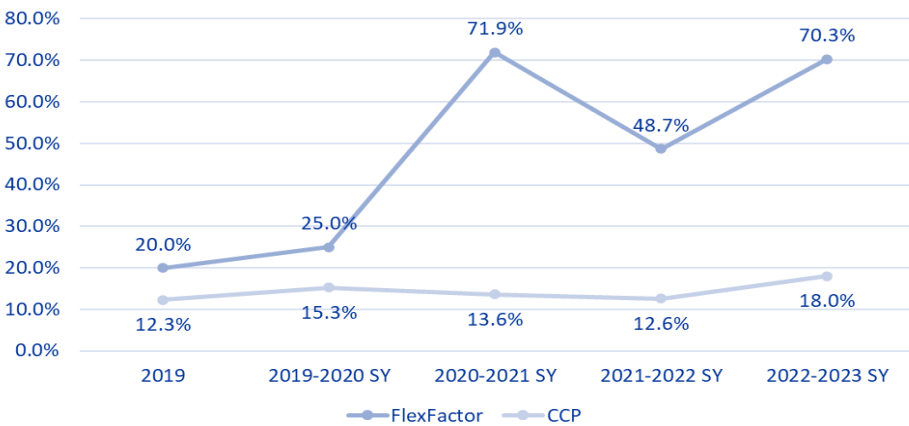
Since the 2019-2020 School Year, Lorain County Community College (LCCC) has successfully implemented the FlexFactor in Northeast Ohio, particularly (though not exclusively) within classes offering College Credit Plus (CCP). Through CCP, high school students can earn college credit while still in high school, with subsequent academic progress tracked through the college’s student information system and the National Student Clearinghouse. This case study summarizes data for FlexFactor students from 2019-2020 School Year (SY) through the 2022-2023 SY, including college credit earned while still in high school, post-secondary matriculation, program declaration, and course completion.

The first graph compares the completion rates of LCCC’s College Success course—a foundational class designed for students planning to pursue higher education—between FlexFactor participants and the broader CCP student population. Notably, FlexFactor students demonstrated a significantly higher completion rate, peaking at 71.9% in the 2021 school year, compared to just 13.6% among the general CCP student body. This suggests that participation in FlexFactor not only enhances students’ readiness for college but also motivates them to take crucial preparatory steps while still in high school.

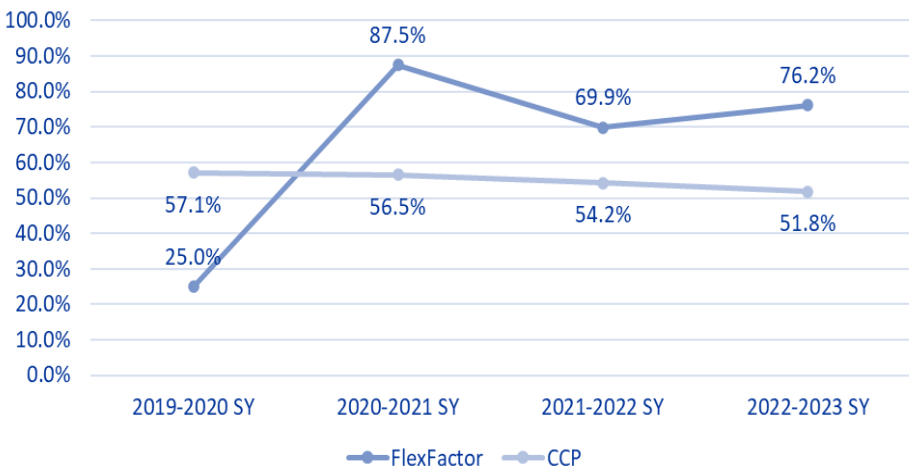
The second graph highlights the success of FlexFactor students in earning at least 12 college credits before graduating from high school, compared to their CCP peers. Except for a slight dip in the 2020 school year, FlexFactor participants consistently outperformed the general CCP population in credit accumulation, reaching a high of 87.5% in 2021.

Post-graduation, a significant proportion of FlexFactor participants continued their educational journey, with 26% enrolling at LCCC and 34% attending other institutions, predominantly Ohio public universities. This enrollment rate is on par with the overall high school graduate population tracked by LCCC’s Institutional Research. FlexFactor students pursued a wide array of majors, with notable interest in Business, Nursing, Biology, Sport & Fitness Management, Marketing, Finance, Computer Science, Criminal Justice, Engineering, and Entrepreneurship. Interestingly, FlexFactor participants showed a stronger tendency to major in Entrepreneurship and Marketing, aligned to the program’s “shark tank” pitch component, and to many of the courses in which FlexFactor was offered.

