

EMPLOYER ENGAGEMENT IN COLLEGE AND CAREER PATHWAYS IN MIDDLE TENNESSEE

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EXECUTIVE SUMMARY

Tennessee has long been known as an innovator in secondary education, but the period starting in 2012 was unique in the energy that was directed towards connecting statewide workforce and education efforts under a common strategy to increase the skills, qualifications, and degree attainment of Tennessee citizens. This case study will explore the first two regions—the Upper Cumberland and Rutherford County—that implemented

college and career pathways programs under a statewide initiative called “Tennessee Pathways.” In these programs, secondary and postsecondary programs—including those at community and technical colleges, as well as four-year universities—are articulated, or deliberately aligned with one another, such that students can easily navigate the system and achieve prior credit for courses taken or degrees earned. Programs are prioritized by the labor

market needs of the local community, so long as they provide a living wage to workers. And, educator-employer relationships are supported by an intermediary organization, like a chamber of commerce.

Such pathways have not received enough attention as a viable model that can achieve improved outcomes in both the U.S. education and employment systems. Many have recognized that the current predominant system is disconnected and ineffective (i.e. students complete high school and, ideally college, with only a limited focus on the development of valuable workforce skills or informed career goals). In reaction to the deficiencies in the dominant system, there has been increasing national attention to reviving and modernizing the apprenticeship model. However, apprenticeships are complicated and expensive to arrange and they are dogged by concerns that employer commitment will collapse as economic conditions shift. College and career pathways—such as those developed in Tennessee—are promising because they represent an “in between” way, requiring less employer commitment than apprenticeship programs but achieving much better connectivity between educators and employers than the current fragmented system.

While the employer resources required for college and career pathways are not as intensive as they might be in a traditional apprenticeship program, pathways still require a significant departure from the status quo. The model promotes early and frequent “work-based learning” experiences, such as job shadows and student internships, and it requires

employer involvement in the design and governance of the regional systems that support the pathways. Tennessee has achieved a significant level of employer engagement in its college and career pathways, and the information shared by employers in a series of interviews from 2016-2017 can provide important lessons for those interested in scaling the model.

Rutherford County is roughly 35 miles southeast from state capital of Nashville and is one of the top 50 fastest growing counties in the country. Like many areas of the country, Rutherford’s fastest growing industries include manufacturing, government, administrative, retail, and healthcare. Nissan North America is the county’s largest and most recognizable employer, supporting a cluster of smaller automotive parts suppliers. The county is also home to Middle Tennessee State University, Motlow State Community College, and a Tennessee College of Applied Technology (TCAT) located in the county seat of Murfreesboro. With significant economic growth on the horizon, Rutherford County held a workforce development conference in 2013 to analyze the state of the county’s education and training system. The county chamber of commerce created an entity named Rutherford Works that led five industry councils and an executive committee in organizing career opportunities for students and provided input into the CTE curricula across the local secondary and postsecondary schools. Early wins included a high school internship program that grew to place 43 students with area employers by 2019.

The Upper Cumberland is a largely rural region east of Nashville with fourteen

counties spanning over 5,090 square miles that held 352,282 residents in 2017. Its largest city is Cookeville, which sits about 80 miles from Nashville and holds over 70,000 people, a four-year university (Tennessee Technological University), and several community and technical colleges. In and around Cookeville, there are mostly small businesses across industries including manufacturing, retail, healthcare, agriculture, and tourism. A four-county initiative called the Highlands Economic Partnership is the mecca of the education and workforce development efforts in the region. After the Great Recession in 2008, the Highlands developed committees to bring educators and employers together to create programming with the goal of building long pipelines from the region's schools to its employers. By 2017, the committees' programs had expanded to include company tours, a 12th grade job fair, an externship for teachers, and a "work-based learning" capstone program that allowed high school students to intern at an employer four days per week, 1.5 hours per day, for a semester.

The typical pathways student experience across both regions can be understood as a blend of vocational and academic learning. Before entering high school, students choose a CTE (career technical education) program of study in fields such as healthcare and information technology. Because neither region had separate vocational secondary schools, students took their CTE courses as electives alongside their regular academic courses in comprehensive high schools. Classroom instruction was supplemented by work-based learning experiences including job shadows and field trips to area employers. One of the guiding principles for organizers

in these regions was that college and career pathways were appropriate and desirable for all students, regardless of their future career goals and academic abilities.

For students, being a pathways participant provided clear benefits through career exploration and the opportunity to earn early college credits. Despite the fact that, in the United States, there are strong economic and cultural arguments against employer participation in student education and training, employers also benefitted from their involvement in the pathways. Before the career pathways initiatives, some employers had participated in smaller scale work-based learning programs, where they encountered some of these issues. For instance, in Rutherford County, healthcare employers had occasionally offered job shadowing to students, but these programs were not popular with managers (or students) because they were not supported by related instruction from the school system, and they placed a large burden on employers. Other barriers to employer engagement were liability, scalability, communicating with educators, and lack of time.

However, some employers in Rutherford County and the Upper Cumberland did direct considerable energy to provide internships and job shadowing opportunities for students, and they contributed personal time towards career fairs and committee meetings. These employers recognized that they needed to go beyond providing better onboarding to combat high turnover and to attract qualified workers. They recognized that their future workers had limited opportunities to develop a set of reasonable expectations about the working

world within a given occupation, meaning that action needed to be taken earlier in the educational process. These employers recognized that an extended process of career exposure would help their workers gradually socialize to the job and the organization. They believed something needed to change in the way students were prepared for the working world.

While college and career pathways did not solve these problems entirely, employers found it worthwhile and feasible to participate due to two main features in the programs' design. First, modular content allowed the programs to be personalized to students with different interests, commitments, and abilities, rather than being targeted to a particular group (non-college-going students, for instance). Participating in an intentionally connected sequence of courses and work-based

learning experiences instilled a variety of knowledge, skills, and abilities in students, and the relative exposure to each type of skill could be tailored to a student's ability and interests. Because these experiences were not entirely customized to each individual learner, they could also be delivered at a greater scale. Second, the networked structure of these programs—employer-educator partnerships connected by chambers of commerce—distributed the costs of these programs over multiple stakeholders. It also created a positive feedback loop whereby program content and structure were improved over time as networks were strengthened and expanded. These two features allowed a regional ecosystem to develop that provided students with foundational knowledge, skills, and abilities, as well as experiences of real-world work.

INTRODUCTION

In an environment of rapid technological change, globalization, demographic shifts, and new business models, there has been increasing attention paid to the education and training systems in the United States. Energy has come from unexpected places, like the wide expanses of middle Tennessee, between the urban hubs of Nashville, Knoxville, and Chattanooga. While there are still gaps between the workforce needs and education outcomes in these areas, these gaps are closing because education and industry representatives are working together for the economic development of the regions and for the benefit of students and workers. Here, coalitions of individuals and organizations have formed regional ecosystems to support the implementation of college and career pathways – a model in which students take rigorous academic- and career-focused courses in high school, participate in a series of work-based learning experiences like job shadows and internships, and transition seamlessly to postsecondary education and the workforce, achieving employment in a high-wage, high-skill occupation. In this model, secondary and postsecondary programs—including those at community and technical colleges, as well as four-year universities—are articulated, or deliberately aligned with one another, such that students can easily navigate the system and achieve prior credit for courses taken or degrees earned. Programs are prioritized by the labor market needs of the local community, so long as they provide a living wage to workers. And, educator-employer relationships are supported by an intermediary organization, like a chamber of commerce.

These pathways represent a relatively innovative model for workforce education in the United States. On the workforce side, they evolved from occupation- and sector-based training programs starting in the 1980s and 1990s that were designed under the idea that

there were basic common sets of skills needed for entry-level workers within certain sectors and that employers could benefit by taking part in a collective workforce development effort.ⁱ On the education side, career pathways evolved from the spread of aligned career technical education (CTE) programs of study that begin in high school and are connected to the higher education system through community and technical college programs.ⁱⁱ

“Career pathways” is a term that presently has at least two different meanings. The first meaning refers to occupations that naturally allow for meaningful career progression. One common example is nursing, since a nurse may progress from a certified nursing assistant (CNA) to a licensed practical nurse (LPN) to a registered nurse (RN) to a nurse practitioner (NP). The second meaning of career pathways, and the way in which the term is used here, refers to a way of organizing education and training under a progression of courses and experiences that allows for various exit and entry points such that workers may flexibly transition between the education and employment systems while earning “stackable” credentials. To make this distinction, and to more accurately describe the model, this case study uses the term “college and career pathways”.

