

# TRANSPORTATION DISTRIBUTION AND LOGISTICS: APPRENTICESHIP ACCELERATION IN WEST TENNESSEE



Department of  
**Economic &  
Community Development**



THE UNIVERSITY OF  
**MEMPHIS**

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## Executive Summary

Apprenticeships, casually defined as young people learning skills on the job from a master craftsman, have existed since the Middle Ages. However, the evolution of an Apprenticeship model has not kept pace with the rapidly changing transportation workplace. New technologies including Artificial Intelligence, enhanced automation, autonomous vehicles, truck platooning, positive train control plus technologies not yet developed, combined with the exit of “Baby Boomers” from the workforce, require an immense expansion of a highly skilled workforce, almost immediately.

This project focused on developing a strategy for accelerating transportation-related apprenticeships in the greater Memphis area. The research methodology included labor market analysis, best practice review, stakeholder engagement, career pathway analysis, educational program and curriculum review, and an assessment of secondary and post-secondary needs.

From our findings, variations of existing Apprenticeship models that incorporate both the “earn and learn” model and pre-apprenticeship programming, but also value the importance of community partnerships, both private and public, should be enhanced by thoughtful consideration of best practices including: the ability to incorporate minors and provide experiential learning opportunities, early implementation of workforce development/ career pathway planning for middle school students, offer healthcare compensation and provide childcare and transportation options for apprentices, and address the public misconception of how transportation careers and apprenticeship programs are defined. Through success stories and clearly defined programming, it is critical that Apprenticeships be marketed and promoted in a way that elevates the current understanding of the term, thus elevating its status, the same with transportation careers- help the public realize this occupational segment has expanded to include highly technical, highly skilled workers.

Successful Apprenticeship programs will invite women, veterans, and persons with disabilities and welcome all socioeconomic backgrounds, levels of preparation, interest level, and a full range of educational aspirations. Overall an ideal model will provide seamless transition from secondary to postsecondary programs with appropriate support between levels as needed.

Priority occupations that emerged from this work included heavy and commercial drivers, bus and truck mechanics and diesel engine specialists, industrial engineers, and computer and information systems managers. As technologies continue to evolve, engineering and STEM pathways to transportation careers will become increasingly important. The value of apprenticeships also has the potential to rise, as employers look for innovative ways to address workforce challenges and adapt training in real time to technology shifts. In order to position the greater Memphis area for accelerated adoption of apprenticeship models, it is crucial to increase awareness of apprenticeship programs by all stakeholders and elevate the image of apprenticeships so that they are more attractive to students and parents. Continuing to innovate models for nontraditional occupations, such as the new apprenticeship in engineering, will accelerate this process and improve perceptions with all stakeholders.

With the data analysis and research findings from this project in mind, it is suggested that the following three occupations be targeted for apprenticeship expansion in the greater Memphis area:

**diesel technicians, CDL drivers, and Engineering/STEM.** The proposed strategy includes launching three pilot initiatives in 2018. These pilots are structured around apprenticeable occupations, have strong industry-academia-community partnerships already in place, and have a readily accessible cohort of potential candidates. Beginning with these target areas should provide valuable insight, impact data, and best practice from which to further accelerate apprenticeship models in the greater Memphis area.

## 1.0 Introduction

In recent years, there has been increasing focus on attracting and retaining qualified workers into the transportation industry with the recognition that an unprecedented number of transportation professionals would be eligible for retirement due to the aging “Baby Boomer” population. The transportation industry is broad-based, occupationally diverse, and rapidly changing. As autonomous vehicles and connected infrastructure, the sharing economy, artificial intelligence (AI), the Internet of Things (IoT), and availability of big data transform the landscape, the transportation workforce must also adapt. Transportation workforce challenges are recognized at the state, local, and national levels as the rapid pace of technological advance creates an ever-changing environment requiring workers who are adaptive, tech-savvy, adept at critical thinking and problem solving, and who possess crucial communication skills<sup>1-3</sup>. At the same time, the number of people explicitly choosing transportation occupations and preparing for these careers is insufficient. Demand outpaces supply for workers in many transportation occupations, with no remedy in sight as the industry suffers from lack of awareness of transportation careers, misperceptions about career opportunities, limited programs providing early exposure (and targeted messaging) for youth, women, veterans, and other groups with significant potential to fill these workforce gaps.

As the demands in the workforce and workplace continue to evolve, so must our approach to workforce development. Apprenticeship programs are gaining increased traction nationally due to the recognition that such ‘earn and learn’ and ‘on the job training’ opportunities provide workers with relevant education and training combined with the critical aspect of experience that provide more direct pathways for students to enter targeted occupations<sup>4</sup>. Additionally, apprenticeship programs may increase access for persons with disabilities and provide a mechanism for attracting and retaining a more diverse workforce that is inclusive of women, ethnic minorities, veterans, and other frequently underrepresented groups, where other approaches have failed to address these diversity challenges<sup>5-6</sup>.

These workforce challenges are particularly daunting in the greater Memphis region, where an extensive transportation and logistics sector employs more than 12% of the Memphis workforce. Memphis is known as ‘America’s Distribution Center’, with the convergence of five Class-1 railroads, the nation’s largest cargo airport (home of FedEx), the fourth largest inland port, and seven interstates and US highways, uniquely positioning the city as a logistics leader nationwide. The City of Memphis is also a very diverse community, with African-Americans making up approximately 64%, Caucasians 30%, and Hispanics approximately 7% of the community<sup>7</sup>. Memphis has a large workforce of over 600,000 citizens, and the Memphis Chamber of Commerce reports that nearly 200,000 of these workers are underemployed, with 42% of the workforce eager to upgrade skills through training and education programs. Thus, Memphis provides an excellent location for testing new workforce strategies, identifying programs that work well for populations traditionally underrepresented in transportation professions, and hosting regional working sessions engaging a breadth of transportation employers.

In light of these issues, the Southeast Transportation Workforce Center (SETWC) conducted a study designed to complement the State of Tennessee’s activities related to researching, implementing, and promoting a statewide apprenticeship engagement strategy. In particular, this

project focused on creating a blueprint for increasing transportation and logistics apprenticeships with particular emphasis on recruiting nontraditional candidates. The project identified relevant stakeholders, target occupations within transportation and logistics (from US Department of Labor apprenticeable occupations list) and emerging fields, strategies for increasing apprenticeship programs in target occupations, and key recruiting mechanisms and partnerships for attracting nontraditional candidates. The final outcome of this work is an implementation strategy designed to increase apprenticeship adoption for transportation occupations in the greater Memphis region.

## 2.0 Project Purpose and Scope

The purpose of this project was to develop a plan to accelerate adoption of apprenticeships for transportation occupations in the greater Memphis region. The project scope included interviews, workshops, surveys, and meetings with relevant stakeholders (industry, education, and community agency representatives), literature review for national best practice experience, examination of relevant labor market data, and review of existing transportation education programs (both formal and informal) for the greater Memphis region. Potential barriers to apprenticeship adoption as well as key accelerators were identified specific to the Memphis region. The detailed methodology, findings, needs assessment, and proposed implementation strategies are presented in subsequent sections of this report.

### Methodology

The methodology for this study included the following key elements:

- Labor market analysis (LMA),
- Best practice review,
- Stakeholder engagement,
- Career pathway analysis,
- Educational program and curriculum review for greater Memphis region, and
- Secondary and post-secondary needs assessment.

The LMA included analysis of available data related to employment trends and projections for transportation occupations at the state and national levels available from the US Bureau of Labor Statistics as well as review of additional published reports documenting LMA specific to the greater Memphis region. A set of target occupations was identified as most promising for apprenticeship programs in the Memphis area, along with associated knowledge, skills, and abilities (KSA) and competency requirements<sup>1, 8</sup>. The best practice review included examining case studies of successful apprenticeship programs across the country (not restricted to transportation occupations) to identify key attributes that led to success, and particularly aspects beneficial for attracting and retaining diverse and underrepresented participants.

The goal of stakeholder engagement was to elicit feedback regarding barriers to and recommended approaches for accelerating transportation apprenticeship programs in the greater Memphis region. The stakeholder engagement process for this work included a series of hosted meetings/workshops, industry interviews, and an industry stakeholder survey. The goal was to provide multiple

mechanisms for a broad spectrum of stakeholders to provide input to the project. Specific emphasis was placed on obtaining student perspectives to inform the apprenticeship acceleration strategy. This is a very important group that is often overlooked in the development of apprenticeship programs. Any effort to increase recruitment success for apprenticeship programs must include insight from youth and young adults. Another very important group of stakeholders are community-based organizations (CBOs) that serve specific populations, such as veterans, women, persons with disabilities, and other underrepresented populations that stand to benefit significantly from apprenticeship opportunities designed with their specific needs in mind.



Each meeting/workshop was hosted and facilitated by SETWC staff in small-group format. A set of discussion questions was developed and used as a prompt for engaging participants. Additional interviews were conducted with key industry stakeholders and a stakeholder survey was also used to obtain insight regarding barriers to more widespread adoption as well as successful practices. A total of 15 transportation-related companies were involved in the stakeholder engagement process. Public and private sector employers involved in this process included:

- BGS Fulfillment
- CN Railroad
- Dunavant
- FedEx Freight
- IMC Companies
- International Paper
- Memphis Area Transit Authority
- Ozark Motor Lines
- ReTrans
- Roadone Logistics
- SSR, Inc.
- Tennessee Department of Transportation
- USDOT Office of Small and Disadvantaged Business Utilization
- Vericlam
- Wepfer Marine



Fourteen educational institutions, CBOs, and government agencies were also involved in the discussion process, including the following organizations:

- Boys and Girls Club of Greater Memphis
- Greater Memphis Alliance for a Competitive Workforce
- Hope Works
- Innovate Memphis
- Memphis World Trade Club

- Shelby County Schools (administration)
- East High School (administration and students)
- Bolton High School (administration)
- Ridgeway Middle School (administration)
- Southwest TN Community College
- STEP, Inc.
- University of Memphis
- US Department of Labor ETA/OA
- Women’s Foundation for a Greater Memphis

Regardless of the outreach mechanism (workshop, interview, survey), the following key aspects were of interest:

- Familiarity with apprenticeship programs
- Perception of apprenticeship programs
- Value of apprenticeship programs to stakeholder
- Barriers to successful programs
- Suggestions for accelerating apprenticeship adoption
- Stakeholders that should be involved in apprenticeship acceleration efforts
- Special considerations for designing programs that work well for underrepresented groups

The survey was developed in Survey Monkey and distributed via email to SETWC’s stakeholder list for the greater Memphis area, and to an additional contact list (particularly for CBOs) created for this project. The formal meetings hosted as part of this project are described in Table 1. In addition to the apprenticeship focused meetings, a workshop was also held to determine particular considerations in designing career pathway programs for women.

**Table 1 Apprenticeship Accelerator Stakeholder Meetings**

<b>Date</b>	<b>Event</b>	<b>Targeted Stakeholders</b>	<b>Location</b>
<b>03/23/18</b>	Choosing Transportation Summit: Apprenticeship Accelerator Workshop	Industry, academia, community-based organizations	Hilton Memphis
<b>03/23/18</b>	Choosing Transportation Summit: Women in Transportation – Designing a Low-Barrier Career Pathway	Industry, academia, community-based organizations	Hilton Memphis
<b>05/15/18</b>	Apprenticeship Discussion	College students	University of Memphis main campus
<b>05/18/18</b>	Apprenticeship Discussion	High School students	East High School
<b>05/24/18</b>	Apprenticeship Accelerator Workshop	Industry, academia, community-based organizations	University of Memphis main campus

Career pathway analysis encompassing previous work by SETWC as part of the National Transportation Career Pathways Initiative and review of relevant information for the Memphis area led to a generalized career pathway model for target occupations<sup>1</sup>. Review of educational programs and curriculum included both secondary and post-secondary institutions and formal and informal educational settings to develop a comprehensive picture of available programming in the region. This information in combination with findings from stakeholder engagement led to development of the secondary and post-secondary needs assessment. The findings resulting from this study informed development of a set of proposed implementation strategies that is presented in the final section of this report.

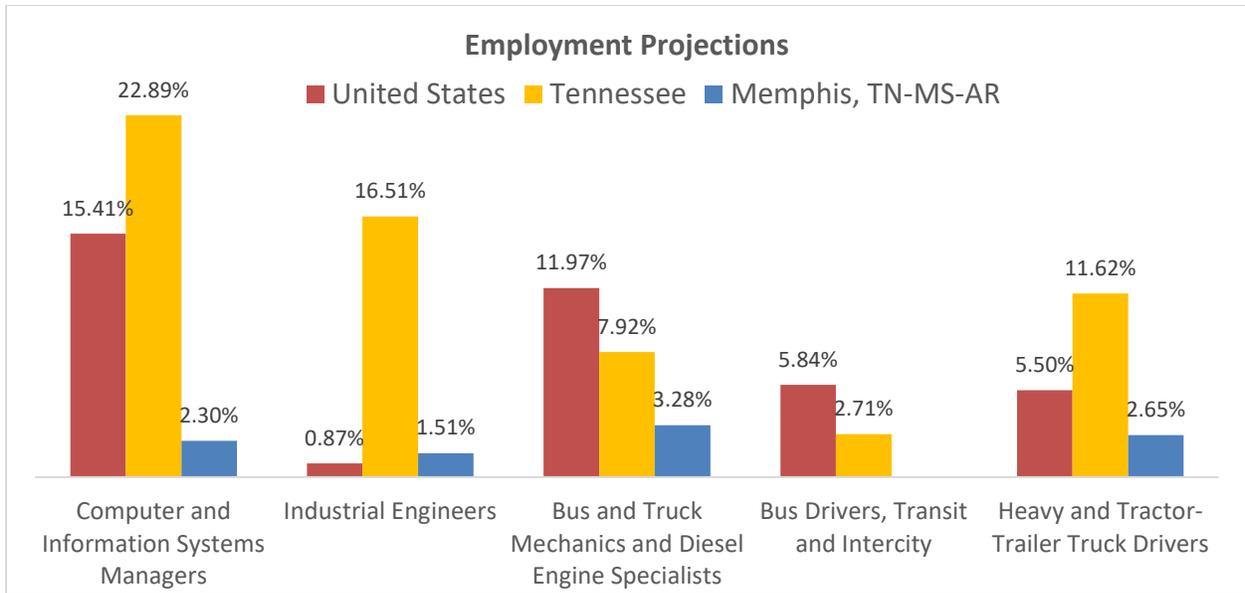
## 3.0 Research Findings

### Labor Market Analysis

Previous research related to the SETWC Job Needs and Priorities Report the importance of considering a broader definition of transportation rather than one narrowly focused on traffic – in particular because of the high demand for workers across industry sectors and occupational overlap but tendency of the workforce to remain siloed<sup>9</sup>. For example, discussions with SETWC stakeholders revealed that very similar roles are reflected in traffic, transit, and freight (regardless of mode) but industry stakeholders do not necessarily recognize these similarities and associated opportunities for attracting workers. Additionally, the limited scope of the definition of transportation, distribution, and logistics (TDL) occupations is particularly detrimental to telling the story of the industry and making connections in particular to STEM jobs within transportation. With this in mind, our labor market analysis incorporated a broader definition of transportation occupations known to be priorities for local employers based on previous research<sup>9</sup>. However, we narrowed the scope to apprenticeable occupations, as defined by the Department of Labor. Occupations were prioritized by demand in the greater Memphis area as well as projected growth to 2024 (as indicated by the Bureau of Labor Statistics). The full range of occupations considered is provided in Appendix A. The final list of priority occupations that will be discussed in detail in this report are:

- Heavy and Tractor-Trailer Truck Drivers (53-3032)
- Bus Drivers, Transit and Intercity (53-3021)
- Bus and Truck Mechanics and Diesel Engine Specialists (49-3031)
- Industrial Engineers (17-2112)
- Computer and Information Systems Managers (11-3021)

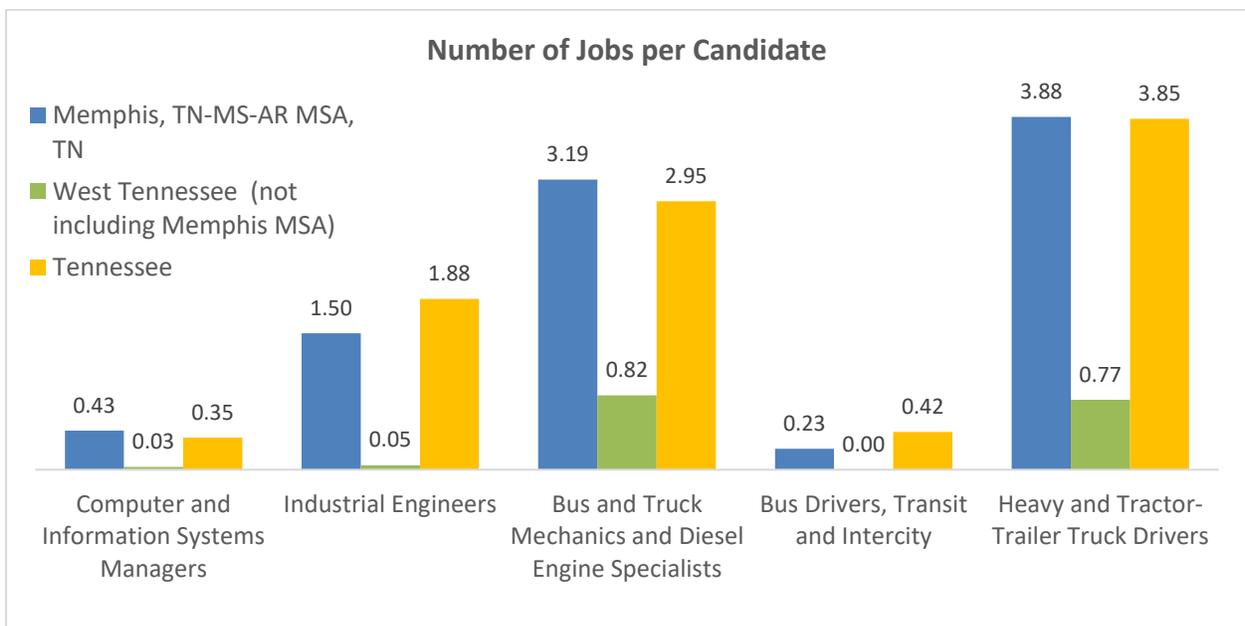
The expected change in employment in the next six years is summarized for these occupations in Figure 1<sup>10,11</sup>.



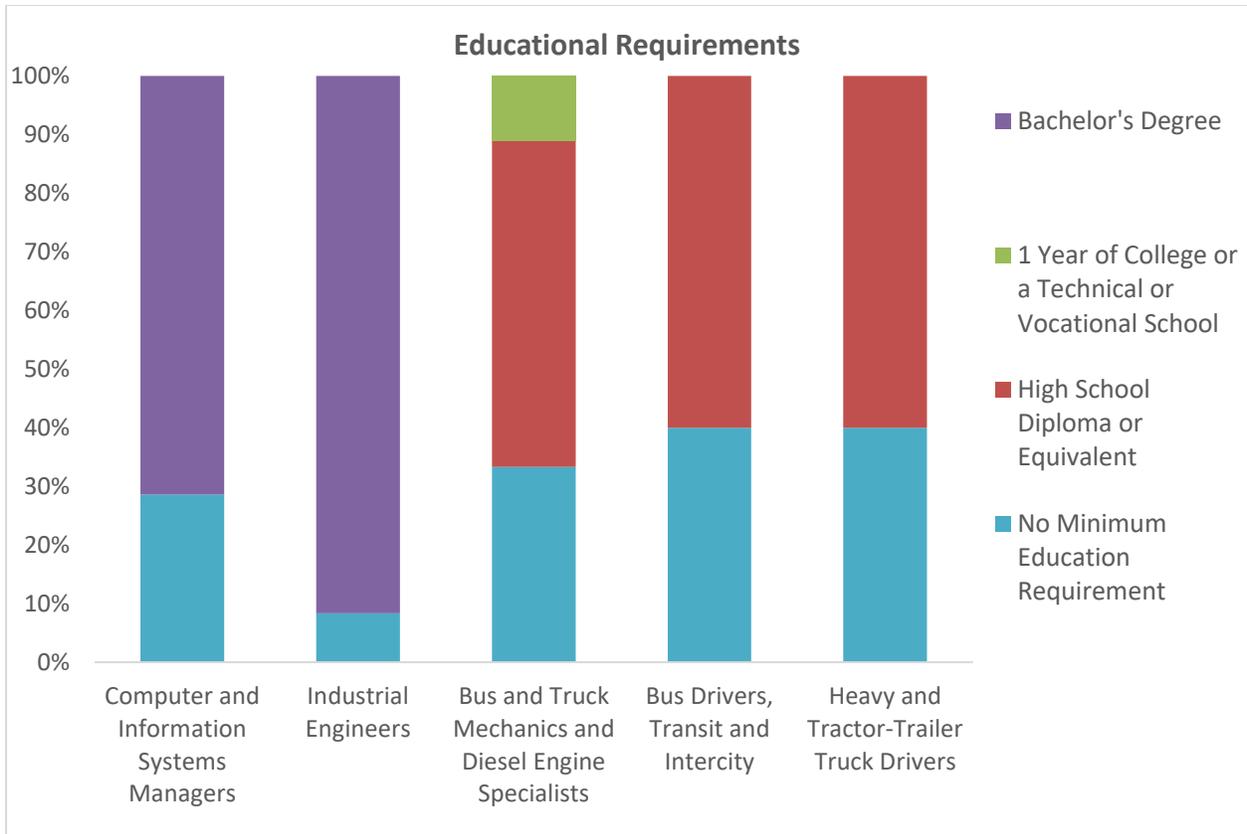
**Figure 1 Employment Projections for Priority Occupations, 2014-2024<sup>10,11</sup>**

Note: Data for the Memphis, TN-MS-AR region reflects shorter term projections from 2015-2020.

The demand for these jobs is apparent in considering the number of online job openings available per candidate for each occupation in the Memphis area. Figure 2 depicts the supply and demand trends for Memphis MSA, West TN (without Memphis), and Tennessee. Typical education requirements for job postings related to these occupations are presented in Figure 3.