College Success Course Completion While Enrolled in High School, FlexFactor & CCP



Share of Students Earning 12 or More College Credits While in High School, FlexFactor & CCP



FlexFactor also made LCCC an attractive option for students who were undecided about their academic focus. Of the 70 postsecondary students who initially declared a General or Interdisciplinary Studies major, 60 (86%) chose to enroll at LCCC. This may have been due to the Education Day components of FlexFactor. Moreover, some FlexFactor participants showed an inclination towards manufacturing-related programs, with several students enrolling in fields such as Electronic Engineering Technology, Automation Engineering Technology, Manufacturing Engineering Technology, and Micro Electromechanical Systems (MEMS).

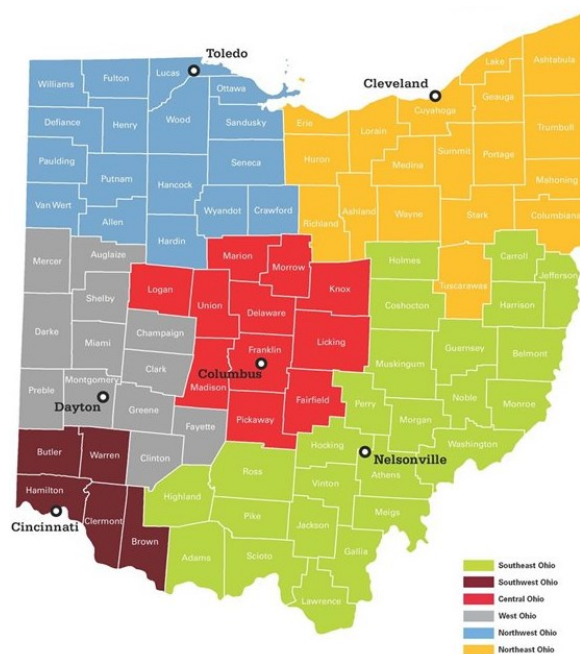
Within the first year post-high school, 21 former FlexFactor students took manufacturing-related courses at LCCC, with 13 enrolling in Technical Problem Solving, 8 in Computer-Aided Design, 8 in Digital Fabrication, and 8 in Electronics. This trend underscores the program's role in guiding students toward technical and engineering pathways.

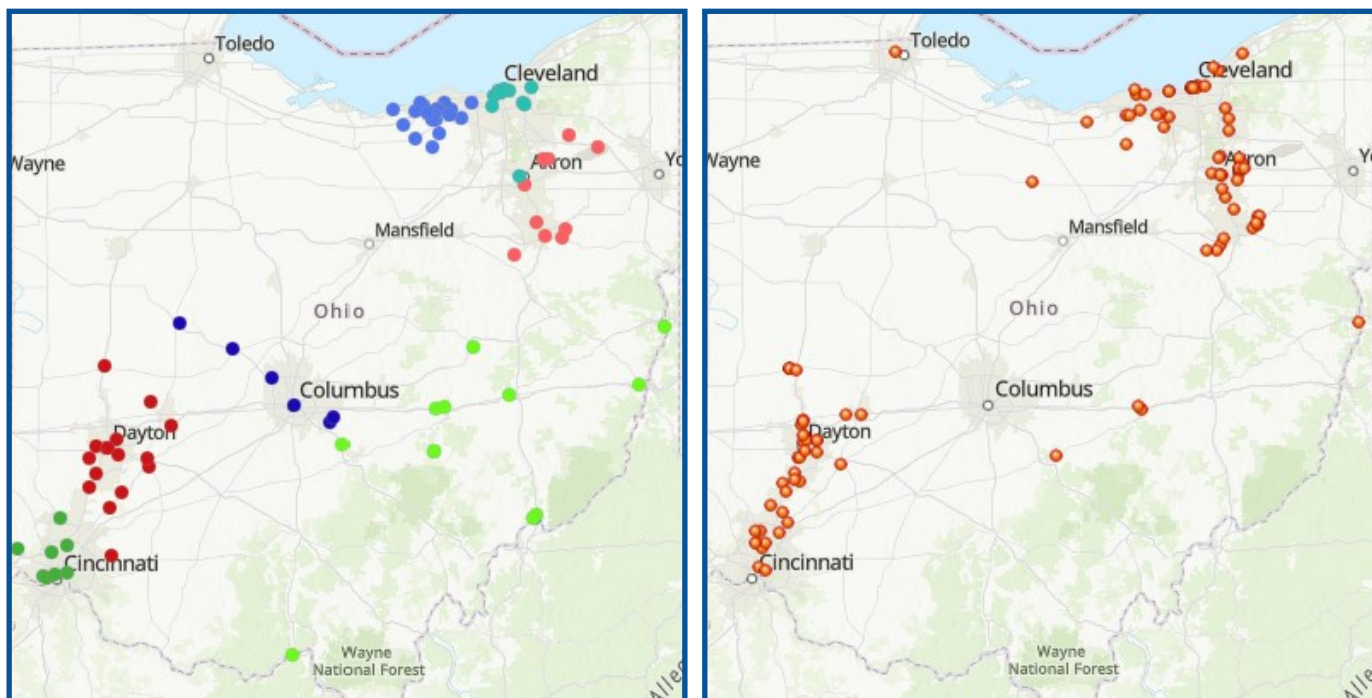
LCCC is committed to refining its tracking and evaluation processes to better understand the long-term impact of FlexFactor on student outcomes. The college is actively exploring opportunities to enhance its longitudinal studies by leveraging statewide and national resources, including the National Student Clearinghouse, Ohio Department of Job and Family Services, and the Ohio Department of Education and Workforce.

