Toledo Talent Alignment Strategy

Report 2: Supply-Demand Gap Analysis

January 2019

CAEL avalanche

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01 Introduction

About the Toledo Talent Alignment Strategy

The Toledo Regional Chamber is championing the Toledo Talent Alignment Strategy in partnership with the Lucas County Workforce Development Board. The purpose of this Strategy is to ensure education and workforce development efforts are aligned with the needs of employers and to coordinate existing education and workforce development initiatives currently underway throughout the region. Ultimately, the project aims to create the next generation workforce that the Toledo region will need to propel its economy forward.

The strategic planning process is an initiative from the Toledo Regional Chamber of Commerce, with engagement from key funding partners.

CAEL and Avalanche Consulting were engaged to facilitate and prepare the Strategy, to include the following:

Report 1: Talent Analysis will determine the makeup of the region's labor force and identify the industries and occupations that are thriving. This report serves to construct a baseline analysis of the Toledo Region's demographics and an analysis of the trends in the workforce and education infrastructure pipeline, including the supply of graduates' in the Toledo region.

Report 2: Supply-Demand Gap Analysis will identify what skills the workforce currently has, what skills employers need, and how to fill in gaps in the workforce pipeline. This report will review the growing industry and occupation clusters and provide a comprehensive inventory of all education and training assets in the region. Using this inventory, this report will include a supply, demand and program gap analysis as it relates to gaps in humans and educational programs.

Report 3: Talent Alignment Strategy will provide recommendations on how to align and improve the region's talent pipeline. The strategy will include high level goals for developing, retaining, and attracting talent within the region. These goals will include several strategy recommendations for action, tactics to be deployed across the region and talent development systems, as well as a high level implementation plan to guide strategic activity.

Supplement Research Reports will include a Labor Shed Analysis of commuter impacts on available workforce and Occupational Profiles with line-item data on employment, forecasted jobs, and wage levels for individual occupations in target clusters.

Stakeholder Input will take place throughout this process. Focus groups and interviews will be facilitated with stakeholders in the region. A Steering Committee consisting of industry, education, and workforce leaders from throughout the Toledo Region will serve as advisors to the project.

Project Partners and Funders

The Toledo Regional Chamber is championing the Toledo Talent Alignment Strategy in partnership with the Lucas County Workforce Development Board. The project was facilitated and developed by CAEL and Avalanche Consulting, Inc.

Toledo Regional Chamber of Commerce

The Toledo Regional Chamber of Commerce, serving a membership of over 2,300 businesses, fosters economic growth and prosperity in the Toledo Region by ADVOCATING for a thriving business environment, LEADING the charge to attract and retain talent in the region and CONNECTING business with resources and opportunities for growth. Our member businesses range in size from small, one-person, operations to large corporations employing thousands. The membership is supported by the Chamber's certified and professional staff, which carries out the organization's initiatives. A volunteer Board of Trustees, representing a cross-section of the business community, guides these initiatives which are determined by our 2019-2021 Strategic Plan.

Lucas County Workforce Development Board

Delivers innovative workforce solutions to businesses and job seekers to accelerate regional economic growth and individual prosperity. Their vision is to create a region with economic prosperity through a diverse, trained, career-ready workforce that addresses the current and future needs of individuals and businesses.

City of Toledo

The City of Toledo is located in the county seat of Lucas County, Ohio at the western end of Lake Erie, bordering the state of Michigan. The first of many glass manufacturers arrived in the 1880s, earning Toledo its nickname as The Glass City.

Toledo Community Foundation

The Community Foundation serve the Toledo region, including Northwest Ohio and southeast Michigan. Since 1973, the Foundation has worked with individuals, families, and businesses and assisted them in making effective choices that match their philanthropic interest and needs while creating a better community for generations to come.

Wood County Economic Development Commission

In 1993, private sector business leaders approached the Wood County Commissioners with the idea of a public/private partnership to grow the tax base and employment of Wood County. The WCEDC takes the message of the County onto the worldwide stage through participation in Trade Missions and other events.

Project Partners and Funders

The University of Toledo

The University of Toledo is a student-centered, public metropolitan research university with 20,500 students. Established in 1872, the University has the third-largest public university operating budget in the state and is accredited by the Higher Learning Commission.

Bowling Green State University

Bowling Green State University is one of the top public universities nationwide with a strong commitment to first-year programs that lead to success. Founded in 1910, the university enrolls just over 19,000 students and provides experiences that enhances lives and prepares students for lifelong career growth.

Toledo Lucas County Port Authority

The Port Authority's business focuses on transportation and development. The business is shaped by the Port Authority's mission to move people and cargo through the region while employing innovative programs to stimulate development in the region.

Fulton County Economic Development Corporation

The Fulton County Economic Corporation works with companies of any size and in various industries to support their efforts to grow, invest, and hire in Fulton County. Their teams work in Business Development, Community Outreach and Workforce Development and Education.

Penta Career Center

Penta Career Center is a Career and Technical Education (CTE) school that provides industry-recognized certifications to high school students and adults. Penta provides courses a total of 16 school districts across the northwest Ohio region.

Technical Team

CAEL (Council for Adult and Experiential Learning)

CAEL is a national, non-profit organization whose mission is to put meaningful learning, credentials and work within reach for every community. Since its founding in 1974, CAEL has been providing colleges and universities, companies, economic development organizations, labor organizations, and state and local governments with the tools and strategies they need for creating practical and effective lifelong learning solutions to address long-term skills needs.

Avalanche Consulting, Inc.

Avalanche Consulting is the nation's premier economic development strategist. Avalanche is deeply driven to make a positive impact and seek clients who are equally inspired to energize their economies. Headquartered in Austin, Avalanche was established in 2005 and its team has a combined 80+ years of experience working with more than 150 cities, counties, and regions across the country.

Steering Committee Members

The Toledo Talent Alignment Strategy project partners and consulting team sincerely thank the members of Toledo Talent's Steering Committee for helping inform and guide the development of this strategy. Members include:

Dr. Cecelia Adams, City of Toledo
Deborah Bubp, Hylant
Keith Burwell, Toledo Community Foundation
Lena Ciminillo, The Andersons, Inc.
Catherine Crosby, City of Toledo
Rashad Delph, Dana, Inc.
Andrea Domachowski, Lourdes University
Dr. Romules Durant, Toledo Public Schools
Ed Ewers, Penta Career Center
Martha Gebers, Wood County/Sauder Woodworking
Wade Gottshalk, Wood County
Wendy Gramza, Toledo Regional Chamber of Commerce
Andrea Gurscik, First Solar
Stacy Hammer, Manpower
Cindy Hurst, Lourdes University
Amy Kelley, Libbey Glass
Nicole Langenderfer, ProMedica
Joe Luzar, Lucas County Workforce Development Board
Ron Matter, Penta Career Center
Diane Miller, University of Toledo
Russell Mills, Bowling Green State University
Pam Mohler, Associated General Contractors
Angela Nowak, Mercy Hospitals
Timothy Richissin, SSOE
Carolyn Rodenhauser, Regional Growth Partnership/JobsOhio
Tonia Saunders, Lucas County Workforce Development Board
Jeff Schaaf, Toledo Regional Chamber of Commerce
Adam Schlatter, O-I
Denise Smith, Owens Community College
Steven Stockdale, Buckeye Broadband
Paul Toth, Toledo Lucas County Port Authority
Michael Veh, Lucas County
Courtney Wagner, Owens Corning
Tom Walsh, Toledo Regional Chamber of Commerce
Jennifer Wuertz, SSOE
Sarah Zibbel, Libbey Glass

About the Supply-Demand Gap Analysis

This report, the Supply-Demand Gap Analysis, shows how well labor demand (local job postings) in the Toledo region is served by the output of local post-secondary graduates (degree completions). In this analysis, we identify occupations with current and future potential shortages – or at least those where the supply of local graduates is insufficient to meet projected employer needs. Unless existing trends are reversed, these occupations will require the attraction of labor from other parts of the multi-state region and the US. Each occupation group is described in terms of being in balance with graduate output, over-supplying the market, or under-supplying.

Occupations are organized according to their competency, or focus area, that often aligns with specific target industries (i.e. a Production competency serves the Advanced Manufacturing industry). Demand is measured by the forecasted job openings in occupations due to new job creation and replacement needs due to workers retiring or exiting a specific occupation. Supply is measured by the output of graduates from training providers and colleges. While local graduates are not the only source for new workers, graduates are a significant source of new workers and one that can be directly affected through local economic and workforce development programs.

Within the Supply-Demand Gap Analysis, we include an Education Infrastructure Assessment. This analysis provides a regional 50k foot overview of the education and training that is aligned to key growth sectors and available regionally. More information on this methodology can be found in the next section of this report.

Why is this analysis important?

This analysis is important in understanding the current makeup of the region's graduate output and how directly it is responding to the labor market demand in the Toledo region. As it relates to talent retention, it is crucial to understand whether or not available programming and graduates produced are in line with the type of talent that the local labor market is demanding.

How can you use this information?

This information can be used to educate and inform a wide variety of audiences, detailed below:

- For Economic Developers: Provides a greater understanding of regional education and training to support current and new businesses
- For Education & Training Stakeholders: To drive program expansion and coordination
- For Higher Education: To use as guidance for program creation and alignment
- For Workforce Development: Provides a regional picture on postsecondary credential offerings/institutions and programs to include on the Eligible Training Provider List
- For Funders/Partners: Provides a regional overview on the system to make better connections on funded initiatives
- For Employers: To drive recruitment, retention, and attraction of talent locally

02 Data Analysis

About the Data Analysis & Methodology

The first step to determine the needs of the Toledo Region's future workforce is to understand the condition of the current workforce. To get a full picture of the workforce flows in and out of the Toledo region, this analysis includes the Toledo metro counties of Fulton, Lucas, and Wood as well as the surrounding counties identified in the map below. To illustrate how well each of your industries of focus are being served, the consulting team conducted ten focus groups (~ 60 participants) and 15 individual stakeholder interviews with representatives from workforce and economic development, higher education & training, and employers. This data enables us to better understand how to capitalize on the strengths of the current workforce, and how to best address areas of future need. More detail on the methodology and sources are included on the following pages.

Supply & Demand Gap Analysis includes:

- An analysis of educational institution graduate output as it relates to regional job demand in the region based on institutional completions and annual job openings
- An overview of occupations by industry that are experiencing severe shortages, shortages, in balance, and are in surplus
- An in-depth analysis of the number of programs in each industry by institution type and focus area

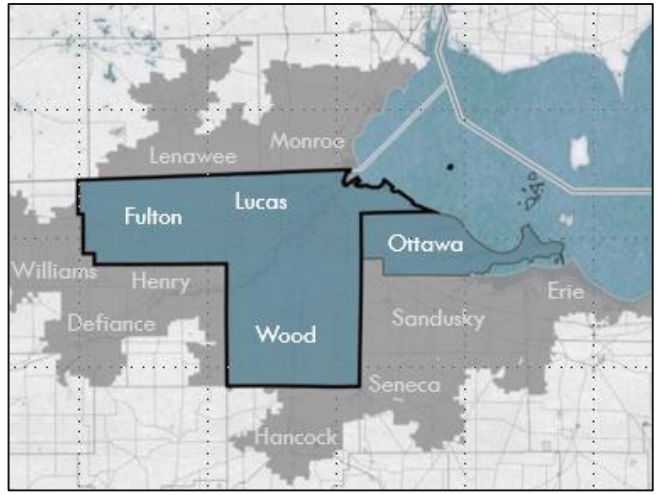
Education Infrastructure Analysis includes:

- Provides an in-depth analysis of 1,217 education programs for the 4 industries of focus in the Toledo region
- Programs by institution type – public, private, 2-year, 4 year, vocational, K-12 district, and for-profit institutions
- Programs by institution and credential (or focus area) level – Certificate, Associates, Bachelors, Masters, etc.
- Proportion of programs by Credential Level (or focus area)
  Number of programs by industry and credential (focus area)

Industries of Focus

The following industries were determined based on high job demand and prevalence in the Toledo region. The graphic below details the specific sub-sectors within each industry. The report digs in-depth within each of these industries to identify supply and demand gaps for occupations within these industries.

Defining Region for the Analysis



In the analysis, data will cover the Toledo metro region including Lucas, Fulton, Ottawa, and Wood as well as the surrounding labor shed counties of Sandusky, Lenawee, Hancock, and Monroe, Michigan.

Gap Data Methodology and Sources

Avalanche has developed a process to analyze the future pipeline of workers and college students in a way similar to industry cluster analysis. We have built and manage the entire database of post-secondary credential completions for 7,500 educational institutions in the US. Data is maintained from 2000-2016, the latest year of complete, finalized data. This data is collected by the US Department of Education as part of its IPEDS program (Integrated Postsecondary Education Data System). Each institution is required to submit their completions data to their state education agency, which packages the data and submits it to the US Department of Education for final analysis and publication. To complete the gap analysis, we match demand back to the supply of post-secondary graduates in related fields. Matching a post-secondary credential to a specific occupation can sometimes prove difficult. Some broad degrees in Liberal Arts could serve any number of competencies, such as Education or Business, for example. Technical degrees are easier to link to specific occupations (e.g., linking Mechanical Engineering degrees with the Mechanical Engineering occupation). We have designed our taxonomies to maximize the overlap between supply and demand.

Like the NAICS coding system, there are thousands of codes used for degree majors. To bridge degree codes (CIP) to occupation codes (SOC), Avalanche creates smaller skills groups of usually 2-5 occupations and 4-5 degrees. Unlike other supply-demand taxonomies in use today, our taxonomy extends to matching degrees and occupations at each education level (Certificates, Associates, Bachelor's, Master's and PhD). This prevents matching a Bachelor's graduate in Psychology, for example, with any mental health occupations, which require at least a Master's degree to get licensed to work. The example below shows the data that are used in the gap calculations:

Balance
The colored bar in the chart measures the supply-demand "gap." The gap is the **ratio** of college graduates versus average job demand. A higher percentage indicates more college graduates per job.

Severe Shortage | **Shortage** | **In Balance** | **Surplus**

Completions
Local degree output corresponding to the occupation group. Degree classifications typically include 2-5 degree codes by award level.

Gap	Occupation Group	Education Level	Annual Job Openings	Local Output		
				Completions	Gap	% of Jobs
	Dental Assistants	Certificate	78	100	-22	128%

Occupation Group
A classification typically consisting of 2-3 occupations

Education Level
(Certificate, Associate's, Bachelor's, etc.)

Annual Job Openings
Demand forecast is the annual average "New & Replacement Jobs" each year from 2017-2022. "New & Replacement" jobs include the net new jobs forecast for that occupation plus the average replacement jobs created due to retirements and persons exiting the field.

Gap
The absolute difference in **volume** between colleges gradates and available jobs. A negative number indicates that there are more available jobs than college graduates

Gap Data Methodology, cont'd

Detail on how each occupational cluster was assessed per graduate production included below.

Severe Shortage	Shortage	In Balance	Surplus	Unknown
<20%	20<80%	100-150%	>150%	Insufficient Data
<20% of job demand is met by the local supply of graduates.		100-150% of job demand is met by graduate supply. But, since the Toledo region does not retain its Millennial graduates, an upper threshold of 150% is used to indicate over-supply.		A gap condition is "unknown" when the output of local graduates is hard to determine to due lack of data, usually for non-credit programs or for-profit education providers, which are not required to submit their data to the US Department of Education. Unknowns are usually indicated for short-term certificates such as Home Health Aides or Office Management certificates.

Education Infrastructure Data:
In addition to the Gap Data analysis a full review of all education and training offered within the region was included to provide a full understanding of the Education system programming (secondary and post-secondary programs) which support skill development for the four Industries of Focus (Advanced Manufacturing, Healthcare, Professional Services & Back Office and Transportation & Logistics. Program offerings from secondary career and technical (CTE) programs to industry certifications, associate degrees, and through to doctorate level programs were inventoried and assessed to determine how well aligned the current system infrastructure is to support industry demands in key sectors. This data was gathered from public sources, course catalogs and institutional web presence for 52 regional institutions offering programs within one of the four industries of focus areas. Select detail on this inventory is included in each industry section and the full inventory is included in the Appendix of this report.

03 Key Findings

Summary of Key Findings

The Supply and Demand Gap Analysis was informed by several points of both quantitative and qualitative data. The summary of findings listed below are detailed with supporting data on the following sections of this report. The qualitative feedback included was gathered through three meetings with the Toledo Talent Alignment Steering Committee and with critical input provided from other regional leadership through two trips into the region during this phase of the Strategy development process. These findings, and the subsequent data provided in this report, lay the foundation and set a direction for the regional Talent Alignment Strategy.

Key findings include:

Demand (Industry and Occupational Growth) Outpaces Supply (Talent Production) in Key Areas. Economy is growing and diversifying presenting workforce challenges. Specifically, Advanced Manufacturing, one of the major industry sectors growing the economy, employers are experiencing a challenge finding enough talent to fulfill their entry to mid-level positions. In this industry there are roughly 3,000 job openings per year – 2,500 of which are for Certificate-level positions (meaning low skilled to semi-skilled positions) with only 1000 graduates identified. Meeting demand with regional talent is likely to be a challenge in the Transportation and Logistics sector within entry level positions - minimal data is available to confirm talent supply in typical education programs preparing workers for these careers. As the Transportation and Logistics continues to grow it will become increasingly imperative to ensure these occupational demands are being met with local supply and the education offerings match skill needs at the entry, mid and more senior levels critical to the success of these businesses and functions.

Entry and Mid-Level Positions Present a Real Challenge. Entering a career and progressing through it requires support from the employer and an aligned education and training system to ensure skills are developed along the pathway. Many employers, especially within the Advanced Manufacturing and Healthcare fields, indicated that initially hiring at the entry level is not as challenging as retaining these employees – this creates a deficit for both the entry and mid-level positions. Some businesses have developed internal pathway programs to begin to alleviate these challenges and incentivize longevity within the company and the career field, however, many of these efforts are in their infancy. It is important to incentive and scale these approaches so more workers can earn while they learn more skills and employers reap the benefit of a more stable incumbent worker pipeline.