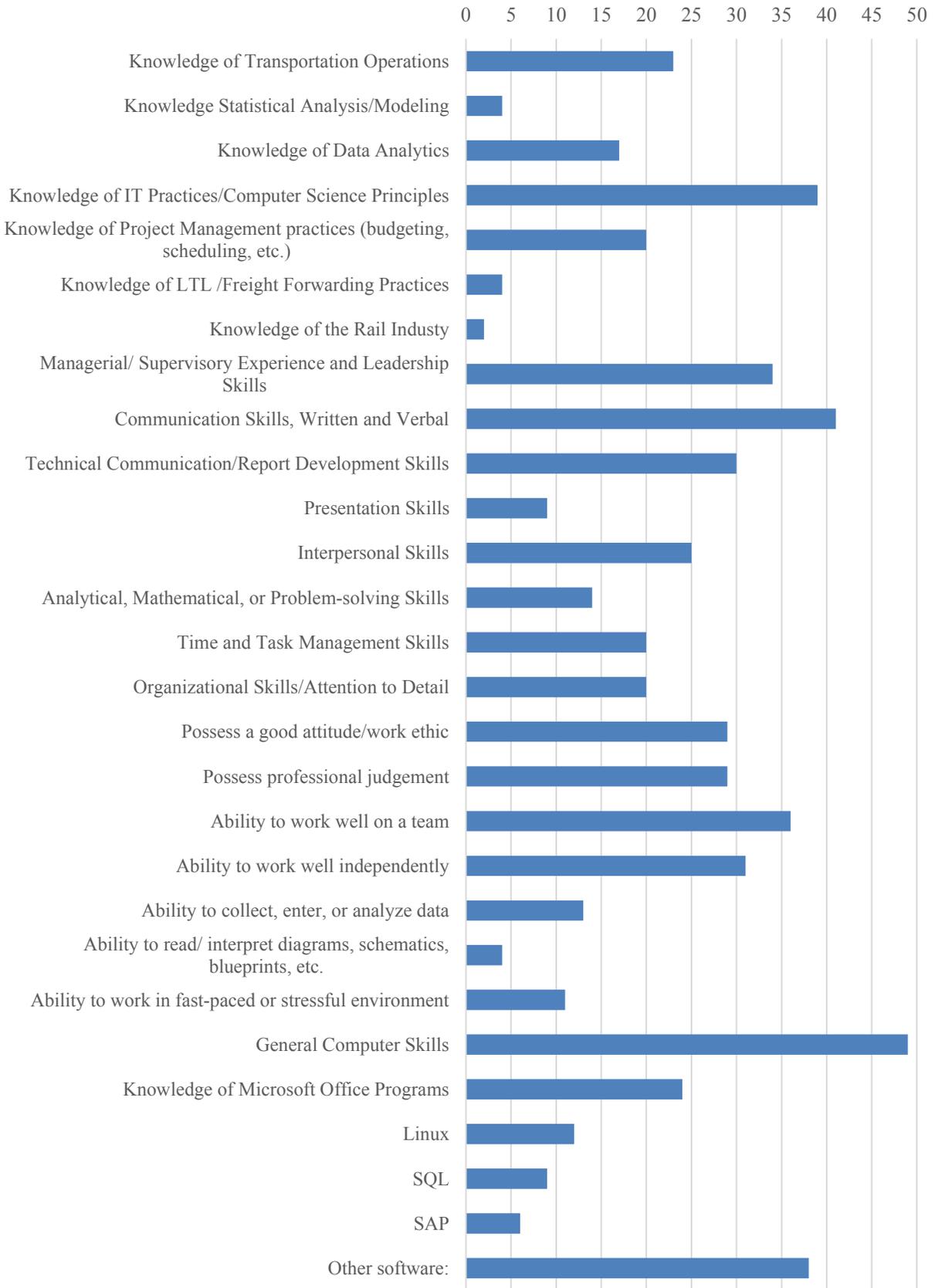


**Figure 2 Supply and Demand for Priority Transportation Occupations<sup>12</sup>**

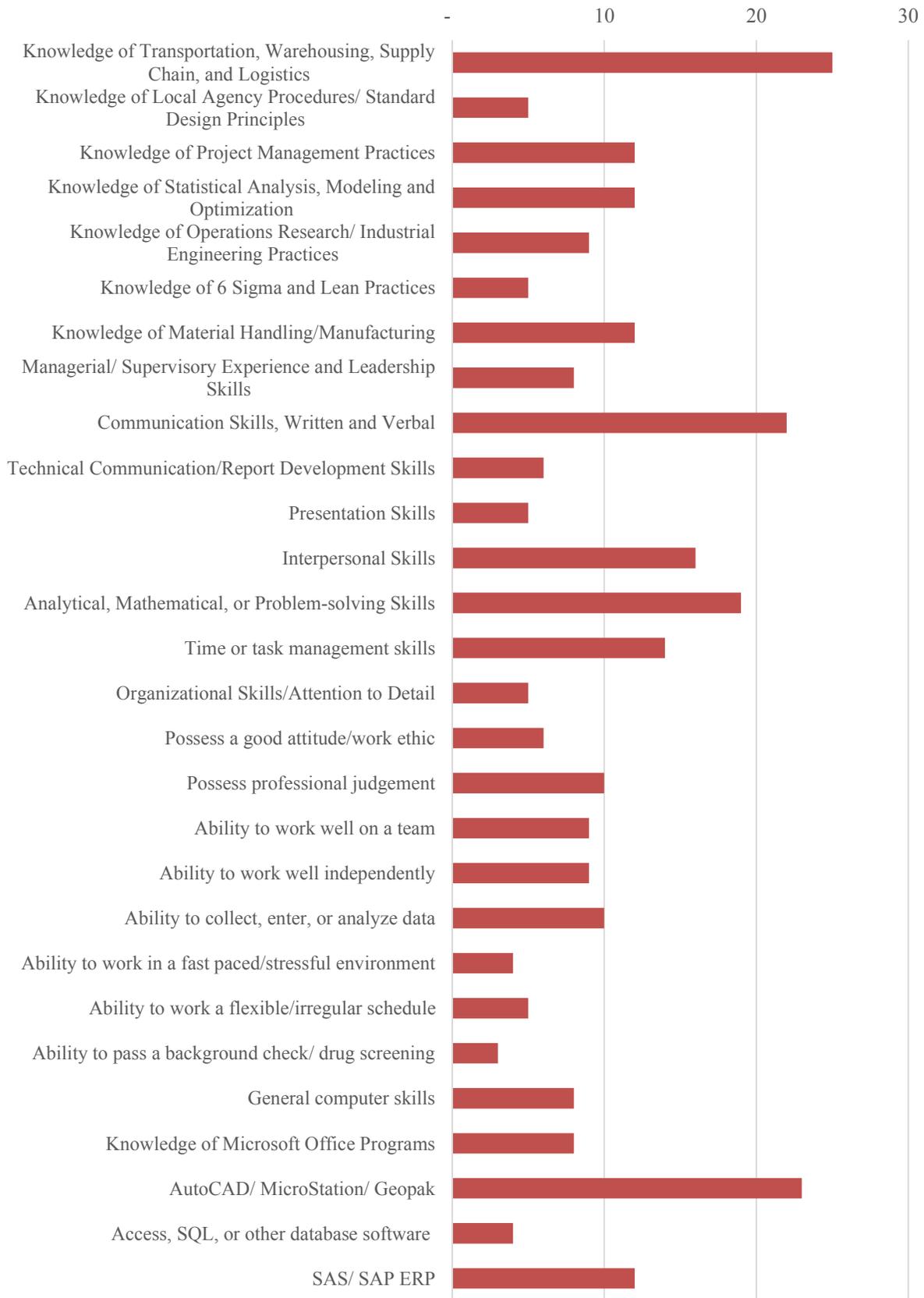


**Figure 3 Education Requirements for Priority Transportation Occupations<sup>12</sup>**

Review of real-time job postings provides insight into knowledge, skills, and abilities (KSAs) that are essential for career success and must be part of training and education strategies for these occupations. For instance, all priority occupations require workers who are able to communicate effectively, work well independently, and are tech-savvy. Specific KSAs in greatest demand for these occupations are profiled in Figures 4-7<sup>1</sup>.



**Figure 4 Computer and Information Systems Managers: Most Sought After Competencies<sup>1</sup>**



**Figure 5 Industrial Engineers: Most Sought After Competencies<sup>1</sup>**



**Figure 6 Diesel Mechanics: Most Sought After Competencies<sup>1</sup>**



**Figure 7 Commercial Drivers: Most Sought After Competencies<sup>1</sup>**

### **Best Practice Review**

A review of successful apprenticeship and pre-apprenticeship programs reveals key features and structural elements important for ensuring impact. Many of the features are important for all potential participants, but there are also special considerations for supporting specific populations such as women, low-income individuals, veterans, and persons with disabilities. Providing access for these groups and tailoring programs to address specific needs of these diverse individuals can lead to programs that build a pipeline of diverse talent that is often underrepresented, particularly in transportation-related professions.

Apprenticeship programs lead to better alignment between secondary and post-secondary institutions and employers, resulting in students that are better prepared to be productive workers. The on-the-job training structure allows real-time adjustments as new technologies continually flood the workplace. Workers are trained in state-of-the-practice techniques that may be slower to infiltrate educational institutions, and also obtain a breadth of experience not possible through traditional internship programs<sup>14</sup>. And, the valuable experience obtained through apprenticeship programs can improve retention and advancement for workers, as they better understand industry settings, workplace expectations, and career pathways<sup>14</sup>.

For veterans, benefits of apprenticeship programs can include a structured transition process, ability to use GI Bill benefits in combination with apprenticeship incentives, and facilitation of skillset translation from a military to civilian environment. For women, apprenticeship programs can lead to economic self-sufficiency and access to high wage occupations they otherwise may not consider<sup>5</sup>. For persons with disabilities who may not perform well on standardized testing, apprenticeships can provide an alternative means of training that is better aligned to their strengths. However, the challenge may be in qualifying for apprenticeship programs as these individuals may not meet entrance criteria<sup>6</sup>.

The "Earn and Learn" Model of registered apprenticeship programs has been extremely beneficial and an incentive for those who want (or need) to make money right away. Sponsorship and support from mentors is also key the development of successful apprenticeships. Apprenticeship programs feature partnerships between education/training institutions, employers, and community organizations that can provide necessary wrap-around services required for participants to be successful.

A pre-apprenticeship program teaches basic technical and job readiness skills that are necessary for a successful application to a registered apprenticeship program. Therefore, pre-apprenticeship programs are valuable assets for developing the registered apprenticeship pipeline. Pre-apprenticeship programs can help prepare high school, college, or even current workforce employees through a program that serves as a stepping-stone into a registered apprenticeship program. One of the best qualities of these programs are that they are also “earn and learn” style training so students will be earning a wage while going through the training they need to take the next step in their career path.

Examples of successful Apprenticeship and Pre-Apprenticeship Programs are outlined in Table 2.

*Table 2 Exemplar Programs*

Program name	Description
<b>Target Audience: Underrepresented groups</b>	
<b>Cummins Inc. Apprenticeship Program (Canada)</b>  <a href="https://careers.cummins.com/us-canada/hourly-jobs/apprentice-programs">careers.cummins.com/us-canada/hourly-jobs/apprentice-programs</a>	Cummins offers and Engineering Technician and Service Technician apprenticeship programming. Cummins apprentices work beside and learn from Cummins Technicians in the field while earning an Associate’s Degree in Applied Science. Cummins guarantees all qualifying apprentices an opportunity to continue working with their company upon completion of the program.

Program name	Description
<b>Builders Guild of Western PA</b> <a href="http://buildersguild.org/index.php/apprenticeship-programs">buildersguild.org/index.php/apprenticeship-programs</a>	A non-profit labor/management initiative representing 16 building trade unions and 6 affiliated contractor associations, they offer construction trades' apprenticeship training throughout the southwestern Pennsylvania region. There is no tuition for apprentices. To meet a construction boom and impending retirement numbers, the Guild is specifically recruiting women and minorities.
<b>The Broad Museum Diversity Apprenticeship Program</b> <a href="http://thebroad.org/sites/default/files/dap_faq.pdf">thebroad.org/sites/default/files/dap_faq.pdf</a>	The DAP provides full-time, paid apprenticeships in preparation/art handling. The program strives for equity within museum staff demographics. It addresses mid-level museum jobs and provides opportunities to apprentices from groups systemically marginalized on museum staffs.
<b>Economically disadvantaged minorities, women, and youth</b>	
<b>Building Pathways</b> <a href="http://buildingpathwaysboston.org">buildingpathwaysboston.org</a>	This program provides a gateway for low-income Boston area residents, particularly in under-served communities, to access family-sustaining careers in the construction industry through apprenticeship preparedness training and advocacy. Their Trades Pre-Apprenticeship Program aims to address the continued disparities in apprenticeship for women, people of color, and other under-served communities.
<b>Wisconsin Regional Training Partnership (WRTP)/ Big Step</b> <a href="http://www.wrtp.org">www.wrtp.org</a>	WRTP/BIG STEP is industry-led, worker-centered and community-focused with a mission to enhance the ability of private sector organizations to recruit and develop a more diverse, qualified workforce in construction, manufacturing and emerging sectors of the regional economy.
<b>High school and secondary students</b>	
<b>Army Educational Outreach Program</b> <a href="http://www.usaeop.com/program/hsap">www.usaeop.com/program/hsap</a>	<ul style="list-style-type: none"> <li>• Science and Engineering Apprenticeship Program (SEAP): For high school students, SEAP matches practicing Department of Defense scientists with talented high school students to create a direct mentor-student relationship.</li> <li>• The High School Apprenticeship Program (HSAP): For current rising high school juniors and seniors, the HSAP provides an authentic science and engineering research experience alongside university researchers sponsored by the Army Research Office. This commuter program helps students learn research methods and develop skills in Army critical research areas in a university lab setting.</li> <li>• Research &amp; Engineering Apprenticeship Program (REAP): For high school students, REAP is a summer STEM program that places them in research apprenticeships at area colleges and universities. REAP apprentices work under the direct supervision of a mentor on a hands-on research project, exposing them to the real world of research.</li> <li>• Undergraduate Research Apprenticeship Program (URAP): For undergraduate students, URAP provides an authentic science and engineering research experience alongside university researchers sponsored by the Army Research Office. This commuter program helps students develop skills in critical research areas while in lab settings to prepare them for the next steps of their educational and professional careers.</li> </ul>
<b>High school graduates</b>	
<b>GlaxoSmithKline (GSK) Apprenticeship Program</b> <a href="http://us.gsk.com/en-us/careers/apprenticeships/our-programs">us.gsk.com/en-us/careers/apprenticeships/our-programs</a>	GSK offers on-the-job learning while earning a competitive compensation package, college enrollment in an Associate's Degree program paid for by GSK, and the opportunity to receive a Certificate of Apprenticeship Completion from the US DOL.

Program name	Description
<p><b>PHCC of NC Apprenticeship Program</b></p> <p><a href="http://www.phcnc.com/wp-content/uploads/2017/01/Apprenticeship-Program-Brochure.pdf">www.phcnc.com/wp-content/uploads/2017/01/Apprenticeship-Program-Brochure.pdf</a></p>	<p>A 4-yr training course combining on-the-job training under the direction of experienced workers, and related instruction through online classes. PHCC of NC received approval and certification from the NC DOL, and the program is recognized and certified by the US DOL/Bureau of Apprenticeship Training. At the successful completion of the apprenticeship, students attain skilled journeyman status and have a greater opportunity for obtaining licenses and better wages.</p>
<p><b>Tech Ready Apprentices for Careers in Kentucky (TRACK)</b></p> <p><a href="http://www.education.ky.gov/CTE/cter/Pages/TRACK.aspx">www.education.ky.gov/CTE/cter/Pages/TRACK.aspx</a></p>	<p>This youth pre-apprenticeship program is a partnership between the Kentucky DOE's Office of Career and Technical Education and the Kentucky Labor Cabinet to provide students with career pathway opportunities into Registered Apprenticeship programs. This is a business and industry driven program designed to create a pipeline for students to enter post-secondary apprenticeship training in carpentry, electrical, manufacturing, and welding trades.</p>
<p><b>Associated Builders and Contractors, Inc. of Iowa Apprenticeship &amp; Training Trust</b></p> <p><a href="http://www.abciowatrust.org">www.abciowatrust.org</a></p>	<p>A non-profit construction trade association with apprenticeship and pre-apprenticeship opportunities available to high school and secondary students in electrical, HVAC, plumbing, carpentry, and sheet metal trades.</p>
<b>High school students</b>	
<p><b>Destinations Career Academy of Wisconsin</b></p> <p><a href="http://www.widca.k12.com">www.widca.k12.com</a></p>	<p>This program prepares students to enter an apprenticeship training program to become a journeyman operating engineer in the construction industry. Operating engineers work as heavy equipment operators, mechanics, or surveyors. The pathway is a cooperative effort between the Fox Valley Technical College and the International Union of Operating Engineers Local 139. The options for students can be blended to include online learning as well as hands-on instruction.</p>
<p><b>Manufacturing Skill Standards Council (MSSC) High School Pre-Apprenticeship Programs</b></p> <p><a href="http://blog.msscusa.org/new-mssc-high-school-pre-apprenticeship-program">blog.msscusa.org/new-mssc-high-school-pre-apprenticeship-program</a></p>	<p>The MSSC Pre-Apprenticeship Program includes 560 hours of manufacturing training preparing high school students for the Industrial Manufacturing Technician Registered Apprenticeship Program and the MSSC Certified Production Technician pathway. Students complete 280 hours, or 8-weeks, during each summer of their junior and senior years and receive a stipend of approximately \$1,800 for each session.</p>
<p><b>The Apprentice School</b></p> <p><a href="http://www.as.edu/programs/index.html#disciplines">www.as.edu/programs/index.html#disciplines</a></p>	<p>Offering four-, five-, and eight-year apprenticeships in nineteen shipbuilding disciplines and eight advanced programs of study, The School is accredited by the Commission of the Council on Occupational Education and registered with the VA Apprenticeship Council. It offers apprentices the opportunity to earn college credit, receive competitive pay and benefits and learn a trade. The school is committed to fostering apprentices' development of craftsmanship, scholarship and leadership.</p>
<p><b>Wisconsin Youth Apprenticeship</b></p> <p><a href="http://dwd.wisconsin.gov/youthapprenticeship">dwd.wisconsin.gov/youthapprenticeship</a></p>	<p>Wisconsin's program is a part of a statewide School-to-Work initiative. It is designed for high school students who want hands on learning in an occupational area at a worksite along with classroom instruction. Local programs provide training based on statewide youth apprenticeship curriculum guidelines, endorsed by business and industry.</p>
<b>High school students or older</b>	
<p><b>Apprenticeship Carolina</b></p> <p><a href="http://www.apprenticeshipcarolina.com">www.apprenticeshipcarolina.com</a></p>	<p>A division of the SC Technical College System, they work to ensure all employers in South Carolina have access to the information and technical assistance they need to create demand-driven registered apprenticeship programs. At no cost to the employer, apprenticeship consultants are available to guide companies through the registered apprenticeship development process from initial information to full recognition in the national Registered Apprenticeship System.</p>

Program name	Description
<p><b>Caterpillar Assembly Pre-Apprenticeship Program &amp; Welding Apprenticeship Program</b></p> <p><a href="http://www.ncleg.net/documentsites/committees/BCCI-6630/10-22-14MeetingHandouts/CaterpillarApprenticeshipProgramPresentationtoGeneralAssembly_final.pdf">www.ncleg.net/documentsites/committees/BCCI-6630/10-22-14MeetingHandouts/CaterpillarApprenticeshipProgramPresentationtoGeneralAssembly_final.pdf</a></p>	<p>Caterpillar, NC offers two pre-apprenticeship programs to students in assembly and welding. Caterpillar offers 640 hours of training with a career transition to full-time within the company. Students in the assembly program also receive a Registered Department of Commerce Certificate for completion of the Pre-Apprenticeship Program and earned hours towards Johnston Community College credits at no cost in North Carolina. Students in the welding program will earn a welding certificate for 24 hours credit from Central Carolina Community College, an OSHA Safety Card, and a certificate of completion. They will have a preferred employment opportunity at Caterpillar.</p>
<p><b>Memphis Electrical JATC Inside Wireman Apprenticeship Training Program</b></p> <p><a href="http://www.memphiselectricaljatc.org">www.memphiselectricaljatc.org</a></p>	<p>This program is jointly sponsored by the International Brotherhood of Electrical Workers and the National Electrical Contractor’s Association. This five year apprenticeship program is a combination of related classroom instruction and on-the-job training providing apprentices with the knowledge and skills necessary to become a Journeyman Inside Wireman.</p>
<p><b>YouthBuild</b></p> <p><a href="http://www.youthbuild.org">www.youthbuild.org</a></p>	<p>The focus is on providing opportunities for millions of young people ages 16-24 who are neither in work nor in school. The goal is to provide pathways to education, jobs, entrepreneurship, and other opportunities leading to productive livelihoods and community leadership. YouthBuild USA has a network of programs in 44 states, including one in Memphis, TN. They are sponsored and managed by local nonprofits, community colleges, and public agencies. Primarily funded by the US DOL, YouthBuild USA provides training and technical assistance, leadership development, funding for innovative program enhancements, and advocacy for these programs.</p>
<b>Secondary students with disabilities</b>	
<p><b>AAPD Summer Internship Program</b></p> <p><a href="http://www.aapd.com/summer-internship-program">www.aapd.com/summer-internship-program</a></p>	<p>Since 2002, the AAPD Summer Internship Program has developed the next generation of leaders with disabilities. Each summer, AAPD places college students with all types of disabilities in summer internships with Congressional offices, federal agencies, non-profits, and for-profit organizations in the Washington, DC area. AAPD provides the interns with a living stipend, transportation to and from Washington, DC, and fully-accessible housing.</p>
<p><b>Emerging Leaders Internship Program</b></p> <p><a href="http://www.emerging-leaders.com">www.emerging-leaders.com</a></p>	<p>This program gives college students with disabilities the opportunity to jumpstart their career path and gain a competitive edge. Funded by The UPS Foundation and coordinated by the National Business &amp; Disability Council at The Viscardi Center, it is a highly competitive program that places top college students with disabilities in fulfilling internships nationwide.</p>
<b>Veterans</b>	
<p><b>TMC Apprenticeship</b></p> <p><a href="http://www.tmctrans.com/drive-for-tmc/military-veterans.aspx">www.tmctrans.com/drive-for-tmc/military-veterans.aspx</a></p>	<p>TMC Transportation specializes in hauling freight and has a long history of hiring current and former military personnel. The company offers military veterans the opportunity to enroll in its Apprenticeship program that is approved for the GI Bill®. Veteran employees comprise over 35% of their driver fleet and support team.</p>
<p><b>Cummins Inc. Technician Apprentice Program (TAP)</b></p> <p><a href="http://cummins.jobs/technician-apprentice-program-tap/jobs-in/">cummins.jobs/technician-apprentice-program-tap/jobs-in/</a></p>	<p>Cummins, Inc. offers apprenticeships across the county. This is a government-registered program provides on-the-job training to military veterans while they are considered full-time, paid employees. Apprenticeships focus on one of their service specialties: Diesel Engines, high horsepower engines, marine vessels, power generation products, or service operations.</p>
<p><b>BNSF Railway Apprenticeship</b></p> <p><a href="http://jobs.bnsf.com/go/Transitioning-Military/400926">jobs.bnsf.com/go/Transitioning-Military/400926</a></p>	<p>BNSF prioritizes the hiring of transitioning military veterans and offers signal apprenticeships in locations across the country. BNSF is consistently identified as a top employer for U.S. military veterans, and they’ve hired more than 9,000 veterans since 2005.</p>