Such pathways have not received enough attention as a viable model that can achieve improved outcomes in both the U.S. education and employment systems. Many have recognized that the current predominant system is disconnected and ineffective (i.e. students complete high school and, ideally college, with only a limited focus on the development of valuable workforce skills or informed career goals). In reaction to the deficiencies in the dominant system, there has been increasing national attention to reviving and modernizing the apprenticeship model, which includes employer-funded wages for part-time work supplemented by vocational-oriented schools and college programs. The

apprenticeship model appears promising in today's tight labor market, but it is complicated and expensive to arrange and is dogged by concerns that employer commitment will collapse as economic conditions shift. College and career pathways—such as those developed in Tennessee—are promising because they represent an “in between” way, requiring less employer commitment than apprenticeship programs but achieving much better connectivity between educators and employers than the current fragmented system.

However, while the employer resources required for college and career pathways are not as intensive as they might be in a traditional apprenticeship program, pathways still require a significant departure from the status quo. The model promotes early and frequent “work-based learning” experiences, such as job shadows and student internships, and it requires employer involvement in the design and governance of the regional systems that support the pathways. The economic and cultural arguments against employer-provided training of general skills are oft-repeated – that trainees will leave to find better jobs after building up their skills, that apprenticeships were effective but are no longer viable with a decline in unionization, and that it is the responsibility of educators to improve schooling such that it meets employer needs. In fact, it might be argued that employer engagement is the most challenging aspect of developing sustainable systems of college and career pathways. Yet, Tennessee has achieved a significant level of employer engagement in its college and career pathways and can provide important lessons for those interested in scaling the model.

This case study will explore how two regions in middle Tennessee have reimaged how to structure workforce development to achieve the joint goals of preparing future generations for further education and careers and building

worker pipelines for in-demand jobs. These regions were some of the first to implement programs under a statewide initiative called “Tennessee Pathways”. Here, state and regional stakeholders are betting on a model that provides a way “in between” the traditional college-for-all model and the apprenticeship model. This case study will privilege the employer perspective, aiming to address the question of why employers in these regions find it worthwhile and feasible to participate in these efforts. Part 1 describes the ecosystems of college and career pathways programs that were created in the two regions by reviewing the regional contexts and outlining the typical student experience in a pathway. Part 2 focuses on the motivation for employers to engage in such programs and describes the barriers that they face in doing so. Part 3 turns to the implementation of the programs and the key features that facilitated employer engagement in these regions.

In Part 3, we will see that the college and career pathways programs implemented in these two regions provided modular content—a set of classroom and work-based experiences that can be flexibly combined—in a networked content delivery structure with educators and employers connected by a central intermediary organization, such as a chamber of commerce. Modularity allows the programs to be personalized to students with different interests, commitments, and abilities, rather than being targeted to a particular group—non-college-going students, for instance—while a networked content delivery structure allows stakeholders to distribute the costs and responsibilities for building student skills. These features, which will be spelled out in more detail below, have allowed employers to become active champions for the pathways and to embrace their role in building occupational identities for the regions' students.

PART 1: REGIONAL ECOSYSTEMS OF COLLEGE AND CAREER PATHWAYS

but the period starting in 2012 was unique in the energy that was directed towards connecting statewide workforce and education efforts under a common strategy to increase the skills, qualifications, and degree attainment of Tennessee citizens.

The State Landscape: Tennessee has long been known as an innovator in secondary education,

Statewide Workforce Development and Education Landscape

In 2014, then Governor Bill Haslam set an ambitious goal that 55% of Tennesseans would achieve a postsecondary degree by 2025. At the time, the number was near 33%,ⁱⁱⁱ compared to a national average of 42% of United States citizens with an Associate’s degree or higher.^{iv} Since then, Tennessee has made significant progress towards its goal: the Lumina Foundation estimated the 2016 postsecondary attainment rate in Tennessee to be 40.7%.^v The effort, branded Drive to 55, was supported by several pillars, described below.

Tennessee Promise, launched by Governor Haslam in 2015, provided a means for Tennessee students to receive two years of community or technical college tuition-free. Since this time, sixteen other states have developed similar programs.^{vi} Tennessee Promise provides a “last-dollar” scholarship to students to cover tuition costs that are not otherwise covered through state and federal scholarship and grant programs. It also leverages volunteer mentors to provide routine advice and support to Promise recipients during the college admissions process. Recipients must maintain a 2.0 grade point average and complete eight hours of community service per year to maintain eligibility for the scholarship. In the first year of implementation, the state college-going rate increased nearly 6%, from 58.4% to 64.3%, and remained at this level in succeeding years, according to the policy’s latest annual report.³

While Tennessee Promise has improved the ability of new high school graduates to successfully transition from high school to college, increasing students’ college-going rate by a modest amount was not projected to be enough to achieve the Drive to 55 goal. Another component of the Drive to 55 initiative, Tennessee Reconnect, focused on incumbent workers without degrees and similarly provided them with the opportunity to attend community or technical college tuition-free. Tennessee Reconnect provided options for adults with some college, no college, and/or military service to complete a two-year degree or certification.

Several years prior to the launch of Drive to 55, Tennessee joined a national effort to connect education, workforce development, and economic development efforts towards high-skill and high-demand occupations. The national Pathways to Prosperity Network, a joint initiative of Jobs for the Future and the Harvard Graduate School of Education, promotes the concept of college and career pathways nationwide. Jobs for the Future is a nonprofit organization focused on creating economic opportunity by bridging education and workforce development through research, policy advocacy, and program management. The Pathways to Prosperity Network is a network of states committed to implementing and scaling college and career pathways with the support of Jobs for the Future experts. The Network operates under a framework that promotes the importance of early career advising, employer-provided work-based learning opportunities, intermediary organization support of educator-employer partnerships, and supportive state policy. While the national Pathways project has now reached 14 states and counting, Tennessee is considered one of its most successful states because of its strong and diverse state leadership that has backed regional implementation spanning all nine economic development regions of the state.

Under the Pathways to Prosperity Network, Tennessee Pathways launched as a cross-agency effort to support regions in developing college and career pathways. In Tennessee, college and career pathways were defined by integrated model of academic and technical education spanning grades 9-14, which

allows students to transition smoothly from high school to college and into careers providing a living wage and opportunities for advancement. The state steering committee for the effort included the state's Department of Education, Department of Labor, Department of Economic and Community Development, the Tennessee Business Roundtable, and several postsecondary governing agencies. To begin implementation, state Department of Education officials audited the state's career technical education (CTE) programs of study that could be offered in high schools. They ensured that each CTE program of study was aligned to multiple postsecondary opportunities, meaning that each program of study corresponded to degree or certificate programs offered at Tennessee community or technical colleges. Then, under the Tennessee Transfer Pathway program, students who complete Associate's degrees in particular focus areas were guaranteed that their credits would transfer to all public (and many private) Tennessee universities.vii CTE programs of study also specified an option for students to earn industry-valued certifications and early college credit. This audit process included retiring CTE programs that did not align with workforce and economic data, as well as rewriting standards for remaining programs to raise the level of rigor in instruction. Tennessee Pathways officials also worked closely with regional coordinators and intermediary organizations, like chambers of commerce or regional economic development offices, that managed local efforts. Across the state, top priority sectors according to labor market data were manufacturing, healthcare, and information technology. In the 2016-2017 academic year, pathways in these three priority sectors were available to 90% of public high school students, and enrollment (the percent of students in grades 9-12 completing at least one course in one of these sectors), was 19% of all secondary students.viii In general, Tennessee Pathways focused on middle-skill occupations—those that required some postsecondary education less than a bachelor's degree to achieve skilled technician status—but the courses and experiences that they put in place could also benefit students pursuing other paths, including advanced degrees. For more on Tennessee Pathways, including a spotlight on the Upper Cumberland (one of the regions profiled here) and the Southeast region, see a case study completed by Richard Kazis for Jobs for the Future.ix

The Tennessee education landscape includes a relatively unique set of institutions that will be mentioned in this case – Tennessee Colleges of Applied Technology (TCATs). While many other states have combined community and technical colleges, the Tennessee system includes 13 general community colleges and 27 TCATs. TCATs offer one- to two-year certificate and diploma programs in technical occupation areas including pharmacy technology, automotive technology, and cosmetology. They have close relationships to area employers and require their programs to maintain high graduation and placement rates.