Talent Surplus Point to Retention Challenges. Several talent surpluses have been identified within the data sets – meaning too many graduates are being produced relative to the employment demand in the regional economy. Some examples include: Engineering specialties, Medical & Health Service Managers, Supply Chain Managers & Analysts, Computer System Analysts & Web Developers. However, some of these surplus data points are in direct contradiction to employer realities. For example, in the Healthcare field data illustrates Registered Nurses are produced at twice the rate demanded by industry growth (757 graduates for 374 job openings). Feedback from employers' points to the exact opposite scenario – one in which they cannot fill these positions based on the current talent pool available. This points to a challenge in either retaining these graduates in the region or potentially a mismatch in skills they have developed within their programs of study and the skills required by the regional employers.

Summary of Key Findings, cont'd

Career Messaging to Drive Education Choices. Understanding where employment opportunities are and will likely be in the future is critical to effective education planning. In many of the industries key to the Toledo regional economy the data suggest certain opportunities for realignment and redirection from one education field to a closely related one which would result in higher employability in areas of need. For example, in Advanced Manufacturing data indicates an oversupply of talent related to the welding focus area whereas the closely aligned general machinist field is experience a severe shortage in the talent pool. In Healthcare, there are many non-direct medical positions currently experiencing shortages such as vet assistants, medical and clinical lab technicians and dental careers which could potential be addressed by shifting some talent in the oversupplied fields in direct patient care to better meet industry needs. Finally, Information Technology positions related to software development and network administration are not adequately supplied regionally, however, learners pursuing education in computer systems and web development where there is much lower demand could be advised to consider those slight career redirections which would potentially result in more stable and local employment.

Education Pathways Aligned to Career Pathways. To support continued, stackable and progressive skill development as required by the mid-career and senior-level positions in each industry sector, it is important to ensure regional academic programs reflect the nature of the occupational pathways and articulate from one credential to the next. This will allow for a more seamless transition for workers to progress through career pathways in Advanced Manufacturing where skilled trades can build to more traditional engineering functions and in Professional Services positions where more administrative focused positions could transition into harder to fill careers in financial legal areas. Ensuring that there is a stackable credential and degree pathway for these key areas where higher level degrees are necessary for career progression simultaneously address skill gaps within the labor market, allow employers to access a labor pool and education system addressing skill needs aligned to their career pathways and create more long term, sustainable career options for Toledo region residents.

04 Supply & Demand Gap Analysis

About This Report

The subsequent pages include data analysis on the Supply & Demand Gap Analysis broken down by the four industries of focus: Advanced Manufacturing, Healthcare, Transportation & Logistics, and Professional Services & Operational Support. For each industry, the report breaks down how well job demand is served by local graduates and programs and further broken down by focus area and credential area across the industry. Narrative analysis includes insights from both the data and input received from Toledo stakeholders within education, workforce, and economic development.

The following sections of this report aim to analyze four specific data points to better understand how well each industry of focus is currently being served by the Toledo region's education and training system and the volume of academic graduates completing credentials and degrees aligned to their occupational areas of growth. Each section, for the industries of focus as mentioned above will include:

- Industry demand by occupational group and credential level required for each occupation. Size of employment demand (job openings and occupational growth) is represented by the bubble size on the Gap and Program Overview page for each industry. Additionally, the degree to which each level of occupation is being current met by talent supply (representing education and training graduates) is color coded to represent whether there is a severe shortage, shortage, balance or surplus of talent (people) production.

- Talent output of Toledo's educational system by focus area within the industry of focus. Education Infrastructure detail is included for each sector breaking down focus area, credential, credential by focus area, and type of institution. This analysis is performed to determine where there's a concentration of competency development, areas where there are potential misalignment in types of programs as they relate to the labor market, areas in which more, and more developed career pathways could be created and/or determining the level of accessibility – both generally and financially – for Toledo's citizens.

- Employer and other stakeholder feedback to determine pain points at different levels and understand the reality between data and reality when it comes to recruitment, retention, and skills alignment with labor market demands.

All of these data points combined paint a clearer, more comprehensive view of the reality in which Toledo's labor market and education infrastructure are operating in and where thoughtful and intentional intervention could bring about a positive change in the larger Toledo region.

Supply & Demand Gap Analysis: Advanced Manufacturing

Advanced Manufacturing Key Takeaways

There is significant current and projected demand for entry-level manufacturing careers in the Toledo region, however, based on both examination of current student output and direct feedback from regional employer's demand is outpacing talent supply. On the higher, technical skill areas within Engineering the data, in some cases, points to an oversupply of talent – largely accounted for by significant Bachelor and Master level programs at two major universities in the region. Based on input from the education community and regional employers, many Engineering students leave the Toledo region following graduation and recruitment of positions within the Toledo labor market is conducted not just locally but regionally and nationally to find the top talent available. While there are some areas of talent overproduced within Engineering it is clear from the data the current and future projected need is within entry and middle skill positions. Regional education offerings directly align to these occupational clusters and represent a significant share of the programming available in support of this industry of focus.

The following pages will show a high-level overview of top findings of employment growth trends (demand), student output (supply), regional education and training program offerings (education system) and regional employer and educator insight.

What you can do with this data:

Use this information to drive initial conversations regarding the Northwest Ohio Manufacturing Association sector partnership. Determine where additional programs should be developed to better address a larger talent supply or skill gap within this sector.

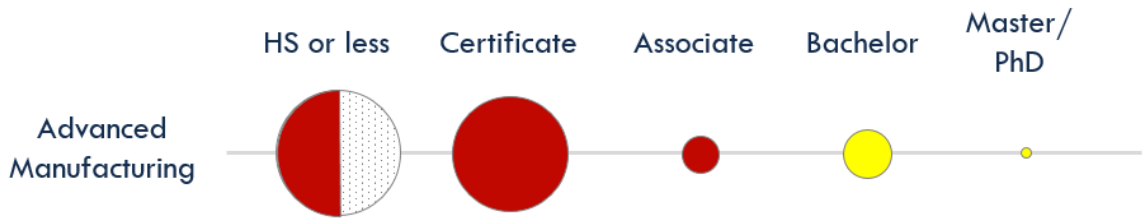
Assess program capacity and whether new programs should be developed to better address regional demand. The data shows us that much of the programming is at the certificate level, aligned to regional demand, however talent supply is falling significantly short of meeting projected employment growth in Skilled Trades and Maintenance & Repair technology areas.

Use this data to promote career choices. Entry and mid-level occupations in Advanced Manufacturing are significant, strong and growing in the region. Regionally message the need for these positions and their connection to a long and sustainable career in, in many cases, very well compensated occupations.

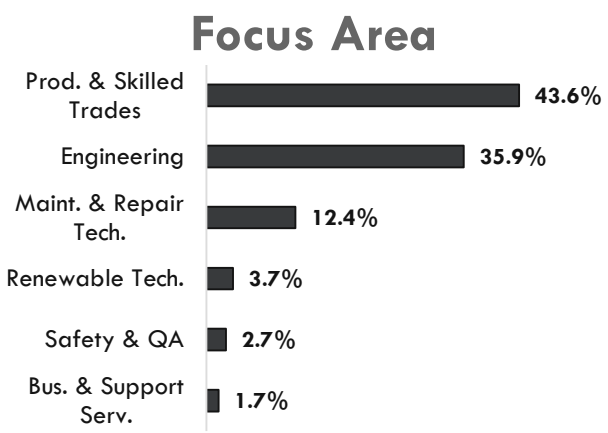
Full detail on the demand, supply and education programming included in the Appendix of this report.

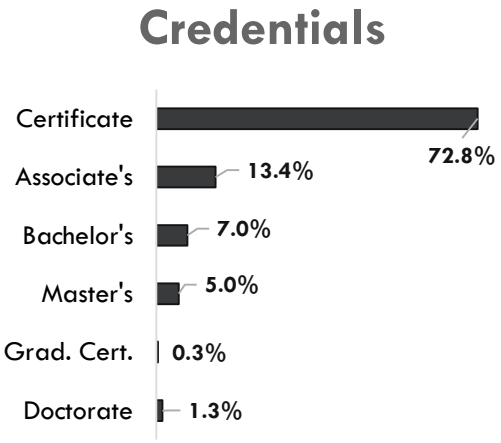
Advanced Manufacturing Gap and Program Overview

How well is job demand served by local graduates and programs?



Size of circles indicates forecasted annual job openings; colors indicate graduate supply vs. demand.





Focus Area and Credential charts indicate % of education and training programs offered within the Toledo region as aligned to each targeted Industry.

Large Demand for Unskilled and Semi-Skilled

In the Toledo region, there is a strong job demand for entry-level workers (about 3,000 job openings per year), typically requiring a high school degree. Employers report of extreme difficulty filling these positions, indicating a severe shortage in workers.

Certificate-level positions are large, with 2,500 openings per year and less than 1,000 graduates identified in programs across the region. Shortages are severe primarily due to the lack of maintenance and repair graduates. Associate-level positions are in less of a shortage, with fewer job openings (250) and 130 graduates. Some positions might be oversupplied, such as Drafters.

Bachelor's-level job openings are comprised primarily of engineers (380), with most engineering positions oversupplied by local graduates. No positions require a master's level or higher.

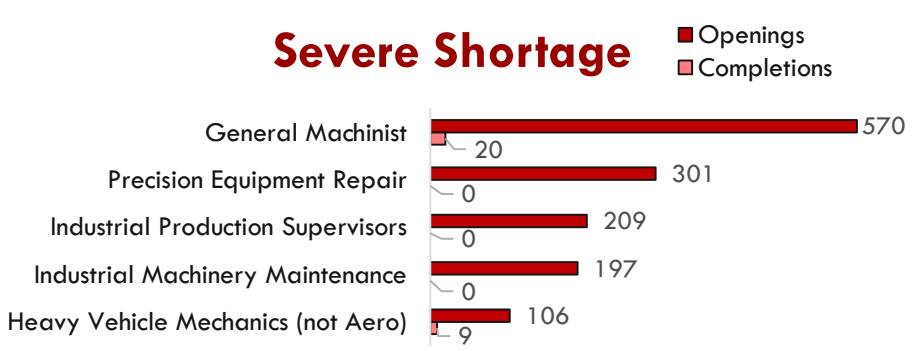
Educational System - Focus Area and Credentials

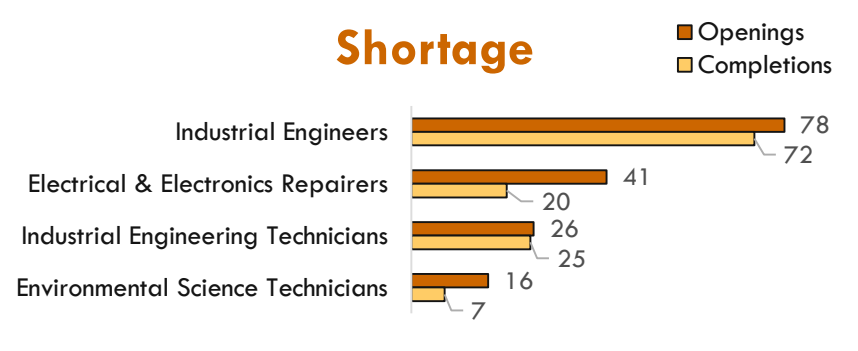
Within the Toledo region's education and training system for Advanced Manufacturing, the most widely available credential is a Certificate at 72.8%, followed by an Associate's degree at 13.4%. Over 85% of the full suite of education and training in support of Advanced Manufacturing skills is reasonably aligned to where most of the employment base and project growth exists.

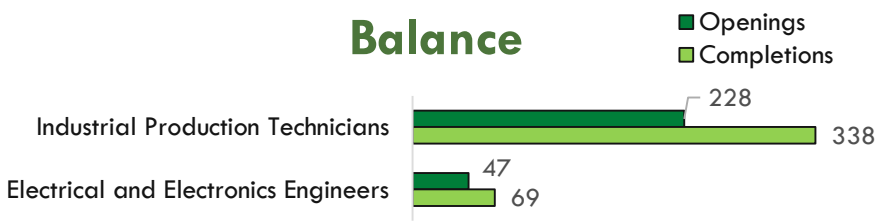
However, as noted through several employer conversations, these certificate and associate level positions – largely focused on skilled trades, maintenance and repair, are the hardest to fill and sustain within their talent pipelines. Essentially, while significant education resources are supporting skill development at the right employment level demand of skilled workers is well outpacing talent supply.

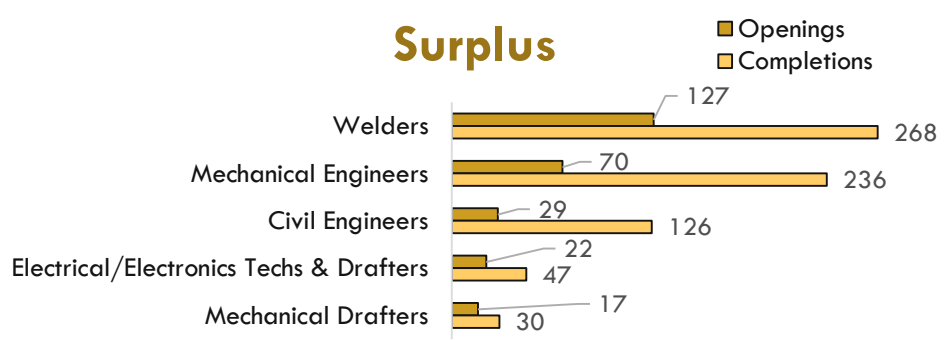
Advanced Manufacturing Detail – Occupational Gaps

How well is job demand served by local graduates and programs?









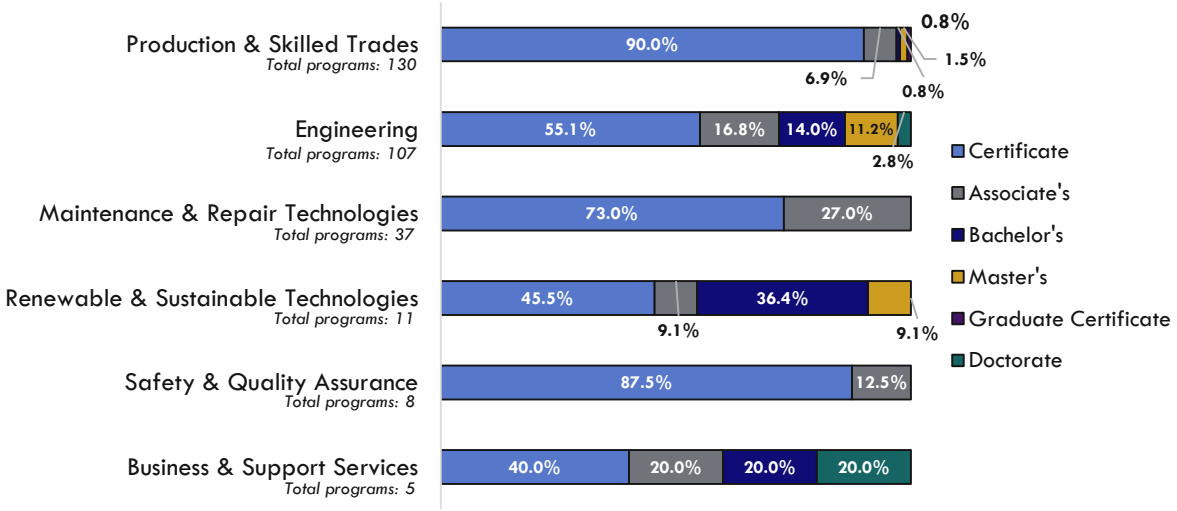
For semi-skilled or skilled positions, the largest shortages in Advanced Manufacturing are in Machinists and various industrial repair and maintenance positions. Also in severe shortage are Heavy Vehicle Mechanics. Less severe shortages exist for Industrial Engineers, Electrical Repairers, and Technicians. Employer interview support these findings – that filling entry-level unskilled positions is very difficult, and that there is a lack of maintenance workers to manage equipment. Most employers indicate that finding Engineers is not a problem, as they typically recruit nationally.

Industrial Production Technicians appear to be in-balance, with over 300 local graduates to fill about 230 job openings. Electric Engineers also appear to be in-balance.

Surpluses have been identified for Welders, which produce about twice as many graduates (270) as job openings (130). Mechanical and Civil Engineers are also vastly oversupplied for the local market, which indicates that most of the graduates will leave the region. Drafting graduates appear to oversupply the market, which may indicate they will have difficulty finding jobs upon graduation.

Advanced Manufacturing Detail – Focus Area by Credential & Institution Type

Focus Area by Credentials

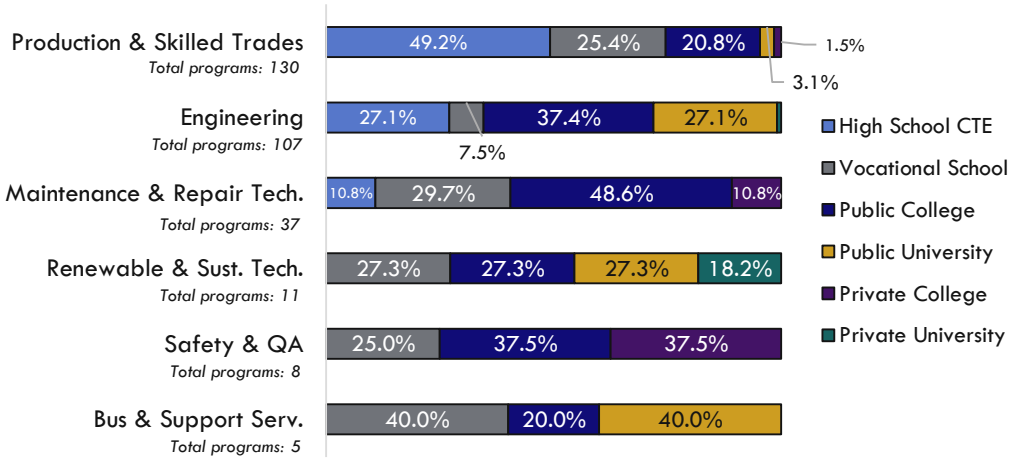


** Values represent number of programs; competencies ranked in descending order by total number of programs*

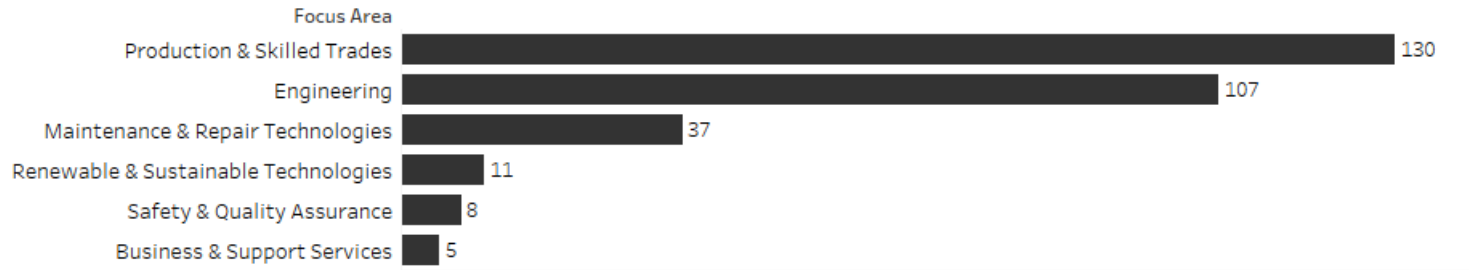
Focus Area by Credentials: The chart to the left details the percentage of programs by credential level for each focus area. Overall, Production & Skilled Trades has the highest amount of total programs and is dominated by Certificate level programming followed by Maintenance & Repair Technologies and Safety & Quality Assurance – tracking against where highest projected demand of employment will be in terms of education credential required and projected occupational growth. However, as previously noted, demand is well outpacing supply indicating programs are not at capacity (meaning not graduating as many students as they could) or more programs are needed, in general, to meet regional demand.