Program name	Description
<b>Boilermakers National Apprenticeship Program</b>  <a href="http://www.bnep.com">www.bnep.com</a>	<p>A well-established program dedicated to creating highly skilled craftsmen and women to be the Boilermakers of tomorrow. Boilermaker apprentices learn welding, rigging, and heavy fabrication skills. BNAP offers minority scholarships and collaborates with Helmets to Hardhats, which helps transitioning veterans secure careers in the construction industry.</p>
<b>UPS</b>  <a href="http://military.jobs-ups.com/culture-benefits/article/ra-faq.html">military.jobs-ups.com/culture-benefits/article/ra-faq.html</a>	<p>UPS values military experience and plans to vastly expand the number of veterans employed by the company. Their apprenticeship program is a 48 month long program for full-time driver service providers. Veterans who are eligible will have an opportunity to earn an educational monthly stipend from the department of veteran affairs along with a weekly paycheck from UPS.</p>
<b>Women</b>	
<b>Apprenticeship and Non-Traditional Employment for Women</b>  <a href="http://anewaop.org">anewaop.org</a>	<p>Offers the Pre-Apprenticeship Trades Rotation Training Program and the Apprenticeship Opportunities Project (AOP) with expanded apprenticeship opportunities for women in the construction and manufacturing trades. The pre-apprenticeship program includes a trades rotation that provides women with direct experiences with apprenticeship training programs and facilities.</p>
<b>EDF Energy's Engineering Maintenance Apprenticeship</b>  <a href="http://www.edfenergy.com/careers/early-careers/apprenticeships/engineering-maintenance-apprenticeship">www.edfenergy.com/careers/early-careers/apprenticeships/engineering-maintenance-apprenticeship</a>	<p>This apprenticeship is a four-year program in the UK which focuses on the skills required to maintain power stations. Last year EDF Energy saw a 14% boost to their female engineering apprenticeship intake – 35% of those who joined the scheme were women, way above the industry average. The company runs female-only workshops at special events throughout the UK and opens its visitor centers for engagement events also aimed directly at women.</p>
<b>Moore Community House Women in Construction Program</b>  <a href="http://www.moorecommunityhouse.org/winc">www.moorecommunityhouse.org/winc</a>	<p>This pre-apprenticeship program is designed to train women for careers that meet the needs of families as well as the demands of the construction skilled craft trades and advanced manufacturing industry. The program aims to create an avenue for women to pursue careers that earn wages to promote self-sufficiency, as well as to improve the outreach, training, placement and retention of women in apprenticeship and nontraditional occupations.</p>
<b>Nontraditional Employment for Women (NEW)</b>  <a href="http://www.new-nyc.org/">www.new-nyc.org/</a>	<p>The number of women construction workers in New York City has grown substantially as a result of a coordinated effort between NEW, labor unions, contractors, and government. With a commitment by these partners to place women in 10% of all new apprenticeship slots, more than 1,300 NEW graduates have found work since 2005. An additional 1,000 women have found careers in the energy, transportation, and facilities maintenance industries.</p>
<b>Oregon Tradeswomen Trades and Apprenticeship Career Class (TACC)</b>  <a href="http://www.tradeswomen.net/pathways-to-success">www.tradeswomen.net/pathways-to-success</a>	<p>Oregon Tradeswomen is dedicated to promoting success for women in the trades through education, leadership, and mentorship. Oregon Tradeswomen's Pathways to Success program offers the TACC; an 8-week, no cost, pre-apprenticeship training class that helps students prepare for a high skill, high wage career in construction. Students enrolled in the TACC can also enroll in the Industrial Fabrication track or the Environmental Worker Training track.</p>
<b>Policy Group on Tradeswomen's Issues (PGTI)</b>  <a href="http://policygroupontradeswomen.org">policygroupontradeswomen.org</a>	<p>PGTI offers customized Technical Assistance for contractors, apprenticeship programs, enforcement agencies and any other stakeholders who need help in increasing their women apprentices, members and employees. PGTI is collaboration of construction industry stakeholders crushing the barriers to good jobs for women in the construction trades.</p>
<b>Siemens Professional Education Dual Study Programs</b>  <a href="http://www.siemens.com/global/en/home/company/jobs/search-careers/siemens-professional-education.html">www.siemens.com/global/en/home/company/jobs/search-careers/siemens-professional-education.html</a>	<p>Siemens has set a target for 20% female apprentices by 2020. Activities include running the SeeWomen careers roadshow, activities in schools, targeted recruitment focused on areas of its business with the lowest female representation, and raising the profile of its female apprentices.</p>

Program name	Description
<p><b>Tradeswomen, Inc.</b></p> <p><a href="http://www.tradeswomen.org/programs/apprenticeship">www.tradeswomen.org/programs/apprenticeship</a></p>	<p>A California organization that aims to recruit more women into construction and related non-traditional trades, TWI maintains multiple programs and relationships to support entering and established tradeswomen. TWI holds regular informational Entry to Apprenticeship workshops with regional partners. TWI works in partnership with utilities to provide pre-apprenticeship workshops and a scholarship program at the Women Building the Nation Conferences.</p>
<p><b>WV Women Work: Construction &amp; Advanced Manufacturing Pre-Apprenticeships</b></p> <p><a href="http://www.wvwomenwork.org/news/wv-women-work-inc-receives-women-grant-step-women-pre-apprenticeship-programs">www.wvwomenwork.org/news/wv-women-work-inc-receives-women-grant-step-women-pre-apprenticeship-programs</a></p>	<p>Multiple pre-apprenticeship programs in various West Virginia cities that allow women to gain entry-level positions in construction, manufacturing, and registered apprenticeships.</p>

Additional best practices for consideration in accelerating apprenticeship programs include:

- The ability to incorporate minors in apprenticeship programs due to liability concerns can be a significant challenge for companies to build occupational pipelines with youth. Partnerships between CTE programs and employers whereby the school district assumes liability for workplace training/internships can alleviate some of this concern.
- Offering healthcare compensation to apprentices is a good practice to support participation of participants with families.
- Partnerships with community organizations or employer-based programs that provide childcare options are valuable support for single parents.
- Low-income individuals may encounter significant barriers to participation due to transportation issues. Provision of a transportation option (such as company buses with pick-ups at community centers with multiple participants or reduced-fare or free passes for public transit options) may result in significant improvement in retention and completion statistics.
- Pre-apprenticeship programs are particularly valuable for disadvantaged groups, such as persons with disabilities and people in poverty, to help them develop necessary skills and credentials required for acceptance to apprenticeship programs.

### **Stakeholder Engagement**

Stakeholder responses provided significant insight regarding challenges to successful apprenticeship expansion as well as ideas for encouraging adoption. Key findings are summarized by topic below. Complete meeting summaries are provided in Appendix B.

#### ***Familiarity with apprenticeship programs***

A primary issue identified through this research is a significant lack of awareness of apprenticeship programs. Many stakeholders were either completely unaware of the existence of registered apprenticeships or had misperceptions about what these programs entailed. Very few stakeholders were aware of pre-apprenticeship programs.

### ***Perception of apprenticeship programs***

It is apparent from stakeholder discussion that there is still an image problem with apprenticeships. For those that were aware of these programs, many perceived them to be pathways to lower-skill, lower-wage, 'blue collar' occupations. A discussion in one group centered on the fact that parents do not want their children to participate in these programs, as they are viewed as 'dead end' and not leading to higher education. Once apprenticeship programs were fully explained by SETWC staff, they were seen as significant opportunities, and discussion then centered on how to change the image of these programs.

### ***Value of apprenticeship programs to stakeholder***

The value of apprenticeship programs to participants and to employers was described by stakeholders as:

For Participant:

- Kids aren't sure about future goals, apprenticeship might help explain to kids what they DO or DON'T want to do. Real world exposure.
- Gains knowledge and earns money at the same time.
- Youth obtains new skill set.
- Youth can feel proud that company and person are investing in their future.
- Opens doors, opens opportunity to earn money and learn a new vocation
- Experience real world of business
- Learn from mentor how to navigate new company and field of study.
- More people getting degrees, it's imperative to have experience to compete in job market.

For employer:

- Help fill needed skills gap and employee shortage
- Can improve workforce diversity
- Can improve retention

### ***Barriers to successful programs***

A variety of barriers to successful apprenticeship programs were discussed. They generally focused on lack of awareness, recruiting challenges, candidates experiencing difficulty meeting requirements to be accepted to programs, transportation and child care issues for participants, and cumbersome paperwork and reporting process for companies. All stakeholder types focused on parents as a key barrier to apprenticeship acceleration and commented on the importance of changing perceptions and understanding of the intent of apprenticeships. The new STEM/engineering apprenticeship models are seen favorably for raising the image of apprenticeship programs. Additional barriers included:

- Lack of information and understanding about how to become a sponsor
- Apprenticeships are not on radar at all for American Job Center/WIN
- Apprenticeship programs not set up in 'one stop centers'
- WIN-need effective people/programs
- Quit creative new things – address existing programs to improve/make fit
- For pre-apprenticeships, does bar have to be so high- can they allow flexibility to fit the

model (i.e. rather than having to totally redo existing programs to fit.)

- Employers have to buy into having flexibility on background
- Adults pursuing high school equivalency don't qualify
- Time- company mentor having enough time to devote to apprentice and other job responsibilities. HR- they hear 'paperwork with no payback' when you say apprenticeship.
- Perception from non-union companies that apprenticeship is unionized is a barrier.
- Funding to pay apprentice
- Difficult to teach someone that might not be long-term; as soon as you get someone up to speed they leave for a competitor
- Inability of “hooking and maintaining” interest of youth
- Everything can't be electronic- population that is afraid of electronics – materials that can reach people with disabilities

### ***Suggestions for accelerating apprenticeships***

One key recommendation for accelerating apprenticeships was integrating opportunities throughout higher education experiences, particularly for four-year programs. Participants viewed this as a way to elevate the image of the programs and as a way to provide experiential learning (viewed as highly valuable) to students. Additional ideas for acceleration included:

- Make it fun! Visual!
- Get the word out
- Multiple touch points as generations develop – make sure it ‘fits’ all generations
- Funding
- Create a truly 'one-stop shop'
- Work with companies and apprenticeship programs to be more 'background friendly'
- Open to people at a younger age
- Large scale incentive program to incentivize businesses to offer apprenticeships (tax deductions)
- Large scale program to include a massive amount of HS students
- English and Spanish brochures.
- Be aware of reading level- 5th or 6th grade level.
- State could start recording successful stories and record strong ROI. Stories with people.
- Provide childcare.

High school students were particularly interested in videos, social media, field trips, visits (with engaging speakers and activities) to classrooms to promote apprenticeship opportunities, and expanding apprenticeships to include 4-year degree programs. They also emphasized the importance of outreach to parents.

### ***Stakeholders that should be involved in apprenticeship acceleration efforts***

All stakeholders agreed that diversity was the key to success- all partner types needed to be at the table to ensure programs were well thought-out and connections were made to provide support needed. General stakeholder types included secondary and post-secondary educational institutions, public and private sector employers, community organizations to meet special needs of participants, community organizations that serve diverse populations to improve recruiting efforts

(women, minorities, veterans, people with various disabilities – autism spectrum disorders in particular given the sizeable population impacted by this set of disorders), chambers of commerce, and government agency representatives. Participants also discussed the importance of including former apprentices as well as individuals from targeted groups (youth, college students, veterans, women, etc.) to be sure that programs are designed to be attractive to those that employers are trying to recruit.

### ***Special considerations for designing programs that work well for underrepresented groups***

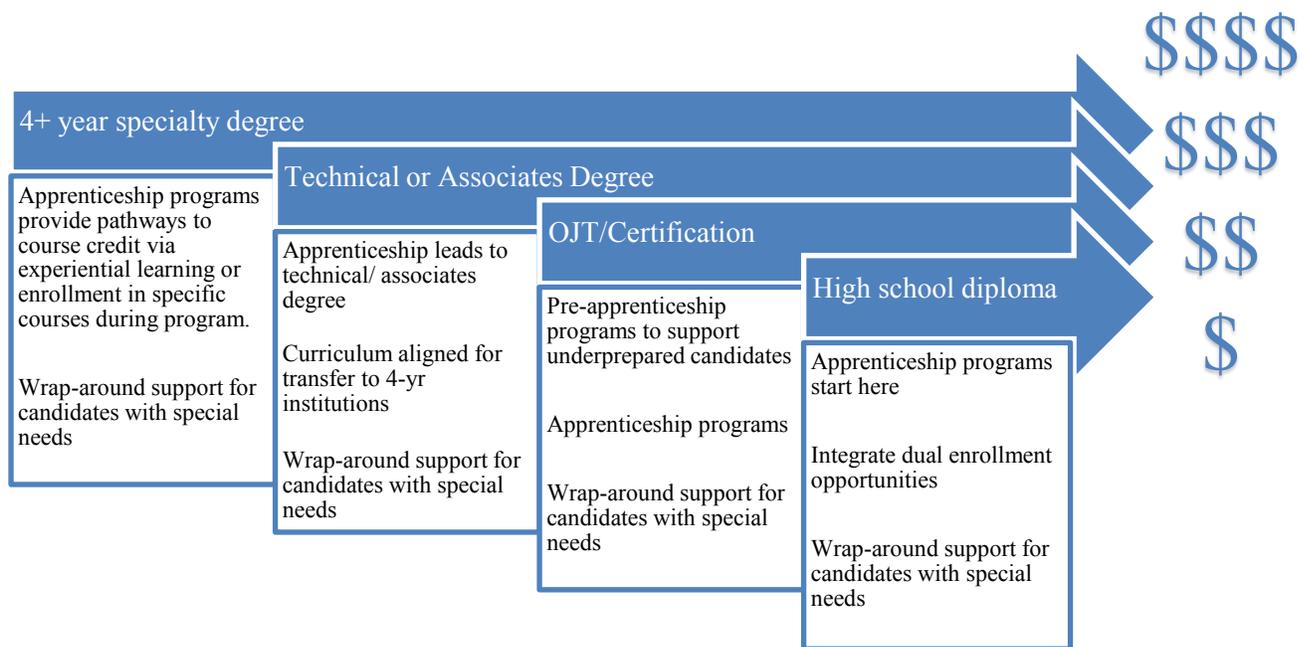
A significant amount of focus was placed on the approach to providing equitable access to diverse groups. The following recommendations were made by participants:

- TDOT's work with their HR and Department of Correction program is a good exemplar. Initial program had 12 inmates in it. It is a 2-month program, paid internship that covers 6 categories (OSHA, flagging, equipment, safety, etc.) The state contractors hire the inmates while in prison and give them a job based upon after their incarceration. Lesson learned was to do the program at night where conflicts would not exist.
- Mayor Luttrell's program entitled 'Mayor's University'
- Program with kids that are under-employed
- Programs revolving around the different generations
- CDL program and certification
- Summer Institute by FHWA for kids (comment: goal is to make it sustainable).
- Towing program mentioned – ½ day program out of high school for real life experience of the maritime industry.
- Progressions model or ladders of opportunity (i.e. dock handler, forklift operator, yard driver, CDL over the road driver – additional pay at each step).
- A history of the bus drivers at MATA. 50 years ago all drivers were white males. This changed to black males in the 80's. Now most of the drivers are black females. Very few white males apply any more. Even the applicant pool reflects this.
- Mentoring program for minorities, women, and other groups
- 'Success' stories from non-traditional candidates who have reached a position so others see it as attainable. Simply put, the next workforce generation would have role models and goals that they can achieve and show others anything is possible. Communicate these stories!
- Establishing an intermediary to help train. Companies want skilled, willing to work people but they need help on training.
- Links into programs that serve nontraditional programs. Hope Works- single moms over 25
- Transportation
- Support for students with home life challenges
- Awareness
- Partner more with community agencies serving target population
- Reserve units/national guard units have people transitioning out
- Get them into apprenticeship programs early so transition is easier (they know 18 months-2 years ahead of time when EAS)

- IEP – make apprenticeships part of IEP meetings for transition for occupations that fit.
- Make sure guidance counselors know
- Key is 'transition'. Make sure to connect with them where they will transition whether in high school, military, prison, etc.
- Be sure to review successful formal programs that include partnerships with public schools, private business
- Breakdown stereotypes associated with disabilities
- Workplace accommodations
- Workplace culture- make sure apprentice and employer understand each other!

### Career Pathway Analysis

A variety of career pathways, many with significant opportunity for continued skill building and career advancement are available in the transportation industry. In general, an ideal model would provide seamless transition from secondary to postsecondary programs with appropriate support between levels as needed. Truly successful pathway models provide alignment between levels for smooth transition and progression along the pathway. This general model is depicted in Figure 8.



**Figure 8 Generalized Career Pathway Model**

For the priority occupations identified in this report, a set of specific career pathway models was recently developed with a working group of national industry experts. These career pathways were created as part of the Federal Highway Administration’s National Transportation Career Pathways Initiative (NTCPI), where SETWC led development of the transportation operations focus for this project<sup>1</sup>. These models are provided in Figures 9-12. All of these occupations are apprenticeable, as designated by the US Department of Labor.

	KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOBS & WAGES
<b>ADVANCED LEVEL</b>	<ul style="list-style-type: none"> <li>Communication Skills, Written and Verbal Interpersonal Skills</li> <li>Ability to work a flexible/irregular schedule</li> <li>Ability to perform manual labor/ meet physical requirements</li> <li>General Computer Skills</li> <li>Knowledge of Microsoft Office Programs</li> <li>Ability to operate relevant equipment or software</li> </ul>	<ul style="list-style-type: none"> <li>High School Diploma or GED Required</li> <li>Bachelor's Degree preferred</li> <li>Major Coursework in business, transportation, safety or other relevant area</li> </ul>	<ul style="list-style-type: none"> <li>Commercial Driver's License (CDL) Required               <ul style="list-style-type: none"> <li>Class A or B CDL with Airbrake and Passenger Endorsements</li> </ul> </li> <li>Good driving record required</li> </ul>	<b>Advanced Level</b> <b>Transit Operator Supervisor</b> <ul style="list-style-type: none"> <li>Supervisor, Transit Service Delivery</li> </ul> \$29.72 (mean hourly rate from job descriptions)
<b>FREIGHT</b>	<ul style="list-style-type: none"> <li>Knowledge of Local Agency Procedures</li> <li>Interpersonal Skills</li> <li>Ability to perform manual labor/ meet physical requirements</li> <li>Communication Skills, Written and Verbal</li> <li>Possess a good attitude/work ethic</li> </ul>	<ul style="list-style-type: none"> <li>Must be at least 21-24 years old in many cases</li> <li>0-2 years driving experience, commercial driving experience preferred</li> </ul>	<ul style="list-style-type: none"> <li>CDL Required- Class A (or sometimes Class B) with the following endorsements:               <ul style="list-style-type: none"> <li>Hazardous Materials</li> <li>Tank Vehicle</li> <li>Double or Triple Trailer</li> <li>Airbrake</li> </ul> </li> <li>Good driving record required</li> </ul>	<b>Freight Driver/Operator</b> <ul style="list-style-type: none"> <li>Commercial Driver</li> <li>Equipment Operator</li> <li>Route Delivery Driver</li> <li>Truck Driver Class A</li> </ul> \$26.29 (mean hourly rate from job descriptions)
<b>TRANSIT</b>	<ul style="list-style-type: none"> <li>Knowledge of Local Agency Procedures</li> <li>Knowledge of Local Geography</li> <li>Communication Skills, Written and Verbal Interpersonal Skills</li> <li>Possess professional judgement</li> <li>Ability to work a flexible/irregular schedule</li> <li>Ability to pass a background check/ drug screening requirements</li> <li>Ability to perform manual labor/ meet physical requirements</li> <li>Ability to work well independently</li> <li>Ability to operate relevant equipment or software</li> </ul>	<ul style="list-style-type: none"> <li>Must be at least 21 in some cases</li> <li>High School Diploma or GED required</li> <li>1-5 years driving experience, commercial driving experience preferred (training can sometimes count experience)</li> </ul>	<ul style="list-style-type: none"> <li>CDL Required- Class A, B, C or D with the following endorsements:               <ul style="list-style-type: none"> <li>Airbrake</li> <li>Passenger</li> </ul> </li> <li>Good driving record required</li> <li>Driver's License with a good driving record required</li> <li>Class A, B, or C CDL with Airbrake and Passenger Endorsements</li> </ul> (On the job training toward obtaining a CDL is sometimes available)	<b>Paratransit Driver/ Operator</b> <ul style="list-style-type: none"> <li>Paratransit Bus Driver</li> <li>Paratransit Driver</li> <li>Van Driver - Paratransit</li> </ul> \$13.46 (mean hourly rate from job descriptions)  <b>Bus or Shuttle Driver/Operator</b> <ul style="list-style-type: none"> <li>Airport Shuttle Bus Driver</li> <li>Bus Driver</li> <li>Bus Operator / Motor Coach Driver</li> <li>Chariot Driver – Commuter</li> </ul> \$16.11 (mean hourly rate from job descriptions)