Two Regions in Middle Tennessee: As Tennessee Department of Education officials began implementing Tennessee Pathways, they surveyed the state and found the seeds of exciting and related work taking place in pockets throughout the state. Two regions in particular had made progress in connecting their workforce development and education systems – the Upper Cumberland and Rutherford County. In these regions, state officials partnered with regional stakeholders to integrate, structure, and scale the work. These two regions differ along key factors, including

size, population density, and industry mix, providing compelling evidence that the college and career pathways model can be adapted successfully to different regional contexts.

Rutherford County is roughly 35 miles southeast from state capital of Nashville and is one of the top 50 fastest growing counties in the country.x Its population, according to the 2010 census, was just over 262,000, but skyrocketed to over 315,000 by 2017. The county is nearly 80% white, with 12.8% of residents living in households

under the poverty level.⁸ Though its rate of growth is unusual, like many areas of the country, Rutherford's fastest growing industries include manufacturing, government, administrative, retail, and healthcare. Nissan North America is the county's largest and most recognizable employer, supporting a cluster of smaller automotive parts suppliers. Nissan is followed in employee size by the Rutherford County government and Middle Tennessee State University.^{xi} The county also has a transportation and distribution presence, including an Amazon fulfillment warehouse, as well as several major medical centers. Most of these large employers, as well as a handful of smaller companies, are "Career Pathway Partners" – organizations that have signed up with the county chamber of commerce to support K-12 education initiatives, including by offering company tours and sending individuals to events as guest speakers.^{xii} The county is also home to two elementary and secondary school districts and boasts multiple postsecondary education institutions, including Middle Tennessee State University, Motlow State Community College, and a Tennessee College of Applied Technology (TCAT) located in the county seat of Murfreesboro.

With significant economic growth on the horizon, Rutherford County held a workforce development conference in 2013 to analyze the state of the county's education and training system. From the beginning, education and workforce training were discussed as two sides of the same coin, largely thanks to a dynamic chamber leader named Beth Duffield. Duffield had significant experience in education at the community college, university, and state levels, so she "really

had a good understanding of who did what" in the county. Also supported by her husband's experience as a high school career technical education (CTE) teacher, Duffield said she "knew ultimately that the basis for everything we wanted to do with employers started with CTE". During the first year after the 2013 workforce development conference, Duffield led programs centered on providing early career exposure to students in the county's schools. These included an after-school career exploration program, an industry speaker program, and company field trips. But by her own admission, these programs were just the first disorganized throes of a county eager to tackle workforce issues in a more structured way: "Was it good? Yes. Were there specific outcomes? No. And it was a little bit of a hot mess logistically."

Through trial and error, and after partnering with the state initiative, Tennessee Pathways, these efforts were formalized into an entity named Rutherford Works, led out of the county chamber of commerce. Rutherford Works grew to consist of five industry councils and an executive committee that organized career opportunities for students and provided input into the CTE curricula across the local secondary and postsecondary schools. The first three industry councils were in construction, healthcare, and manufacturing (with information technology and supply chain added in 2017). Each council was led by a representative from an employer champion in the sector and included 10-20 additional employers, as well as representatives from the county economic development council, the city and county school districts, and the county's colleges and universities.

However, the councils continually evolved, according to Duffield:

We started all of these [councils with] just industry [membership] and then we brought our education partners in. Because I've been on the higher ed side, and I know that education is quick to say, 'This is what we have to offer.' And industry says, 'No that's not what we want' . . . So I wanted to make sure that the industry [sectors] clearly define what it is they want before we ask our education providers to provide it . . . I still want to add the United Way, I want to add our workforce investment board youth services folks, probably our GED folks, and city or county leadership.

By 2017, dozens of employers participated in Rutherford Works programs, which now included a paid four-week summer internship for high school students, a 12th grade hiring fair, an 8th grade career awareness fair, an externship for CTE teachers to visit local employers, and a program in which students received a “Work Ethic Distinction” on their high school diplomas to recognize their level of career readiness. Beth Duffield described the chamber’s pivotal role in managing logistics for the high school summer internship program, one of the more ambitious aspects of the initiative:

It runs the month of June, and we [the chamber] pay the students \$10 an hour. The employers, [from] November to December, give us their job placements and identify a mentor and a job description. All of that [goes] live on our website for our students to apply for those jobs . . . Once we have ten applicants for a specific job, that job closes. We send those applications to the employer, and they decide which three [students] they want to interview.

We'll host interviews in February, early March. It's much like a real job interview process: they have to provide a resume, fill out an application, two letters of recommendation. We're up to about 125 applications . . . and we hope to have 250 or 300 applications this year. . . for 54 [employer] placements. [Students] work 16 hours a week, Monday through Thursday, and that can be two 8-hour or four 4-hour [shifts]. And on Friday, we [at the chamber] do work-based learning trainings or soft skills development.

While this program has been tremendously successful according to student and employer surveys, its scale and sustainability issues are representative of the challenges facing the Rutherford Works initiative as a whole. The internship program began in 2015 with 20 internship placements, and grew to 39 in 2016 and 54 in 2017. In 2018, there were 42 placements with nearly 300 applicants, and in 2019, there were 43 placements with 185 applicants. By 2019, the Rutherford Works Executive Council included new members: the Executive Director for the area workforce development board and a Rutherford County Commissioner who also chairs the Health and Education Committee. But, according to Duffield, the challenge is “scale and engaging more employers in the work. We have some really committed people, but . . . we've got maybe a quarter of a percent of our companies participating with this.”

In addition to the chamber-sponsored work-based learning experiences, the Rutherford County Schools CTE director, Tyra Pilgrim, led parallel efforts to ensure that each of the nearly dozen high schools in the county had rigorous and fully

sequenced CTE programs of study across key industry sectors. Pilgrim was mentioned by name by multiple employers as an indispensable resource in closely tying high school programs to industry needs.

Mechatronics, an interdisciplinary mechanical and electrical engineering field, was the model program for the county. Mechatronics programs include curricula on robotics, electronics, and control systems and can be applied in diverse fields including healthcare and manufacturing. At several Rutherford County high schools, students could take up to three mechatronics courses that would introduce them to the manufacturing environment and basic engineering principles. Upon the completion of the course sequence, students could sit for the first level of the Siemens Mechatronics Systems Certification. Students matriculating to the mechatronics technology program at Motlow State Community College would be awarded credit thanks to their high school courses. Upon completion of this associate's level program, students could sit for the second level of the Siemens certification. Then, for students choosing to advance their education to a bachelor's degree, Middle Tennessee State University offered a mechatronics engineering degree program that awarded transfer credit for the two-year degree students received at Motlow State and qualified students to sit for the third and final level of the Siemens certification. The opportunity to earn both valued industry credentials and college credit provides multiple portable options for students in these programs. It was the ambition of the other industry councils to develop such clearly articulated programs that were aligned to industry-valued certifications and degrees.

The Upper Cumberland is a largely rural region east of Nashville. According to the state Department of Economic and Community Development, the Upper Cumberland spans a fourteen-county area over 5,090 square miles with 352,282 residents in 2017. In comparison, Rutherford County is 624 square miles, with only a slightly smaller population than the entire Upper Cumberland region. The Upper Cumberland is also both poorer and whiter than Rutherford County, with 95.6% white residents and 20.1% living in households below the poverty line. Its largest city is Cookeville, which sits about 80 miles from Nashville and holds over 70,000 people, a four-year university (Tennessee Technological University), and several community and technical colleges. In and around Cookeville, there are mostly small businesses across industries including manufacturing, retail, healthcare, agriculture, and tourism. A four-county initiative called the Highlands Economic Partnership is the mecca of the education and workforce development efforts in the region. The Highlands was launched out of the Cookeville-Putnam County Chamber of Commerce in 2006 as a public-private program designed to boost the economic development of the region. It is funded by 85 investor organizations, including government agencies and for-profit corporations.^{xiii}

At the start of the Great Recession in 2008, Highlands leaders had focused their energies around separate but related feedback they had been receiving from stakeholders in the region. According to a new employee working in economic development, Lillian Hartgrove, incumbent

employers were concerned about economic development efforts involving the recruitment of new industry, which they feared would exacerbate the shortage of qualified workers in the area:

Every one of those conversations always turned to [the fact that] they can't find the workforce. [They would say,] 'We're struggling to find the workforce, and you all are trying to bring in new industry. What about us? What about us?'