Focus Area by Institution Type: The chart to the right details the percentage of institution type that provides programs in identified focus areas. Within the Toledo region, approximately 96% of institutions that provide programming in Advanced Manufacturing are public. This is an important when considering how accessible these programs are for interested students and can more easily lead to a sustainable career pathway. Overall, Production & Skilled Trades are distributed, representing a clear educational pathway from entry to higher level opportunities in the industry. Within Engineering, there are far fewer opportunities for Certificate level programs and a much heavier focus on upper-level credentials in colleges and universities.

Focus Area by Institution Type



Advanced Manufacturing Detail



Focus Area	High School CTE	Vocational School	Public College	Public University	Private College	Private University
Production & Skilled Trades	64	33	19, 8	1, 2, 1	1, 1	
Engineering	29	8	22, 18	14, 12, 3		1
Maintenance & Repair Technologies	4	11	8, 10		4	
Renewable & Sustainable Technologies		3	2, 1	2, 1		2
Safety & Quality Assurance		2	2, 1		3	
Business & Support Services		2	1	1, 1		

Credential
- Certificate
- Associate's
- Bachelor's
- Master's
- Grad. Cert.
- Doctorate

The above data sets drill down further into the data presented on the previous page. This details the volume of programs offered in support of various focus areas within the industry, by credential and per type of institution. Within Advanced Manufacturing, the pathway pipeline significantly narrows at the baccalaureate level for many programs – meaning there are significant opportunities for a stackable credential pathway from Certificate to Associates, however, minimal support for continued skill development (except for Engineering) into the higher credential levels. While this progression of programs tracks to current projected growth and employer hiring pain points (at the Certificate and Associate's degree levels), it will be important to validate with industry whether middle-skill and higher degreed positions are being met by regional offerings. Full detail on program offerings included in the Appendix.

** Values represent number of programs*

Supply & Demand Gap Analysis: Healthcare/Medical

Healthcare/Medical Key Takeaways

Healthcare is a large and growing major industry in the Toledo region. There is significant current and projected demand for entry and mid-level healthcare careers in the Toledo region, however, based on examination of current student output, in much of the industry – supply is outpacing demand. Direct feedback from regional employers painted varying scenarios– many had difficulty filling mid-level skill locally. Retention was also a prevailing issue, with many citing they had issues retaining entry-level positions such as CNA's and Home Health Aides. For the more advanced skill areas within the industry, Toledo is oversupplying talent – largely accounted for by significant Bachelor and Master level programs at two major Universities in the region. However, based on input from the education community and regional employers, data suggests that many advanced level healthcare students leave the Toledo region following graduation. This is an issue because the data is misaligned with employer feedback – while the educational system is sufficiently providing entry and mid-level credentials, those that obtain these credentials are not retained in the region. Recruitment of higher-level positions within the Toledo labor market is conducted not just locally but regionally and nationally to find the top talent available. While there are some areas of talent overproduced within the advanced levels, it is clear from the data the current and future projected need is within entry and middle skill positions. Regional education offerings directly align to these occupational clusters and represent a significant share of the programming available in support of this industry of focus.

What you can do with this data:

Use this information to engage with educators (from K-12 and vocational schools to higher education) on curriculum development and program capacity to create new programs that align with regional demand. The data shows that there are a significant number of certificate and higher-level offerings, but adjustments can be made to specify the types of program offerings to improve alignment with Toledo's labor market demand.

Work with educators to develop a clear career pathway from assistant-level positions through home health and nursing aide positions in order to bolster retention and motivation to continue on individuals' chosen career path.

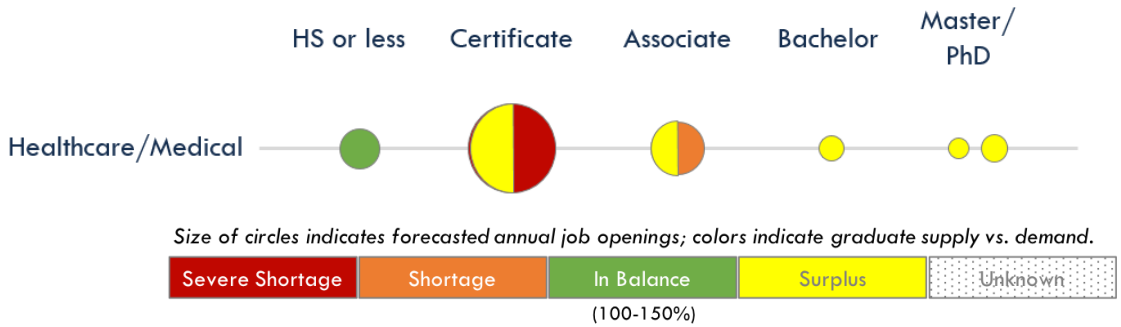
Determine scalability of internal pathway programs within industry employers to retain talent in the lower and mid-level pipeline

Work to identify more opportunities to get individuals connected to the job market and take advantage of student supply in high-demand focus areas.

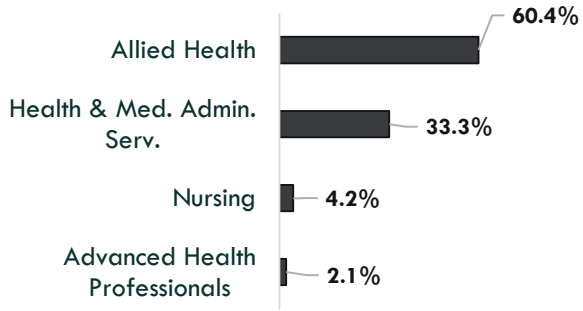
Full detail on the demand, supply and education programming included in the Appendix of this report.

Healthcare/Medical Gap Analysis

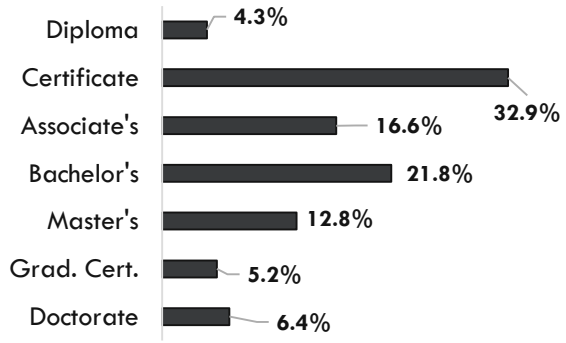
How well is job demand served by local graduates and programs?



Focus Area



Credentials



Focus Area and Credential charts indicate % of education and training programs offered within the Toledo region as aligned to each targeted Industry.

Feast or Famine - High Demand for Skilled Workers

The Toledo region has a surplus of graduates for many of the nearly 3,200 annual job openings in the Healthcare/Medical cluster and most shortages exist for occupations in low demand which lack local programming.

Certificate-level positions represent the largest and most diverse area of demand with nearly 1,800 openings per year in 19 different occupations. Associate-level positions are the next largest with more than 630 annual job openings. Training is very specialized at this level and as a result, supply and demand vary greatly by occupation.

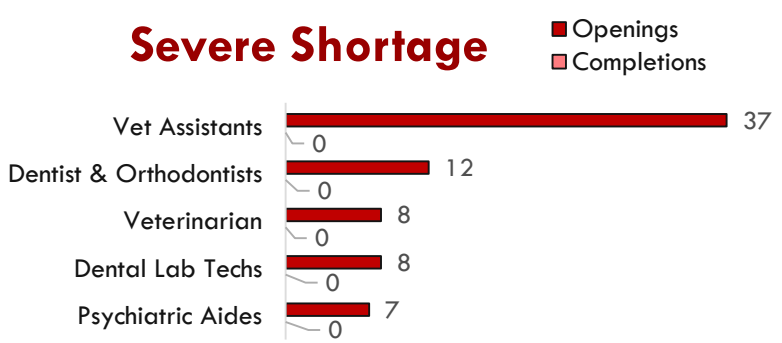
Job openings decrease as the level of education increases. The shortages that do exist for the Toledo region are in specialty occupations like Veterinarians, Chiropractors, Audiologists and Optometrists.

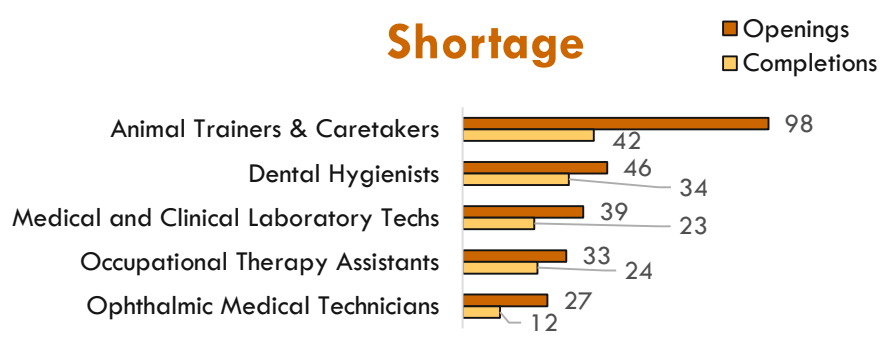
Educational System – Focus Area and Credentials

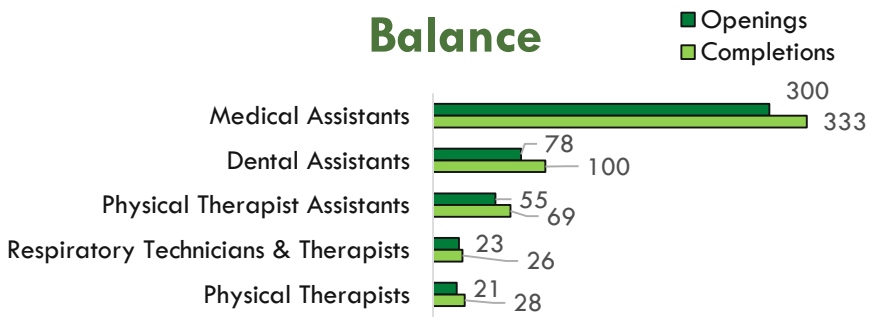
The charts to the left indicate the percentage of programs available in the industry. For industry-focused credentials, the most widely available credential is a Certificate at 32.9% followed by an Bachelor's degree at 21.8%. While this is typical of the industry, providing more options at higher-levels would be beneficial for filling in workforce gaps across the region. When speaking with employers, many had trouble filling mid-level skill locally.

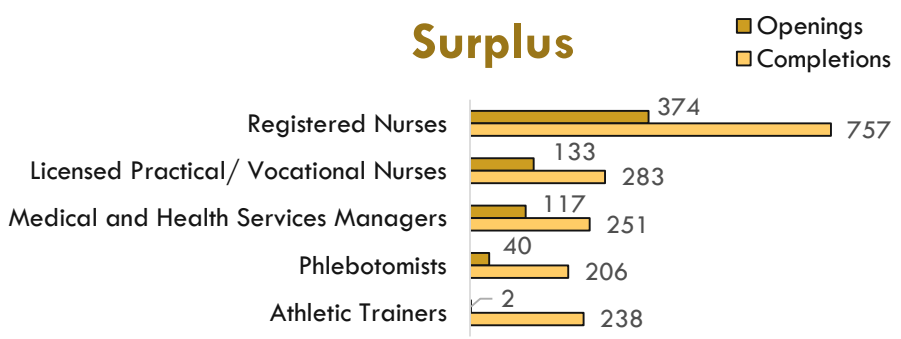
Healthcare/Medical Gap Analysis

How well is job demand served by local graduates and programs?









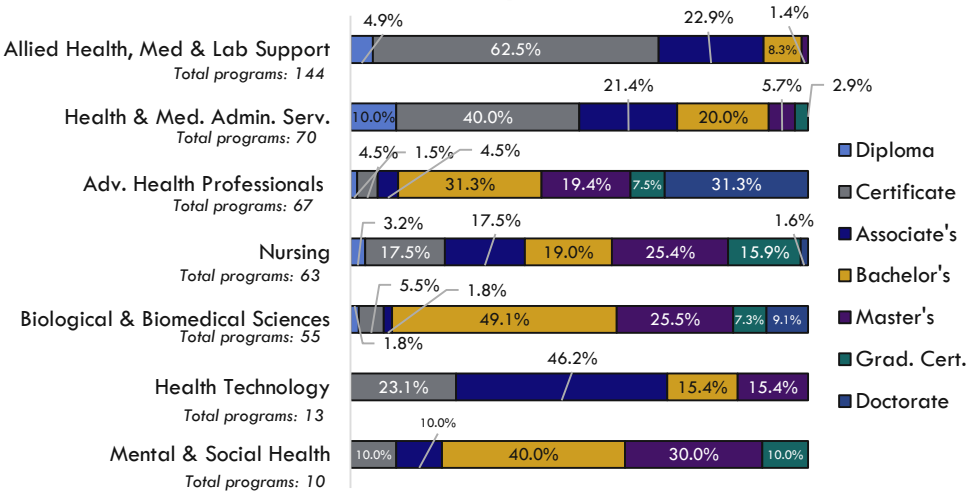
Graduates and programs in the Toledo region are in relatively large supply for the Healthcare/Medical cluster with a few exceptions. For the Healthcare/Medical cluster, the few occupations facing severe shortages are in such low demand that local gaps can be filled by graduates outside the market. The exception, Vet Assistants and Animal Trainers & Caretakers, require little to no formal training and are therefore hard to truly quantify.

Medical Assistants appear to be in-balance, with more than 330 local graduates to fill 300 job openings. Other balanced Healthcare/Medical occupations include Dental Assistants, Physical Therapy Assistants, and Physical Therapists.

The Toledo region produces a major surplus of Registered Nurses and Medical & Health Services Managers, suggesting many graduates will leave the region for employment opportunities elsewhere. The surplus of LPNs can fill employment opportunities in related occupations such as Home Health Aides or Nursing Assistants. The substantial surplus of Phlebotomists and Athletic Trainers will mean graduates will likely have trouble finding employment. Based on conversations with healthcare providers in the region, nurses are in very high demand and many cannot fill entry level positions within the industry. Some are beginning to develop internal support and training in order to articulate the long-term value of a career path in the healthcare field.

Healthcare/Medical Programs by Focus Area

Focus Area by Credential

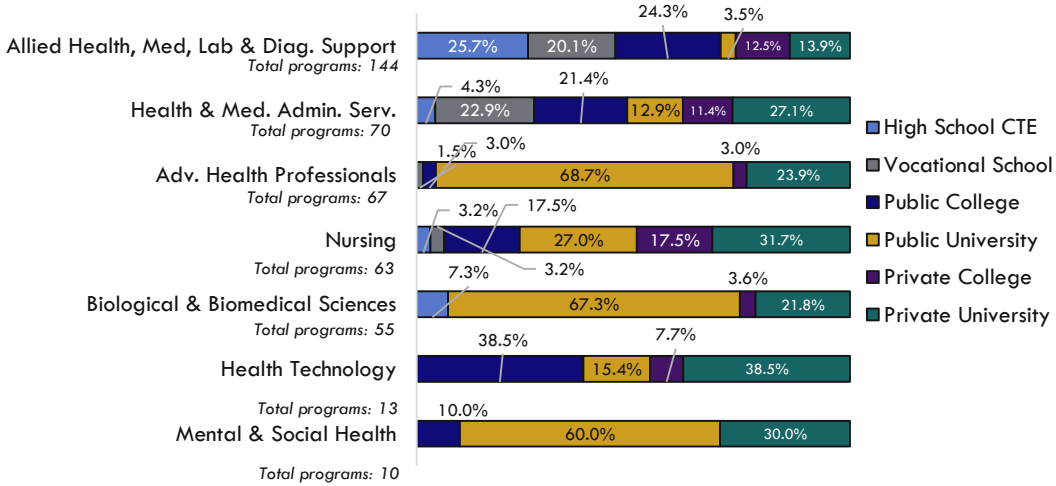


Focus Area by Credentials: High school CTE programs focus almost exclusively on Allied Health programs, with a few other programs in specialties such as Health & Medical Admin. Services and Nursing. There's a similar picture for vocational schools, but they offer more middle-skill programming within the Health & Medical Administrative services focus area.