Figure 9 Transportation Career Pathways: Commercial Drivers<sup>1</sup>

	KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOBS & WAGES
<b>ADVANCED LEVEL</b>	<ul style="list-style-type: none"> <li>Knowledge of Vehicle Systems/ Mechanical Aptitude</li> <li>Knowledge of Electrical and Hydraulic Systems</li> <li>Knowledge of Local Agency Procedures/ Standard Design Principles</li> <li>Time and Task Management Skills</li> <li>Ability to work a flexible/irregular schedule</li> <li>Ability to operate relevant equipment or software</li> <li>General Computer Skills</li> </ul>	<ul style="list-style-type: none"> <li>High School Diploma or GED Required</li> <li>Vocational/ Technical Training Required               <ul style="list-style-type: none"> <li>Trade School Certification or Diploma in Diesel Technology</li> <li>Associate's degree</li> </ul> </li> <li>3-7 years experience fleet maintenance or diesel equipment maintenance and repair (education can count toward experience in most cases)</li> </ul>	<b>In addition to the certifications listed below:</b> <ul style="list-style-type: none"> <li>Automotive or Medium/ Heavy Duty National Institute for Automotive Service Excellence (ASE) Certification</li> <li>Annual Inspector Certification</li> <li>Brake Inspector Certification</li> <li>608 and 609 HVAC – Refrigeration Certification</li> </ul>	<b>Advanced Level</b> <b>Senior Diesel Technician/ Mechanic</b> <ul style="list-style-type: none"> <li>Diesel Fleet Mechanic Technician II</li> <li>Diesel Mechanic III</li> <li>Senior Diesel Technician/Mechanic</li> <li>Head Diesel Mechanic</li> </ul> \$31.50 in Transit and \$26.44 in Freight (mean hourly rate from job descriptions)
<b>MID LEVEL</b>	<ul style="list-style-type: none"> <li>Knowledge of Vehicle Systems/ Mechanical Aptitude</li> <li>Knowledge of Equipment Management</li> <li>Communication Skills, Written and Verbal</li> <li>Ability to work well on a team</li> <li>Interpersonal Skills</li> <li>Possess a good attitude/work ethic</li> <li>General Computer Skills</li> <li>Ability to operate relevant equipment or software</li> </ul>	<ul style="list-style-type: none"> <li>Additional Vocational/ Technical Training Preferred in Diesel/Automotive Mechanics</li> <li>High School Diploma or GED Required</li> <li>1-4 years experience heavy duty diesel or automotive equipment repair and maintenance (education can count toward experience in some cases)</li> </ul>	<b>Relevant Industry Certifications for Technicians and Mechanics:</b> <ul style="list-style-type: none"> <li>Driver's License</li> <li>Class A or B CDL with Passenger and Airbrake Endorsements</li> <li>National Institute for Automotive Service Excellence (ASE) Certification</li> <li>Journeyman's Card</li> <li>Diesel Mechanic Certification</li> </ul>	<b>Diesel Technician</b> <ul style="list-style-type: none"> <li>Diesel Technician</li> <li>Heavy Duty Diesel Technician</li> <li>Fleet Services Technician</li> <li>Truck &amp; Trailer Diesel Tech.</li> </ul> \$35.97 in Transit and \$29.13 in Freight (mean hourly rate from job descriptions)
<b>ENTRY LEVEL</b>	<ul style="list-style-type: none"> <li>Knowledge of Vehicle Systems/ Mechanical Aptitude</li> <li>Knowledge of Diesel Technology</li> <li>Knowledge of Equipment Management Practices</li> <li>Communication Skills, Written and Verbal</li> <li>Time and Task Management Skills</li> <li>Ability to follow/ interpret instructions</li> <li>Ability to operate relevant equipment or software</li> </ul>	<ul style="list-style-type: none"> <li>Additional Vocational/ Technical Training Preferred               <ul style="list-style-type: none"> <li>Trade School Certification</li> <li>Associate's degree</li> </ul> </li> <li>High School Diploma or GED Required</li> <li>1-5 years experience in heavy equipment mechanics (education can count toward experience in some cases)</li> </ul>	Some additional relevant certifications: <ul style="list-style-type: none"> <li>Transportation Workers Identification Card</li> <li>HVAC Certification</li> <li>Forklift Certification</li> <li>Welding Certification</li> <li>Valid DOT Medical Card</li> </ul>	<b>Diesel Mechanic</b> <ul style="list-style-type: none"> <li>Diesel &amp; Heavy Equipment Mechanic</li> <li>Diesel Mechanic</li> <li>Diesel Truck Mechanic</li> </ul> \$26.67 in Transit and \$29.10 in Freight (mean hourly rate from job descriptions)

Figure 10 Transportation Career Pathways: Diesel Mechanics/Technologists<sup>1</sup>

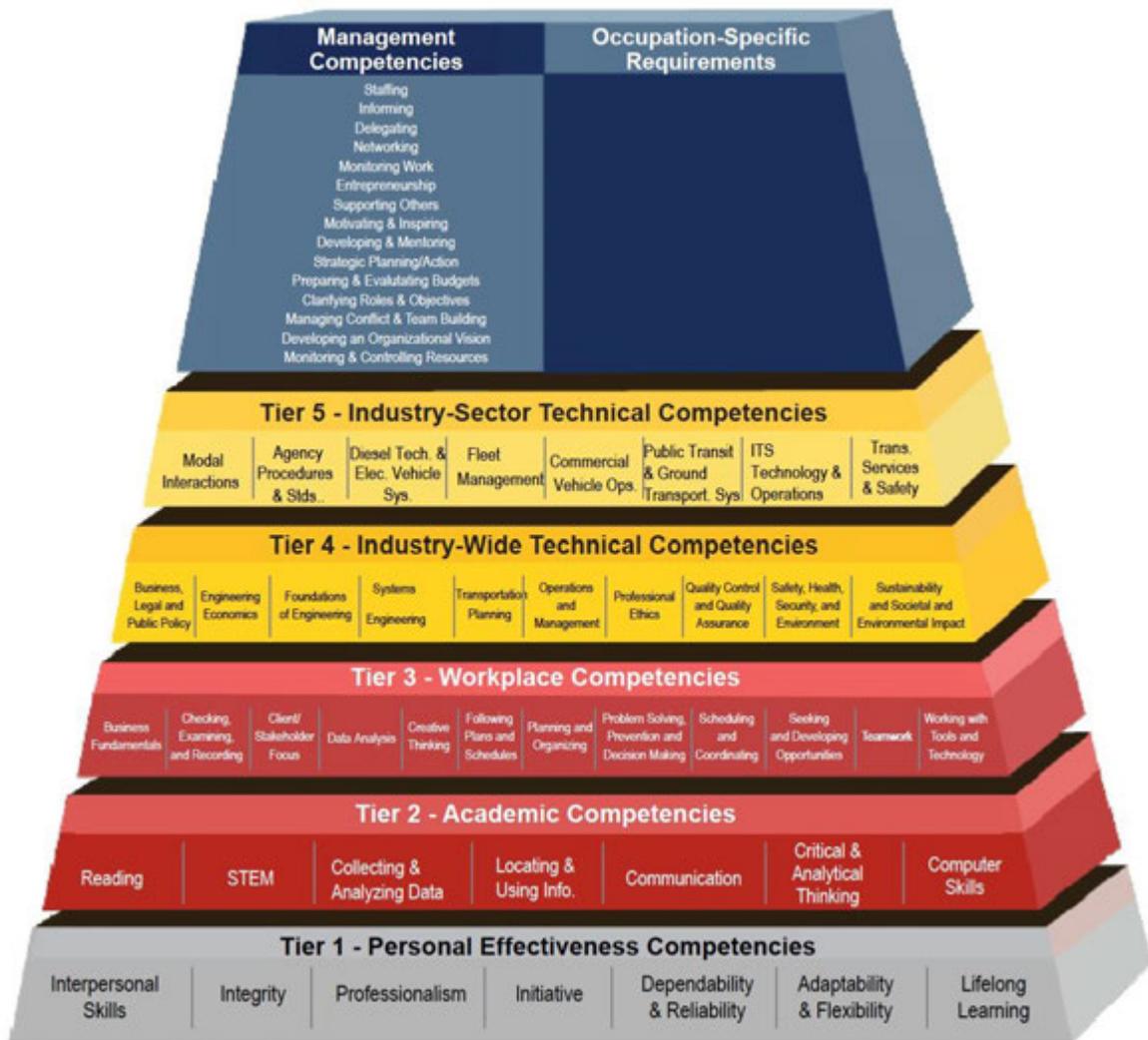
	KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOB'S & WAGES
<b>ADVANCED LEVEL</b>	<p>Knowledge of Transportation, Warehousing, Supply Chain, and Logistics Knowledge of Project Management Practices</p> <p>Problem solving, mathematical, or critical thinking skills Communication Skills, Written and Verbal Possess a good attitude/work ethic</p> <p>AutoCAD/ MicroStation/ Geopak SAS/ SAP ERP</p>	<p><b>Bachelor's Degree Required</b></p> <p>Major Coursework in Transportation, Supply Chain Management, Operations Research, Mathematics, Logistics Management, Industrial Engineering, Business Administration, or other quantitative field</p> <p>5-10 years of supply chain leadership/management and engineering experience in logistics/transportation</p>		<p><b>Advanced Level</b></p> <p><b>Supply Chain Manager or Senior Analyst</b></p> <ul style="list-style-type: none"> <li>Director of Supply Chain Engineering</li> <li>Senior Analyst, Operations Analysis</li> <li>Supply/Demand Planning Program Manager</li> </ul>
<b>MID LEVEL</b>	<p>Knowledge of Transportation, Warehousing, Supply Chain, and Logistics Knowledge of Material Handling/Manufacturing</p> <p>Communication Skills, Written and Verbal Problem solving, mathematical, or critical thinking skills Interpersonal Skills</p> <p>AutoCAD/ MicroStation/ Geopak SAS/ SAP ERP</p>	<p><b>Bachelor's Degree Required or In Progress;</b> Master's Degree sometimes preferred</p> <p>Major Coursework in Computer Science, Data Analytics, Engineering (Industrial, Electrical, Systems or Mechanical), Logistics Management, Operations Research, Statistics, Supply Chain Management, or Transportation, or other related field</p> <p>2-5 years experience transportation and/or production industry</p> <p>1-3 years experience logistics planning or process engineering</p>		<p><b>Intermediate Level</b></p> <p><b>Logistics/Supply Chain Engineer</b></p> <ul style="list-style-type: none"> <li>Industrial Engineer</li> <li>Logistics Engineer I</li> <li>Manufacturing Engineer</li> <li>Logistic Engineer/Distribution Analyst</li> </ul> <p><b>Logistics Coordinator/Analyst</b></p> <ul style="list-style-type: none"> <li>Logistics Coordinator</li> <li>Logistics Operation Analyst</li> <li>Materials Analyst II</li> </ul>
<b>ENTRY LEVEL</b>	<p>Knowledge of Transportation, Warehousing, Supply Chain, and Logistics Knowledge of Project Management Practices</p> <p>Communication Skills, Written and Verbal Time or task management skills Organizational Skills/ Detail Oriented Interpersonal Skills Problem solving, mathematical, or critical thinking skills</p> <p>AutoCAD/ MicroStation/ Geopak</p>	<p><b>Bachelor's Degree Required or In Progress</b> Master's Degree sometimes preferred</p> <p>Major Coursework in Industrial Engineering, Logistics/Transportation Management, Operations Research/Management, Supply Chain, Finance, or other related business field</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Certified Professional Logistician (CPL) preferred</li> <li><input type="checkbox"/> PMP Certification a plus</li> <li><input type="checkbox"/> Customs Broker's License</li> <li><input type="checkbox"/> Certified Lean Manager</li> <li><input type="checkbox"/> Forklift Certified</li> <li><input type="checkbox"/> Driver's License</li> </ul>	<p><b>Entry Level</b></p> <p><b>Logistics Intern</b></p> <ul style="list-style-type: none"> <li>Intern - Global Logistics</li> <li>Intern - Industrial Engineering</li> <li>Logistics Analyst Intern</li> <li>Logistics Engineering Apprentice</li> </ul> <p>\$17.00 (mean hourly rate from job descriptions)</p>

**Figure 11 Transportation Career Pathways: Industrial Engineering<sup>1</sup> (Logistics Engineer is Apprenticable)**

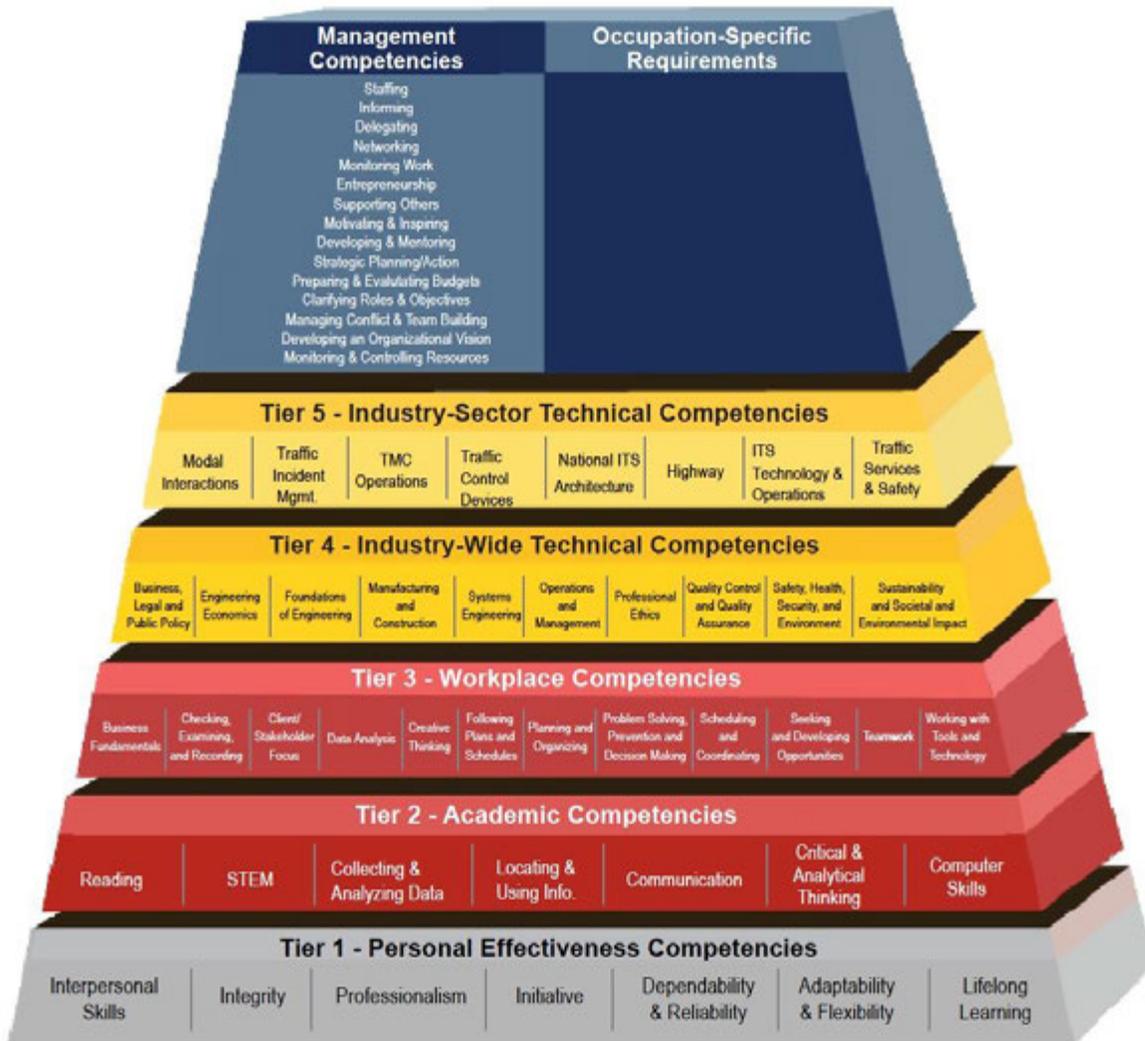
	KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOB'S & WAGES
<b>ADVANCED LEVEL</b>	<p>Knowledge of IT Practices/Computer Science Principles Knowledge of Project Management practices (budgeting, scheduling, etc.) Knowledge of Transportation Operations</p> <p>Managerial/ Supervisory Experience and Leadership Skills</p> <p>General Computer Skills</p>	<p><b>Bachelor's Degree Required</b></p> <p>Master's degree or MBA sometimes preferred</p> <p>Major Coursework in Civil Engineering or related field strongly preferred</p> <p>4-10 years of experience in computer technical development, program management, and/or system administration with technical management experience</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> GIAC Certifications (GCIA, GCIH, GMON, GPPA or GCED)</li> <li><input type="checkbox"/> EC-Council (CEH, ECSA, CHFI)</li> <li><input type="checkbox"/> Cisco CCIE</li> </ul>	<p><b>Advanced Level</b></p> <p><b>Senior Level Computer Information Systems Manager</b></p> <ul style="list-style-type: none"> <li>Engineering Manager</li> <li>IT Leadership Development Program</li> <li>IT Manager – Transportation</li> <li>Analyst / Sr. Specialist Mechanical Systems</li> <li>Lead IT Analyst</li> <li>Senior Systems Product Manager</li> </ul> <p>\$51.99 (mean hourly rate from job descriptions)</p>
<b>MID LEVEL</b>	<p>Knowledge of IT Practices/Computer Science Principles Knowledge of Data Analytics Knowledge of Transportation Operations</p> <p>Technical Communication/Report Development Skills Communication Skills, Written and Verbal Analytical, Mathematical, or Problem-solving Skills</p> <p>General Computer Skills Knowledge of Microsoft Office Programs</p>	<p><b>Bachelor's Degree Required</b></p> <p>Major Coursework in Engineering, Mathematics, Physics, Computer Science, Information Technology, Business Administration</p> <p>2-8 years experience with computers, systems or technical experience with Logistics / Transportation experience preferred</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Professional Engineering License</li> </ul>	<p><b>Intermediate Level</b></p> <p><b>Engineer/ Technologist/ Programmer</b></p> <ul style="list-style-type: none"> <li>Systems Engineer</li> <li>Information Systems Programmer</li> <li>Information Technology Security Engineer</li> <li>ISSO-Security Engineering and Architecture</li> <li>Information Technology Technician</li> </ul>
<b>ENTRY LEVEL</b>	<p>Knowledge of IT Practices/Computer Science Principles Knowledge of Data Analytics Knowledge of Transportation Operations</p> <p>Communication Skills, Written and Verbal Technical Communication/Report Development Skills Possess a good attitude/work ethic</p> <p>General Computer Skills Knowledge of Microsoft Office Programs</p>	<p><b>Bachelor's Degree Required or In Progress</b></p> <p>Major Coursework Computer Science, Management Information Systems, Engineering, Supply Chain/Logistics, or Mathematics</p> <p>1-5 experience in IT systems design and development</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Driver's License Required</li> <li><input type="checkbox"/> Microsoft Certifications</li> <li><input type="checkbox"/> Comp TIA IT Certifications</li> </ul>	<p><b>Entry Level</b></p> <p><b>IT Specialist/ Analyst</b></p> <ul style="list-style-type: none"> <li>IT Support Specialist</li> <li>IT Analyst - Supply Chain Systems</li> <li>Cyber Security Specialist</li> <li>Paratransit Technical Support Data Analyst (Administrative Officer III)</li> </ul>

**Figure 12 Transportation Career Pathways: Computer and Information Systems Managers<sup>1</sup>**

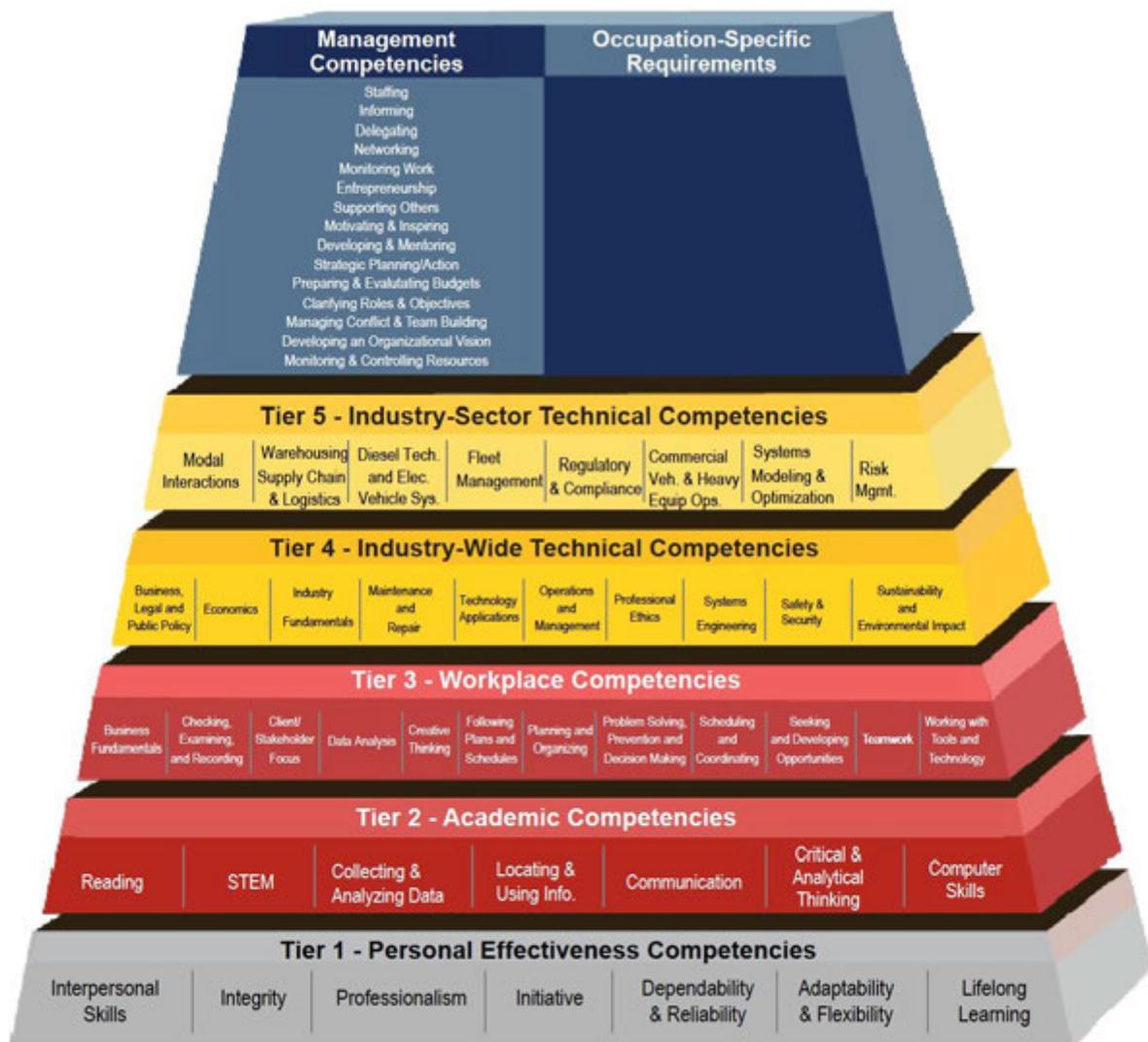
Beyond these current priorities, it is crucial to begin thinking about how occupations will continue to change in the future given rapid advances in technology. A forward-looking perspective that also considered a breadth of transportation occupations was the focus of SETWC’s NTCPI effort that engaged diverse industry experts from across the country in an iterative development process. The resulting competency models that provide guidance for the future of transportation workforce development are shown in Figures 13-15.