Around this time, the Highlands also received alarming results from a study that had been conducted on the drop-out rate of the local schools.^{xiv} Rather than creating siloes around these issues, the Highlands developed committees to bring educators and employers together to create programming with the goal of building long pipelines from the region's schools to its employers. Early programs included an after-school speaker program in which industry representatives shared their career experiences with students, as well as a "parental engagement" strategy in which committee representatives visited local employers during break times and lunches to share information about the schools and other local initiatives with working parents. Based on a recommendation from the dropout study, the region launched an annual 8th grade career fair in 2010 and began developing career pathways in Advanced Manufacturing and Health Science in 2013. As in Rutherford County, these efforts were viewed as building important connections across the stakeholders but were not yet connected to a larger strategy to truly change the educational experience for students and to solve the area's workforce problems.

When the statewide Tennessee Pathways initiative scanned the state for early work in these areas, Hartgrove's education programs came to their attention. State leaders made an enticing offer: state funds could be used to support Hartgrove's salary for several years if she transitioned from economic development to focus entirely on expanding the education and workforce efforts in the area. Hartgrove and her supervisors at the chamber agreed, and, over the next several years, the Highlands expanded their programs and formalized their governance structure through an education and workforce development steering committee. By 2017, the committees' programs had expanded to include company tours, a 12th grade job fair, an externship for teachers, and a "work-based learning" capstone program that allowed high school students to intern at an employer four days per week, 1.5 hours per day, for a semester. The Highlands continues to analyze regional labor market needs and, by 2019, had developed additional pathways for Information Technology and Education—the latter, to respond to a shortage of teachers in the area.

Hartgrove was not the only notable leader in the county. As a rural and neighborly area, the Upper Cumberland had long had several key players that were well-connected, experienced, and respected in the community. These players, including leaders from the Cookeville Higher Education Center, TCAT-Livingston, the Upper Cumberland Development District, and Tennessee Tech University, coordinated the diverse efforts across these institutions and united them towards a common set of goals.

Because of the region’s early dedication to workforce development, state Department of Education representatives also allocated funds from the state Perkins CTE Reserve (a federal funding source for career technical education) to fund the salaries of a new position for the region’s school districts. These individuals, called academic career coaches, liaised with local employers, managed student work-based learning experiences, and became so valued by the school districts that they succeeded in completely transitioning the funding of these positions to the local district budgets after three years.

The majority of the data in this case study comes from a series of 21 interviews conducted with 16 manufacturing and healthcare employers in Rutherford County

and the Upper Cumberland region of Tennessee in 2016 and 2017. See the box below for descriptive information on these interviews. In general, healthcare employers were large (greater than 500 employees at the establishment), and manufacturing employers included a mix of small and large, with the smallest being a ten-employee shop. Upper Cumberland employers were smaller, on average, than those in Rutherford County, reflecting the rural nature of the area. Employer interviews are supplemented by recorded notes from several committee meetings in each region and additional interviews with chamber of commerce employees and education administrators. To protect the confidentiality of interviewees, the quotes below are labeled only with the interviewees’ position, type of organization, and region.

Data Collection – Employer Interviews				
<i>Region of Establishment</i>				
Upper Cumberland: 6	Rutherford County: 10			N=16
<i>Company Industry</i>				
Manufacturing: 9	Healthcare: 6	Information technology: 1		
<i>Number of Employees in Establishment</i>				
<100: 3	100-500: 5	500-1000: 2	>1000: 5	
<i>Interviewee Position*</i>				
Human resources: 10	Training manager: 3	Operations: 2	Other administration: 4	Technician: 2

*Sums to greater than 16 because some establishments had multiple interviewees

The Pathways Student Experience:

Although the Tennessee devoted energy to these issues statewide, Rutherford County and Upper Cumberland were clearly front

runners and stood out as exemplary regions that translated this political energy to local-level structures and programming. What did participation in a college and career

pathway look like for the average student in one of these regions?

The typical pathways student experience can be understood as a blend of vocational and academic learning beginning in about eighth grade. In Rutherford County, for instance, eighth graders attended a “pathways fair”, during which employers and current high school students and teachers led sessions to describe the opportunities available within each industry concentration available in the high schools. This event preceded the selection of a CTE (career technical education) program of study by all rising freshmen. So, a student interested in science and medicine would choose one of the healthcare programs of study offered by their local high school. The programs of study offered at each high school varied, and this constrained students’ choices somewhat, because, within the healthcare sector, one high school might offer a concentration in nursing, while another school focused on occupational therapy. However, the topics covered in all introductory healthcare programs focused on general industry-wide knowledge, including HIPPA, medical ethics, and anatomy. Many schools also offered extracurricular student organizations like HOSA, a group for future healthcare professionals. Because neither region had separate vocational secondary schools, students took their CTE courses as electives alongside their regular academic courses in comprehensive high schools. Classroom instruction was supplemented by work-based learning experiences including job shadows and field trips to area employers. Students demonstrating aptitude and interest could also apply for internships or healthcare clinicals before their 12th grade year. After the Rutherford County Chamber

of Commerce designed a formal internship program, students participating in these four-week experiences were paid \$10 per hour for 16 hours per week. Organizers in both regions also worked behind the scenes to develop clear connections between these high school programs of study and the degree programs offered by area colleges and universities. They aimed to develop such “articulation agreements” so that degree-granting institutions would award credit for prior courses, degrees, and certifications that students might have completed.

One of the guiding principles for organizers in these regions was that college and career pathways were appropriate and desirable for all students, regardless of their future career goals and academic abilities. Some pathways students continued on to a two- or four-year degree program in a related field, and employers saw early work-based learning experiences as valuable in helping these students determine whether they were truly interested in pursuing a degree in their chosen field. Many, like this VP of human resources from an Upper Cumberland hospital system, had experienced the misgivings of new and unprepared graduates entering their workplaces:

I hate it whenever people get out of school and they come to work and see the environment and say, 'Oh, that's not what I thought it was, and I don't want to do that', and they've wasted four years of their life, and then they go and do something else.
-Human resources, hospital, Upper Cumberland

Other pathways students entered the workforce directly after high school, some with an industry-valued certification and

with college credits that would be applied towards a degree at area colleges if students later enrolled in such a program. Employers also valued working with these students and strongly felt that non-college-going paths could lead to productive and fruitful careers, especially if students received technical instruction and options to sit for industry certifications while in high school:

For instance, a student may say, 'I just want to be a mechanic'. Okay, well, if you come and spend a little bit of time with us, will push you down this pathway of getting the certification, and then you can have a lucrative profession that makes X dollars a year. That's, a lot of times, a lot better than what they would get in a different situation [where they would not be pushed to earn a certification]. We try to let them know that there's careers and not just jobs for folks that don't want to go to college.

-Human resources, automotive parts manufacturer, Rutherford County

Further, because pathways students took a regular course-load of traditional academic subjects, they were not locked in to applying for postsecondary education or employment only in their pathway of choice, as may be the case for students in a traditional vocational education program. Both educators and employers recognized that – through coursework or work-based learning experiences – some students would recognize that they did not want a future career in their chosen pathway. Learning this lesson as early as possible was also a positive outcome of student participation in pathways.

For students, being a pathways participant provided clear benefits. In these programs, they could explore potential careers

through various classroom and work-based experiences, becoming more informed about the type of further education or work experience that they desired and the specific options in the region for pursuing it. And, given that over half of entering college freshmen attending public institutions enroll within about 50 miles of their home,xv the opportunity to earn college credit and have it applied towards a degree at a local institution was valuable. Yet, without a large pool of engaged employers, work-based learning experiences for students and teachers could not be scaled and sustained, and CTE course curricula could not be effectively targeted to employer needs.

Fortunately, employers also stood to benefit from their involvement in the pathways. In both the Upper Cumberland and Rutherford County, employers had been struggling both to find qualified workers and to retain the workers that they already had. Part 2 in this case will explore employer engagement, starting with the general employer role in work-based learning, then turning to the specific workforce challenges faced by employers in the middle Tennessee regions. Across a wide mix of organizations, these employers tied turnover issues to a lack of preparation in the workforce, which motivated them to find better ways to prepare the future workforce for their industries.