Case Study — Southeast Ohio TechPrep: Novel Program Implementation Models

Beginning in 2022, seven community colleges in Southeast Ohio obtained FlexFactor licenses with support from the Ohio TechNet Manufacturing Engineering Education Program (MEEP) grant. Implementation of FlexFactor in the region was designed to leverage six Tech Prep coordinators representing those seven colleges—Belmont College, Eastern Gateway Community College (closed in 2024), Hocking College, Rio Grande Community College, Shawnee State University, Washington State College of Ohio, and Zane State College—were trained as FlexFactor Program Managers and leveraged connections to industry and K-12 districts to rapidly stand up a collaborative regional FlexFactor ecosystem. Ohio Tech Prep is an integrated pathway of education and experience that starts in high school, continues through postsecondary, and leads to success in the chosen technical career field. Six Ohio Tech Prep Regional Centers serve as the liaison to Ohio's 91 career-technical planning districts, 22 community colleges and 14 universities to ensure high-quality career-technical education programs for students. The Regional Centers work with their education partners to increase student access to quality career-technical education pathways that provide opportunities to earn college credit while in high school.

With pilot FlexFactor iterations delivered in Summer 2022, SE OH Tech Prep PMs made innovative strides in utilizing the FlexFactor Sprint modality to reach younger student populations and integrate FlexFactor into other events or programming. Zane State College ran a Sprint during student visit days to the college campus, and Shawnee State wove the program into its Bear Trax Summer Camp for middle and high school students. This regional roll-out was not without challenges. It became evident that the demands of FlexFactor program management and delivery in addition to their typical job responsibilities strained the capacity of Tech Prep coordinators. Additionally, the unique geography and lower population density of Southeast/Appalachian Ohio pose logistical challenges to a region-wide effort. Lessons learned from this pilot will inform future programming, including more strategic leveraging of the Tech Prep Regional Center coordinators to facilitate outreach to K-12, post-secondary, and career-technical planning district education partners as well as industry, in support of but not synonymous with FlexFactor program delivery.





OTN partner FlexFactor delivery sites (left) and employer partner / industry stakeholders (right), June 2020—September 2024

Licensed Ohio FlexFactor Lead Partners



This material is based upon work supported by the National Defense Education Program (NDEP) for Science, Technology, Engineering, and Mathematics (STEM) Education, Outreach, and Workforce Initiative Programs under Grant No. HQ00342220007. The views expressed in written materials or publications, and/or made by speakers, moderators, and presenters, do not necessarily reflect the official policies of the Department of Defense nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

This work relates to Department of Navy award Grant Award N00014-20-1-2703 issued by the Office of Naval Research. The United States Government has a royalty-free license throughout the world in all copyrightable