*Figure 13 Traffic Operations Competency Model<sup>1</sup>*



**Figure 14** Transit Operations Competency Model<sup>1</sup>



**Figure 15** Freight Operations Competency Model<sup>1</sup>

## Educational Program and Curriculum Review for Greater Memphis Region

SETWC staff conducted a review of secondary and post-secondary transportation-related education and training opportunities within the greater Memphis area. The educational institutions and community organizations offering programs are diverse and provide pathways for students from many different socioeconomic backgrounds, levels of preparation, and interest. Both formal and informal programs were included in the review. Formal programs are structured education and training programs leading to credential or degree, while informal programs are primarily designed to increase students' interest in particular pathways. The following review includes highlights relevant programs from the greater Memphis area.

### **Secondary Programs**

#### Arlington High School, Arlington, TN

**Program Title:** STEM

**Program Type:** Formal (CTE)

**Population Served:** high school students

**Degree or certification offered:** dual enrollment opportunities

**Description:** State of TN Career and Technical Education program.

**Course Listing:** STEM I: Foundation, STEM II: Applications, STEM III: STEM in Context

#### Bolton High School, Arlington, TN

**Program Title:** Automotive Technology, IT, Construction Technology

**Program Type:** Formal (CTE)

**Population Served:** high school students

**Degree or certification offered:** dual enrollment opportunities

**Description:** State of TN Career and Technical Education program.

**Course Listing:** Transportation Core, Automotive Electronics, Automotive Suspension & Steering, Automotive Engine Performance; Information Management Systems, Administrative Management Systems; Construction Core

#### University of Memphis, Memphis, TN

**Program Title:** Girls Experiencing Engineering

**Program Type:** informal

**Population Served:** middle and high school students

**Degree or certification offered:** NA

**Description:** Week-long summer intensive summer program and academic year workshops designed to increase students' awareness, interest, and preparation for STEM careers, with particular emphasis on engineering and engineering technology and relevant career pathways.

**Course Listing:** NA

**Program Title:** Transportation Academy

**Program Type:** informal

**Population Served:** high school students

**Degree or certification offered:** NA

**Description:** Week-long summer intensive summer program and academic year workshops designed to increase students' awareness, interest, and preparation for transportation careers, with particular emphasis on transformative technologies and relevant career pathways.

**Course Listing:** NA

**Program Title:** Choosing Transportation

**Program Type:** informal

**Population Served:** high school students

**Degree or certification offered:** NA

**Description:** Academic year day-long workshop designed to help students develop essential professionalism skills, learn about transportation career opportunities, and network with post-secondary students and industry professionals. Workshop includes leadership and networking sessions, keynote addresses from industry leaders, speed networking with industry representatives from all modes, and a career expo with 25+ companies designed to showcase career options in the greater Memphis area.

**Course Listing:** NA

#### [Transportation-STEM Academy at East High, Memphis, TN](#)

**Program Title:** Robots + Rockets

**Program Type:** Formal (CTE)

**Population Served:** high school students

**Degree or certification offered:** 1/2 Credit awarded

**Description:** The T-STEM Academy at East High School, a unique engineering high school program, offers a summer program focused on aviation and robotics. Students will take Introduction to Engineering Design (IED) for a half high school credit and engage in enhanced STEM coursework that incorporates problem-based learning and the use of aviation and robotics technology as a learning tool. Students will build rockets and robots and engage in computer programming. ACT prep in English-Language Arts and Math will be provided, and students will receive a free ACT-approved scientific calculator.

**Course Listing:** Introduction to Engineering Design, 3D Modeling and Design, 3D Printing, Robotics, Coding

**Program Title:** Engineering; Aviation; Transportation and Logistics, Memphis, TN

**Program Type:** Formal (CTE)

**Population Served:** High School Students

**Degree or certification offered:** Professional Certificates

**Description:** At the T-STEM Academy, explicit and carefully sequenced Programs of Study help students to explore STEM education and specific career pathways, deepening their knowledge and skills, and leading to both increased career and college readiness and industry-recognized, professional certifications.

**Course Listing:** Intro to Engineering, Principals of Engineering, Civil Engineering, Biotechnical Engineering, Computer Integrated Manufacturing, Engineering Design and Development, Intro to Engineering; Aviation Flight, Introduction to Aerospace, Aviation I: Principles of Flight, Aviation III Advanced Flight; Foundations of Transportation, Distribution, and Logistics; Distribution and Logistics I, Distribution and Logistics II: Management

[Sheffield High School, Memphis, TN](#)

**Program Title:** Sheffield Career and Technology Center

**Program Type:** Formal

**Population Served:** High School Students

**Degree or certification offered:** Professional Certificates

**Description:** Sheffield Career and Technology Center provides a data driven, research based, intellectual and technological learning environment to prepare students for 21st century careers.

**Course Listing:** Transportation, Distribution, and Logistics; Collision Repair

[Trezevant High School, Memphis, TN](#)

**Program Title:** Trezevant Career and Technology Center

**Program Type:** Formal

**Population Served:** High School Students; Adult Students

**Degree or certification offered:** Professional Certification

**Description:** The Trezevant Career and Technology Center serves as an academic center of Learning and Education that motivates and nurtures all learners by preparing them to meet the needs of future leaders and professionals in the Industrial, Professional and Medical arenas.

**Course Listing:** Fundamentals of Transportation, Distribution, and Logistics; Distribution & Logistics I; Principles of Transportation, Distribution and Logistics.

[Christian Brothers University, Memphis, TN](#)

**Program Title:** Unmanned Aerial Systems Summer Camp

**Program Type:** Informal

**Population Served:** Middle and High School Students

**Degree or certification offered:** NA

**Description:** The Unmanned Aerial Systems Summer Camp at Christian Brothers University is a three-day activity-filled workshop designed to introduce students to unmanned aerial systems. Students will learn about unmanned aerial systems and engineering. Students will build and fly a Flite Test Mighty Mini Sparrow glider and a remotely controlled ground effect vehicle.

**Course Listing:** NA

**Program Title:** Future Women Engineers

**Program Type:** Informal

**Population Served:** High School Students

**Degree or certification offered:** NA

**Description:** The Future Women Engineers Program is a five-day summer program that includes hands-on activities in areas of Civil & Environmental, Chemical & Biochemical, Electrical & Computer, and Mechanical Engineering. The program also includes industrial tours and talks by professional women engineers and scientists.

**Course Listing:** NA

**Program Title:** Transport Packaging Summer Program

**Program Type:** Informal

**Population Served:** High School Students

**Degree or certification offered:** Certificate of Completion

**Description:** This one-day summer program has 25 spaces available for rising high school freshmen to seniors. The cost of the program is \$10. A Certificate of Completion will be awarded to the participants at the end of the program.

**Course Listing:** NA

**Program Title:** Aspiring Engineers Workshop

**Program Type:** Informal

**Population Served:** High School Students

**Degree or certification offered:** NA

**Description:** The engineering summer camp will be a four-day program for high school students. Each day will include hands-on engineering experiments in an area related to one of the departments of the Gadomski School of Engineering, as well as a guest speaker representing the four engineering majors that are offered at CBU.

**Course Listing:** NA

[Boys and Girls Club of Memphis, Memphis, TN](#)

**Program Title:** Juice Plus+ Technical Training Center, IT Program

**Program Type:** Formal

**Population Served:** High School Students

**Degree or certification offered:** Professional Certification

**Description:** The Technical Training Center is proud to partner with local IT specialists to provide foundational technology classes for interested students. The computing foundations course provides students with the skills necessary to receive an industry-recognized certification, which can help catapult their careers and allow them to obtain technology jobs. These classes provide our students with a rare opportunity to get a head start in a career field with one of the highest projected growth rates. Students may receive an A+ Certification and IT Fundamentals Certification.

**Course Listing:** NA

**Program Title:** Juice Plus+ Technical Training Center, Logistics Program

**Program Type:** Formal

**Population Served:** High School Students

**Degree or certification offered:** Professional Certification

**Description:** Memphis is rife with opportunities in the field of logistics and thanks to the support of FedEx the TTC prepares our students with a foundational understanding of warehouse management. Become certified to operate: a forklift, rise lift, and pallet driver; practice warehouse techniques such as: picking and packing, inventory control, supply tracking with electronic bar code scanners, shipping and receiving

**Course Listing:** NA

[Girls Inc., Memphis, TN](#)

**Program Title:** Eureka!

**Program Type:** Informal

**Population Served:** Eighth Grade to High School Students

**Degree or certification offered:** NA

**Description:** Eureka! is a 5-year comprehensive program designed to inspire girls ages 12 to 18 to pursue their academic and career interests, especially in Science Technology Engineering and Math (STEM) related fields. Girls enter the program the summer before their eighth-grade year and continue through their high school graduation. The Eureka! Program is designed to meet the intellectual, social, physical and emotional needs of adolescent girls through a combination of engaging STEM, sports, personal and career development activities.

**Course Listing:** NA

**Program Title:** West Tennessee STEM Hub

**Program Type:** Informal

**Population Served:** K-12 Students

**Degree or certification offered:** NA

**Description:** The West TN STEM Hub serves as a resource for West Tennessee to increase students' interest in and preparedness for the STEM workforce through a variety of activities. Collaborative partnerships between STEM Hub, Platform School, and STEM community (K-16 faculty, industry, government) professionals are the cornerstone of this effort.

**Course Listing:** NA

## Post-Secondary Programs

[Arkansas State University Mid-South, West Memphis, AR](#)

**Program Title:** Diesel Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Certificate of Proficiency in Heavy Truck Diesel Maintenance

**Description:** Teaches students how to maintain and repair diesel engines and related components in a variety of vehicles and machinery.

**Course Listing:** [Diesel Technology](#)

**Program Title:** Aviation Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Technical Certificate in Aviation Airframe Maintenance  
Technology Program Goals

**Description:** Prepares students to work in the aviation industry maintaining a broad spectrum of aircraft, from small planes to large-scale commercial jets.

**Course Listing:** [Aviation Technology](#)

[Christian Brothers University, Memphis, TN](#)

**Program Title:** Civil Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S. in Civil Engineering

**Description:** This program provides an education that balances theory and practice with emphasis on the traditional areas of structural, transportation, geotechnical, environmental, and construction engineering.

**Course Listing:** [Civil Engineering](#)

**Program Title:** Electrical & Computer Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S. Electrical Engineering

**Description:** The electrical engineering track emphasizes electronics, controls, and digital systems. This track prepares students for the research, design and production of computers, communication systems, power systems, electrical appliance and many other electronic devices and systems. The computer engineering track emphasizes digital systems, networks, and complex hardware and software systems; this track prepares students to work with the design and operation of computing systems and digital communication systems.

**Course Listing:** For [Electrical Engineering](#); For [Computer Engineering](#)

**Program Title:** Mechanical Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S. Mechanical Engineering

**Description:** The course of study begins with a strong foundation in mathematics, physical sciences, and engineering sciences, and culminates in a series of design courses. This sequence requires the student to apply material learned in foundation courses to practical design problems in other areas. Traditional classroom instruction is supported with extensive laboratory experience to insure a solid foundation in traditional and emerging areas of mechanical engineering.

**Course Listing:** Mechanical Engineering

**Program Title:** Packaging

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S. Engineering Management (Packaging Concentration)

**Description:** Packaging engineering includes the study of products, packages, materials, containers, structures, methods, machinery, and transportation.

**Course Listing:** [Packaging](#)

[Lemoyne Owen College, TN](#)

**Program Title:** Information Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:**

**Description:** Lemoyne Owen prepares students for the computer industry which is one of the fastest growing segments of our economy and the growth will continue well into the new century.

**Course Listing:** For [Information Technology](#)

Southwest TN Community College, Memphis, TN

**Program Title:** Automotive Service

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Associate of Applied Science

**Description:** The program is designed to provide the technical competency required of entry-level technicians employed by dealerships and other automotive service establishments.

**Course Listing:** For [AAS](#)

**Program Title:** Architectural Engineering Technology, Civil/Construction Concentration

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Technical Certificate, Associate of Applied Science

**Description:** The civil/construction concentration technician assists engineers in the planning for, and in the design, construction, and maintenance of residential subdivisions, industrial parks, airports, bridges, highways, dams, pipelines, railroads, and buildings.

**Course Listing:** For [Technical Certificate](#); For [AAS](#)

**Program Title:** Electronic Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Technical Certificate, Associate of Applied Science

**Description:** The student gains skills and knowledge to repair and maintain a variety of electronic equipment including communications equipment (two-way radios, cellular phone and satellite equipment.), computers and peripherals (computers, monitors, printers, and copiers), industrial related equipment (manufacturing controls and robotics), audio and visual related equipment (audio amplifiers, televisions, public address equipment and recording equipment)

**Course Listing:** For [Technical Certificate](#); For [AAS](#)

**Program Title:** Computer Information Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Technical Certificate, Associate of Applied Science

**Description:** Computer Information Technology (CITC) offers learning opportunities in a wide range of topics, including network communications, system administration and object-oriented systems development, that prepare you for a career in today's business Information Technology (IT) environment.

**Course Listing:** For [AAS](#)

Tennessee College of Applied Technology, Memphis, TN

**Program Title:** Aircraft Mechanics

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Airframe Mechanic

**Description:** Students are taught to inspect, repair, service and overhaul airframes and power plants of both large and small aircraft.

**Course Listing:** For [Airframe Mechanic](#)

**Program Title:** Truck Driving

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Class A-CDL Certificate

**Description:** Students prepare for entry-level employment as tractor-trailer drivers by providing the identified knowledge and performance skills necessary to pass the Commercial Driver's test.

**Course Listing:** For [Class A - CDL](#)

**Program Title:** Avionics Maintenance Technician

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Avionics Maintenance Technician Diploma

**Description:** The course prepares individuals to test, trouble-shoot, maintain, replace and repair aviation electronic systems and components of both large and small aircraft.

**Course Listing:** For [Avionics Maintenance Technician](#)

**Program Title:** Automotive Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Technician Assistant Certificate, Technician Apprentice Certificate, Master Technician Diploma

**Description:** Prepares students for entry-level employment as automotive technicians. The program provides classroom instruction and hands-on training on the auto-motive systems and their functions.

**Course Listing:** For [Automotive Technology](#)

[The University of Memphis, Memphis, TN](#)

**Program Title:** Biologistics Research Cluster

**Program Type:** Informal

**Population Served:** college, community

**Degree or certification offered:** NA

**Description:** Biologistics can be defined as the management of the safe flow of high value, temperature sensitive and time-critical biological materials as they are delivered for patient care, analyzed for diagnostic purposes, processed to higher value products or stored to meet physical and data archival needs. The cluster offers professional development workshops for college and community members.

**Course Listing:** [Biologistics Research Cluster](#)

**Program Title:** Civil Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S., M.S. in Civil Engineering; PhD in Engineering

**Description:** The Civil Engineering program of study provides an integrated educational experience that combines study in basic and engineering science, the humanities, and the social sciences with practical experience in laboratory experimentation, problem solving, and engineering design.

**Course Listing:** [Civil Engineering](#)

**Program Title:** Data Analytics for Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Graduate Certificate

**Description:** The business analytics discipline has become very important in information systems and industry, due to increased access to big data, unstructured and structured data, and strategic business decision making. These increasingly complex decision making capabilities lead directly to competitive advantage and increased profits. Thus, trained business analysts with skills in addressing data management and business intelligence and analytics are in high demand. The certificate program requires completion of 12 semester credit hours.

**Course Listing:** [Data Analytics for Technology](#)

**Program Title:** Data Science

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Graduate Certificate

**Description:** The goal of the Data Science certificate is to help train a workforce of future data scientists able to tackle the challenges and reap the promising benefits of the vast quantities of data available today in all parts of the economy, society, and government. At the end of the program, students will exhibit a deep understanding of how to manage large volumes of data, discover patterns and make inferences from the data, use models to make predictions about potential solutions, and quantify the reliability and effectiveness of the outcomes.

**Course Listing:** [Data Science Certificate](#)

**Program Title:** Drone Research Cluster

**Program Type:** Informal

**Population Served:** college, community

**Degree or certification offered:** NA

**Description:** The DRONES cluster at the FedEx Institute is committed to the development of innovative research, corporate partnership, and community engagement in all aspects related to Drones, Robotics, and Navigation Enabled Systems (including autonomous vehicles). The cluster offers professional development workshops for college and community members.

**Course Listing:** [DRONES - Drones, Robotics, and Navigation Enabled Systems](#)

**Program Title:** Electrical and Computer Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S., M.S. in Electrical or Computer Engineering; PhD in Engineering

**Description:** The course of study begins with a strong foundation in mathematics, physical sciences, and engineering sciences, and culminates in a series of synthesis and design courses.

**Course Listing:** [Electrical and Computer Engineering](#)

**Program Title:** Engineering Technology

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S., M.S. in Engineering Technology

**Description:** Engineering Technology is the profession in which knowledge of mathematics and natural science, gained by higher education, experience, and practice, is devoted primarily to the implementation and extension of existing technology for the benefit of humanity.

**Course Listing:** [Engineering Technology](#)

**Program Title:** Geographic Information Systems

**Program Type:** Formal

**Population Served:** college students (Graduate)

**Degree or certification offered:** Graduate Certificate in Geographic Information Systems

**Description:** The GIS Certificate Program will provide students with an interdisciplinary perspective which will allow them to integrate GIS skills into their knowledge acquired in other disciplines.

**Course Listing:** [Geographic Information Systems](#)

**Program Title:** Intermodal Freight Transportation Institute

**Program Type:** Both

**Population Served:** college, industry professionals

**Degree or certification offered:** Graduate Certificate (through Civil Engineering); PDH offered for conferences/workshops

**Description:** The Intermodal Freight Transportation Institute offers an administrative home for a wide range of multi-disciplinary research and curricular initiatives as well as public-private partnership endeavors collectively designed to provide national leadership on issues related to intermodal freight transportation. An annual State of Freight conference is hosted each fall. The Graduate Certificate in Freight Transportation will enable individuals with science or engineering bachelor's degrees to expand their analytical, practical, and problem-solving skills in the area of freight transportation (e.g., supply chain and logistics, maritime transportation, rail transportation). The certificate will also enable them to transition and pursue advanced degrees (Master's or Ph.D.).

**Course Listing:** [Graduate Certificate in Freight Transportation](#)

**Program Title:** Mechanical Engineering

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.S., M.S. in Mechanical Engineering; PhD in Engineering

**Description:** The course of study begins with a strong foundation in mathematics, physical sciences, and engineering sciences, and culminates in a series of synthesis and design courses.

**Course Listing:** [Mechanical Engineering](#)

**Program Title:** Southeast Transportation Workforce Center (SETWC)

**Program Type:** Informal

**Population Served:** college students, industry professionals

**Degree or certification offered:** PDH offered for conferences/workshops

**Description:** The mission of SETWC is to coordinate existing regionally based programs, plans, and processes and to strategically create partnerships to ensure that students and persons seeking workforce reentry, career transition, or career advancement are aware of opportunities, required education, skills, training, and ladders to success within the regional transportation workforce. SETWC hosts the annual Choosing Transportation Summit for industry professionals each spring.

**Course Listing:** NA

**Program Title:** Supply Chain Management

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** B.B.A. in Supply Chain Management

**Description:** Students earning a degree in supply chain management learn to evaluate issues and solve problems related to purchasing, operations, distribution and transportation

**Course Listing:** [Supply Chain Management](#)

**Program Title:** Urban Planning

**Program Type:** Formal

**Population Served:** college students (Graduate)

**Degree or certification offered:** M.S. in

**Description:** Program prepares students for careers concerned with the physical development of communities, and the interaction of that development with the social, economic, and environmental well-being of communities

**Course Listing:** [Urban Planning](#)

**Program Title:** University College

**Program Type:** Formal

**Population Served:** college students

**Degree or certification offered:** Experiential Learning Credit; Bachelor of Professional Studies

**Description:** Credit is offered for a variety of experience. Commercial Aviation and Information Technology are two such occupations where experiential learning credit is offered. The Bachelor of Professional Studies in Commercial Aviation is a new program with an expected start date of Fall 2018. The Bachelor of Professional Studies in Information Technology is already available.

**Course Listing:** [Experiential Learning Credit](#)

### **Secondary and Post-Secondary Needs Assessment**

The following are primary needs related to secondary and post-secondary programming for transportation-related occupations in the greater Memphis area:

- While numerous programs for preparing students for transportation careers exist, a primary need is for greater awareness of the breadth of transportation occupations (not limited to strict transportation, distribution, and logistics (TDL) definitions) and the multitude of pathways available that support individual strengths.

- Greater industry-academia partnership is needed to expand students’ understanding of career opportunities, attract students to transportation programs, and ensure programs appropriately prepare students for workforce success.
- There is a significant need at all levels- both secondary and post-secondary – for increased opportunities for students to obtain work experience related to career fields of interest. This type of experience is crucial for deepening understanding of industry context. This also provides a platform for training that is directly aligned with industry practice so that as technology evolution continues, students are trained in state-of-the-art and state-of-the practice.
- Workforce development must start early- more programming is needed at the middle school level, as it is often too late by the time a student reaches high school to address misperceptions of industries and to change course if not on the right pathway for preparation (particularly for STEM fields).

## 4.0 Implementation Plan

Several primary elements that are key to successful expansion of apprenticeship programs in the greater Memphis area were identified through this project. These core features include:

- Increase awareness across the board- employers, educational and community partners, target audiences for recruiting;
- Elevate the ‘status’ of apprenticeships by building exemplars that include 4-year degree pathways;
- Create productive partnerships from the outset so that programs are developed with necessary support for success; and
- Develop programs with diversity in mind- incorporating recommendations from stakeholder meetings.