PART 2: EXPLAINING EMPLOYER ENGAGEMENT IN PATHWAYS

Economic, Cultural, and Logistical Barriers to Employer Engagement:

Despite a complicated and fraught institutional history in the United States, vocational education has long been argued to be an effective means for students to develop career-related competencies and identities. In vocational training that takes place in the workplace, trainees learn from supervisors and co-workers in a community of practice.^{xvi} This informal style of learning allows learners to continually operate at the edge of their capacity alongside more experienced individuals, which continually increases the learner's skill level. Crucially, this type of learning also allows workers to internalize expectations and assumptions about how to behave in the workplace.^{xvii} Developing competencies and qualifications in the workplace can also aid in the formation of an occupational identity—a sense of one's place in society through belonging to an occupational community of practice. A strong occupational identity is related to a number of outcomes including occupational commitment and satisfaction, which are desirable for individual workers and their employers.^{xviii}

However, in the United States, there are strong economic and cultural arguments against employer participation in student education and training. From the employer perspective, the costs of providing worker training (particularly for general, rather than firm-specific, skills) are not justified without the assurances of a return on that investment. To provide such a return, companies typically offer lower wages to the trainee or do not increase the trainees' wages accordingly after training has been completed. This raises the risk that newly trained workers will take their skills to an

alternate employer where they will be able to capture a higher wage.^{xix} (Though there is some recent evidence that employers investing in training programs are not significantly concerned about this “poaching” effect.^{xx}) These problems are only exacerbated when employers consider providing training to students, who are merely potential future workers, rather than to their incumbent workforce.

Further, widely-accepted cultural expectations have resulted in siloed practices, as Americans “make a sharp distinction between ‘education’ as a task of the communities and ‘training the workforce’ as a task of the enterprises”.^{xxi} From the perspective of some educators and policymakers, the purpose of public education is to produce a well-rounded citizen equipped with knowledge of the liberal arts. In contrast to most other developed countries, vocational education in the United States has only reached a minority of secondary students. And there is a dominant view, supported by the favorable treatment of capital investments over workforce investments, that employers are suited to provide any necessary firm- or job-specific training but that they should not invest in more training than necessary.

The employer communities in the Tennessee regions were no strangers to these challenges. Before the career pathways initiatives, some employers had participated in smaller scale work-based learning programs, where they encountered some of these issues. For instance, in Rutherford County, healthcare employers had occasionally offered job shadowing to students, but these programs were not popular with managers (or students)

because they were not supported by related instruction from the school system, and they placed a large burden on employers.

-Human resources, medical clinic, Rutherford County

We had teachers all the time, or parents, that were wanting their children to come shadow in the summer to see if they want to be a doctor, to see if they want to be a nurse. And if the child is not interested, and if they have no medical background, it's a chore getting them in, getting them trained, getting the HIPAA done and the OSHA done, and the dress code... Yeah, we did not have a great experience doing that before.

Clearly, even for employers that were inclined to partner with the school system, participating in poorly managed work-based learning programs could prove too difficult to sustain. Leaders seeking to improve education and workforce development efforts faced significant logistical barriers, only several of which are highlighted in the box below.

Barriers to Implementation and Scale	
<i>Barrier</i>	<i>Example</i>
Employer liability	There's not enough paper to make that stuff go away, so you just have to decide it's worth doing. -Administrator, industrial machinery manufacturer, Upper Cumberland
Scalability	We are one of 11 hospitals in our system, and we are the only one that takes [students at] the high school level. -Human resources, hospital, Rutherford County
Communication	It's like they're speaking two different languages. There's a lot of acronyms, especially in healthcare. It's 'industry speak'. Education has it too. Education [representatives] will start talking about grants, about initiatives, and the industry folks don't know what they're talking about. -Human resources, assisted living, Rutherford County
Time	From an industry perspective, you know that training and education is important, but you have no time for that . . . For every minute that I sat [in committee meetings], my [production] system had to make a car . . . So don't think that you're not sitting there [with your mind] spinning: Did I make it? Did I make it? -Former administrator, automotive manufacturer, Upper Cumberland

However, some employers in Rutherford County and the Upper Cumberland did direct considerable energy to provide internships and job shadowing opportunities for students, and they contributed personal time towards career fairs, speakers programs, and committee

meetings. Learning from the dozens of employers that were early champions of the efforts in their regions can provide lessons for those interested in building regional ecosystems of college and career pathways. Their experiences can also help us understand why deficiencies in

occupational identity formation during a student’s early experiences—which occurs when students, like the majority of secondary students in the United States, are not exposed to career-related education opportunities—might translate into an ill-prepared workforce and increased turnover. We turn to this this second lesson in the next section, which describes how high turnover and an ill-prepared workforce were employers’ main motivations for participating in the college and career pathways programs.

Workforce development programs, including most vocational education programs, tend to be concerned with training individuals so they acquire job-related skills and then connecting these individuals with open positions. Some programs also attempt to influence job quality and build career ladders by forming long-term relationships with employers. This dual role in managing both sides of the labor market is complex, and it is worth considering what each side of the labor market considers requisite to build and maintain the employment relationship.

It is clear that employers want employees with the right knowledge, skills, and abilities to perform effectively in the job. When the system works well, employer skill requirements guide some of the content and objectives of education and training programs. But, workers also need to have the right set of expectations and motivations to find the employer, apply for the job, and be committed enough to continue coming to work every day. It is this career development process that is often ignored both in workforce development programs and in the

traditional education environment writ large. Neither employers nor educators currently dedicate adequate resources toward exposing individuals to a set of occupations, processing their experiences, developing their preferences, and helping them align those preferences to appropriate organizations and occupations. When these priorities are neglected, young people are left afloat, fending for themselves in fragmented and complex labor markets, with many having substantial difficulty finding well-paying jobs, let alone crafting careers.

The employer role in the career development of its future workforce is an important one. While classroom learning can provide a base level of workplace skills, on-the-job or experiential learning gives students granular and tacit experiences that help them learn whether they prefer working in individuals or teams, in formal or casual settings, in project-based work or individual initiative, in “hands on” settings or in offices, and so on. Employers have some self-interest in taking on this role, since many employers—including those providing middle- and high-skilled work—are facing high turnover. The loss of experienced or skilled workers through high turnover can be a major problem for companies, multiplying downtime and costs, particularly given increasingly complex industrial and service sector processes and growing requirements for information technology capabilities.

Tennessee employers discovered firsthand what happens when workers do not have the opportunity to develop such informed preferences. When asked about their workforce needs, across industries and for multiple occupations, the Tennessee

employers constructed narratives about why workers might find a given occupation undesirable. These narratives helped employers justify why certain positions

experienced high turnover and why it was difficult to develop and attract qualified workers for these positions. These narratives are explored in the box below.

Narratives on Job Conditions and Turnover		
<i>Occupation/ Position</i>	<i>Reason for Turnover</i>	<i>Example</i>
<i>Healthcare</i>		
Nurse (RN)	Stresses related to direct patient care	<p>One issue that we're having now – the RNs, especially the ICU [intensive care unit] RNs want to go back and get their nurse practitioner['s license]. So, you train them for two years and then they go get their master's, and they leave and they go do a different type of work. Retaining people [who don't want] to go ahead and get that next level degree is an issue that we're having.</p> <p>-Human resources, hospital, Upper Cumberland</p> <p>The other thing that we find is that nurses might be in nursing six months and they immediately go back to school to get their master's degree . . . because they're going to go teach, they're going to go do [something else], and they don't want to be actively involved in patient care.</p> <p>-Training manager, hospital, Rutherford County</p>
Phlebotomist	Discomfort from inflicting harm	<p>The phlebotomist position is just one of those that has a high rate of turnover. Students migrate towards that because they can be on-the-job trained, but it is an extremely tough job when you're actually inflicting pain on a patient. So unless you've got some real mature students that come in to accept that job, they're going to leave.</p> <p>-Human resources, hospital, Rutherford County</p>
Long-term senior care	Emotional and physical toll	<p>Right now, turnover's an issue. When you get into senior care, . . . it's the most physically and emotionally demanding care that's out there . . . In long-term care, patients are around for a while, there are family members there... To work in that kind of environment takes someone who really loves what they're doing . . . It's not exceptionally high paying, and one of our big challenges is finding the right people who are comfortable in that environment.</p> <p>-Human resources, assisted living, Rutherford County</p>
Hospice care	Discomfort with end-of-life	<p>There's no class on how to tell somebody they're dying . . . It's always been almost a taboo to think that a 16 or 17-year-old kid would even be interested or even think about a career path in end-of-life [care].</p> <p>-Administrator, medical clinic and hospice care, Rutherford County</p>