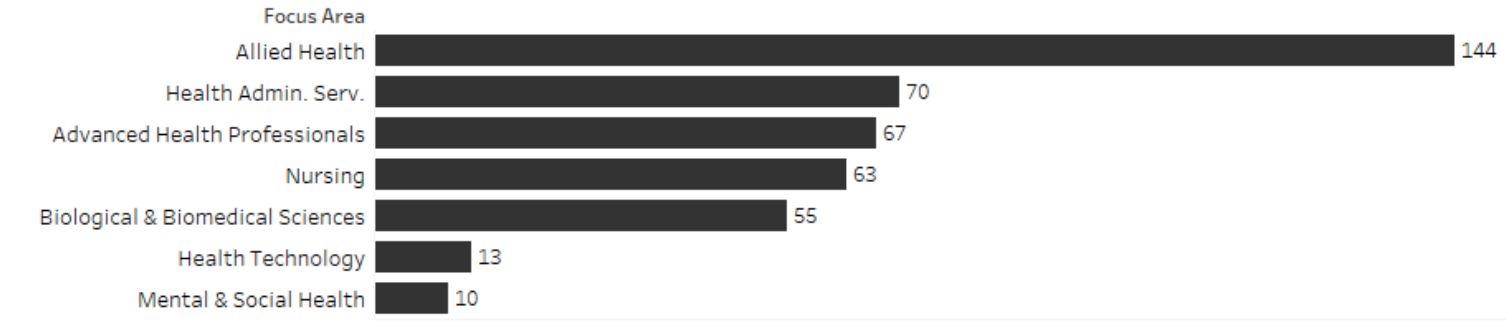
** Values represent number of programs; competencies ranked in descending order by total number of programs*

Focus Area by Institution Type: For public institutions, there's a more diverse spread of offerings in more advanced/specialized areas such as Nursing and Biological and Biomedical Sciences. For private institutions, there is an almost equal amount of programs proportionally throughout each of the specialty areas. The Toledo region's breakdown of institution type shows well over two thirds of the institutions are public – which indicates more affordable and accessible options for students at mid-level points on their career pathways.

Focus Area by Institution Type



Healthcare/Medical Detail



Focus Area	High School CTE	Vocational School	Public College	Public University	Private College	Private University
Allied Health	37	29	13, 22	4, 1	5, 7, 5, 1	2, 4, 6, 7, 1
Health Admin. Serv.	3	16	8, 7	5, 3, 1	4, 1, 1, 1, 1	3, 7, 8, 1
Advanced Health Professionals		1	2	11, 12, 5, 18	1, 1	1, 1, 10, 1, 3
Nursing	2	2	3, 8	1, 4, 6, 5, 1	2, 3, 3, 2, 1	6, 9, 5
Biological & Biomedical Sciences	1, 3			16, 13, 4, 4	1, 1	10, 1, 1
Mental & Social Health			1	1, 2, 2, 1		2, 1
Health Technology			5	2	1	3, 2

Credential
- Diploma
- Certificate
- Associate's
- Bachelor's
- Master's
- Grad. Cert.
- Doctorate

The above view drills down further into the data presented on the previous page by showing the number of programs within each focus area in Healthcare. Within this industry, there are numerous opportunities to find a pathway from high school CTE to higher education.

* Values represent number of programs;

Supply & Demand Gap Analysis: Transportation & Logistics

Transportation & Logistics Key Takeaways

When speaking with Toledo regional employers, we learned that there is a high demand for entry level positions within the Transportation & Logistics industry. By nature of the industry, employers typically do not use formal education to find and recruit employees and more often develop and grow employees internally. This, as well as other sustainable, homegrown practice, should continue to happen as the industry is projected to grow in the coming years. The industry is also a critical function that regional employers – specifically within Advanced Manufacturing – rely on. An example is that many employers which produce and process material rely on Truck Drivers and Logistics Supply Managers to distribute and ship their products to customers.

What you can do with this data:
Use this data to drive conversations about the value and essential function this industry provides to other major industries in the Toledo region.

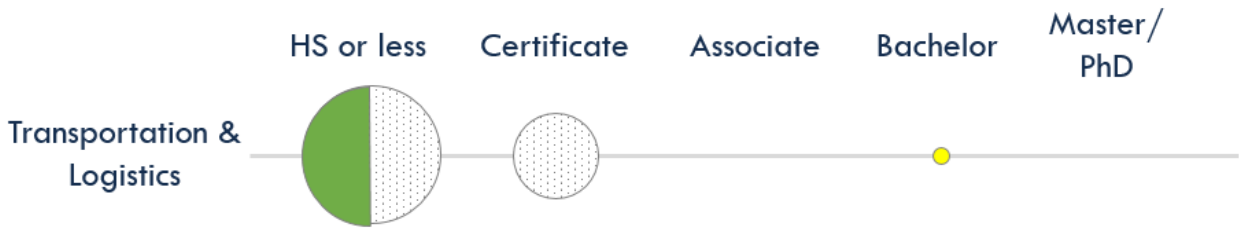
Much of the industry is dominated by sub-baccalaureate credentials, with some offerings at more advanced levels. Assess areas of oversupply and engage with educators and employers on how to articulate more lucrative career pathways and shifts into more in-demand occupations.

Consider developing incumbent worker training programs with major employers to help develop the skills of front line workers (materials movers, logistics clerk) positions and further fortify the career pathways within the industry.

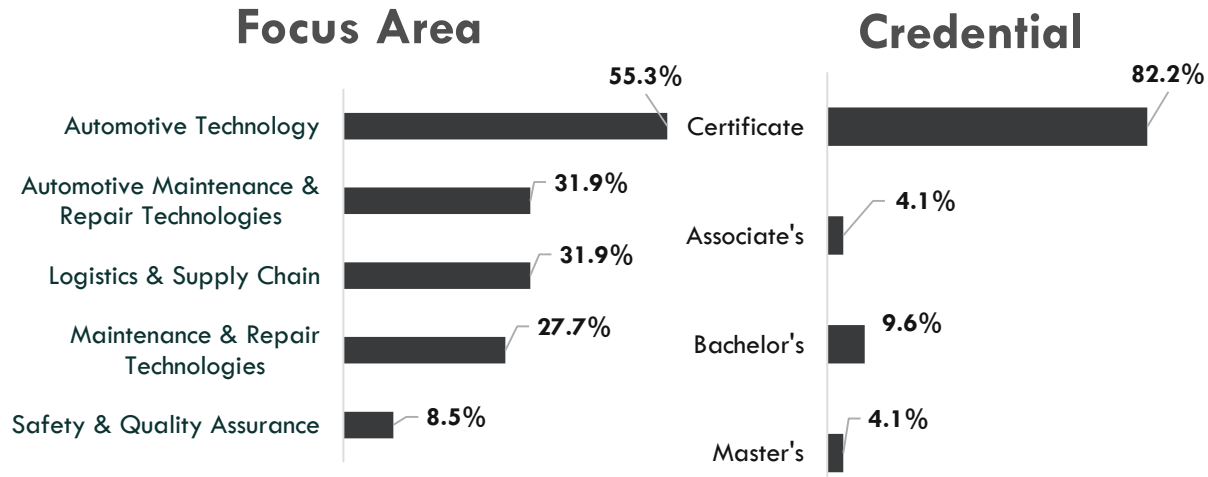
Full detail on the demand, supply and education programming included in the Appendix of this report.

Transportation & Logistics Key Takeaways

How well is job demand served by local graduates and programs?



Size of circles indicates forecasted job openings; colors indicate graduate supply vs. demand.



Focus Area and Credential charts indicate % of education and training programs offered within the Toledo region as aligned to each targeted Industry.

Large Demand with an Unknown Supply

A vast majority of the 4,100 annual job openings in the Logistics cluster are for unskilled or semi-skilled workers such as Packers & Material Movers and Truck & Commercial Drivers.

A very small percentage of Logistics occupations require formal education. These positions include Supply Chain Managers & Analysts, Airline Pilots, and Ship/Marine Engineers.

A surplus of Supply Chain Managers and Analysts exist in the Toledo region. Pilots and Marine Engineers, however, must be recruited from outside the region due to the high specialization of their training programs.

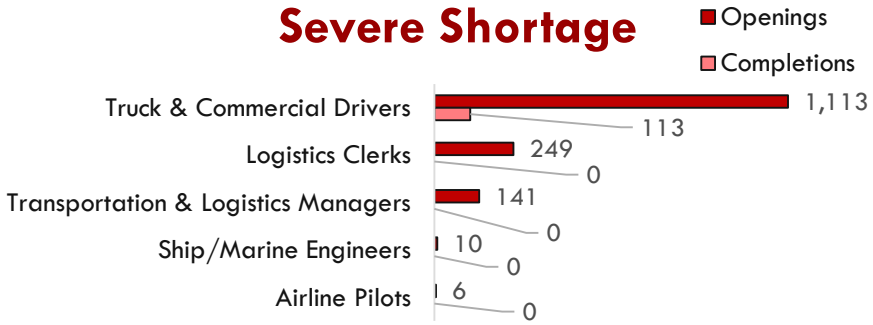
Educational System – Focus Area & Credentials

The charts to the left indicate the percentage of programs available in the industry. For industry-focused credentials, the most widely available credential is a Certificate at 82.2% followed by a Bachelor's degree at 9.6%. This breakdown matches the projected occupation demand areas. While this is typical of the industry, providing more options at higher-levels would be beneficial for filling in workforce gaps across the region.

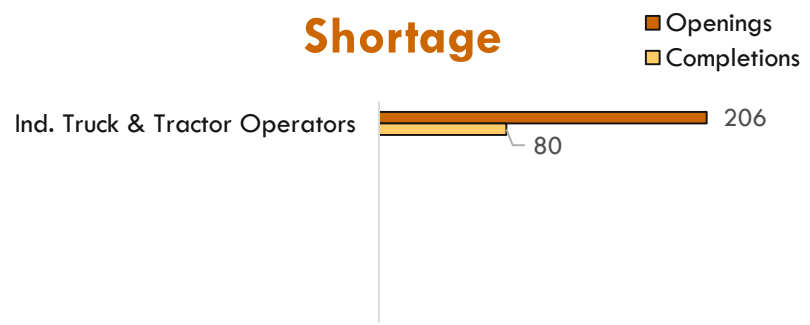
Transportation & Logistics Gap Analysis

How well is job demand served by local graduates and programs?

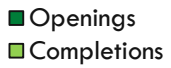
Severe Shortage



Shortage

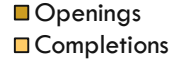


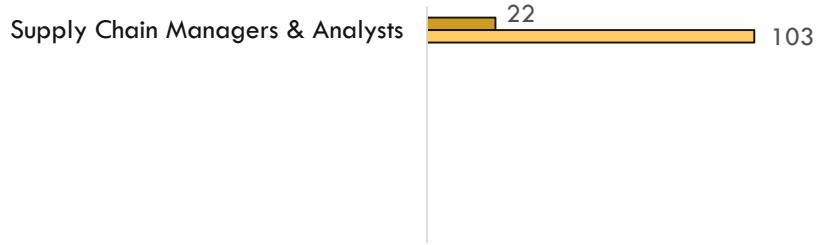
Balance



No data to support occupations in demand that are being met by the education and training output. This is largely because much of the employment in this sector doesn't necessarily require specific education

Surplus

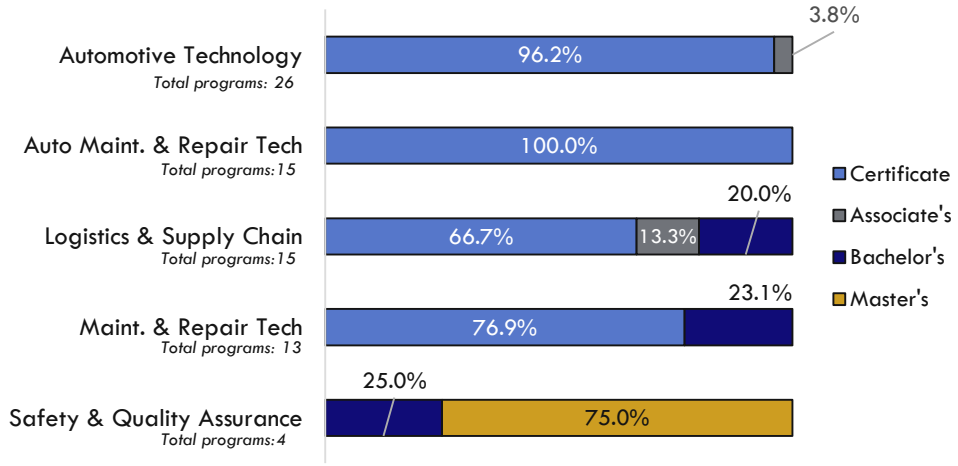




Drivers and Operators represent the majority of job openings for the Logistics cluster. Local gaps and national data suggest a severe shortage in the supply of qualified candidates, but the exact severity is impossible to quantify given the number of private entities offering licenses and certificates in these areas. Other severe shortages exist for Ship/Marine Engineers and Airline Pilots. These positions can and should be recruited to the area given the high specialization of training and low demand for local jobs.

Supply Chain Managers & Analysts make up only a fraction of job openings in the Logistics cluster and are currently produced in surplus. With a graduate to job opening ratio of more than 4:1, a majority of these graduates will have to seek employment outside the region or in adjacent industry sectors locally in which their skills can also be transferred. Detail on occupation gaps, including credential levels is included in the Appendix.

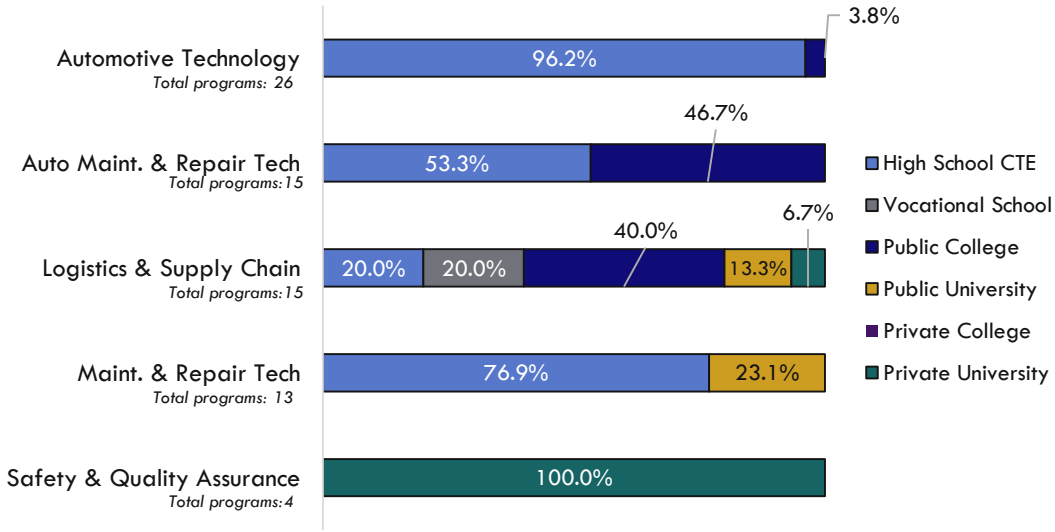
Transportation & Logistics Gap Analysis



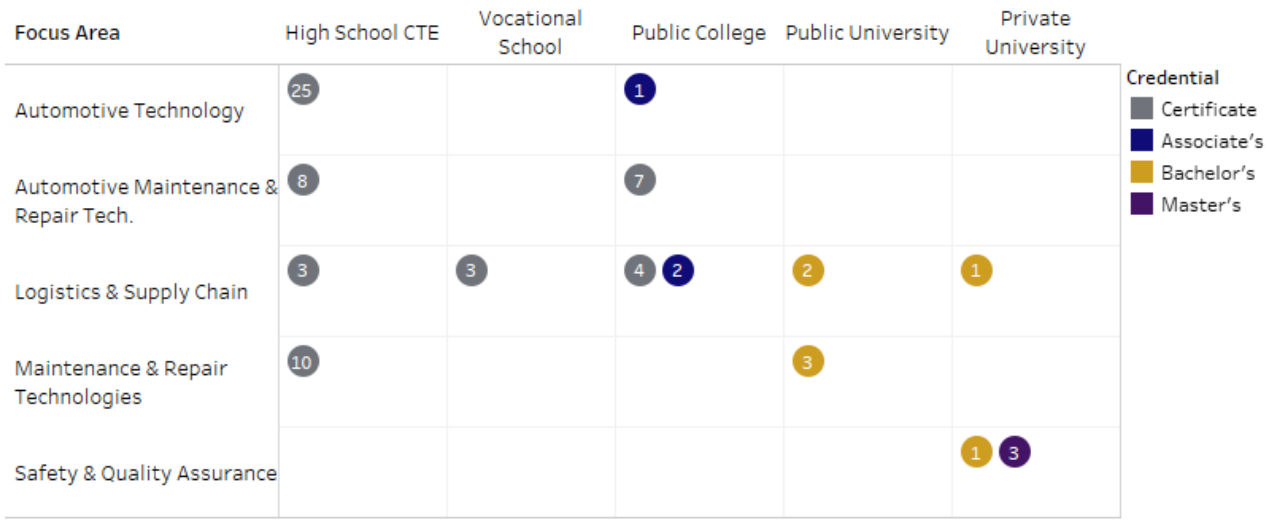
Focus Area by Credentials In Transportation & Logistics, the credentials are dominated by certificates in every focus area except for Safety & Quality Assurance. While this is typical of the field, expanding offerings at higher credentials could address some mid-level shortages in the field such as Ship Marine Engineers and Airline Pilots.

** Values represent number of programs; competencies ranked in descending order by total number of programs*

Focus Area by Institution Type When breaking focus areas down by institution type, Automotive Technology and Maintenance & Repair Technologies – the focus areas with the most programs – are dominated by high school CTE programs and public colleges or universities. For more specialized focus areas, such as Safety & Quality Assurance – all the programs are offered at only the private university level.



Transportation & Logistics Programs Focus Area



The above view drills down further into the data presented on the previous page by showing the number of programs within each focus area in Transportation & Logistics. Within this industry, there are several high school CTE programs in every focus area except for Safety & Quality Assurance – in which there are very few higher-level offerings at private universities.

** Values represent number of programs;*

Supply & Demand Gap Analysis: Professional Services & Operational Support

Professional Services & Operational Support Key Takeaways

The Toledo region offers numerous credentials in a wide range of focus areas for the Professional Services and Operational Support industry. Overall, there is a strong demand for these positions across the region, with many requiring formal education and other certificate-level credentials. This industry is well supported in the region, with a few misalignments in focus areas as they relate to regional job demand. Based on employer feedback however, with some higher-level positions such as cybersecurity and other advanced technical careers, are being filled by international candidates via H1B visa which represent a more expensive approach to talent recruitment. This points to a need for local development of programs in these high-tech areas and a targeted approach to retain these students within the regional labor market. Employers also report having issues finding mid-level talent in areas such as Finance and Legal.

What you can do with this data:
Engage with educators and employers about re-directing and aligning career pathways to meet regional employer demand. Examples include redirecting more creative fields such as designers to more in-demand occupations in focus areas such a software development and network administration.