With these recommendations and the data analysis and research findings from this project in mind, it is suggested that the following three occupations be targeted for apprenticeship expansion in the greater Memphis area: **diesel technicians, CDL drivers, and Engineering/STEM.**

The proposed strategy includes launching three pilot initiatives in 2018. This is feasible if SETWC serves as an intermediary to help expand partnerships and launch programs, as the identified pilots align with SETWC’s focus areas. Pilot recommendations include:

### ***CDL Drivers (38126 pilot)***

SETWC in partnership with the Women’s Foundation for a Greater Memphis has already begun efforts to develop a pilot transportation workforce training initiative with women living in 38126. This zip code is the target of the Women’s Foundation for a Greater Memphis 2020 vision, with a goal of reducing poverty by 1% per year over a five-year timeframe. A new community center has been established for training programs, and extensive partnerships have been created through the WFGM activities over the last two years that make this a prime opportunity to pilot such an initiative. Creating a registered apprenticeship opportunity makes sense for this population that needs immediate pay and a pathway to economic self-sufficiency.

***Diesel Technology (T-STEM at East High)***

Cummins and a group of industry and educational partners established a Technical Education for Communities (TEC) program that will launch a diesel technology track at the high school starting in Fall 2018. This new program is a prime opportunity to explore creation of a formal apprenticeship program since all of the partners are already committed and in place. SETWC staff are already working with US Department of Labor (DOL) staff to host an interest meeting in Memphis in early August for all relevant stakeholders.

***Engineering/STEM***

The new DOL apprenticeship program in Engineering/STEM in partnership with Project Lead the Way is another key opportunity for expanding apprenticeships. SETWC staff have already been in conversations with US DOL representatives, and will be holding a stakeholder meeting in early August to determine feasibility of a pilot program at several high schools in the Memphis area to expand the national engineering apprenticeship pilots underway by the DOL. This program is of particular interest as the schools that offer an engineering or STEM focus have already adopted Project Lead the Way curriculum. This also provides a unique opportunity to elevate the image of apprenticeships through this nontraditional pathway.

Potential partners and candidates for the pilot programs are outlined in Table 3.

**Table 3 Potential Partners for Implementation Strategy**

<b>Occupational Focus</b>	<b>Potential Education and Business Partners</b>		<b>Potential Community Organization Partners</b>	<b>Potential Apprenticeship Candidates</b>
<b>CDL Drivers</b>	ASU MidSouth Averitt Express Chamber of Commerce FedEx Freight GMACW Ozark RoadOne	Ryder Schneider SETWC TCAT Memphis TNDOL TNECD WIN	WFGM Neighborhood Christian Centers Advance Memphis Hope Works STEP, Inc.	Adults (primarily women) in 38126
<b>Diesel Technology</b>	ASU MidSouth Averitt Express Bolton High School Chamber of Commerce Cummins East High School School FedEx Freight GMACW MATA	Ozark Ryder Southwest TN Community College SETWC Shelby County Schools TCAT Memphis TNDOL TNECD WIN	Boys and Girls Club TTC Peer Power Girls Inc. Hope Works West TN STEM Hub STEP, Inc.	High school students

Occupational Focus	Potential Education and Business Partners		Potential Community Organization Partners	Potential Apprenticeship Candidates
<b>Engineering/STEM</b>	Arlington High School AutoZone Chamber of Commerce City of Memphis CN East High School FedEx GMACW International Paper	MLGW Southwest TN Community College SSR SETWC TCAT Memphis TDOT TNDOL TNECD University of Memphis Williams Sonoma WIN	Peer Power Foundation Girls Inc. Boys and Girls Club TTC West TN STEM Hub Knowledge Quest	High school students

As technologies continue to evolve, engineering and STEM pathways to transportation careers will become increasingly important. The value of apprenticeships also has the potential to rise, as employers look for innovative ways to address workforce challenges and adapt training in real time to technology shifts. In order to position the greater Memphis area for accelerated adoption of apprenticeship models, it is crucial to increase awareness of apprenticeship programs by all stakeholders and elevate the image of apprenticeships so that they are more attractive to students and parents. Continuing to innovate models for nontraditional occupations, such as the new apprenticeship in engineering, will accelerate this process and improve perceptions with all stakeholders.

A streamlined process that removes inefficiencies of apprenticeship models for businesses is also very important, along with allowing flexibility for more rigorous standards that may exist in current corporate training programs to apply to registered apprenticeship credentialing so that companies do not have to change their practices.

Beginning with target areas identified through research and stakeholder discussions as outlined in this report should provide valuable insight, impact data, and best practice from which to further accelerate apprenticeship models in the greater Memphis area.

## Acknowledgements

SETWC would like to thank all of the students, educational, industry and community organization representatives that participated in the workshops, meetings, surveys, and interviews as part of this project. SETWC also appreciates the investment of the Tennessee Department of Economic and Community Development that made this research possible.

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## **Appendix A: Extended Labor Market Analysis**



SOC Code	Occupation Title Region	Number of Employees, May 2017	Median Hourly Wage 2017	Median Annual Salary 2017	Typical entry- level education required	Number of Employees, 2014*	Projected Number of Employees, 2024*	Employment Change, 2014- 2024*	Employment Change (percent)*	Average Annual Openings, 2014-2024*	Work experience	Typical OTJ Training
17-3026	<b>Industrial Engineering Technicians (2)</b>											
	United States	65,020	\$ 26.10	\$ 54,280.00	Associate's degree	66,500	63,500	(3,000)	-4.51%	1,630	None	None
	Tennessee	4,090	\$ 21.54	\$ 44,810.00		1,610	1,680	70	4.35%	40		
	West TN nonmetro area	270	\$ 24.02	\$ 49,960.00								
Memphis, TN-MS-AR	360	\$ 23.81	\$ 49,520.00									
17-3027	<b>Mechanical Engineering Technicians (4)</b>											
	United States	43,390	\$ 26.62	\$ 55,360.00	Associate's degree	48,400	49,300	900	1.86%	1,280	None	None
	Tennessee	1,120	\$ 25.05	\$ 52,100.00		940	1,090	150	15.96%	40		
	West TN nonmetro area	x	x	x								
Memphis, TN-MS-AR	60	\$ 23.54	\$ 48,960.00									
17-3029	<b>Engineering Technicians, Except Drafters, All Other</b>											
	United States	76,630	\$ 29.92	\$ 62,230.00	Associate's degree	70,100	69,900	(200)	-0.29%	1,710	None	None
	Tennessee	1,590	\$ 25.63	\$ 53,310.00		630	660	30	4.76%	20		
	West TN nonmetro area	60	\$ 18.44	\$ 38,360.00								
Memphis, TN-MS-AR	130	\$ 21.61	\$ 44,940.00									
17-3031	<b>Surveying and Mapping Technicians (4)</b>											
	United States	51,890	\$ 20.84	\$ 43,340.00	High school diploma or equivalent	57,300	52,900	(4,300)	-7.50%	650	None	Moderate- term on-the- job training
	Tennessee	1,110	\$ 20.51	\$ 42,660.00		1,230	1,410	180	14.63%	40		
	West TN nonmetro area	70	\$ 22.03	\$ 45,830.00								
Memphis, TN-MS-AR	100	\$ 26.87	\$ 55,880.00	182		180	(2)	-1.10%	*			
19-1031	<b>Soil and Water Conservationists (1) 19-1031.01</b>											
	United States	22,040	\$ 29.56	\$ 61,480.00	Bachelor's degree	21,100	22,500	1,400	6.64%	1,060	None	None
	Tennessee	170	\$ 33.78	\$ 70,260.00		290	310	20	6.90%	10		
	West TN nonmetro area	40	\$ 34.70	\$ 72,170.00								
Memphis, TN-MS-AR	x	x	x									
43-5011	<b>Cargo and Freight Agents</b>											
	United States	89,920	\$ 20.11	\$ 41,820.00	High school diploma or equivalent	78,800	84,300	5,500	6.98%	3,130	None	Short-term on-the-job training
	Tennessee	1,110	\$ 20.16	\$ 41,920.00		2,280	2,510	230	10.09%	90		
	West TN nonmetro area	x	x	x								
Memphis, TN-MS-AR	640	\$ 20.20	\$ 42,020.00	1,925		2,039	114	5.92%	70*			
43-5032	<b>DISPATCHER, SERVICE (Alternate Title: Transportation Management Coordinator)</b>											
	United States	198,520	\$ 18.65	\$ 38,790.00	High school diploma or equivalent	199,500	208,200	8,800	4.41%	5,860	None	Moderate- term on-the- job training
	Tennessee	5,180	\$ 18.04	\$ 37,530.00		x	x	x	x	x		
	West TN nonmetro area	130	\$ 13.76	\$ 28,630.00								
Memphis, TN-MS-AR	1,440	\$ 22.42	\$ 46,630.00	1,066		1,112	46	4.32%	30*			
43-5051	<b>POST OFFICE CLERK</b>											
	United States	82,890	\$ 28.15	\$ 58,550.00	High school diploma or equivalent	69,600	51,300	(18,300)	-26.29%	840	None	Short-term on-the-job training
	Tennessee	1,550	\$ 28.15	\$ 58,550.00		1,360	1,260	(100)	-7.35%	20		
	West TN nonmetro area	180	\$ 20.73	\$ 43,120.00								
Memphis, TN-MS-AR	270	\$ 28.15	\$ 58,560.00									
43-5061	<b>Production, Planning, and Expediting Clerks (3)</b>											
	United States	336,000	\$ 22.44	\$ 46,670.00	High school diploma or equivalent	304,600	310,900	6,300	2.07%	8,890	None	Moderate- term on-the- job training
	Tennessee	8,320	\$ 21.32	\$ 44,350.00		7,480	8,480	1,000	13.37%	290		
	West TN nonmetro area	250	\$ 20.24	\$ 42,090.00								
Memphis, TN-MS-AR	1,920	\$ 20.31	\$ 42,250.00									
47-2071	<b>ASPHALT PAVING MACHINE OPERATOR (Alt. Title: Concrete and Asphalt Equip Op)</b>											
	United States	49,760	\$ 18.81	\$ 39,120.00	High school diploma or equivalent	57,700	63,000	5,300	9.19%	1,910	None	Moderate- term on-the- job training
	Tennessee	1,980	\$ 17.09	\$ 35,540.00		1,530	1,730	200	13.07%	40		
	West TN nonmetro area	120	\$ 14.75	\$ 30,670.00								
Memphis, TN-MS-AR	670	\$ 17.02	\$ 35,400.00									
47-2073	<b>Operating Engineers and Other Construction Equipment Operators (4)</b>											
	United States	365,300	\$ 22.62	\$ 47,040.00	High school diploma or equivalent	363,400	400,600	37,200	10.24%	9,780	None	Moderate- term on-the- job training
	Tennessee	5,170	\$ 18.23	\$ 37,920.00		4,510	4,990	480	10.64%	150		
	West TN nonmetro area	330	\$ 17.72	\$ 36,850.00								
Memphis, TN-MS-AR	660	\$ 18.52	\$ 38,530.00	941		958	17	1.81%	*			
47-2111	<b>Electricians (13)</b>											
	United States	631,080	\$ 26.01	\$ 54,110.00	High school diploma or equivalent	628,800	714,700	85,900	13.66%	18,180	None	Apprentice- ship
	Tennessee	11,750	\$ 22.36	\$ 46,500.00		12,620	14,260	1,640	13.00%	400		
	West TN nonmetro area	360	\$ 22.56	\$ 46,920.00								
Memphis, TN-MS-AR	2,410	\$ 22.46	\$ 46,710.00						50*			

SOC Code	Occupation Title Region	Number of Employees, May 2017	Median Hourly Wage 2017	Median Annual Salary 2017	Typical entry- level education required	Number of Employees, 2014*	Projected Number of Employees, 2024*	Employment Change, 2014- 2024*	Employment Change (percent)*	Average Annual Openings, 2014-2024*	Work experience	Typical OTJ Training
47-2152	<b>Plumbers, Pipefitters, and Steamfitters (27)</b>											
	United States	428,260	\$ 25.28	\$ 52,590.00	High school	425,000	474,100	49,100	11.55%	10,520	None	Apprentice- ship
	Tennessee	6,380	\$ 22.56	\$ 46,920.00	diploma or	7,500	8,330	830	11.07%	180		
	West TN nonmetro area	210	\$ 22.54	\$ 46,880.00	equivalent							
Memphis, TN-MS-AR	1,610	\$ 24.61	\$ 51,190.00						30*			
49-2022	<b>AUTOMATIC-EQUIPMENT TECHNICIAN 49-2022.03</b>											
	United States	233,690	\$ 25.66	\$ 53,380.00	Postsecondary	218,600	210,800	(7,800)	-3.57%	1,970	None	Moderate- term on-the- job training
	Tennessee	5,500	\$ 22.34	\$ 46,460.00	nondegree	5,320	6,140	820	15.41%	160		
	West TN nonmetro area	200	\$ 22.34	\$ 46,460.00	award							
Memphis, TN-MS-AR	850	\$ 22.50	\$ 46,800.00									
49-2091	<b>Avionics Technicians (2)</b>											
	United States	18,620	\$ 30.12	\$ 62,650.00	Associate's degree	17,400	17,500	100	0.57%	310	None	None
	Tennessee	90	\$ 27.36	\$ 56,910.00		210	230	20	9.52%	10		
	West TN nonmetro area	x	x	x								
Memphis, TN-MS-AR	x	x	x									
49-2092	<b>ELECTRIC MOTOR REPAIRER</b>											
	United States	17,220	\$ 20.47	\$ 42,580.00	High school	19,300	20,000	700	3.63%	600	Less than 5 years	Moderate- term on-the- job training
	Tennessee	240	\$ 17.82	\$ 37,070.00	diploma or	570	580	10	1.75%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	\$ 16.45	\$ 34,210.00	147		142	(5)	-3.40%	*			
49-2093	<b>Electrical and Electronics Installers and Repairers, Transportation Equipment</b>											
	United States	12,310	\$ 29.25	\$ 60,840.00	Postsecondary	14,800	15,500	700	4.73%	320	None	Long-term on-the-job training
	Tennessee	x	\$ 21.18	\$ 44,050.00	nondegree	400	390	(10)	-2.50%	10		
	West TN nonmetro area	x	x	x	award							
Memphis, TN-MS-AR	x	\$ 18.25	\$ 37,970.00									
49-2096	<b>Electronic Equipment Installers and Repairers, Motor Vehicles</b>											
	United States	11,520	\$ 16.60	\$ 34,530.00	High school	11,500	5,700	(5,800)	-50.43%	200	None	Moderate- term on-the- job training
	Tennessee	110	\$ 18.80	\$ 39,100.00	diploma or	190	180	(10)	-5.26%	-		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
49-3011	<b>Aircraft Mechanics and Service Technicians (7)</b>											
	United States	131,500	\$ 17.88	\$ 37,190.00	Postsecondary	119,900	121,500	1,600	1.33%	3,010	None	Short-term on-the-job training
	Tennessee	1,380	\$ 27.07	\$ 56,300.00	nondegree	1,830	1,720	(110)	-6.01%	50		
	West TN nonmetro area	x	x	x	award							
Memphis, TN-MS-AR	320	\$ 30.35	\$ 63,130.00	718		709	(9)	-1.25%	*			
49-3021	<b>Automotive Body and Related Repairers (3)</b>											
	United States	144,320	\$ 20.18	\$ 41,970.00	High school	149,700	163,400	13,700	9.15%	4,810	None	Long-term on-the-job training
	Tennessee	3,190	\$ 18.07	\$ 37,580.00	diploma or	3,390	3,690	300	8.85%	100		
	West TN nonmetro area	240	\$ 15.72	\$ 32,690.00	equivalent							
Memphis, TN-MS-AR	600	\$ 18.22	\$ 37,900.00									
49-3022	<b>Automotive Glass Installers and Repairers</b>											
	United States	20,190	\$ 16.43	\$ 34,170.00	High school	19,300	20,800	1,500	7.77%	410	None	Moderate- term on-the- job training
	Tennessee	490	\$ 15.50	\$ 32,230.00	diploma or	230	240	10	4.35%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	\$ 14.13	\$ 29,380.00									
49-3023	<b>Automotive Service Technicians and Mechanics (20)</b>											
	United States	639,700	\$ 19.01	\$ 39,550.00	Postsecondary	739,900	779,000	39,100	5.28%	23,720	None	Short-term on-the-job training
	Tennessee	13,510	\$ 18.36	\$ 38,180.00	nondegree	15,590	16,840	1,250	8.02%	520		
	West TN nonmetro area	490	\$ 14.33	\$ 29,810.00	award							
Memphis, TN-MS-AR	2,720	\$ 20.50	\$ 42,630.00	3,827		3,983	156	4.08%	75*			
49-3031	<b>Bus and Truck Mechanics and Diesel Engine Specialists (16)</b>											
	United States	260,380	\$ 22.29	\$ 46,360.00	High school	263,900	295,500	31,600	11.97%	7,690	None	Long-term on-the-job training
	Tennessee	7,000	\$ 20.89	\$ 43,450.00	diploma or	5,430	5,860	430	7.92%	160		
	West TN nonmetro area	370	\$ 16.43	\$ 34,180.00	equivalent							
Memphis, TN-MS-AR	2,090	\$ 21.83	\$ 45,410.00	1,403		1,449	46	3.28%				
49-3042	<b>Mobile Heavy Equipment Mechanics, Except Engines</b>											
	United States	131,590	\$ 24.45	\$ 50,860.00	High school	124,700	131,300	6,600	5.29%	3,600	None	Long-term on-the-job training
	Tennessee	2,970	\$ 21.36	\$ 44,420.00	diploma or	x	x	x	x	x		
	West TN nonmetro area	170	\$ 17.99	\$ 37,410.00	equivalent							
Memphis, TN-MS-AR	720	\$ 19.26	\$ 40,060.00	527		527	-	0.00%	*			

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49-3043	<b>Rail Car Repairers (4)</b>											
	United States	24,090	\$ 27.63	\$ 57,460.00	High school	21,500	22,100	600	2.79%	570	None	Long-term on-the-job training
	Tennessee	x	\$ 27.74	\$ 57,700.00	diploma or	290	280	(10)	-3.45%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	\$ 17.14	\$ 35,660.00									
49-3051	<b>Motorboat Mechanics and Service Technicians (3)</b>											
	United States	21,160	\$ 18.73	\$ 38,960.00	High school	22,500	23,100	600	2.67%	510	None	Long-term on-the-job training
	Tennessee	430	\$ 16.90	\$ 35,160.00	diploma or	300	330	30	10.00%	10		
	West TN nonmetro area	70	\$ 16.86	\$ 35,060.00	equivalent							
Memphis, TN-MS-AR	x	x	x									
49-3052	<b>Motorcycle Mechanics</b>											
	United States	15,850	\$ 17.15	\$ 35,680.00	Postsecondary	17,000	18,000	1,000	5.88%	440	None	Short-term on-the-job training
	Tennessee	320	\$ 18.00	\$ 37,450.00	nondegree	370	400	30	8.11%	10		
	West TN nonmetro area	x	x	x	award							
Memphis, TN-MS-AR	x	x	x									
49-3092	<b>Recreational Vehicle Service Technicians</b>											
	United States	14,780	\$ 17.88	\$ 37,200.00	High school	11,400	11,800	400	3.51%	430	None	Long-term on-the-job training
	Tennessee	520	\$ 24.51	\$ 50,990.00	diploma or	210	230	20	9.52%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
49-9096	<b>Riggers (2)</b>											
	United States	21,000	\$ 23.36	\$ 48,580.00	High school	20,800	22,600	1,800	8.65%	720	None	Moderate-term on-the-job training
	Tennessee	170	\$ 19.93	\$ 41,450.00	diploma or	110	150	40	36.36%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
49-9097	<b>Signal and Track Switch Repairers</b>											
	United States	8,300	\$ 32.88	\$ 68,400.00	High school	9,500	9,500	-	0.00%	150	None	Moderate-term on-the-job training
	Tennessee	x	x	x	diploma or	150	150	-	0.00%	-		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
51-2011	<b>Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (5)</b>											
	United States	41,130	\$ 25.73	\$ 53,510.00	High school	40,600	38,600	(2,000)	-4.93%	810	None	Moderate-term on-the-job training
	Tennessee	x	x	x	diploma or	x	x	x	x	x		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
51-2022	<b>Electrical and Electronic Equipment Assemblers (2)</b>											
	United States	x	x	x	High school	207,200	197,000	(10,200)	-4.92%	2,550	None	Moderate-term on-the-job training
	Tennessee	x	x	x	diploma or	3,130	3,290	160	5.11%	50		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x			607	635	28	4.61%	*		
51-2031	<b>Engine and Other Machine Assemblers (5)</b>											
	United States	37,770	\$ 20.86	\$ 43,390.00	High school	39,000	39,000	-	0.00%	780	None	Moderate-term on-the-job training
	Tennessee	1,250	\$ 13.69	\$ 28,480.00	diploma or	1,650	1,980	330	20.00%	60		
	West TN nonmetro area	30	\$ 22.99	\$ 47,820.00	equivalent							
Memphis, TN-MS-AR	150	\$ 23.29	\$ 48,450.00			139	130	(9)	-6.47%	*		
51-4121	<b>Welders, Cutters, and Welder Fitters (5) 51-4121.06</b>											
	United States	377,250	\$ 19.35	\$ 40,240.00	High school	397,900	412,300	14,400	3.62%	12,850	None	Moderate-term on-the-job training
	Tennessee	8,250	\$ 18.25	\$ 37,950.00	diploma or	8,630	9,210	580	6.72%	270		
	West TN nonmetro area	470	\$ 17.23	\$ 35,830.00	equivalent							
Memphis, TN-MS-AR	850	\$ 18.34	\$ 38,150.00			1,017	1,034	17	1.67%	*		
51-4192	<b>Layout Workers, Metal and Plastic (3)</b>											
	United States	8,550	\$ 22.26	\$ 46,310.00	High school	13,400	10,700	(2,700)	-20.15%	230	None	Moderate-term on-the-job training
	Tennessee	210	\$ 20.97	\$ 43,610.00	diploma or	210	270	60	28.57%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
51-8093	<b>Petroleum Pump System Operators, Refinery Operators, and Gaugers (3)</b>											
	United States	38,700	\$ 32.58	\$ 67,770.00	High school	42,400	43,300	900	2.12%	1,700	None	Moderate-term on-the-job training
	Tennessee	x	\$ 24.08	\$ 50,090.00	diploma or	170	180	10	5.88%	10		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	\$ 24.06	\$ 50,050.00									