Patient care technician	Physical requirements related to patient care	We find that a lot of people are coming to us and saying they want to apply for a nursing care technician, and they get here and they don't really know what they had applied for . . . [They] were getting here, and they would spend about a week, and they would think, 'Uh uh, this isn't for me. I'm lifting patients that are very heavy...' And the turnover was just horrendous. -Administrator, hospital, Rutherford County
<i>Manufacturing</i>		
Machine operator	Repetition and monotony	There are several [new hires] that we bring in, and they're very excited and very enthusiastic. We're like, okay, all right, this is going to be a good person. And they get out on the floor and realize what they got themselves into. By the first break, they're gone. They won't stay. I would bet if you ask every other company to be honest about it, they would have the same problem. -Training manager, consumer products manufacturer, Rutherford County We have quite a bit of turnover . . . It's not a glamorous job, so we normally just use internet recruiting sources . . . That's not to say I don't need a qualified person, but . . . sometimes the repetitiveness may get to that individual . . . It's not just the technical skills, but that overall approach to the job. -Human resources, plastics and rubber manufacturer, Rutherford County

Healthcare employers in particular sought to justify why the unique conditions of different types of care environments might be causing the turnover they experienced. From nurses that endured undesirable schedules and tough patient interactions to phlebotomists whose jobs required constantly inflicting pain on patients, each occupation's challenges were thought to present a barrier to retaining qualified workers.

Yet the variety of these examples shows that employers could construct a narrative around undesirable job conditions for virtually any middle-skills occupation. Because this issue spanned industries and occupations, some employers began to

recognize that the problem was not necessarily with the jobs themselves, or with the workforce. After all, employers agreed that any of these jobs could provide a meaningful vocation with opportunities for advancement for the right type of person. The issue was, any of these jobs could also be a poor fit for an individual's skills and preferences.

Some employers sought to remedy this issue by providing better onboarding for new workers, as in these two examples:

We have started a kind of residency program [for patient care technicians and] nurses. Because even nurses were coming out of training, and they had the book knowledge

but not the practical and the critical thinking skills.

-Administrator, hospital, Rutherford County

What we're trying to do is build a better onboarding program . . . [and] we started doing soft skills training.

-Training manager, consumer products manufacturer, Rutherford County

However, employers also recognized that their future workers had limited opportunities to develop a set of reasonable expectations about the working world within a given occupation, meaning that action needed to be taken earlier in the educational process. This was described by the nursing training manager at one hospital:

What I found, probably over the past 10 years in healthcare, is, many times, for students that are lacking a clear sense of direction when they go into college, . . . healthcare is thrown out there is a very viable option. Nursing in particular is a very viable option because . . . you really do have a lot of career opportunities within nursing. However, I think many times people have been guided that way, and they had really no idea what that meant at their core.

-Training manager, hospital, Rutherford County

These employers recognized that an extended process of career exposure would help their workers gradually socialize to the job and the organization. This was particularly important in a strong economy, where workers “chased quarters”, leaving for a similar position in a company paying a slightly higher wage, or where new workers left after only one day on the job, saying the job “wasn’t what they thought it was”.

Part 3 in this case will highlight how stakeholders in Rutherford County and the Upper Cumberland were able to make inroads in combatting the economic, cultural, and logistical barriers to employer engagement. Their relative success rested on two key features of the programs. The modularity of the content and experiences offered to students helped develop both career-related skills and occupational identities. And, the networked structure of these regional pathways ecosystems distributed the responsibility for building these skills and expectations across a set of stakeholders and organizations. In these regions, it truly did take a village to raise “college and career ready” students.

PART 3: IMPLEMENTATION OF COLLEGE AND CAREER PATHWAYS

Modularity in Content: Modularity is a concept that has been used to describe the design of systems as diverse as computer software packages and metabolic pathways. It broadly refers to the degree to which system components may be separated and recombined into different configurations. The benefit of modularity, as opposed to hierarchy, is in the resulting flexibility and resilience of the overall system. The college and career pathways programs of these Tennessee regions were designed with modularity in mind, as becomes clear when these programs are contrasted with other models for academic and vocational education in the United States.

The traditional (though often mythical) secondary education model in the United States is one in which students attend academic courses in high school, transition to college to focus their education in a particular discipline, and enter the workforce after completing a degree. In this sense, the traditional model is standardized across the majority of public schools in the United States. The drawbacks of this model include its limited career advising and exploration options for students to apply learned content and develop an occupational identity, as well as the lack of appealing alternatives for students who do not attend a four-year college. In contrast, the typical vocational education model, including apprenticeship, is highly customized, with the majority of an individual's training being supplied by a particular supervisor at a unique workplace. While this model can produce skilled and productive worker, it can fail to instill the ability of workers to continually learn and adapt, which is particularly important in fast-changing economic conditions.

As opposed to being largely standardized or customized, pathways programs offered modular components to students that could be flexibly combined based on student interests and goals.^{xxii} The school districts in both Tennessee regions encouraged every student to choose a pathway before 9th grade. Some students closely followed the traditional education model, choosing a pathway in business or computer science and taking a few related elective courses on top of their traditional academics but not pursuing their pathway beyond the walls of their school. Other students immersed themselves in their pathway more deeply by pursuing multiple work-based learning experiences, including internships. After

high school, pathways offered multiple options to students, since each pathway was associated with a variety of technical college, community college, and university programs, as well as industry certifications that allowed students to directly enter the workforce after high school. Further, some affiliated employers offered apprenticeships to supplement the work-based learning programming offered by the school district. This modularity meant that pathways instilled a variety of knowledge, skills, and abilities in students, and the relative exposure to each type of skill could be tailored to a student's ability and interests. These knowledge, skills, and abilities were continually reinforced by experiences that encouraged students to develop nascent occupational identities. And, by earning college credit and industry certifications through coursework and work-based learning experiences, students would have a head start if they chose to advance their education later on.

When participating in varying combinations of experiences during a pathways program, students learned a set of knowledge, skills, and abilities that were continually reinforced and extended. Crucially, both schools and employers exposed students to industry-related knowledge. Schools introduced students to relevant policies and safety processes for their chosen industry, like HIPPA and OSHA policies for healthcare students. Employers then built on this knowledge by showing students how it was applied in the workplace, as this hospital HR manager did:

It's been a real eye-opener. These kids come to you with four years already of healthcare experience. They've had HIPPA and OSHA, medical ethics – very impressive young people

. . . Even though we do HIPAA and OSHA when they come to us, there is nothing like having it year after year after year and it being enforced by their teachers. . . It's just amazing how much they already know. I had a little bit of difficulty getting the managers to agree to take high school students, because in the past, it was almost like babysitting. But . . . they love having the students, so it's been a good thing for us.

-Human resources, medical clinic, Rutherford County

Schools also introduced students to basic technical skills that allowed them to more quickly immerse themselves in a work-based learning experience. Having students with basic knowledge and expectations was valuable to this manufacturer, who supervised work-based learning students at her shop:

They've been in a machine shop class environment, so they can read a blueprint, they can use a set of calipers. They have an idea of what they're going to be getting here.

-Technician, precision metalworking manufacturer, Upper Cumberland

While classroom exposure to technical skills training was important for employers, they recognized that the classroom environment was limited in the technical training it could provide to students, and employers understood their role in concretizing students' technical knowledge. Employers, like this operations manager, understood that classroom and work-based experiences built on one another:

It's different than working on a Siemens trainer [in shop class] and actually going to do it [on the shop floor]. To see that same cylinder working on the line making an actual product that they use or their mom uses, it's like, 'Wow, this [training] is really going to

benefit me someday'. The look on their faces is pretty amazing.

-Operations manager, consumer products manufacturer, Rutherford County

Employers also appreciated the integration of traditional academics that offered students valuable critical thinking and problem-solving skills, as well as basic math and reading. These skills were only becoming more important in the workplace, even for entry-level workers in this manufacturing firm:

Just the math, the reading, the level of communication, the ability to be cross-functional—that's been more evident now versus in the past. I think it's just the changing needs of our customer, primarily, and our desire to expand our product offerings. It requires more versatility. If you can only do one thing, that limits both that individual and us.