Develop clear pathway communication and career awareness on the professional nature of careers at pillar companies in the region that are known for the materials they produce.

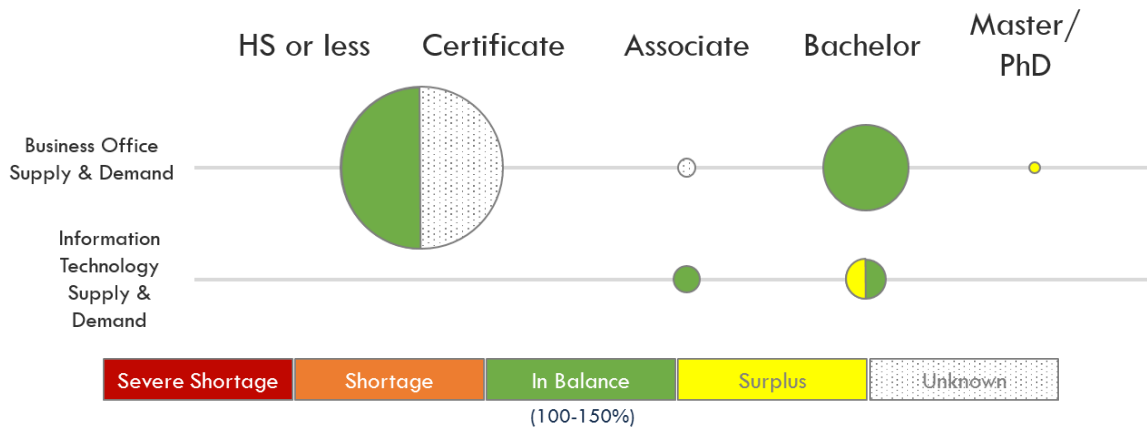
Explore further developing and scaling of leadership development academies and approaches to a regional level in order to assist smaller employers in finding talent at the mid-level.

Connect Toledo Public Schools leadership academy with thought leaders across the country in order to validate the program's approaches and offer more experiential and diverse learning opportunities for Toledo's citizens.

Full detail on the demand, supply and education programming included in the Appendix of this report.

Professional Services & Operational Support Key Takeaways

How well is job demand served by local graduates and programs?



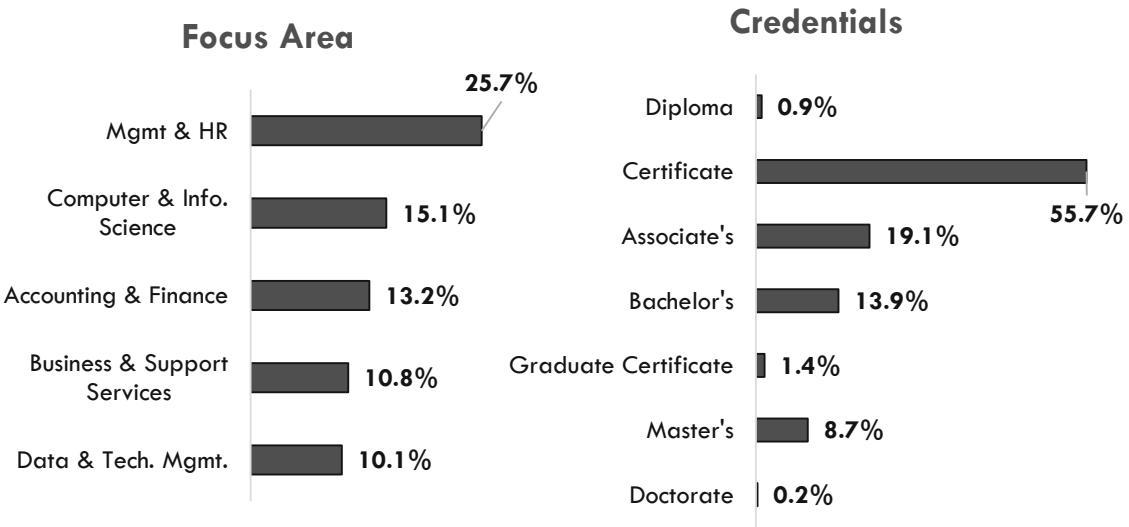
Size of circles indicates forecasted job openings; colors indicate graduate supply vs. demand.

Strong Demand met with a Balanced Supply

There are more than 5,300 annual job openings in the Business/Prof/IT cluster for the Toledo region and a majority of these openings are business support roles requiring minimal formal education with some on-the-job training.

For Business/Office occupations, the desired level of education and training increases for roles in management and analysis. These job openings require a Bachelor's degree. InfoTech occupations require either an Associate's or Bachelor's degree depending on the complexity of the role.

The Business/Prof/IT cluster as a whole is well supported by local graduates even though mismatch in exact skills and programming exists at the occupational level.



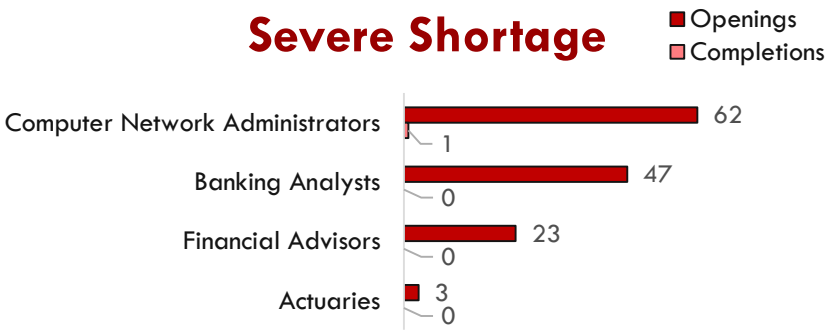
Focus Area and Credential charts indicate % of education and training programs offered within the Toledo region as aligned to each targeted Industry.

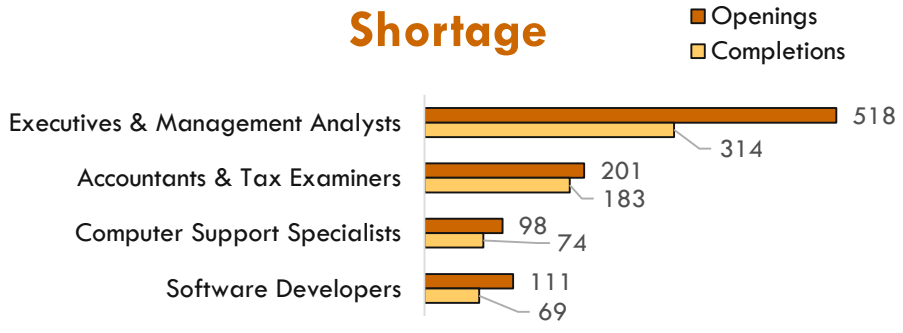
Educational System – Focus Area & Credentials

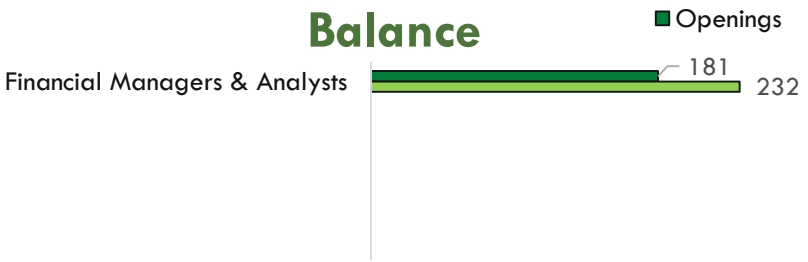
The charts to the left indicate the percentage of programs available in the industry. Within the field, the most widely available credential is a Certificate at 55.7%, followed by an Associate's degree at 19.1%. Further examination of talent needs at the Bachelor level is necessary to ensure demand is being sufficiently supplied by education offerings locally both through the type of program available and the volume of talent getting absorbed into the regional labor market.

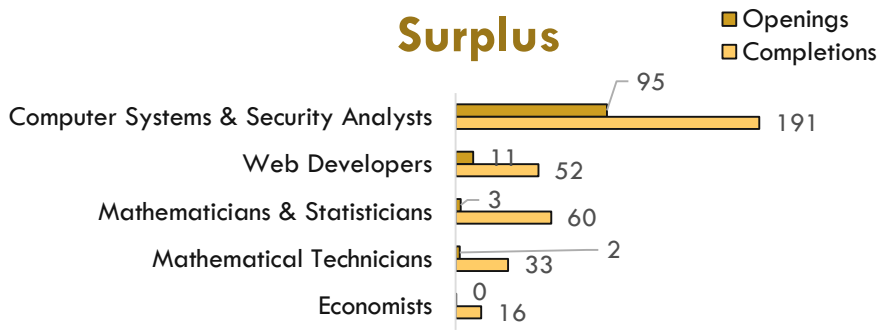
Professional Services & Operational Support Gap Analysis

How well is job demand served by local graduates and programs?





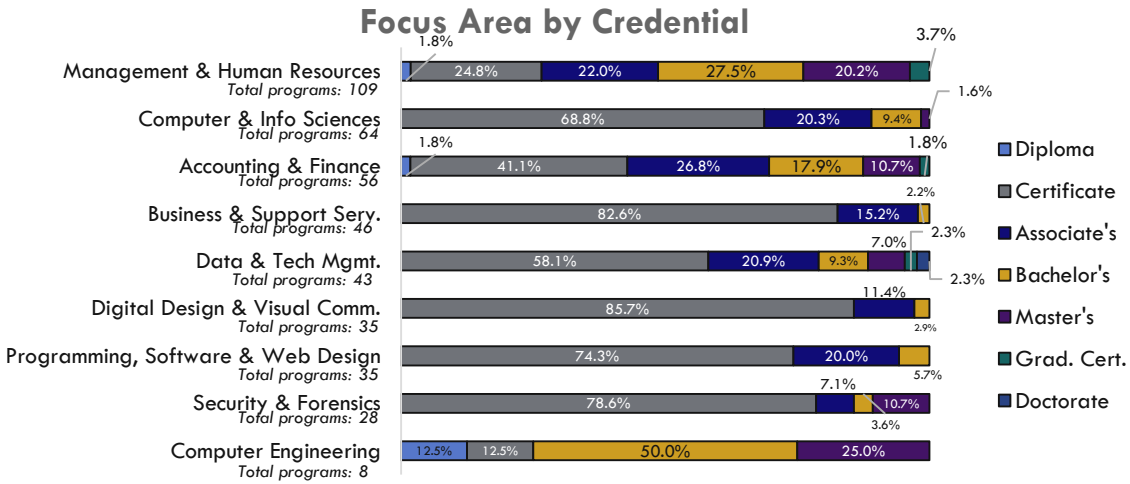




For the Business/Prof/IT clusters, the total number of local graduates is fairly balanced to the number of annual job openings. Differences do occur on the specific program and occupation level, but most of these imbalances can be corrected by the local talent supply. For example, the severe shortage in Computer Network Administrators can be overcome by the surplus in Computer Systems & Security Analysts. Likewise, the severe shortages in Banking Analysts, Financial Advisors, and Actuaries can be met by the surplus of graduates in Math-related programs or by Financial Managers & Analysts.

As mentioned above, many of the occupations with a surplus of local graduates will be recruited to fill related positions facing shortages within the cluster. Exceptions to this include Executives & Management Analysts which can be filled by more experienced local workers and Accountants which require specific training. Graduates in Web Development may have a hard time finding employment or need to acquire additional skills to support the shortage of graduates in software development.

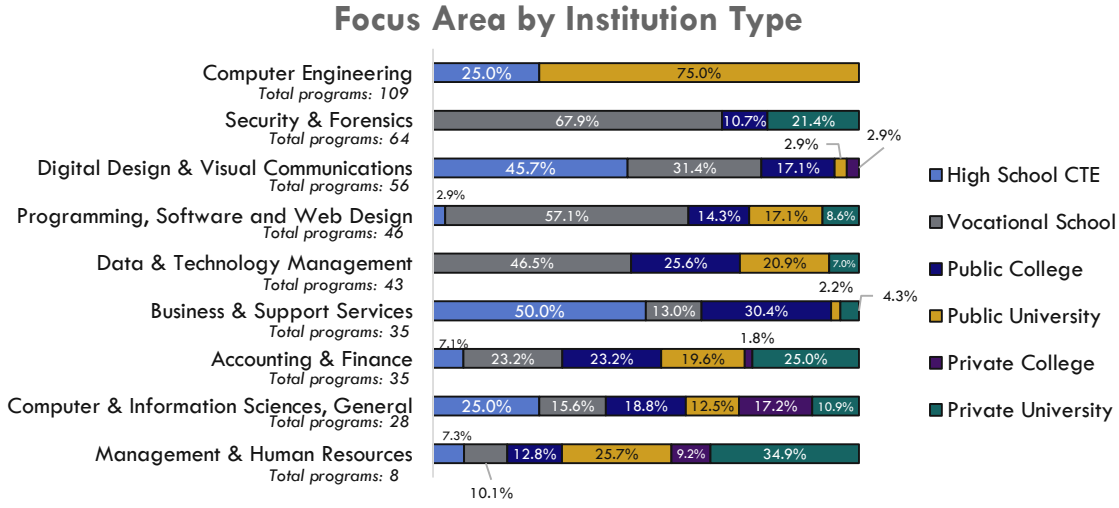
Professional Services & Operational Support Gap Analysis



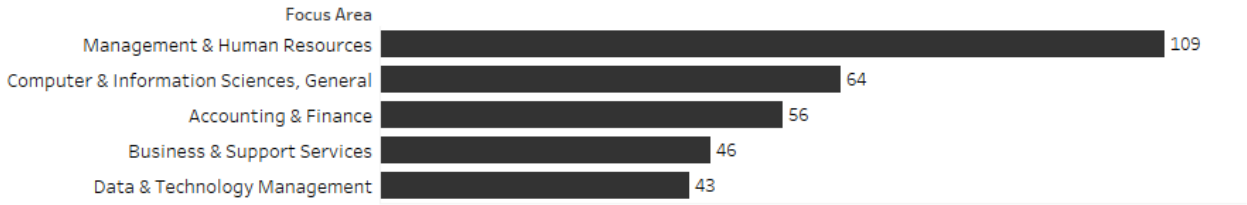
** Values represent number of programs; competencies ranked in descending order by total number of programs*

Focus Area by Credentials: High school CTE programs focus almost exclusively on Allied Health programs, with a few other programs in specialties such as Health & Medical Admin. Services and Nursing. There's a similar picture for vocational schools, but they offer more middle-skill programming within the Health & Medical Administrative services focus area.

Focus Area by Institution Type: Computer Engineering is the focus area with the most programs, and it is dominated by public institutions at 75%. However, the second largest focus area is Security & Forensics in which there are no public programs provided at the university level. For smaller focus areas, there is a more diverse spread of offerings, with some – such as Programming, Software and Web Design being offered in large part at Vocational Schools. The Toledo region's breakdown of institution type in this industry shows well over two thirds of the institutions are public – which indicates higher accessibility for students and more flexibility in programming. This information is available in the Appendix of this report.



Professional Services & Operational Support Detail



Focus Area	High School CTE	Vocational School	Public College	Public University	Private College	Private University
Business & Support Services	23	6	7 7	1		2
Accounting & Finance	4	13	6 7	2 4 5	1	1 5 6 1 1
Computer & Information Sciences, General	16	10	5 7	1 3 3 1	11	1 3 3
Computer Engineering	1 1			4 2		
Data & Technology Management		20	4 7	1 2 2 3 1		2 1
Digital Design & Visual Communications	16	11	3 3	1	1	
Management & Human Resources	1 7	11	2 12	1 2 13 11 1	1 6 3	7 17 11 3
Programming, Software and Web Design	1	20	2 3	3 3		1 2
Security & Forensics		19	1 2			2 1 3

Credential
- Diploma
- Certificate
- Associate's
- Bachelor's
- Master's
- Grad. Cert.
- Doctorate

The above view drills down further into the data presented on the previous page by showing the number of programs within each focus area in Professional Services & Operational Support. In general, private universities offer a greater diversity and more programs overall in Business Support and Accounting & Finance, there are very few program sin Security and Forensics, and an overall limited amount of higher level Master's degrees and above available.