SOC Code	Occupation Title Region	Number of Employees, May 2017	Median Hourly Wage 2017	Median Annual Salary 2017	Typical entry- level education required	Number of Employees, 2014*	Projected Number of Employees, 2024*	Employment Change, 2014- 2024*	Employment Change (percent)*	Average Annual Openings, 2014-2024*	Work experience	Typical OTJ Training
51-9061	<b>AIRPLANE INSPECTOR</b>											
	United States	537,500	\$ 17.95	\$ 37,340.00	High school	496,600	495,500	(1,100)	-0.22%	12,480	None	Moderate-term on-the-job training
	Tennessee	14,160	\$ 16.29	\$ 33,880.00	diploma or	11,870	13,330	1,460	12.30%	410		
	West TN nonmetro area	890	\$ 13.30	\$ 27,660.00	equivalent	2,773	2,802	29	1.05%	95*		
Memphis, TN-MS-AR	2,140	\$ 16.31	\$ 33,920.00									
53-1021	<b>Recycling Coordinators (Prison Only) 53-1021.01</b>											
	United States	x	x	x	High school	173,100	176,900	3,800	2.20%	5,930	Less than 5 years	None
	Tennessee	12,380	\$ 23.85	\$ 49,620.00	diploma or	6,330	6,940	610	9.64%	240		
	West TN nonmetro area	x	x	x	equivalent	2,350	2,390	40	1.70%	*		
Memphis, TN-MS-AR	x	x	x									
53-2012	<b>Commercial Pilots</b>											
	United States	38,490	\$ 37.86	\$ 78,740.00	High school	43,500	48,000	4,500	10.34%	1,510	None	Moderate-term on-the-job training
	Tennessee	380	\$ 33.69	\$ 70,080.00	diploma or	370	420	50	13.51%	20		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	130	\$ 30.57	\$ 63,590.00									
53-2021	<b>Air Traffic Controllers (Military Only)</b>											
	United States	22,790	\$ 59.88	\$ 124,540.00	Associate's degree	24,500	22,400	(2,100)	-8.57%	750	None	Long-term on-the-job training
	Tennessee	620	\$ 62.59	\$ 130,190.00		670	580	(90)	-13.43%	30		
	West TN nonmetro area	x	x	x								
Memphis, TN-MS-AR	x	x	x									
53-2022	<b>Airfield Operations Specialists (2) (Military Only)</b>											
	United States	9,590	\$ 25.17	\$ 52,360.00	High school	7,200	7,500	300	4.17%	250	None	Long-term on-the-job training
	Tennessee	x	\$ 17.04	\$ 35,430.00	diploma or	x	x	x	x	x		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
53-3011	<b>Ambulance Drivers and Attendants, Except Emergency Medical Technicians</b>											
	United States	15,310	\$ 11.66	\$ 24,260.00	High school	19,600	26,100	6,500	33.16%	980	None	Moderate-term on-the-job training
	Tennessee	110	\$ 10.30	\$ 21,430.00	diploma or	280	400	120	42.86%	20		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	70	\$ 11.02	\$ 22,930.00									
53-3021	<b>Bus Drivers, Transit and Intercity</b>											
	United States	176,140	\$ 19.61	\$ 40,780.00	High school	167,800	177,600	9,800	5.84%	3,190	None	Moderate-term on-the-job training
	Tennessee	2,560	\$ 17.67	\$ 36,760.00	diploma or	2,580	2,650	70	2.71%	60		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	630	\$ 20.55	\$ 42,750.00									
53-3032	<b>Heavy and Tractor-Trailer Truck Drivers (9)</b>											
	United States	1,748,140	\$ 20.42	\$ 42,480.00	Postsecondary	1,797,700	1,896,500	98,800	5.50%	40,450	None	Short-term on-the-job training
	Tennessee	60,350	\$ 19.06	\$ 39,640.00	nondegree	60,150	67,140	6,990	11.62%	1,660		
	West TN nonmetro area	2,930	\$ 16.02	\$ 33,320.00	award	14,059	14,432	373	2.65%	290*		
Memphis, TN-MS-AR	15,590	\$ 20.10	\$ 41,810.00									
53-4011	<b>Locomotive Engineers (1)</b>											
	United States	35,680	\$ 29.32	\$ 60,990.00	High school	40,400	39,500	(900)	-2.23%	1,600	Less than 5 years	Moderate-term on-the-job training
	Tennessee	950	\$ 29.52	\$ 61,410.00	diploma or	870	830	(40)	-4.60%	30		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	x	x	x									
53-5011	<b>Sailors and Marine Oilers (1)</b>											
	United States	30,940	\$ 19.58	\$ 40,730.00	No formal	28,300	30,900	2,600	9.19%	990	None	Moderate-term on-the-job training
	Tennessee	900	\$ 12.96	\$ 26,960.00	educational	x	x	x	x	x		
	West TN nonmetro area	40	\$ 16.63	\$ 34,590.00	credential							
Memphis, TN-MS-AR	240	\$ 9.30	\$ 19,340.00									
53-5021	<b>Mates or Pilots of Water Vessels (2)</b>											
	United States	35,780	\$ 34.10	\$ 70,920.00	Postsecondary	35,100	38,700	3,600	10.26%	1,720	Less than 5 years	None
	Tennessee	700	\$ 18.84	\$ 39,180.00	nondegree	920	1,150	230	25.00%	70		
	West TN nonmetro area	30	\$ 33.73	\$ 70,160.00	award							
Memphis, TN-MS-AR	240	\$ 15.23	\$ 31,680.00									
53-6051	<b>Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation (2) 53-6051.07</b>											
	United States	30,030	\$ 34.68	\$ 72,140.00	High school	26,400	26,700	300	1.14%	710	None	Moderate-term on-the-job training
	Tennessee	270	\$ 35.86	\$ 74,580.00	diploma or	460	490	30	6.52%	20		
	West TN nonmetro area	x	x	x	equivalent							
Memphis, TN-MS-AR	80	\$ 46.75	\$ 97,250.00									



## **Appendix B: Stakeholder Meeting Summaries**

# 2018 CHOOSING TRANSPORTATION SUMMIT

MARCH 23, 2018 | LOCATION: HILTON MEMPHIS



THE UNIVERSITY OF  
MEMPHIS

Southeast Transportation  
Workforce Center

## AGENDA | MARCH 23

8:30 - 9:15 BREAKFAST AND WORKSHOP AGENDAS

9:15 - 11:15 **WORKSHOPS**—designed as interactive working group meetings, all workshops will focus on specific problem statements, potential solution strategies, key partners to engage, and recommendations for initiative action plans. Workshop participants will be invited to participate in quarterly web-based working group meetings to ensure progress is made in focus areas. Workshop topics represent priorities of the Southeast Transportation Workforce Center (SETWC). SETWC is committed to facilitating conversations, engaging partners, and making progress on initiative action plans resulting from these workshops.

### **I: WOMEN IN TRANSPORTATION: DESIGNING A LOW-BARRIER CAREER PATHWAY**

Barriers continue to exist for women entering, remaining, and advancing in transportation careers. This workshop will focus on establishing a clear set of initiatives to overcome these obstacles and increase representation of women at all levels of the industry, but particularly for women seeking career retraining, re-entry, or transition. The APEC Women in Transportation Data Framework will be used as the starting point and scaffold for developing ideas for new initiatives to address gender gaps in transportation. Specific emphasis will be placed on identifying occupations with low barriers to entry that may provide significant opportunity for women from impoverished communities seeking economic self-sufficiency.

**FACILITATORS:** **Shante K. Avant**, Deputy Director, Women's Foundation for a Greater Memphis  
**Roquita Coleman-Williams**, Manager Supply Chain Solutions, CN

### **II: TRANSPORTATION OPERATIONS CAREER PATHWAY IMPLEMENTATION PLANNING**

The National Transportation Career Pathways Initiative, sponsored by the Federal Highway Administration, was launched in 2017 to identify priorities, develop career pathway models, and create implementation pilots and plans for five focus areas: engineering, environment, operations, planning, and safety. SETWC is leading the transportation operations focus area encompassing traffic, transit, and freight operations, and invites Discipline Working Group members along with all other interested stakeholders to participate in this workshop. The goal of the session is to review pathway models and deliverables to date and to outline potential pilot programs and implementation plans for post-secondary education.

**FACILITATORS:** **Todd D. Szymkowski**, Transportation Systems Management and Operations (TSMO) Manager, Gannett Fleming  
**Jamie Williams**, Executive Recruiting Manager, Distribution, Transportation & Supply Chain, Vaco

**(WORKSHOPS CONTINUED ON NEXT PAGE)**

**Thanks to our 2018 sponsors!**

The Choosing Transportation Summit is a program of the Southeast Transportation Workforce Center which is supported with funding from the Federal Highway Administration.



Location Details: The conference and expo on March 22 will be held at the FedEx Institute of Technology at the University of Memphis. The Blue Pump Gala (evening of March 22) and the March 23 workshops will take place at the Hilton Memphis.

[memphis.edu/setwc](http://memphis.edu/setwc)

# 2018 CHOOSING TRANSPORTATION SUMMIT

MARCH 23, 2018 | LOCATION: HILTON MEMPHIS



THE UNIVERSITY OF  
MEMPHIS

Southeast Transportation  
Workforce Center

## AGENDA | MARCH 23

### 9:15 - 11:15 WORKSHOPS (CONTINUED)

#### III: CHANGING THE CONVERSATION FOR TRANSPORTATION CTE

As our nation has focused heavily on increasing the number of individuals pursuing 4-year degrees, the impact and importance of technical and 2-year educational pathways has largely been overlooked. This has led to lack of awareness of educational and training options and misperceptions about career pathways that begin in a Career and Technical Education (CTE) setting. The goal of this workshop is to identify key challenges to and potential solutions for changing the conversation around Transportation CTE.

FACILITATORS: **Jameo Pollock**, *Statewide Technical Training Manager, Virginia Department of Transportation*  
**Dr. Tim Taylor**, *Associate Professor of Civil Engineering, University of Kentucky*

#### IV: ACCESS TO OPPORTUNITY: RETHINKING APPRENTICESHIPS IN TRANSPORTATION

This workshop is part of SETWC's activities related to creating a blueprint for increasing transportation and logistics apprenticeships with particular emphasis on recruiting nontraditional candidates. The project's advisory committee and all interested stakeholders are invited to join in on a working session to identify target occupations within transportation and logistics for developing and advancing apprenticeship programs, strategies for creating successful partnerships, and key recruiting mechanisms and partnerships for attracting nontraditional candidates.

FACILITATORS: **Adriana Clark**, *Project Director, USDOT OSBDU Southeast Region*  
**Dan Pallme**, *Assistant Chief of Freight and Logistics, Tennessee Department of Transportation*

### 11:15 - 12:00 LUNCH AND WORKSHOP REPORTS

THANK YOU FOR ATTENDING THE  
2018 CHOOSING TRANSPORTATION SUMMIT!  
SEE YOU NEXT YEAR!



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Location Details: The conference and expo on March 22 will be held at the FedEx Institute of Technology at the University of Memphis. The Blue Pump Gala (evening of March 22) and the March 23 workshops will take place at the Hilton Memphis.

[memphis.edu/setwc](http://memphis.edu/setwc)

**2018 Choosing Transportation Summit**  
**Workshop IV: Access to Opportunity: Rethinking Apprenticeships in Transportation**

This workshop is part of SETWC's activities related to creating a blueprint for increasing transportation and logistics apprenticeships with particular emphasis on recruiting nontraditional candidates. The project's advisory committee and all interested stakeholders are invited to join in on a working session to identify target occupations within transportation and logistics for developing and advancing apprenticeship programs, strategies for creating successful partnerships, and key recruiting mechanisms and partnerships for attracting nontraditional candidates.

*Workshop Facilitators:*

**Adriana Clark**, Project Director, USDOT OSBDU Southeast Region

**Dan Pallme**, Assistant Chief of Freight and Logistics, Tennessee Department of Transportation

Workshop Discussion Guide:

1. What are the key barriers to apprenticeship adoption?
2. What transportation and logistics occupations are good targets for creating new (or expanded) apprenticeship programs?
3. How might we accelerate adoption of apprenticeships in transportation, particularly in TN?
4. What are the opportunities for developing innovative models that attract nontraditional candidates (women, underrepresented minorities, persons with varied abilities, etc.)?
5. Who are the key partners that need to be involved in developing strategies for accelerating apprenticeships in transportation?
6. What kind of data could be collected to document impact/success?
7. What are key action items and next steps for advancing apprenticeships in transportation?
8. Who (from current workshop participants) would like to remain engaged in this effort?

## ***Southeast Transportation Workforce Center***

### ***2018 Choosing Transportation Summit***

#### ***Breakout Session Workshop IV:***

#### ***Access to Opportunity: Rethinking Apprenticeships in Transportation***

3/23/18 – Facilitated by Adriana Clark and Dan Pallme

Overview: Adriana Clark gave an overview of federal budget reforms and regarding apprenticeship programs. Dan Pallme handed out a step-by-step program on how to develop apprenticeships. He pointed out that Tennessee does not have a state program in the national handout.

#### **Preliminary Conversation**

Apprenticeship is a dated term that is not being used in recent time through every aspect of the workforce.

Introducing apprenticeships to the transportation and logistics workforce.

From a federal standpoint, POTUS is considering apprenticeships in the world today especially due to the increase in the infrastructure budget. Apprenticeships may be an aspect in the solutions to the failing infrastructure of the USA.

PCTE: funding for students to give access to high paying careers in the technical sector.

At this time no dollar amount has been given to aid but students will receive funding through financial aid. Will be linked more so to technical school rather than a four-year university.

#### **Questions #1: What are the key barriers to apprenticeship adoption?**

##### 1. Comments:

- a. MATA – hard to find candidates - \$1,500 cost for CDL license – B with P (needed for bus driver positions) – TCAT does offer a program
- b. Strategic partnerships are critical
- c. Where the job fits at this point in their life. Apprenticeships are so broad as a topic it is hard to tie all the different programs together.
- d. Federal money is available
- e. Qualifications are critical
- f. Communication is critical to let people know about the programs and potential jobs
- g. Training
- h. 'Buy in' from the industry
- i. So many retirements are coming up that it is critical to get them to help with building a program for the future of each apprenticeship.

## **Extended Discussion**

Obtaining CDL license (B with P) is difficult and expensive. Can apply through WIN to obtain license in a more economic way. Industry partners are a suggestion to help people qualify for jobs by shadowing.

There is a concern with the new generation that don't fully understand the types of technical job opportunities that are out there and the benefits they provide.

Communication is also an issue. Many programs but not enough people know about the opportunities. The opportunity to have a career for life.

Training is also an issue. Better training opportunities are necessary to bring more people into the workforce.

Simulations in transportation (trains or buses) to give people more types of training and preparation.

Ask people why do they want to do this job and what are the benefits? Questions that need to be asked. Garnering interest in the field of transportation and all of the opportunities the field can provide.

### **Question #2: What transportation and logistics occupations are good targets for creating new (or expanded) apprenticeship programs.**

Marine jobs, MATA – bus drivers, TDOT – Rail safety, trucking, bio hazard cleanup, forklift operators, highway construction, traffic counters, transportation planners, any occupation with safety, diesel mechanics, and electricians

MATA bussing , forklift drivers, marine surveying many opportunities from TDOT, biohazard, railroad industry, highway construction ( TDOT in partnership w/ dept of correction and trained 12 inmates in highway construction and workers had opportunities once they are released. Program was originally opened to all people but there were issues with the people that were no traditional candidates. Candidates would receive 6 certifications and an internship)

Mayor's university: gives people involved insight in tax funded industries throughout Shelby Co.

Should be accommodations made for nontraditional candidates as to not interfere with their current status of breadwinners and wage earners.

Need to find some wavier for the inmates in order of them to be able to get full use out of apprenticeships programs.

Not many opportunities in urban planning (perhaps traffic counters)

Transportation planning is also a job opportunity

**Question #3: How might we accelerate adoption of apprenticeships in transportation, particularly in TN?**

1. Comments:

- a. Programs like the pilot simulation @ Wooddale for pilot program (industry engagement, interactive, excitement, etc.)
- b. Make it fun! Visual
- c. Get the word out
- d. Multiple touch points as generations develop – make sure it ‘fits’ all generations
- e. Funding is a big issue
- f. The point was made that money was not the primary factor on the student panel
- g. Change is constant so the jobs will change in the future and programs will need to be modified in the future to keep up with the next generation of jobs.
- h. Cost versus long term benefits – apprenticeship cost versus life-long earnings
- i. Programs like industry speaking to students. This is done at the university setting but is it done at the apprenticeship programs?

**Extended Discussion**

Make apprenticeships “fun and engaging” in order to bring the new generation interested in technical jobs. Many great programs but all cost money (e.g. Wooddale Aviation program)

Have to consider public funding to make these programs possible. Private sector should be more involved. Win-win conversation from the private sector that invests in building the generation who will improve the new transportation sector.

From employer/employee perspective- one thing that has undermined is cost. From employer standpoint it is cost, from employee standpoint it is time. If we can show long term benefit and not just throwing money/time away at this. How can we quantify cost/benefit? This would be one way to accelerate. Particularly when applying for federal grant programs, have to show cost/benefit analysis to receive federal funds. Understanding this, this is an important part of the process.

Industry does a good job with universities. Not sure at what level participatory initiative is happening in technical schools and is this happening at same levels with non-traditional programs and apprenticeships? Need to demonstrate the solid career opportunities and the fact that you do not necessarily be on a degree path.

TDOT has started a partnership with TCAT, but participants were supposed to be participating during the day for paid internships, and it was a barrier.

People don’t know how to get to these opportunities, and don’t know how to get to them. Need to show the technological landscape for the future of transportation to attract students to technical paths.

A lot of contractors are going back to career fair days at high schools to try to attract students.

Engagement is more important to this generation rather than making a lot of money.

**Question 4: What are the opportunities for developing innovative models that attract nontraditional candidates (women, underrepresented minorities, persons with varied abilities, etc.)?**

1. Programs, such as
  - a. TDOT's work with their HR and Department of Correction program. Initial program had 12 inmates in it. It is a 2 month program, paid internship that covers 6 categories (OSHA, flagging, equipment, safety, etc.) The state contractors hire the inmates while in prison and give them a job based upon after their incarceration. Lesson learned was to do the program at night where conflicts would not exist.
  - b. Mayor Luttrell's program entitled 'Mayor's University'
  - c. Program with kids that under-employed
  - d. Programs revolving around the different generations
  - e. CDL program and certification
  - f. Summer Institute by FHWA for kids (comment: goal is to make it sustainable).
  - g. Towing program mentioned – ½ day program out of high school for real life experience of the maritime industry.
  - h. Progressions model or ladders of opportunity (i.e. dock handler, forklift operator, yard driver, CDL over the road driver – additional pay at each step).
2. Other comments:
  - a. A history of the bus drivers at MATA. 50 years ago all drivers were white males. This changed to black males in the 80's. Now most of the drivers are black females. Very few white males apply any more. Even the applicant pool reflects this.
  - b. Mentoring program for minorities, women, and other groups
  - c. 'Success' stories from non-traditional candidates who have reached a position so others see it as attainable. Simply put, the next workforce generation would have role models and goals that they can achieve and show others anything is possible. Communicate these stories!\

**Extended Discussion**

Maritime industry – large towing companies have internships. Hernando high had work release for half a day to come on board a line boat and this generated a lot of interest. Took students to speak to each craftsman on the vessel from deckhand, chief engineer, cook, captain, etc.

Think about options to get kids work release day passes to see different trades and increase awareness of opportunities.

Whether highway safety or marine industry, all need apprenticeship programs because these jobs can be dangerous if you are not well trained. Apprenticeship programs are so focused on safety (and have to be). OSHA.

Old-school mentoring programs can still be helpful. Particularly for attracting diverse candidates. Students need to see people of same gender, ethnicity, etc., as they are in these roles. If they don't see anyone like them, this can discourage them and make them think achieving this is not realistic. Need mentors that can identify and understand the plight of the person.

As we develop new and change existing programs, need to think about what the particular nuances are that women, minorities, etc., are facing to bring this to the forefront to try to develop programs with this in mind.

Need to tell the stories of people who have been in their shoes (spotlights). This helps to make an opportunity become a reality.

Have to ensure that we are giving everyone an equal opportunity. As long as you have qualified people and are mindful of diversity and recognize importance within the organization.

Need to break stereotypes. Apprenticeships that are well designed can do this.

MATA- predominantly black now in some positions, and predominantly black women. Hard to get men or Caucasians to apply. Do job fairs trying to get candidates, really can't get diverse applicants.

**Question 5: Who are the key partners that need to be involved in developing strategies for accelerating apprenticeships in transportation?**

- a. Government as funding is needed to help
- b. Public/private partnerships
- c. Industry
- d. Candidates themselves and get their feedback and opinions
- e. Training facilities and Schools
- f. Community organizations for non-traditional/underrepresented candidates represented and get the message out.
- g. Veterans
- h. Lawmakers

**Question 6: What kind of data could be collected to document impact/success?**

Numbers of total applicants, numbers of graduated, numbers of employed, immediate feedback and documentation, pay, turnover rate, was efficiency increased (?), company revenue, trends, comparative analysis.

Data to support cost/benefit analysis

Safety – do stats improve as a result of apprenticeship program – comparative analysis of frequencies and types

General comments:

- a. We must communicate the success!!!!
- b. Cost benefit analysis should be done
- c. Don't overlook safety

**Question 7: What are key action items and next steps for advancing apprenticeships in transportation?**

General comments

- a. Utilize contractors to tell the message of the TDOT/DOC program to other contractors
- b. Share successes of the program
- c. Communication is critical
- d. Assessment of the apprenticeship program that is out there – this leads to recruitment and communication and we can take this message to other states.
- e. Apprenticeships could lead to longer employment due to the length of training.
- f. Differences in internship and apprenticeships.

**Extended Discussion**

TDOT certification program- when they first started TRBA was part of discussion initially. Next step is to take contractors on the road to tell other contractors across the state to tell them how successful the program is. When dealing with prisoners/inmates, can be a lot of fear. So need to share successes and help others understand how this can help them if they get involved.

Assessing current apprenticeship programs- need a good assessment, starting with TN, to see what exists and how well they work. They may exist on paper but don't have participants. Figure out how might be able to build out existing programs since they already have the funding.

Emphasis a lot on internships but not apprenticeships. If internships were more like apprenticeships, even for college students, might have less turnover.