-Human resources, plastics and rubber manufacturer, Rutherford County

As we have seen, however, accumulating academic, technical, and soft skills does not necessarily result in a well-prepared worker. Students also needed to personally experience the ways that their skills translated to the work environment and to understand the daily challenges and rewards of a given occupation and workplace. The variety of work-based learning experiences offered by employers, including job shadows, field trips, and internships, allowed students to appreciate these elements of actually working in a job in their chosen pathway. These experiences provided the basis for developing an occupational identity in their fields. Some employers spoke at length about the importance of students fully experiencing

how much persistence was required to succeed on the job:

Guess what? In nursing, you don't get trophies. I'm really honest with [students] in that I say, 'You're going to have to come in, and there are going to be days in nursing where you're going to have to give 110% of yourself. And you're going to walk out at the end of the day sucked bone dry of every bit of compassion, every bit of care, every bit of kindness that you feel like you have. And guess what? Tomorrow, you have to come back and be prepared to give 110% again. And understand at the end of the day, there may or may not be somebody that comes up and pats you on the shoulder and says you did a great job today. Most days you're going to leave and you just have to be satisfied with the fact that you did a good job.'

-Training manager, hospital, Rutherford County

Sometimes, work-based learning experiences revealed to students that they had chosen the right sector but the wrong occupation. For hospitals that brought students to multiple departments and functions, this happened frequently:

I can't tell you how many times I've sat there and they told me they want to be an ER [emergency room] nurse, and they spend a week in the ER, and they're like, 'Oh gosh, I don't want to do this'. Or they thought they wanted to [be a nurse], but they had no idea what people in the lab do, and it's actually something that really interests them, and now they're going to look into becoming a medical lab technician.

-Human resources, hospital, Rutherford County

In receiving the opportunity to explore multiple occupations in a given industry, students were saved from dedicating additional years of education to an unsuitable occupation that might have

otherwise led to an unsatisfactory experience that could quickly drive the student out of the industry altogether. Instead, students were able to build on the technical knowledge they had gained but tweaked their career plans to focus on a different area of the industry. The modularity of pathways programs allowed for this flexible recombination of course and experiences and for sounder career-related decision-making.

In summary, Tennessee's college and career pathways provided modular content, with technical and academic content offered across a series of course and experiences, including classroom learning and work-based learning. In particular, CTE courses in the high schools exposed students to basic technical and occupational skills, as well as to industry-related knowledge and soft skills. Employers, in turn, provided work-based learning experiences that developed applied technical knowledge and nascent occupational identities in students. Modularity allowed the programs to be personalized to students with different interests, commitments, and abilities, rather than being targeted to a particular group (non-college-going students, for instance), and it allowed students to change their pathway if they so desired.

Networked Structure of Content Delivery: Pathways programs in the Upper Cumberland and Rutherford County delivered modular content in a networked system across employers and educators, with area chambers of commerce acting as central nodes of these networks. This content delivery structure distributed the responsibility for building student skills and identities across a set of stakeholders and

organizations. It also allowed for continual improvement of the programs.

Again, it is useful to place this model in contrast with the standard academic model and the standard vocational model of education in the United States. In the traditional public education model that focuses on academic content delivery, content is singularly delivered by the education system. It is not unusual for a public-school student in this model to spend nearly all instructional time within the walls of a school building, and classroom teachers and their supervisors are viewed as having supreme responsibility over the delivery of academic content (so long as the content meets state accountability requirements). The drawbacks of this delivery model are that classroom learning can be divorced from the skills and competencies that employers need, and students do not develop an occupational identity through repeated work-based learning experiences. It is also particularly difficult to continually update classroom content to new technologies and business models used in the workplace. In contrast, the vocational model is distributed. When there is on-the-job instruction through apprenticeship-style learning, the student receives personalized and informal instruction from supervisors and co-workers on the job. Each apprentice therefore receives a different experience as directed by their unique employer. In some vocational models, on-the-job learning is supplemented, or replaced entirely, by classroom-based technical skills instruction. In these classrooms, vocational education is generally focused on technical skills and delivered in a hands-on manner. One drawback of this model can be that content and learning objectives are not tightly

coupled across the classroom and the workplace. In addition, academic content and critical thinking skills may be inadequately incorporated into the student workplace experience, so work and academic learning are not mutually reinforcing.

In contrast to these two models, pathways programs in Tennessee were delivered across networks of educators and employers, intermediated by chambers of commerce programs (Rutherford Works and the Highlands Economic Partnership) that sat in the center of these educator-employer networks. The chambers created spaces for conversation between educators and employers, as well as across employers of different industries. They also provided resources to reduce the burden of participation for both schools and employers. In Rutherford County, the chamber managed the human resources function for the high school internship program, providing the \$10/hour wage and alleviating some employer concerns over liability. In the Upper Cumberland, geographically a much larger region, the multi-county chamber initiated the hiring of academic career coaches who managed employer-educator relationships within their individual counties. This networked structure distributed the costs of training and education, since all stakeholders shared the responsibility of delivering both technical and academic skills. It also resulted in the improvement of content delivery over time.

Connected and supported by the chambers of commerce, educator and employer partnerships flourished in a way they had not before. Schools offering CTE programs had long had employer advisory boards

(indeed, these boards were required for districts to receive federal CTE funds), but the boards had too-often been missed opportunities for fruitful conversations about the types of skills and competencies employers needed. As more employers participated in offering work-based learning experiences as part of the career pathways, these board meetings became more useful for both sides, as an educator described:

I think [our CTE director] could say this too – that our advisory board meetings were better because of [the work-based learning programs]. I believe because [employers] knew more about what was going on at the high school, they had a little more input at the meetings. They felt more comfortable speaking aloud by saying, ‘The student I had was doing amazing in this, but what do y’all think about showing them how to do this right here?’ I think I just brought more conversation from them.

-Administrator, secondary school district, Upper Cumberland

As work-based learning experiences became integrated into a more structured educational system that supported career exploration, employers became valuable sources of advice on classroom instruction outside of their typical advisory board involvement. For instance, this HR manager used his increased communication with teachers to push for team-based instruction in the classroom:

We’ve made a push . . . for [the schools to include] project work and working in teams, because the one thing I think I can assure you of is, when you go to work in your life, you are going to have to work with somebody. You’re going to have to work in a group, you’re going to have to work in a team . . . So hopefully that filters into the classroom.

-Human resources, automotive parts manufacturer, Upper Cumberland

In some cases, employers favored partnerships with particular schools and provided resources to improve the schools’ programs. One manufacturer had a particularly close relationship with one of the three high schools that offered the mechatronics program:

[X high school] is the only high school I recruit from . . . We paid for the instructor to get his Siemens training certification, and it also boils down to the [training equipment] they have in the schools. [A different school] has a tabletop trainer, but [this school has technology that actually] looks like our production line.

-Operations manager, consumer products manufacturer, Rutherford County

Therefore, as employer-educator relationships improved, so too did the quality and relevance of classroom education. And, as classroom education improved, employers responded by investing more in their own training programs. This created a positive feedback loop of increasing investment in training and education within the regions, as the two following examples demonstrate.

In Rutherford County, one assisted and independent living facility modified their long-running certified nursing assistant (CNA) certification program so that high school students could take the program over the winter holiday break:

We didn’t necessarily look at it as though our company would profit from 50 something new CNAs . . . If we can find some folks, that’s great for us, but the big thing is getting folks into healthcare. It will benefit us one way or the other – whether it’s, right now we have workers who can work for us, or it’s that many more people pursuing healthcare

careers so it won't be such a challenge finding folks down the road.

-Human resources, assisted living, Rutherford County

And, a German-owned manufacturing company developed an apprenticeship program that relied heavily on the classroom training provided by the local secondary and postsecondary schools. This reduced the costs of operating the apprenticeship program, according to the operations manager that designed it:

I was asked to create an apprenticeship program here like they had at our parent company in Germany. When I looked at their curriculum, and I compared the mechatronics training [to our high schools and community colleges], they were getting the same technical training. I said, 'Why should I spend the money to invest in an instructor and the space [here in our shop]?' I want my floor space making money, not training people. So, I'll train them on my production line and let someone else do the technical [classroom] training.

-Operations manager, consumer products manufacturer, Rutherford County

In summary, Tennessee's college and career pathways relied on a networked content delivery structure, in which technical skills and workplace competencies were delivered in classrooms and through progressively more immersive work-based learning experiences by employers, and academic content was delivered in traditional classroom facilities. This distributed the costs of training and education across stakeholders and facilitated interactions that improved content delivery over time.

The benefits of modularity and networks are contrasted with the features of traditional academic and vocational models as summarized in the box below. (The traditional models are presented as stylized and simplified models with the recognition that much variation exists within each one.)