** Values represent number of programs;*

05 Appendix

Appendix - Table of Contents

2	Additional Gap Analysis Data Tables
3	Institution Categorization
4	Categories for Program Overview
14	Industry Cluster Table
34	Occupation Cluster Table
35	College Graduate Output Tables

06 Additional Gap Analysis Data Tables

Additional Gap Analysis Data Tables – Advanced Manufacturing

Severe Shortage | Shortage | In Balance | Surplus

Gap	Occupation Group	Annual Job Openings	Completions	Education Level
	General Machinist	570	20	Certificate
	Industrial Production Supervisors	209	0	Certificate
	Heavy Vehicle Mechanics (not Aero)	106	9	Certificate
	Printing Operator	62	0	Certificate
	Semiconductor Manufacturing Technicians	16	0	Associate's
	Auto Mechanics	152	87	Certificate
	Electrical & Electronics Repairers	41	20	Certificate
	Surveying and Mapping Technicians	7	2	Certificate
	Industrial Production Technicians	228	338	Certificate
	Auto Body Repair	23	23	Certificate
	Welders	127	268	Certificate
	Environmental Scientists & Engineers	25	57	Bachelor's
	Chemists	19	47	Bachelor's
	Computer Hardware Engineers	6	86	Bachelor's
	Chemical Engineers	5	58	Bachelor's

Additional Gap Analysis Data Tables - Healthcare

Severe Shortage | Shortage | In Balance | Surplus

Gap	Occupation Group	Annual Job Openings	Completions	Education Level
	Vet Assistants & Caretakers	37	0	High School
	Dentists & Orthodontists	12	0	PhD
	Veterinarians	8	0	PhD
	Dental Laboratory Technicians	8	0	Certificate
	Psychiatric Aides	7	0	Certificate
	Animal Trainers & Caretakers	98	42	Certificate
	Dental Hygienists	46	34	Associate's
	Med & Clinical Lab Techs	39	23	Associate's
	Occupational Therapy Assistants	33	24	Associate's
	Ophthalmic Medical Technicians	27	12	Certificate
	Medical Assistants	300	333	Certificate
	Dental Assistants	78	100	Certificate
	Physical Therapist Assistants	55	69	Associate's
	Respiratory Technicians & Therapists	23	26	Associate's
	Physical Therapists	21	28	PhD
	Registered Nurses	374	757	Associate's
	Licensed Practical and Licensed Vocational Nurses	133	283	Certificate
	Medical and Health Services Managers	117	251	Bachelor's
	Pharmacy Technicians/Aides	77	188	Certificate
	Doctors, Surgeons & Psychiatrists	67	171	PhD

Additional Gap Analysis Data Tables – Transportation & Logistics

Severe Shortage | Shortage | In Balance | Surplus

Gap	Occupation Group	Annual Job Openings	Completions	Education Level
	Packers & Material Movers	1,465	0	Less than HS
	Logistics Clerks	249	0	High School
	Transportation & Logistics Managers	141	0	High School
	Ship/Marine Engineers	10	0	Bachelor's
	Airline Pilots	6	0	Bachelor's
	Ind. Truck & Tractor Operators	206	80	Less than HS
	Supply Chain Managers & Analysts	22	103	Bachelor's

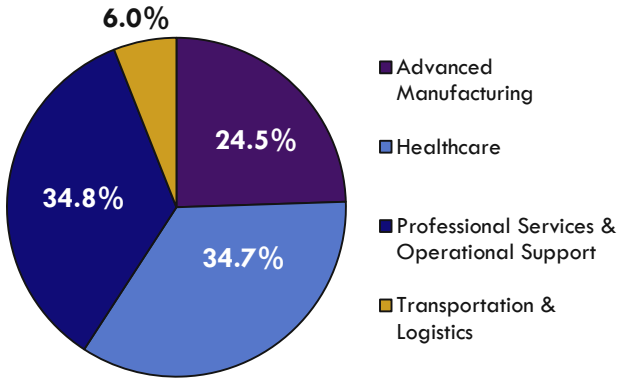
Additional Gap Analysis Data Tables – Professional Services & Operational Support

Severe Shortage | Shortage | In Balance | Surplus

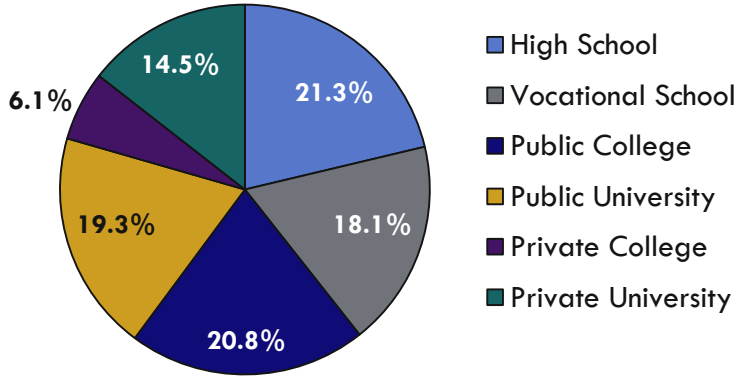
Gap	Occupation Group	Annual Job Openings	Completions	Education Level
	Accounting Support	342	84	High School
	Administrative Support Management	270	0	High School
	Computer Network Administrators	62	1	Bachelor's
	Banking Analysts	47	0	Bachelor's
	Financial Advisors	23	0	Bachelor's
	Insurance Agents & Appraisers	91	0	High School
	Executives & Management Analysts	518	314	Bachelor's
	Accountants & Tax Examiners	201	183	Bachelor's
	Computer Support Specialists	98	74	Associate's
	Software Developers	111	69	Bachelor's
	Financial Managers & Analysts	181	232	Bachelor's
	Human Resources Managers	171	117	Bachelor's
	Computer Systems & Information Security Analysts	95	191	Bachelor's
	Web Developers	11	52	Associate's
	Mathematicians & Statisticians	3	60	Master's/Prof.
	Mathematical Technicians	2	33	Bachelor's
	Economists	0	16	Master's/Prof.

Industry & Credential Breakdown

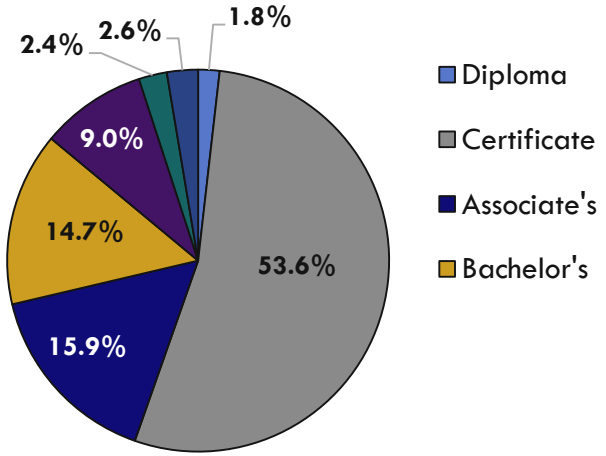
Industry



Institution Type



Credential

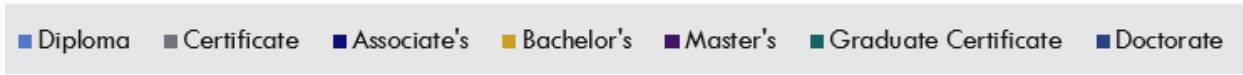


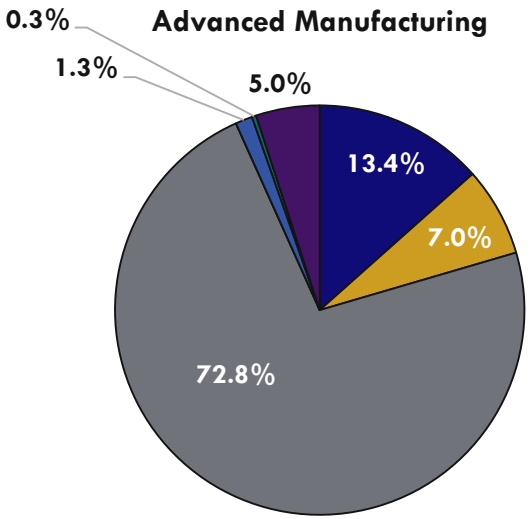
Of the regional industries of focus, Professional Services & Operational Support is slightly more present than Healthcare, at 34.9% and 34.6%, respectively. Following that is Advanced Manufacturing at 24.6% and Transportation & Logistics at 5.9%.

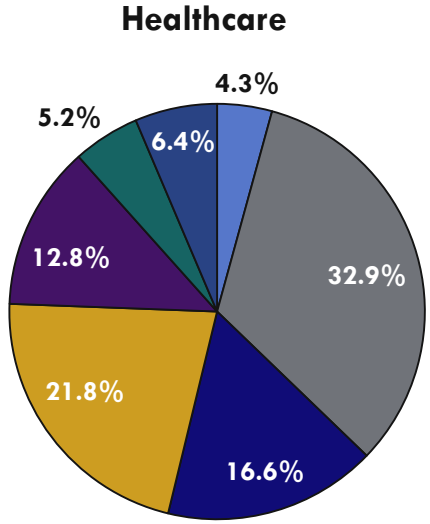
The most prevalent type of institution in the Toledo region are High Schools at 21.3%, followed closely by Public Colleges at 20.8% and an almost equal split of Private and Public Universities at 14.5% and 13.0% respectively. Institution type is an important indicator of the level of access

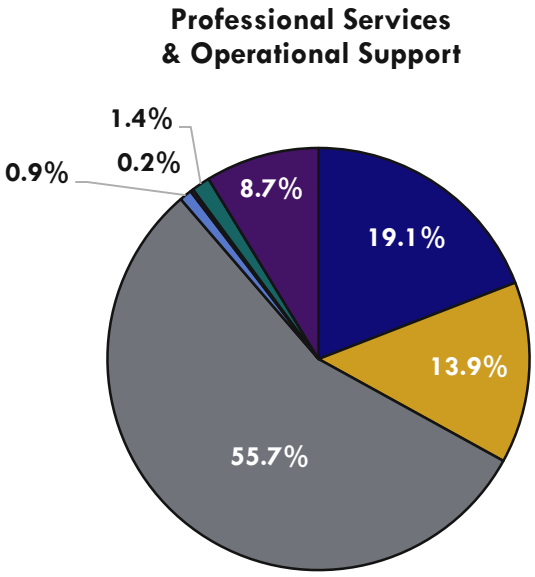
Within these industries, the most prevalent credential available in the Toledo region is a certification taking up just over half of the available credentials. Following that is an almost equal availability of Associate's and Bachelor's degrees, followed by Master's degrees at 9.0%.

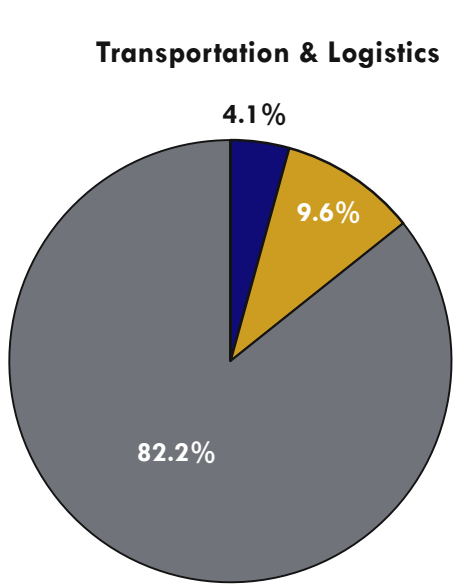
Credentials Per Sector











Advanced Manufacturing

A significant portion of the credentials available for this industry are Certificates at 72.8%. Followed by Associate's at 13.4% and Bachelors at 7.0%. However, the industry is lacking in higher level credentials such as Master's and Doctorate level credentials.

Healthcare

Within the Healthcare industry, the credential distribution is relatively equal, with the largest proportion in Certificate's at 32.8%., followed by Bachelor's-level credentials at 21.9%

Professional Services & Operational Support

Within this industry, Certificates are the most significant proportion, at just over half (55.7%), followed by Associate's degrees at 19.1%. On the lower end of the spectrum, only 8.7% of the credential pool is dedicated to Master's-level degrees.

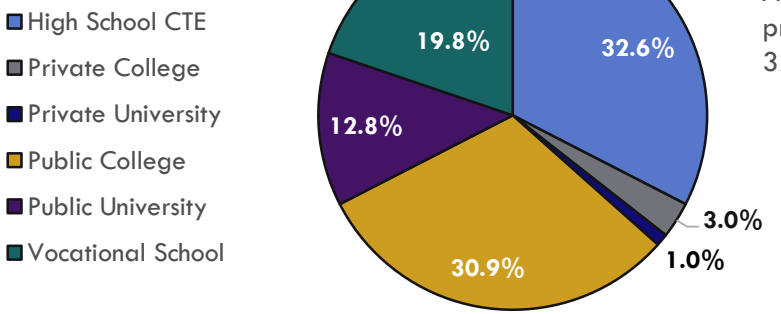
Transportation & Logistics

Within this industry, a large majority of credentials available are Certificates, at 82.2%, with the remaining credential portion in Bachelors (9.6%) and Associate's degrees (4.1%). Beyond this, there are no other types of credential offerings.

Appendix: Advanced Manufacturing Additional Data

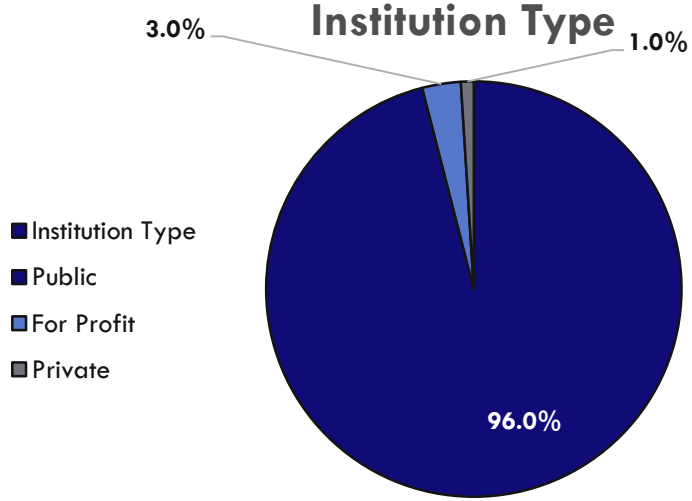
Advanced Manufacturing Programs

Institution Level



Institution Level: For all institutions that provide programming in Advanced Manufacturing, High School CTE takes up the highest proportion at high schools take up slightly more of the spread at 32.6% followed closely by Public Colleges at 30.9%

Institution Type



Institution Type: The Toledo region's institution spread for Advanced Manufacturing is dominated by Public institutions at 96%, followed by 3% For Profit Institutions and 1% of Private institutions. Understanding this makeup is important when considering the availability and access that students have – with public institutions being far more accessible than private, or for-profit institutions.

Advanced Manufacturing Higher Education

Institution	Production & Skilled Trades	Engineering	Maintenance & Repair Technologies	Renewable & Sustainable Technologies	Safety & Quality Assurance	Business & Support Services
Bowling Green State University	1 1 2	3 1 3		1 1		
Custom Training Solutions			4		3	
Lourdes University				1		
Monroe County Community College	4 3	7 5	2	2		
Northwest State Community College	2	2 5	4 1		1	1
Owens Community College	11 3	4	4 7	1	1 1	
Siena Heights University		1				
Stautzenberger College Maumee	1 1					
Terra State Community College	2 2	13 4				
University of Findlay				1		
University of Toledo		11 2 9		1		1 1

Credential
- Certificate
- Associate's
- Bachelor's
- Master's
- Graduate Certificate
- Doctorate

Advanced Manufacturing Secondary/Vocational Schools*

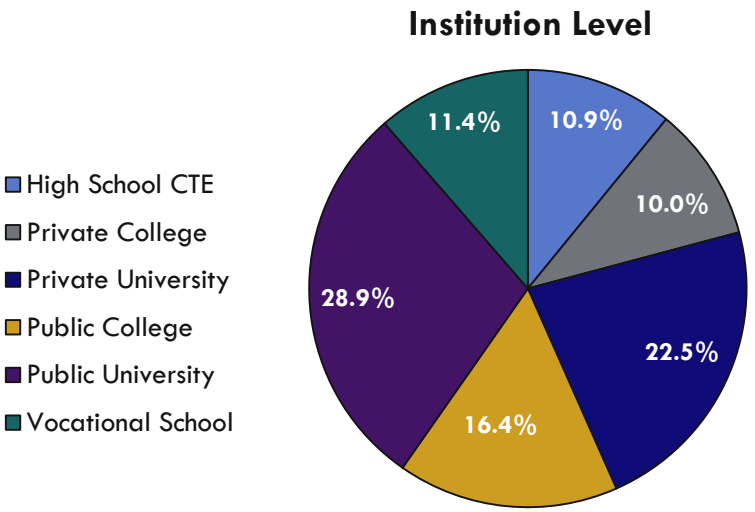
Institution	Production & Skilled Trades	Engineering	Maintenance & Repair Technologies	Renewable & Sustainable Technologies	Safety & Quality Assurance	Business & Support Services
Airport Community Schools	6	5	2			
Anthony Wayne Local School District	2					
Archbold Area Schools District	1	1				
Benton-Carroll-Salem Local School District	2					
Bowling Green Area Schools	2					
Danbury Local School District	2	2				
Eastwood Local School District	2					
Elmwood Local School District	2					
Evergreen Local School District	1	1				
Fayette Local School District	2		1			
Four County Career Center	21	6	6	3	2	2
Genoa Area Local School District	2					
Lake Local School District	2					
Maumee City School District	1					
Monroe Public Schools			1			
North Baltimore Local Schools	2					
Northwood Local School District	2					
Oregon City School District	1	2				
Otsego Local School District	2					
Ottawa Hills Local School District		1				
Penta Career Center	12	2	5			
Perrysburg Local Schools	2					
Pettisville Local School District	1	2				
Pike-Delta-York Local School District	1	1				
Port Clinton City School District	5	4				
Put-In-Bay Local School District	2	2				
Rossford Exempted Village School District	2					
Springfield Local School District	2					
Swanton Local School District	2					
Sylvania City School District		1				
Toledo Public Schools	5	4				
Washington Local School District	6	3				
Wauseon Exemplted Village School District	2					

The table to the left details high school and vocational schools programs at the Certificate level by Focus Area.

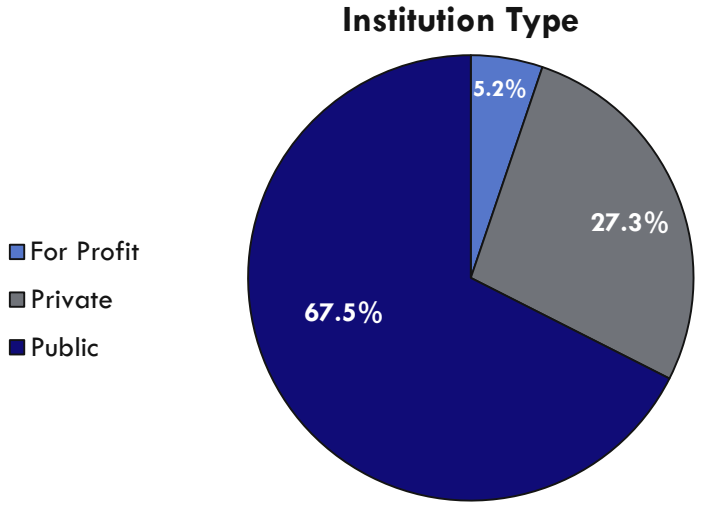
* All credential types are certificate level

Appendix: Healthcare/Medical Additional Data

Healthcare/Medical Programs



Institution Level: For all institutions that provide programming in Healthcare/Medical, public universities are the most common at 28.9%, followed closely by private universities at 22.5%



Institution Type: The Toledo region's institution spread in Healthcare/Medical is 67.5% public institutions, 27.3% private institutions, and 5.2% for profit institutions. This public institution focus is smaller in this industry than other industries, where they are more dominant. Understanding this makeup is important when considering the availability and access that students have – with public institutions being far more accessible than private, or for-profit institutions.