Apprenticeships are typically not for degree seeking students, they are for skilled trades. Might be a potential for helping get people who have degrees that are not useful or not in line with interests get a better track to employment.

**Question 8: Who (form current workshop participants) would like to remain engaged in this effort?**

All of us!

**2018 Choosing Transportation Summit**  
**Workshop I: Women in Transportation: Designing a Low-Barrier Career Pathway**

Barriers continue to exist for women entering, remaining, and advancing in transportation careers. This workshop will focus on establishing a clear set of initiatives to overcome these obstacles and increase representation of women at all levels of the industry, but particularly for women seeking career retraining, re-entry, or transition. The APEC Women in Transportation Data Framework will be used as the starting point and scaffold for developing ideas for new initiatives to address gender gaps in transportation. Specific emphasis will be placed on identifying occupations with low barriers to entry that may provide significant opportunity for women from impoverished communities seeking economic self-sufficiency.

*Workshop Facilitators:*

**Shante K. Avant**, Deputy Director, Women's Foundation for a Greater Memphis  
**Roquita Coleman-Williams**, Manager Supply Chain Solutions, CN

Workshop Discussion Guide:

1. Define the key barriers for women in accessing transportation career opportunities (particularly for women in need of career retraining/reentry or for those from impoverished communities seeking economic self-sufficiency).
2. What pilot-scale initiatives could be developed to address these barriers?
3. What occupation(s) has/have low barriers to entry and pathways for advancement that would be good target(s) for pilot workforce development initiatives? Describe the training/education requirements for entry and pathways for advancement.
4. Who are the key partners that need to be involved in developing such a pilot?
5. What kind of data could be collected to document impact/success?
6. What are key action items and next steps for launching this initiative?
7. Who (from current workshop participants) would like to remain engaged in this effort as SETWC and other key partners work to launch a pilot in Memphis this year?

**Southeast Transportation Workforce Center  
2018 Choosing Transportation Summit  
March 23, 2018  
Workshop 1  
Women in Transportation:  
Designing a Low-Barrier Career Pathway**

**Barriers:**

1. Available Information (position(eligibility), culture, requirements)
2. Lack of Mentors (PD)
3. WTS (women transportation symposium) lack of resources
4. Lack of flexibility/work/life balance
5. Glass Ceiling
6. Education/Training

**Pilot Initiatives:**

1. Position Descriptive - what can be done to improve the attractiveness of a position?
  - incorporate/translate skills and talents
2. Associates for Women at NO Cost
3. Mentors
4. School Outreach (increase involvement, programs, recruitment)

***WHY IS THERE A GAP BETWEEN THE NEED AND THE IDEA OF THE NEED? HOW DO WE IDENTIFY THE PROBLEM?  
(PROACTIVE ENGAGEMENT OF CORPORATE OFFICES)***

- Whitepaper what's working
- Job Fairs
- Public Awareness (spotlight successful programs)
- Intertwine with already existing programs

***WHAT OCCUPATIONS/ROLLS WILL HELP CREATE ENTRY OPPORTUNITY?***

- Outreach/Support Roles (assistant/technicians)
- Dispatcher
- Inside Sales Support
- IT Roles
- Administrative Roles

***WHAT NEEDS TO BE INVOLVED IN DEVELOPING THESE PILOT PROGRAMS/ENTRY LEVEL SKILLS?***

- There MUST BE public and private engagement
- Chamber of Commerce
- Institutions
- TDOT
- Major Corps.
- Staffing Agencies
- Child Care Facilities (halfway)
- Women's Wellness Programs
- Round Table Discussion

### **RESOURCES NEEDED FOR WOMEN TO ADVANCE (already employed)**

- Conferences
- Workshops

### **HOW DO WE DEVELOP EXTERNAL SPONSORS?**

- It is okay to get outside help!

#### ***recruit, retain, and advance***

(keep track and don't be afraid to create a score card...take ownership and improve)

### **WHO SHOULD WE BE TALKING TO ABOUT THIS?**

- Professional Associations (specifically the decision makers)
- Top 200

### **WHERE DO WE START?**

- Student Outreach
- Chairmen Circle
- Internal
- Goal Setting (refer to score cards: where are you today? What's next? What will help us progress?)
- Data Collection geared towards producers and consumers
- Establish clear communication between the workers and the people in power

### **Side Note:**

- ***30% of women in transportation***
- ***4% of women in transportation leadership***

### **HOW DO WE HELP WOMEN IN THE INDUSTRY SHARE THEIR PROFESSIONAL STORIES?**

- Personal Spotlight (confirmation of work life balance)
- Be confident in your reality (parenthood, lifestyle, etc.)
- Do not be afraid of stereotypes
- Adopt the Presentation of the Industry

May 15, 2018  
10:30-12:30

Apprenticeship Workshop – College Students

1. Welcome and introductions
2. Project Overview
3. Facilitated discussion with participants
4. Summary and closing comments

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05/15/18

### Questions for Student Apprenticeship Conversations

1. Are any of you familiar with "Registered Apprenticeships"

3/9 (Registered) ; 9/9 (plain apprentice)

2. What is your perception...

Shadowing- Follow a professional and pick up on behavior, how they interact and handle things.

Mentoring- Learn practical knowledge and apply instead of learning – first

Learning- mentor you in a skill you don't have so that you can build a career

Hands-On: like an internship, but more hands on, more direct learning, guaranteed to get paid

'Trade'- side by side learning, very hands on

Manufacturing- past: manufacturing, dirty jobs

Now: technology influencing

Motorcycle with side cart: experience -being thrown in fire- learn in real time don't get foundational knowledge

Tattoo artist – just getting to job- viewed as internship for non-college bound people.

Who do you think programs are for?

Scribe at hospital

Young fellow

Students

Inexperienced workers

Plumber

Resident doctors

EIT

GA

Mechanic



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3. What do you think is the value of an apprenticeship program?

Learn and work before getting an education

Pays You and Good Experience

Gives you good insight? Into ??

Apprenticeship could be older person ??? intern basics; work way up

Experience- learn by doing a more valuable and stick more than book knowledge

4. What are the barriers to attracting students to apprenticeship's?

Big Perception- would movers to technology- students encourage to go straight to college trade

Parents- scared of students not going to college - don't think can lead to success

Valued less by society

College seems like the only route for success and financial stability

Hands- on, applied, vocational maybe better fit for some people but don't feel free to

Word origin – was trade skills- gets bad rap

Everyone expects you to go to college

No advertising on education about opportunities through apprenticeships

Don't understand can make good money

Social image- negative for trades, not as smart; not using full potential

Stigma if not going to college way more opportunity and money and value than people really

Transportation- people don't recognize the spectrum of options , opportunities and diversity of things you can do

Makes theory more concrete

Improves Learning

A lot of times knowledge from experience needed is technical roles not there

High schools need to pair up with apprentice programs and make students aware of options

Target high school students at junior year start a program that summer pre-apprenticeship program

Apprentice explanation '??' Experiences / camps so students can test things out

Military Veterans- show how can lead to success- connect to jobs they had in military;  
Accelerated program for military veterans to get credentials that accounts for their experience

Value for college students- particularly undecided students to help them find their fit

Explore innovative learning models for higher-ed that layer apprenticeship experiences and credentials into university degree programs ; Better skilled workers

Tell how much money they can make- showcase pathways

Where do you see yourself in 10 years? What do you want to do? Showcase all options, not just college bound.

Pitch programs Fast. ?? Out how to parent apprenticeships as innovative, etc and not as lower tier option

How do we not just push for college? Evaluate guidance counselors

5. Review the handout on Registered Apprenticeships. Does this change any of your perceptions?

Can give people experience that leads to choosing to pursue additional

More eager to try it

If I had known this beforehand, I might have chosen differently

I'm more hands on - I would have done this if I had known about it

6. How do you suggest the state of TN approaches a strategy to accelerating apprenticeships in transportation?

\*Show parents short term goals, career growth, financial stability

Make it accessible/ available- must increase awareness

Make this much more common in high schools

Don't have just 'college fairs'

Programs just for apprenticeship/ career exploration

Don't just focus on money- focus on job fulfillment paint a different picture- choosing a lifestyle ; finding you 'fit'. Making a difference; Technology; 'cool' factor; make it exciting

Short term, summer apprenticeship trials to build interest

Have example of successful people. Need to see success stories as role models

Credible stories of success- numbers- not just one person

Need exposure and open eyes to options

Find people to share their stories

Not everyone is a doctor or engineer and its okay

Kids influenced by parents and act the tone

Need to educate parents

Start early – not just at high school

STEM in action through apprenticeship

Create an experience-

- you graduate HS, pick a route

- Show simulation of what they will do

- Happy; Great, if not pick again

Free Samples – activities at middle schools

Only see medical, law, police on tv shows

Memphis Rocks' - advertise to all in one? Labels ??

Apprentice fairs in addition to college fair

National Apprenticeship week- these needs more attention, state should make this a big deal

Universities recognizing apprenticeship credit toward degree

We have this many student students in post secondary education/training not just college

Go to schools

Create company- school apprenticeship partnership tied into themes

Database of apprenticeship programs- one app like the common app

Build relationships/ facilitate with schools and kids



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Advertising schools to equally promote options- Awareness is key

Students that don't do well in school- don't learn in traditional academic environment

If you test five students in the wrong way they think they're dumb, Find a vessel to excel build self confidence.

7. What the first word that comes to mind for a program that you would participate in?

Aviation , Flexibility, financial stability, revolutionary, advanced, innovation, fulfilling, learn to use cool stuff, Canada ( location makes a difference), engine, culinary,sonography,technologies

8. What would have made you more likely to consider such a program?

Awareness- honestly had never heard of this before

If parents had been open to it

Travel – if that was an option

If had struggled academically

If paid for college/ higher ed

Advertisement- information

Parental approval/ awareness sibling overshadowing

High schools need to help students find what they are good at

Help parents understand financial potential of alternate program/paths

9. What stakeholder...?

School districts, parents, community org., big name companies, workforce development people, universities as stakeholders? Can help eliminate stigma, military,union, students

10. Are they any additional...?

Commercial\*

Pays better, learning more, get out there and be someone

Get everyone involved

College is not the only answer- we need to convey the message

Listen to student and potential employers

Partnership with universities



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Encouraging every individual's strength- don't rank them- value all

Keep persistence

Passion over success (chase what you love, and you will be successful)

Could be build confidence

Look at European models and trades are highly respected and valued

??? Like in college- frosh camp, ?? Aspect apprenticeship

SHOW PRICE OF COLLEGE



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May 18, 2018  
8:30-10:00

Apprenticeship Workshop – East High Transportation-STEM Academy

1. Welcome and introductions
2. Project Overview
3. Facilitated discussion with participants
4. Summary and closing comments

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## Student Apprenticeship Conversation

East High School, May 18, 2018

1. Are you familiar with Registered Apprenticeship?

2 N, 1 Yes

Never heard of it (5/5)

2. What is your perception of these programs? What do you think program entails, what is first word that comes to mind when you think of apprenticeships?

- Medieval
- Understudy
- Sorcerer and apprentice!

Students said: YES, definitely a positive perception: you need experience to get a job, this provides the experience needed to get a job.

Also: job experience without interview process, way to work under someone who is an expert in their field, and it sounds really cool!

- Job that you are not paid at
- Expensive job (less money)
- Internship
- Somebody's assistant
- No idea
- Internship
- Low income
- 4/5 have negative connotation in middle- could learn something

3. What do you think is the value of an apprenticeship program?

- Experience!! You have to have it to get a job.
- More people getting degrees, it's imperative to have experience to compete in job market.
- Any type of job can have an apprenticeship program.



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- Teach someone a job
  - Learn something
  - Help you improve skills
4. What are barriers to attracting student to apprenticeship?
- TIME
  - Pay rate?
  - Nobody wants to work in summer
  - Needs to be during school year
  - No advertisement
  - Need to offer food to get people to meetings
5. Review the handout on registered apprenticeships. Does this change any of your perceptions and how?
- WOW- this pays more than minimum wage!
  - And just the fact that it pays is awesome.
  - Learning and making work connections PLUS getting paid.
- Now its interesting
  - Helps you- higher perspective
  - Prepares you for the future
  - You get paid
6. How do you suggest the State of TN approaches a strategy to accelerating apprenticeships in transportation?
- Open to people at a younger age
  - Large scale incentive program to incentivize businesses to offer apprenticeships (tax deductions)
  - Large scale program to include a massive amount of HS students
  - During school, tell them they can get paid
  - Bring swag for programs
  - People should talk about it more

- Don't put it on paper- make it digital
    - i. Social media (no one checks email) Have people inform then get to follow
  - Be more interactive (games?)
  - Talk about the exciting things you do.' Call it interactive experience where you get paid'  
'get college credit'
7. First word that comes to mind for a program that YOU would want to participate in?
- Paid, MONEY
  - Free gas/ gas cards
  - Experience in specific area of interest (his is computer science)
  - Money
  - Brighter future
  - College credit
  - Access to top colleges
  - Preparation
  - Experience
8. What would have made you more likely to consider such a program?
- Apprenticeship in “computer science” wrapped up with college courses
  - Explain specialized fields – BE SPECIFIC about field. Be precise when describing program and benefits.
  - Flexibility in hours- a few hours a week.
  - Video showing how people do it
  - Speaker
  - Field trip to see in action
  - Show how to get into specific jobs
9. What stakeholders?
- State provides businesses/ companies tax deduction
  - Business has clear ROI
  - State needs skilled workers
  - Students- how to reach students? Not through guidance counselors. If you go to career fair, students like free SWAG but throw away paper handouts. They mainly visit booths

with GOOD candy. Best way to reach students is for teachers to make an assignment about program. Or fund an essay contest across the state with cash prizes/ gas cards.

- School (k12) [some people's parents don't care, so hard to get access]
- They have to be young
- Giveaways
- MPLOY
- Libraries
- Posters/fair at school – part of college fair

10. Are there any additional pieces of advice you have for the state in terms of practices to avoid or to be sure to adopt if they want to build robust apprenticeship programs?

- Tax deductions to company
- Make the program sound easy, not daunting. Simplify the process.
- Advertise with great stock photos and use buzz words
- Remember parental influence
- Reach out to summer service fellowships
- Provide free food for small groups/ host mini conferences around the state at schools.
- Get more young people to talk about and share their stories
- Avoid flyers
- Create more activities- do hands on activity that demonstrates stuff you will learn/ do on the job

May 24, 2018  
11:30 AM – 1:00 PM

Apprenticeship Luncheon

1. Welcome and introductions
2. Project Overview
3. Facilitated discussion with participants
4. Summary and closing comments

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05/24/2018

## Industry, Education, and Community Stakeholders

### Apprenticeship Responses

1. Are you familiar with “Registered Apprenticeships”?

Some of the participants were familiar

Veterans

- Prison/ felony record
- Y&W coding technologies registered apprenticeship (Willis Yates)
- Drones – apprenticeship?

3 yes 3 no

Yes, 4 US Department of Labor has 4 electrical contractor programs. Only recruited by word of mouth though.

2. What is your perception of these programs? (What would you think an apprenticeship entails? What is the first word that comes to mind when you think about apprenticeships?)

Some of the programs are not open for high school students.

Apprenticeships are seen as opportunities for students to have paid opportunities and a clear pathway to jobs within the company they are performing their apprenticeship with.

Apprenticeships are seen as future employment for the student

Seen until recently as “dirty jobs”

Best practice training

Experience

Stepping stone

Low-Skill

Lack of Women

- Lack of awareness
- Electrician
- Adult
  - Paid training
  - Internship-unpaid
  - Long term commitment

On-the-job training, skilled trade workers, opportunities for kids, hands-on, vacations, shadowing.

A college prospective is they want to give students the awareness of the program, so there is a more concrete path laid down for students to take. A company's perspective is they think it is a union and there is a bunch of paperwork involved. Also, people do not know the difference between an apprenticeship program and an internship because they are not the same at all.

3. What do you think is the value of an apprenticeship program?

Company growth

- Great intro into crafts and being able to make a living
- Great option for people not considering formal education
- Credentials



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- Learn a skill

Participant:

- Kids aren't sure about future goals, apprenticeship might help explain to kids what they DO or DON'T want to do. Real world exposure.
- Gains knowledge and earns money at the same time.
- Youth obtains new skill set.
- Youth can feel proud that company and person are investing in their future.
- Opens doors, opens opportunity to earn money and learn a new vocation
- Experience real world of business
- Learn from mentor how to navigate new company and field of study.

For employer:

- Help fill needed skills gap and employee shortage

Some employers view it as new people bringing innovative ideas and innovation to that company.

#### 4. What are the barriers to attracting students to apprenticeship?

Public awareness

Not having information in high school (guidance counselors talking more about college than apprenticeships)

Lack of understanding from the parents

Maturity, literacy. Work readiness, competence to perform in a basic job environment

Lack of soft skills



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## Work ethic

- Need quick sell to capture attention
  - Requirements
  - Perception that craft fields are less attractive (parents) [Don't understand the opportunity/light at end of the tunnel]
  - Awareness
  - Society get away from honoring labor
  - Need to reemphasize CTE
  - Don't make livable wage- low wage jobs
  - Pathway isn't clear
  - Need to see success stories
  - Kids now because of technology- expect instant. Want a quick path?
  
- Can they pass a drug test
- Age, insurance
- Time involved
- When specific career pathway and long-term goals are not clearly explained
- Since college includes an aspect of socialization, an apprenticeship participant might miss the needed socialization (maturity)
- Potential participants missing the needed soft skills/ communication skills needed to grasp benefit of Apprenticeship.
- Industry being out of touch with student skills

Changing the viewpoint within companies to make it a more positive outlook. More publication and awareness of these programs for both people and the companies. Also, the programs that are trying to exist need to be more defined and concrete so that it will be appealing to not only those who are interested in the programs but also to companies looking to hire people.

5. What are the barriers (if any) for companies in developing registered apprenticeship opportunities?

Lack of information and understanding about how to become a sponsor

- Apprenticeship are not on radar at all for American Job Center/WIN
  - Setup apprenticeship programs office in 'one stop centers'
  - Create a truly 'one-stop shop'
  - WIN-need effective people/programs
  - Quit creative new things – address existing programs to improve/make fit
  - For pre-apprenticeships, does bar have to be so high- can they allow flexibility to fit the model (i.e. rather than having to totally redo existing programs to fit.)
  - Employers have to buy into having/flexibility on background
  - Adults pursuing high school equivalency
  - Work with companies and apprenticeship programs to be more 'background friendly'
  - Time- company mentor having enough time to devote to apprentice and other job responsibilities.
  - Funding to pay apprentice
  - Difficult to teach someone that might not be long-term; as soon as you get someone up to speed they leave for a competitor
  - Inability of “hooking and maintaining” interest of youth
6. What additional factors should be considered for attracting diverse groups (people with varied abilities, gender, ethnicity, veterans, ect.) to apprenticeship programs?

Establishing an intermediary to help train. Companies want skilled, willing to work people but they need help on training.

- Links into programs that serve nontraditional programs. Hope Works- single moms over 25
- Transportation
- Support for students with home ...?
- Awareness
- Partner more with community agencies serving target population
- Reserve units/national guard units have people transitioning out

- Get them into apprenticeship programs early so transition is easier (they know 18 months- 2 years ahead of time when EAS)
  - IEP – make apprenticeships part of IEP meetings for transition for occupations that fit.
  - Make sure guidance counselors know
  - Key is 'transition'. Make sure to connect with them where they will transition whether in highschool, military, prison, etc.
  - Be sure to review successful formal programs that include partnerships with public schools, private business
  - Breakdown stereotypes associated with disabilities
  - Workplace accommodations
  - Workplace culture- make sure apprentice and employer understand each other!
7. What occupations within TDL are most suited for expanding apprenticeships in TN?  
What are the highest demands?
- Freight
  - Railroads
  - Truck drivers
  - FedEx/ UPS; companies where you can work your way up/ opportunities within all levels of the organization.
8. Are you familiar with the pre-apprenticeship programs? How might these enhance workforce development efforts? Any special considerations or barriers for expanding adoption of pre-apprenticeships?
- Group is somewhat familiar
- Barriers:
- Entrance requirements/ age/ liability insurance
  - Funding
  - Is company responsible for insurance or is the school?
- Special considerations:
- Probably grants available?
9. How do you suggest the State of Tennessee approaches a strategy to accelerating apprenticeships in transportation?

Providing stakeholders with a streamlined way to incorporate registered apprenticeship programs within their companies.

- Bring stuff for students to see and tell the story.
- Get into adult classes for high school equivalency
- QR codes- link to stores and instant information
- Brochure- What can I give my clients?
- Be aware of reading level- 5<sup>th</sup> or 6<sup>th</sup> grade level
- Advocate and increase awareness
- With our stop shops changing leadership July 1, this is prime opportunity for making a change and getting apprenticeship formal ... of program
- Right partnerships
- Go into schools multiple times a year
- Perception from non-union companies that apprenticeship is unionized is a barrier.
- HR- they hear 'paperwork with no payback' when you say apprenticeship
- State could start recording successful stories and record strong ROI. Stories with people
- Everything can't be electronic- population that is afraid of electronics – materials that can reach people with disabilities
- English and Spanish
- State offer grant opportunities
- state offer companies incentive to host apprenticeship program
- tax incentives to companies
- pay portion of salary to apprentice
- pay apprenticeship program licensing up program completion
- tax break for hiring apprentices with disabilities

10. What stakeholders should be involved in developing apprenticeship programs (i.e. how do we develop these to ensure we are recruiting diverse participants who are interested and will be successful in these programs).

The community colleges, the State, employers needing skilled workers

- Education: higher education 2 and 4 yr. and high school
- Private industry



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- Local federal and state government employment programs
- Graduates of programs
- Professionals work with educators to determine appropriate curriculum.

11. Are there any additional pieces of advice you have for the state in terms of practices to avoid or be sure to adopt if they want to build robust (successful) apprenticeship programs?

Educate employers on registered apprenticeships.

1. Awareness
  2. Make it easy to apply
  3. Clearer path to application
  4. Invite companies in to tell story
  5. Start getting local solution rather than statewide
  6. Tell the story of apprenticeships
- Provide financial incentives
  - Create a solid plan – commit to it- don't change guidelines soon after implemented.
  - Consider the reality of working with students with disabilities- parents often discourage child working because they see it as a threat the federal subsidy they earn for disability. However this is often not the real story, they can still work up to a certain time/ pay and receive federal check. Education needed for parent, apprentice, school, private industry on this!