Content and Content Delivery Characteristics of Education and Training Models			
	<i>Traditional Academic Model</i>	<i>Traditional Vocational Model</i>	<i>Pathways Model</i>
Content	Standardized	Customized	Modular
	Definition: Secondary students take a series of core academic courses including mathematics, science, English, and social studies, supplemented by electives and extracurricular experiences. Courses are narrowed to disciplines of interest in postsecondary education.	Definition: Technical learning content is determined by the nature of the industry and occupation chosen by the student. While basic skills may be standardized within occupations, more advanced learning is customized to a particular workplace.	Definition: Technical and academic content is offered across a series of course and experiences, including classroom learning and work-based learning; includes continuous exposure to core academic content
	Drawbacks: Limited career advising and exploration	Drawbacks: Difficult to integrating abstract critical thinking and problem-solving skills that can be ported	Benefits: Can be combined in personalized ways depending on student interest and career goals; includes preparation for multiple

	options to apply learned content and develop an occupational identity	across workplaces and as job conditions change over a worker's career	postsecondary options and promotes lifelong learning
<i>Content delivery</i>	Singular	Distributed	Networked
	Definition: Content delivery is the responsibility of classroom teachers, and instruction largely takes place in traditional classroom facilities	Definition: Content delivered in the workplace is the responsibility of work supervisors and co-workers; on-the-job learning can be supplemented by technical skills instruction delivered in classrooms	Definition: Technical skills and workplace competencies are delivered in classrooms and through progressively more immersive work-based learning experiences by employers; academic content is delivered in traditional classroom facilities
	Drawbacks: Classroom learning can be divorced from skills and competencies needed in the workplace; difficulty updating course content to reflect changes in necessary skills and knowledge	Drawbacks: Content delivered on-the-job and in the classroom is not tightly coupled; academic content can be inadequately incorporated into the student experience	Benefits: Distributes the costs of training and education across stakeholders; facilitates interactions that can improve content delivery over time

CONCLUSION

With statewide efforts to improve education and workforce development beginning in 2012, regional stakeholders in Rutherford County and the Upper Cumberland worked relentlessly to improve outcomes for students, workers, and local economies. In these types of educator-employer partnerships, employer engagement is a consistent struggle. Stakeholders in these two regions have persisted through this struggle for years, continually striving to improve and scale the programs. By 2017, each had enlisted between 70 and 80 employers who hosted students and teachers on company tours and job shadows, offered work-based learning and clinical placements to high school and college students, and devoted their time to industry committees to better connect postsecondary programs and

industry needs. We have seen that employers were largely motivated to participate because of turnover that they perceived as being caused by a poor fit between employees' expectations and the actual conditions on the job. They believed something needed to change in the way students were prepared for the working world. One nursing training manager summarized this view:

I'm going to take you back almost 40 years to when I did my clinicals. I was in a classroom for six weeks learning fundamentals, and then our clinicals were three days a week, eight hours a day. And we took care of patients. When I got out of nursing school, there was no real shock and awe . . . Over the years, nursing has changed to where there is been more focus on academia, more focus on passing exams. I think nursing schools have conformed to guidelines and structures that they've been given, but unfortunately, [it's] at the cost of clinical

time, time spent at the bedside with patients, and I think that that has contributed quite a bit to the initial dissatisfaction in nursing that [graduates] feel when they get out . . . I think what we need to do within nursing education is a concerted move back towards giving these people more time at the bedside, . . . even if that means extending the programs for another six months or whatever. Because I think until we do that, until we let these students see what real nursing is, it's going to continue to be like this.
-Training manager, hospital, Rutherford County

While college and career pathways would not solve these problems entirely, employers found it worthwhile and feasible to participate due to two main features in the programs' design. First, modular content allowed the programs to be personalized to students with different interests, commitments, and abilities, rather than being targeted to a particular group (non-college-going students, for instance). Participating in an intentionally connected sequence of courses and work-based learning experiences instilled a variety of knowledge, skills, and abilities in students, and the relative exposure to each type of skill could be tailored to a student's ability and interests. Because these experiences were not entirely customized to each individual learner, they could also be delivered at a greater scale. Second, the networked structure of these programs—employer-educator partnerships connected by chambers of commerce—distributed the costs of these programs over multiple stakeholders. It also created a positive feedback loop whereby program content and structure were improved over time as networks were strengthened and expanded. These two features allowed a regional ecosystem to develop that

provided students with both knowledge, skills, and abilities, as well as experiences that facilitated the creation of nascent occupational identities in students.

While this case aimed to describe the implementation process of the pathways programs and explore the motivation of the employers who participated in them, it will be important to quantify the impact of these programs. It is also worth noting that the employers featured here are the “first adopters” of the college and career pathways model in their regions. These first adopters may have both challenges and advantages that are not representative of their business communities as a whole. They may also offer higher quality jobs and advancement opportunities than other employers. This could require chamber of commerce leaders to subtly shift their goal to one of improving the workforce practices of employers that become involved in career pathways efforts, as employer involvement scales.

A rigorous evaluation of this model will require studying each of the stages of the student experience and asking whether these programs improve postsecondary matriculation and graduation rates, ease the transition from school to work, and ultimately contribute to a reduction in turnover for employers and result in good jobs for workers over the long run. It would also require parsing the results to investigate for which employers and for which students the effects are strongest. The state of Tennessee is collecting longitudinal education and employment data, including postsecondary matriculation and graduation rates, as well as the percent of students employed in high-skill, high-demand sectors within six and twelve

months of high school graduation, to assess some of these stages. Determining the impact of college and career pathways on employer turnover and other workforce outcomes will be more challenging and will likely require an external evaluation. However, the arguments for better integrating academic and technical

education have now been well-developed and supported. The experiences of Rutherford County and Upper Cumberland regions, supported by a strong state policy environment, can provide valuable lessons for those wishing accomplish this goal by building regional systems of college and career pathways.

ⁱ King, C., & Prince, H. (2015). Moving sectoral and career pathway programs from promise to scale. *Transforming US Workforce Development Policies for the 21st Century*, 195-229.

ⁱⁱ Hoffman and Schwartz chapter, forthcoming

ⁱⁱⁱ <http://driveto55.org/tennessee-promises-free-college-to-all-high-school-graduates/>

^{iv} <https://www.census.gov/content/dam/Census/library/publications/2016/demo/p20-578.pdf>

^v <https://www.tn.gov/content/dam/tn/thec/bureau/research/promise/TN%20Promise%20Report%20-%202018%20-%20Final.pdf>

^{vi} <https://tcf.org/content/report/future-statewide-college-promise-programs/>

^{vii} <http://www.tntransferpathway.org/>

^{viii} Tennessee Department of Education data provided to the author

^{ix} https://jfforg-prod-prime.s3.amazonaws.com/media/documents/Tennessee-Case-Study_v5a_012918.pdf

^x <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

^{xi} <https://tnced.com/county-profiles/>

^{xii} <https://www.rutherfordworks.com/building-tomorrow-s-workforce/about-workforce-development>

^{xiii} <https://highlandsoftn.com/who-we-are>

^{xiv} Reaching Higher. Highlands Initiative Workforce Development Study: Improving High School Graduation Rates Among At-Risk Students. 2008.

^{xv} Eagan, Kevin, Ella Bara Stolzenberg, Joseph J. Ramirez, Melissa C. Aragon, Maria Ramirez Suchard, and Sylvia Hurtado. 2014. *The American Freshman: National Norms Fall 2014*. Los Angeles: Higher Education Research Institute.

^{xvi} Brown, J., & Duguid, P. (2000). Organizational learning and communities of practice: Toward a unified view of working, learning, and innovation. In *Knowledge and communities* (pp. 99-121).

^{xvii} Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of management Journal*, 53(6), 1419-1440.

^{xviii} Brown, A., Kirpal, S. R., & Rauner, F. (Eds.). (2007). *Identities at work* (Vol. 5). Springer Science & Business Media.

^{xix} Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of political economy*, 70(5, Part 2), 9-49.

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^{xx} *Ibid.*

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^{xxi} Lerman, R. I., & Rauner, F. (2012). Apprenticeship in the United States. In *Work and Education in America* (pp. 175-193). Springer, Dordrecht. (quote from pg. 181)

^{xxii} Poppe, N., Strawn, J., & Martinson, K. (2003). Whose job is it? Creating opportunities for advancement. *Workforce Intermediaries in 21st Century*, 41-50.