Healthcare/Medical Programs – Higher Education

Institution	Allied Health	Health Admin. Serv.	Advanced Health Professionals	Nursing	Biological & Biomedical Sciences	Health Technology	Mental & Social Health
Athena Career Academy				3 1			
Bowling Green State University	2	2 1	5 1 2 2	1 2	12 1 1 2		1 2
Davis College	1 1	1 1					
Herzing University	2 1	3 7 4 1		1 2 4			
Lourdes University		2	5	3 3 5	2		1
Mercy College of Ohio	6 1 1	1 1 1	1	2 2 1	1 1	1	
Monroe County Community College	1 1			2 2			
Northwest State Community College	3 6	2		2			
Orion Institute	1						
Owens Community College	7 14	6 4	1	1 2		4	1
Professional Skills Institute	1 1	1		1			
Ross College - Sylvania	2	1	1				
Siena Heights University			1 4	1	2		1
Stautzenberger College Maumee	1 2	1		1			
Terra State Community College	2 1	2 1	1	2		1	
University of Findlay	4 5 7 1	2	1 1 3 1	1	6 1 1	3 2	1
University of Toledo	2 1	3 1 2	6 17 3 10	2 1 5 6	4 3 3 11	2	1 1 1

Credential
- Diploma
- Certificate
- Associate's
- Bachelor's
- Doctorate
- Grad. Cert.
- Master's

Healthcare/Medical Programs – Secondary/Vocational Schools*

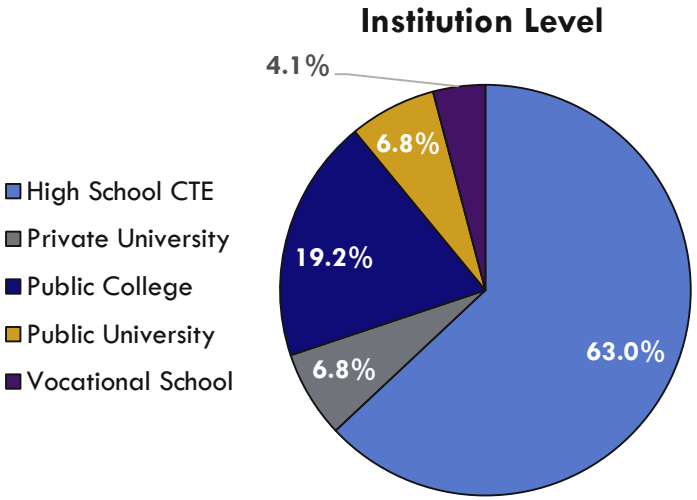
Institution	Advanced Health Professionals	Allied Health	Biological & Biomedical Sciences	Health Admin. Serv.	Nursing
Airport Community Schools		2	1		
Anthony Wayne Local School District				1	
Archbold Area Schools District			1		
Bedford Public Schools			1		1
Benton-Carroll-Salem Local School District		1			
Bowling Green Area Schools		1	1		
Danbury Local School District		3			
Eastwood Local School District		1			
Elmwood Local School District		1			
Evergreen Local School District		1			
Fayette Local School District		1			
Four County Career Center	1	22		15	2
Genoa Area Local School District		1			
Lake Local School District		1			
Maumee City School District		1			
Monroe Public Schools		1			
North Baltimore Local Schools		1			
Northwood Local School District		1			
Oregon City School District		1			
Otsego Local School District		1			
Ottawa Hills Local School District		1			
Penta Career Center		7		1	
Perrysburg Local Schools		1			
Pettisville Local School District		1			
Pike-Delta-York Local School District		1			
Port Clinton City School District		3		1	1
Put-In-Bay Local School District		3			
Rossford Exempted Village School District		1			
Springfield Local School District		1			
Swanton Local School District		1			
Sylvania City School District		1			
Toledo Public Schools		2		1	
Washington Local School District		1			
Wauseon Exemplted Village School District		1			

Credential
- Diploma
- Certificate

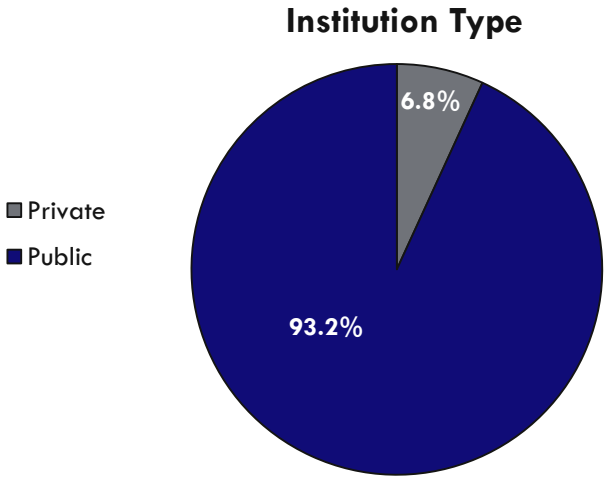
The table to the left details high school and vocational schools programs at the Certificate level by Focus Area.

Appendix: Transportation & Logistics Additional Data

Transportation & Logistics Programs



Institution Level: For all institutions that provide programming in Transportation & Logistics, the majority of programs are offered at the High School CTE level at 63%, followed by Public Colleges at 19.2%, followed by an equal amount of programs at Public Universities and Private Universities at 6.8%.



Institution Type: The Toledo region's institution spread in Transportation & Logistics almost primarily public institutions, at 93.2%. This public institution focus is smaller in this industry than other industries, where they are more dominant. Understanding this makeup is important when considering the availability and access that students have – with public institutions being far more accessible than private, or for-profit institutions.

Transportation & Logistics Programs – Higher Education

Institution	Automotive Technology	Automotive Maintenance & Repair Technolog..	Logistics & Supply Chain	Maintenance & Repair Technologies	Safety & Quality Assurance
Bowling Green State University			1	3	
Northwest State Community College			3 1		
Owens Community College			1 1		
Terra State Community College	1	7			
University of Findlay			1		1 3
University of Toledo			1		

Credential
- Certificate
- Associate's
- Bachelor's
- Master's

Transportation & Logistics Programs – Secondary/Vocational Schools*

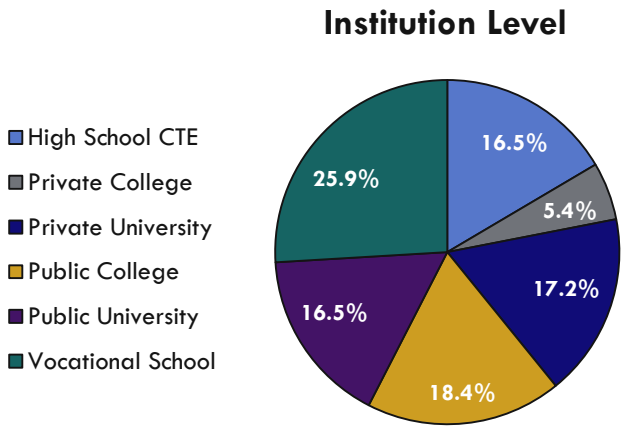
Institution	Automotive Technology	Automotive Maintenance & Repair Technologies	Logistics & Supply Chain	Maintenance & Repair Technologies
Airport Community Schools				2
Anthony Wayne Local School District	1			
Archbold Area Schools District		1		1
Bedford Public Schools	1			
Benton-Carroll-Salem Local School District	1			
Bowling Green Area Schools	1			
Danbury Local School District	2			1
Eastwood Local School District	1			
Elmwood Local School District	1			
Evergreen Local School District		1		1
Fayette Local School District	1			
Four County Career Center			3	
Genoa Area Local School District	1			
Lake Local School District	1			
Maumee City School District	1			
North Baltimore Local Schools	1			
Northwood Local School District	1			
Oregon City School District	1			
Otsego Local School District	1			
Perrysburg Local Schools	1			
Pettisville Local School District		1		1
Pike-Delta-York Local School District		1		1
Port Clinton City School District	2			1
Put-In-Bay Local School District	1	2		
Rossford Exempted Village School District	1			
Springfield Local School District	1			
Swanton Local School District	1			
Toledo Public Schools	2	1	2	
Washington Local School District		1	1	
Wauseon Exemplted Village School District				2

The table to the left details high school and vocational schools programs at the Certificate level by Focus Area.

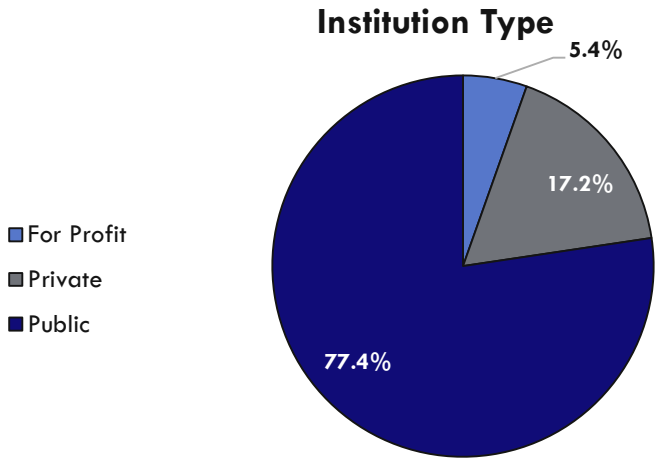
* All credential types are at the certificate level

Appendix: Professional Services & Operational Support Additional Data

Professional Services & Operational Support Programs



Institution Level: For all institutions that provide programming in xxx



Institution Type: The Toledo region's institution spread in Transportation & Logistics almost primarily public institutions, at 93.2%... for profit institutions. This public institution focus is smaller in this industry than other industries, where they are more dominant. Understanding this makeup is important when considering the availability and access that students have – with public institutions being far more accessible than private, or for-profit institutions.

Professional Services & Operational Support Programs – Higher Education

Institution	Management & Human Resources	Computer & Information Sciences, General	Accounting & Finance	Business & Support Services	Data & Technology Management	Computer Engineering	Digital Design & Visual Communications	Programming, Software and Web Design	Sec. & Forensics
Bowling Green State University	5 4	2	1 3	1	2 1 2	2			
Custom Training Solutions	6	11							
Davis College	2		1				1		
Herzing University	1 4 2 1	1 1	1 2 1 1 1		2 1			1 2	1
Lourdes University	1 3 1 4		1						
Monroe County Community College	1	1 2	1 2	2	2 2				1
Northwest State Community College	4	2 2	2	2 2			1 1	1	1 1
Owens Community College	5	1 2	5 2	2 4	1 4		1 1	2 2	
Siena Heights University	2 5 3	1 1	2 2						
Stautzenberger College Maumee	1 1								
Terra State Community College	2 2	1 1	1	1 1	1 1		1 1		
University of Findlay	3 5 3	1 1 1	1 2	2					2 3
University of Toledo	1 2 8 1 7	1 3 1 1	2 3 2		1 2 1	2 2	1	3 3	

Credential
- Diploma
- Certificate
- Associate's
- Bachelor's
- Doctorate
- Grad. Cert.
- Master's

Professional Services & Operational Support Programs – Secondary/Vocational Schools*

Institution	Business & Support Services	Accounting & Finance	Computer & Information Sciences, General	Computer Engineering	Data & Technology Management	Digital Design & Visual Communications	Management & Human Resources	Programming, Software and Web Design	Sec. & Forensics
Airport Community Schools	1					2			
Anthony Wayne Local School District	1								
Archbold Area Schools District			1			1	1		
Bedford Public Schools		1				1	1		
Benton-Carroll-Salem Local School District	1								
Bowling Green Area Schools	1						1		
Danbury Local School District	1		1			1			
Eastwood Local School District	1								
Elmwood Local School District	1								
Evergreen Local School District			1			1	1		
Fayette Local School District			1						
Four County Career Center	4	10	4		18	4	5	17	18
Genoa Area Local School District	1								
Lake Local School District	1								
Maumee City School District	1								
Monroe Public Schools			1				1		
North Baltimore Local Schools	1								
Northwood Local School District	1								
Oregon City School District						1		1	
Otsego Local School District	1								
Ottawa Hills Local School District	1	1	1			1			
Penta Career Center	2	3	6		2	7	6	3	1
Perrysburg Local Schools	1								
Pettisville Local School District			1			1			
Pike-Delta-York Local School District	1		1			1			
Port Clinton City School District			2			1	1		
Put-In-Bay Local School District	1		1			1			
Rossford Exempted Village School District	1								
Springfield Local School District	1								
Swanton Local School District	1								
Sylvania City School District	1	1	2			1			
Toledo Public Schools		1	1	1 1		2	2		
Washington Local School District			1						
Wauseon Exempted Village School District	2		1			1			

The table to the left details high school and vocational schools programs at the Certificate and Diploma level by Focus Area.

Credential

- Diploma
- Certificate

* All credential types are certificate level

06 Institution Categorization Tables

Institution Categorization

Institution	Type of Institution	County	State
Four County Career Center	CTE	Defiance, Fulton, Henry, Williams	Ohio
Penta Career Center	CTE	Fulton, Lucas, Ottawa, Sandusky, Wood	Ohio
Athena Career Academy	Higher Education	Monroe	Michigan
Bowling Green State University	Higher Education	Wood	Ohio
Davis College	Higher Education	Lucas	Ohio
Herzing University	Higher Education	Lucas	Ohio
Lourdes University	Higher Education	Lucas	Ohio
Mercy College of Ohio	Higher Education	Lucas	Ohio
Monroe County Community College	Higher Education	Monroe	Michigan
Northwest State Community College	Higher Education	Fulton	Ohio
Owens Community College	Higher Education	Lucas	Ohio
Professional Skills Institute	Higher Education	Lucas	Ohio
Ross College - Sylvania	Higher Education	Lucas	Ohio
Siena Heights University	Higher Education	Lenawee	Michigan
Stautzenberger College Maumee	Higher Education	Lucas	Ohio
Terra State Community College	Higher Education	Sandusky	Ohio
University of Findlay	Higher Education	Hancock	Ohio
University of Toledo	Higher Education	Lucas	Ohio
Airport Community Schools	K-12	Monroe	Michigan
Anthony Wayne Local School District	K-12	Lucas	Ohio
Archbold Area Schools District	K-12	Fulton	Ohio
Bedford Public Schools	K-12	Monroe	Michigan

Institution Categorization

Institution	Type of Institution	County	State
Benton-Carroll-Salem Local School District	K-12	Ottawa	Ohio
Bowling Green Area Schools	K-12	Wood	Ohio
Danbury Local School District	K-12	Ottawa	Ohio
Eastwood Local School District	K-12	Wood	Ohio
Elmwood Local School District	K-12	Wood	Ohio
Evergreen Local School District	K-12	Fulton	Ohio
Genoa Area Local School District	K-12	Ottawa	Ohio
Gorham Fayette Local School District	K-12	Fulton	Ohio
Lake Local School District	K-12	Wood	Ohio
Maumee City School District	K-12	Lucas	Ohio
Middle Bass Local School District	K-12	Ottawa	Ohio
Monroe Public Schools	K-12	Monroe	Michigan
North Baltimore Local Schools	K-12	Wood	Ohio
North Bass Local School District	K-12	Ottawa	Ohio
Northwood Local School District	K-12	Wood	Ohio
Oregon City School District	K-12	Lucas	Ohio
Otsego Local School District	K-12	Wood	Ohio
Ottawa Hills Local School District	K-12	Lucas	Ohio
Perrysburg Local Schools	K-12	Wood	Ohio
Pettisville Local School District	K-12	Fulton	Ohio
Pike-Delta-York Local School District	K-12	Fulton	Ohio
Port Clinton City School District	K-12	Ottawa	Ohio
Put-In-Bay Local School District	K-12	Ottawa	Ohio
Rossford Exempted Village School District	K-12	Wood	Ohio
Springfield Local School District	K-12	Lucas	Ohio
Swanton Local School District	K-12	Fulton	Ohio
Sylvania City School District	K-12	Lucas	Ohio
Toledo Public Schools	K-12	Lucas	Ohio
Washington Local School District	K-12	Lucas	Ohio
Wauseon Exemplted Village School District	K-12	Fulton	Ohio

06

Categories for Program Overview

Categories for Program Overview – Advanced Manufacturing

Focus Area/Competency	Program Type
Business & Support Services	Business Operations
	Logistics & Supply Chain Management
	Purchasing & Procurement
	Sales
Engineering	Aerospace, Aeronautical, and Astronautical Engineering
	Architectural/Construction Engineering
	Bio/Biomedical Engineering, Biotechnology
	Chemical Engineering
	Civil Engineering
	Computer Engineering
	Computer Hardware Engineering
	Computer Software Engineering
	Electrical Engineering
	Engineering Sciences
	Engineering, General
	Environmental, Energy, and Systems Engineering
	Industrial/Manufacturing Engineering
	Mechanical Engineering

Categories for Program Overview – Advanced Manufacturing

Focus Area/Competency	Program Type
Engineering Technology	Civil Engineering Technologies/Technicians
	Computer Engineering Technologies
	Drafting and Design
	Electrical Engineering Technology
	Engineering Technology, General
	Environmental Control Technology
	Industrial Production Technology
	Mechanical Engineering Technology
Maintenance & Repair Technologies	Aircraft Powerplant Technology
	Autobody/Collision and Repair Technology
	Automotive Mechanics Technology
	Avionics Maintenance Technology
	Diesel Mechanics Technology
	Engine Machinist
	Heavy/Industrial Equipment Maintenance Technologies
	Maintenance, Installation and Repair
	Medium/Heavy Vehicle and Truck Technology
	Small Engine Mechanics and Repair Technology
	Vehicle Maintenance and Repair Technology

Categories for Program Overview – Advanced Manufacturing

Focus Area/Competency	Program Type
Production & Skilled Trades	Carpenter
	CNC
	Electrician
	Forklift Training
	HVAC
	Machining
	Plumber
	Production Process Development
	Sheet Metal Technology/Sheetworking
	Welding
Safety & Quality Assurance	Health, Safety and Environmental Assurance
	Inventory Control
	Quality Assurance
	Quality Control
	Safety Management

Categories for Program Overview – Healthcare

Focus Area/Competency	Program Type
Advanced Health Professionals (including Preparatory Programs)	Dentistry (and other Oral Science)
	Nutritionist/Dietician
	Pharmacist
	Physical/Occupational Therapy (and other Rehabilitation Science)
	Physician
	Physician's Assistant
	Speech-Language Pathology (and other Communications Disorders)
Allied Health, Medical, Laboratory, & Diagnostic Support	Cardiovascular Technology
	Clinical Technician
	Dental Assisting/Hygiene
	Diagnostic Medical Sonography
	Dietetic/Nutrition Technician/Assistant
	EMT/Paramedic
	Medical/Clinical Assistant
	MRI Technology
	Pharmacy Technician

Categories for Program Overview – Healthcare

Focus Area/Competency	Program Type
Allied Health, Medical, Laboratory, & Diagnostic Support	Phlebotomy Technician
	Physician Assistant
	Radiologic Technology/Science
	Respiratory Therapy
	Sterile Processing Technology
	Surgical Technology
Biological & Biomedical Sciences	Bio/Biomedical Engineering, Biotechnology
	Biochemistry and Molecular Biology
	Biology Sciences, General (e.g. Biology)
	Cell/Cellular Biology
	Genetics
	Microbiological Immunology
	Neurobiology and Neurosciences
	Physiology, Pathology, and Related Sciences
Gerontology	Gerontology (Non-Nursing)

Categories for Program Overview – Healthcare

Focus Area/Competency	Program Type
Health & Medical Administrative Services	Bioethics/Medical Ethics
	Health Administration/Management
	Medical Coding and Billing
	Medical Office Support
	Medical Transcription
	Public Health and Public Health Education
Health Technology	Biomathematics and Bioinformatics
	Health Information Technology
Health, General	Health Sciences, General
	Health and Wellness, General
Mental & Social Health	Clinical and Applied Psychology
	Clinical/Medical Social Work
	Marriage and Family Counseling
	Mental Health Counseling
	Substance Abuse/Addiction

Categories for Program Overview – Healthcare

Competency/Focus Area	Program Type
Nursing	Family Practice Nursing
	Geriatric Nursing
	Licensed/Vocational Practical Nursing
	Nurse Practitioner
	Nursing Administration
	Nursing Assistance/Aid
	Nursing Education
	Nursing, General (incl. RN, BSN, ASN)

Categories for Program Overview – Professional Services & Operational Support

Competency/Focus Area	Program Type
Accounting	Accounting and Business Management
	Accounting and Finance
	Bookkeeping
Administrative Support	General Office Occupations and Clerical Services
	Paraprofessionals
	Legal Services
Business & Support Services	Business Administration and Management, General
	Customer Service, Call Center Management
Computer & Information Sciences, General	Computer Science
	Computer Support Specialist
	Information Science
	Information Technology
Computer Engineering	Computer Engineering
	Computer Engineering Technology
	Computer Hardware Engineering
	Computer Software Engineering

Categories for Program Overview – Professional Services & Operational Support

Competency/Focus Area	Program Type
Data & Technology Management	Data Science
	Database Management
	Management Information Systems
	Technology Management
Digital Design & Visual Communications	Digital Arts
	Game and Interactive Media Design
	Graphic Design
Finance	Banking and Financial Support Services
	Budget Analyst
	Credit Management
	Finance Management
	Finance, General
	Financial Planning
	Investments and Securities
	Mortgages and Housing Finance
	Personal Finance

Categories for Program Overview – Professional Services & Operational Support

Competency/Focus Area	Program Type
Human Resources	Human Resources Management
	Learning and Development Management
Insurance	Insurance
	Risk Management
	Actuarial Sciences
Management	Business Administration and Management, General
	General Management
	Business Operations Management
	Leadership Development
Programming, Software and Web Design	Computer Programming, Specific Applications (e.g. JAVA)
	Computer Programming/Programmer, General
	Web Page and Digital Design
Security & Forensics	Cyber/Computer Forensics and Counterterrorism
	Systems Security/Information Assurance
Systems & Networking	Computer Systems Analysis
	Computer Systems Networking
	Network and System Administration

06 Industry Cluster Tables

Industry Clusters

Toledo Region

Cluster	2012	2017	Net New	% Growth	LQ '17	'17 Shr	United States % Growth	United States '17 Shr
Aerospace	201	243	41	20.6%	0.24	0.1%	-2.1%	0.3%
Agribusiness & Food	3,260	2,796	-464	-14.2%	0.56	0.9%	11.0%	1.6%
Apparel & Textiles	473	362	-111	-23.5%	0.32	0.1%	-4.9%	0.4%
Automotive	10,756	15,511	4,755	44.2%	5.44	5.1%	17.9%	0.9%
Back Office	20,033	23,586	3,553	17.7%	1.03	7.7%	13.5%	7.4%
Biomedical	658	1,115	457	69.5%	0.65	0.4%	4.8%	0.6%
Construction	20,817	22,612	1,795	8.6%	1.11	7.4%	20.6%	6.6%
Consumer Goods Mftg	678	826	147	21.7%	0.58	0.3%	2.5%	0.5%
Creative Content	3,845	3,117	-728	-18.9%	0.69	1.0%	0.2%	1.5%
Education	27,452	26,634	-817	-3.0%	0.93	8.7%	4.1%	9.3%
Electronics	3,299	3,606	307	9.3%	0.68	1.2%	-0.1%	1.7%
Energy	3,617	3,310	-308	-8.5%	1.13	1.1%	-10.8%	1.0%
Entertainment	34,124	35,818	1,694	5.0%	1.04	11.7%	15.6%	11.2%
Finance	8,923	9,020	96	1.1%	0.56	2.9%	7.6%	5.2%
Furniture	2,404	3,098	694	28.9%	2.90	1.0%	12.6%	0.3%
Government	18,158	18,160	2	0.0%	0.76	5.9%	1.7%	7.8%
Healthcare	48,664	49,222	558	1.1%	1.19	16.1%	14.6%	13.5%
Industrial Machinery	7,069	7,594	525	7.4%	1.17	2.5%	-0.1%	2.1%
Materials	5,201	5,575	375	7.2%	1.43	1.8%	4.4%	1.3%
Metalworking	6,281	6,193	-88	-1.4%	1.61	2.0%	-1.0%	1.3%
Mining & Logging	229	287	58	25.1%	0.66	0.1%	1.1%	0.1%
Non-Profits	3,269	3,338	69	2.1%	1.15	1.1%	3.1%	1.0%
Professional Services	8,019	7,856	-163	-2.0%	0.87	2.6%	7.5%	3.0%
Research	1,483	1,341	-142	-9.6%	0.31	0.4%	16.5%	1.4%
Retail	38,857	38,889	33	0.1%	0.97	12.7%	4.4%	13.1%
Software / Info. Tech.	1,183	1,373	190	16.0%	0.21	0.4%	29.2%	2.1%
Telecom Services	1,414	1,537	122	8.7%	0.93	0.5%	-9.1%	0.5%
Transportation & Logistics	10,471	12,365	1,894	18.1%	1.19	4.0%	19.0%	3.4%
Total	291,605	306,303	14,698	5.0%	1.00	100.0%	9.2%	100.0%

06 Occupation Cluster Table

Occupation Clusters

Toledo Region

United States

Code	Cluster	2012	2017	Net New	% Growth	LQ '17	'17 Share	% Growth	'17 Share
AG	Agriculture	803	926	123	15.3%	0.40	0.3%	9.4%	0.8%
ARCH	Architecture	192	216	24	12.5%	0.57	0.1%	18.1%	0.1%
BACK	Back Office	39,372	38,842	-530	-1.3%	0.87	12.7%	4.1%	14.6%
BIZ	Business	5,840	6,416	576	9.9%	0.61	2.1%	16.6%	3.4%
COMM	Communications	874	837	-37	-4.2%	0.61	0.3%	8.1%	0.5%
COMP	Computer	4,359	4,831	472	10.8%	0.45	1.6%	16.0%	3.5%
CONS	Construction	10,364	11,757	1,392	13.4%	0.96	3.8%	18.1%	4.0%
DESI	Design	1,252	1,181	-71	-5.6%	0.59	0.4%	17.1%	0.7%
ED	Education	20,733	20,678	-55	-0.3%	1.14	6.8%	5.1%	5.9%
ENG	Engineering	4,741	5,234	493	10.4%	0.83	1.7%	6.9%	2.1%
FIN	Financial	5,323	5,706	383	7.2%	0.62	1.9%	10.5%	3.0%
GEO	Geology	27	49	23	85.2%	0.12	0.0%	-26.1%	0.1%
HOSP	Hospitality	42,153	43,987	1,834	4.4%	1.07	14.4%	10.6%	13.4%
LEGA	Legal	1,332	1,361	29	2.2%	0.57	0.4%	6.9%	0.8%
LOGI	Logistics	28,268	31,425	3,156	11.2%	1.14	10.3%	13.3%	9.0%
MATH	Math	94	115	21	22.3%	0.31	0.0%	37.1%	0.1%
MECH	Mechanics	11,597	12,784	1,187	10.2%	1.08	4.2%	9.1%	3.9%
MED	Medical	31,623	31,275	-348	-1.1%	1.14	10.2%	9.4%	9.0%
MFTG	Plant Operators	1,151	1,145	-6	-0.5%	1.42	0.4%	3.0%	0.3%
MKTG	Sales & Marketing	1,948	1,634	-315	-16.2%	0.79	0.5%	1.8%	0.7%
PERF	Performance	1,387	1,385	-1	-0.1%	1.17	0.5%	5.3%	0.4%
POLI	Political	90	87	-3	-3.2%	0.32	0.0%	8.1%	0.1%
PROD	Production	24,923	27,368	2,445	9.8%	1.76	8.9%	6.1%	5.1%
SERV	Personal Services	28,512	29,399	887	3.1%	0.82	9.6%	10.5%	11.7%
SOCI	Social Service	14,125	14,613	487	3.4%	1.02	4.8%	7.3%	4.7%
TOT	**All Occupations**	**291,605**	**306,303**	**14,698**	**5.0%**	**1.00**	**100.0%**	**9.2%**	**100.0%**

06 College Graduate Output Tables

College Graduate Output by Award Level

Graduate Clusters by Award Level

Toledo Region

	2016 Graduates				
Cluster	**Certificate**	**Associate's**	**Bachelor's**	**Master's +**	**Total**
Agriculture	1	35	47	0	83
Architecture	0	0	45	5	50
Business, Finance, Economics	49	271	761	330	1,414
Creative Arts and Design	8	43	288	73	414
Construction	184	15	0	0	199
Education	81	78	750	399	1,356
Science & Engineering	49	147	930	347	1,487
Family Development	3	7	351	53	428
Government, Social Work, Criminology	0	104	396	103	604
Health Care	879	919	1,290	785	3,916
Legal	8	10	13	91	124
Mathematics	0	1	33	60	94
Media and Communications	0	15	409	59	490
Mechanics and Machine Repair	57	10	0	0	67
Liberal / Multicultural Studies	1	207	484	78	783
Personal Services / Hospitality	208	120	0	0	328
Software and Computer Sciences	10	74	60	132	276
Transportation Professionals	0	1	124	0	125
	1,538	**2,057**	**5,981**	**2,515**	**12,238**

College Graduate Output by Degree Cluster

Graduate Clusters - All Degree Levels

Toledo Region

Cluster	2006	2016	Net New	% Growth	LQ '16	U.S. % Growth
Agriculture	69	83	14	20.3%	0.53	43.7%
Architecture	62	50	-12	-19.4%	1.11	9.9%
Business, Finance, Economics	1,721	1,414	-307	-17.8%	0.76	22.0%
Creative Arts and Design	494	414	-80	-16.2%	1.15	9.0%
Construction	49	199	150	306.1%	0.95	94.7%
Education	1,874	1,356	-518	-27.6%	1.84	-12.1%
Science & Engineering	1,154	1,487	333	28.9%	1.25	58.4%
Family Development	330	428	98	29.7%	1.21	58.2%
Government, Social Work, Criminology	664	604	-60	-9.0%	0.71	37.0%
Health Care	2,524	3,916	1,392	55.2%	1.42	46.6%
Legal	245	124	-121	-49.4%	0.78	-6.9%
Mathematics	60	94	34	56.7%	1.04	68.0%
Media and Communications	588	490	-98	-16.7%	1.02	12.7%
Mechanics and Machine Repair	34	67	33	97.1%	0.24	27.0%
Liberal / Multicultural Studies	690	783	93	13.5%	0.46	43.3%
Personal Services / Hospitality	86	328	242	281.4%	0.80	29.7%
Software and Computer Sciences	258	276	18	7.0%	0.58	32.7%
Transportation Professionals	61	125	64	104.9%	1.26	19.5%
Total	**10,963**	**12,238**	**1,275**	**11.6%**	**1.00**	32.1%

College Graduate Output by Degree Cluster (Certificates)

Graduate Clusters - Certificates

Toledo Region

Cluster	2006	2016	Net New	% Growth	LQ '16	U.S. % Growth
Agriculture	0	1	1		0.10	8.3%
Architecture	0	0	0		0.00	-4.8%
Business, Finance, Economics	106	49	-57	-53.8%	0.38	31.6%
Creative Arts and Design	7	8	1	14.3%	0.47	-19.1%
Construction	45	184	139	308.9%	1.57	21.8%
Education	20	81	61	305.0%	4.68	4.9%
Science & Engineering	74	49	-25	-33.8%	0.89	20.2%
Family Development	0	3	3		0.08	21.0%
Government, Social Work, Criminology	3	0	-3	-100.0%	0.00	18.6%
Health Care	715	879	164	22.9%	1.68	-30.9%
Legal	26	8	-18	-69.2%	1.07	-20.5%
Mathematics	0	0	0		0.00	149.3%
Media and Communications	0	0	0		0.00	14.9%
Mechanics and Machine Repair	28	57	29	103.6%	0.44	-11.9%
Liberal / Multicultural Studies	0	1	1		0.01	100.7%
Personal Services / Hospitality	51	208	157	307.8%	1.05	-10.0%
Software and Computer Sciences	15	10	-5	-33.3%	0.17	23.7%
Transportation Professionals	0	0	0		0.00	6.8%
Total	**1,090**	**1,538**	**448**	**41.1%**	**1.00**	**-7.8%**

College Graduate Output by Degree Cluster (Associate's)

Graduate Clusters - Associate's Degrees

Toledo Region

Cluster	2006	2016	Net New	% Growth	LQ '16	U.S. % Growth
Agriculture	35	35	0	0.0%	2.17	20.4%
Architecture	0	0	0		0.00	-16.3%
Business, Finance, Economics	334	271	-63	-18.9%	1.33	-11.0%
Creative Arts and Design	40	43	3	7.5%	1.03	-6.2%
Construction	4	15	11	275.0%	0.68	5.6%
Education	57	78	21	36.8%	2.30	-25.8%
Science & Engineering	156	147	-9	-5.8%	1.08	11.9%
Family Development	10	7	-3	-30.0%	0.20	-3.2%
Government, Social Work, Criminology	186	104	-82	-44.1%	1.00	-4.6%
Health Care	754	919	165	21.9%	2.18	-3.2%
Legal	44	10	-34	-77.3%	0.61	-30.3%
Mathematics	1	1	0	0.0%	0.17	84.4%
Media and Communications	8	15	7	87.5%	0.54	36.1%
Mechanics and Machine Repair	6	10	4	66.7%	0.14	-11.8%
Liberal / Multicultural Studies	117	207	90	76.9%	0.26	24.2%
Personal Services / Hospitality	10	120	110	1100.0%	2.06	-9.0%
Software and Computer Sciences	81	74	-7	-8.6%	1.17	-21.3%
Transportation Professionals	0	1	1		0.24	-49.3%
Total	**1,843**	**2,057**	**214**	**11.6%**	**1.00**	**3.9%**

College Graduate Output by Degree Cluster (Bachelor's)

Graduate Clusters - Bachelor's Degrees

Toledo Region

Cluster	2006	2016	Net New	% Growth	LQ '16	U.S. % Growth
Agriculture	34	47	13	38.2%	0.38	28.0%
Architecture	62	45	-17	-27.4%	1.63	-9.6%
Business, Finance, Economics	947	761	-186	-19.6%	0.66	1.8%
Creative Arts and Design	366	288	-78	-21.3%	1.00	-0.7%
Construction	0	0	0		0.00	-34.9%
Education	1,111	750	-361	-32.5%	2.75	-16.7%
Science & Engineering	743	930	187	25.2%	1.11	29.4%
Family Development	276	351	75	27.2%	1.30	29.4%
Government, Social Work, Criminology	400	396	-4	-1.0%	0.72	8.7%
Health Care	787	1,290	503	63.9%	1.19	42.6%
Legal	36	13	-23	-63.9%	0.99	-3.7%
Mathematics	24	33	9	37.5%	0.47	32.5%
Media and Communications	505	409	-96	-19.0%	0.94	-0.3%
Mechanics and Machine Repair	0	0	0		0.00	45.2%
Liberal / Multicultural Studies	453	484	31	6.8%	0.91	-10.8%
Personal Services / Hospitality	25	0	-25	-100.0%	0.00	15.6%
Software and Computer Sciences	123	60	-63	-51.2%	0.26	44.7%
Transportation Professionals	61	124	63	103.3%	4.32	33.0%
Total	**5,953**	**5,981**	**28**	**0.5%**	**1.00**	**12.0%**

College Graduate Output by Degree Cluster (Master's+)

Graduate Clusters - Master's, Professional, and Doctorate Degrees

Toledo Region

Cluster	2006	2016	Net New	% Growth	LQ '16	U.S. % Growth
Agriculture	0	0	0		0.00	18.6%
Architecture	0	5	5		0.23	3.0%
Business, Finance, Economics	334	330	-4	-1.2%	0.67	0.3%
Creative Arts and Design	81	73	-8	-9.9%	1.42	10.8%
Construction	0	0	0		0.00	31.6%
Education	676	399	-277	-41.0%	0.97	-18.9%
Science & Engineering	181	347	166	91.7%	1.27	28.1%
Family Development	44	53	9	20.5%	1.36	21.8%
Government, Social Work, Criminology	74	103	29	39.2%	0.57	16.9%
Health Care	247	785	538	217.8%	1.38	30.7%
Legal	139	91	-48	-34.5%	0.76	-11.2%
Mathematics	35	60	25	71.4%	2.26	37.8%
Media and Communications	75	59	-16	-21.3%	0.88	-8.5%
Mechanics and Machine Repair	0	0	0		0.00	302.3%
Liberal / Multicultural Studies	117	78	-39	-33.3%	0.72	-2.6%
Personal Services / Hospitality	0	0	0		0.00	0.6%
Software and Computer Sciences	39	132	93	238.5%	1.08	81.2%
Transportation Professionals	0	0	0		0.00	0.5%
Total	**2,042**	**2,515**	**473**	**23.2%**	**1.00**	**7.6%**