Beginning with the End in Mind: A Career Pathways Playbook for CTE Leaders

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INTRODUCTION

Career Pathways Systems and CTE

Career and technical education (CTE) has led many initiatives in programs of study (POS) and career pathways; now The U.S. Department of Education (ED), Office of Career, Technical, and Adult Education (OCTAE), Division of Academic and Technical Education's (DATE) new initiative, *Advancing Career Pathways Systems*, aims to encourage CTE leaders to look beyond POSs and career pathways into broader career pathways **system** development at the state, tribal, and local levels by capitalizing on models and tools from previous career pathways investments.

In April 2012, three federal agencies signed a joint letter[1] describing their mutual commitment to "the use of career pathways approaches as a promising strategy to help adults acquire marketable skills and industry-recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers." In April 2016, twelve federal agencies signed the most recent iteration of that letter,[2] signaling an increasing commitment to working together across agencies. The letter defines the goal of the effort as being "to promote the use of career pathways to assist youth and adults with acquiring marketable skills and industry-recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers." Federal attention has moved from POS codified in the Carl D. Perkins Act of 2006 to career pathways codified in the Workforce Innovation and Opportunity Act of 2014 (WIOA) and now to career pathways systems. Each of these concepts shares similarities, but each also has its differences.

Advance CTE and ED have developed crosswalks aligning CTE POS with career pathways, to show how a comprehensive career pathways system promotes the development of structured pathways into and through postsecondary education. As CTE leaders look forward from POSs, they will notice that many of the program components they have in place correspond to the components (elements) of career pathways and transfer into career pathways systems.

[1] Dann-Messier, Brenda, Jane Oates & George Sheldon. 2012. *Joint Commitment Letter From U.S. Departments of Education, Health and Human Services, and Labor*. http://cte.ed.gov/docs/RPOS_2012/Joint_Letter_Career_Pathways.pdf.

[2] https://s3.amazonaws.com/PCRN/docs/15-0675.CareerPathwaysJointLetterFinal-4-22-2016.pdf

FROM ADVANCING CTE

Career Pathways Six Key Elements	Programs of Study Ten Essential Components
1) Build Cross-Agency Partnerships 2) Identify Industry Sectors and Engage Employers 3) Design Education and Training Programs 4) Align Policies and Programs 5) Identify Funding Needs and Strategies 6) Measure System Change and Performance	1) Legislation and Policies 2) Partnerships 3) Professional Development 4) Accountability and Evaluation Systems 5) College and Career Readiness Standards 6) Course Sequences 7) Credit Transfer Agreements 8) Guidance, Counseling, Academic Advisement 9) Teaching and Learning Strategies 10) Technical Skills Assessment

Career Pathways: Six Key Elements	Programs of Study: Ten Components	Common Features
1. Build Cross-Agency Partnerships	#2: Partnerships	• Cross-agency partnerships include education, business, workforce, economic development, and community stakeholders • Common vision and goals • Clearly delineated and agreed upon roles/responsibilities for all partners
2. Identify Industry Sectors and Engage Employers	#2: Partnerships #10: Technical Skills Assessment	• Both career pathways and POS frameworks stress the analysis and validation of economic and workforce trends, and adaptation of pathways accordingly
3. Design Education and Training Programs	#5: College and Career Readiness Standards #6: Course Sequences #7: Credit Transfer Agreements #8: Guidance Counseling and Academic Advising #9: Teaching and Learning Strategies #10: Technical Skills Assessment #3: Professional Development	• Clear, non-duplicative sequences of course • Opportunities to earn college credit leading to industry-recognized, postsecondary credentials • Credit transfer / articulation agreements • Counseling, including career planning and academic advisement • Support services, especially in career pathways • Contextualization and modularization of curricula, and mapping of pathways • Integrated instruction of academic and technical content, acceleration (dual enrollment in POS; co-enrollment in career pathways) • Instructional strategies that instill work readiness skills
4. Align Programs and Policies	#1: Legislation and Policies #3: Professional Development (policy implications)	• Emphasis on the role of federal, state, and local policies in promoting and sustaining career pathways and POSs; and in helping students access career pathways and POSs services
5. Identify Funding Needs and Strategies	#1: Legislation and Policies	• Braided or integrated funding from multiple funding sources to provide sufficient resources and sustain programs • Importance of funding to support professional development and other system development activities
6. Measure Systems Change and Performance	#4: Accountability and Evaluation Systems #10: Technical Skills Assessment	• Importance of defining outcomes/measuring progress • Processes for collecting, storing, analyzing, and sharing data are encouraged in both career pathways and POS frameworks

Source: ADVANCING CTE IN CAREER PATHWAYS SYSTEMS - INTEGRATED MODEL (JFF)

These trends present CTE with increased opportunities to partner with industry and strengthen CTE's ability to impact the strategies that will produce students with the knowledge, skills, and abilities necessary to compete in the workforce. Stronger partnerships with industry offer mechanisms to open a wider channel for keeping the technical skills components of CTE

programs updated; open more markets for work-based learning; open more doors for industry funding, in-kind donations, and other contributions; and spotlight the important role CTE plays in the economy by filling the workforce pipeline with highly skilled candidates.

CTE is experiencing a renaissance, and its leaders can rebrand CTE to define it as a platform for preparing students to be both college and career ready. *Beginning with the End in Mind: A Career Pathways Playbook for CTE Leaders* is a practical tool for CTE leaders who see an opportunity to take the next steps in the evolution of their state's CTE through the development and implementation of effective career pathways systems. This requires expanding CTE's view beyond POSs and career pathways, to developing a **system** in which a wide range of partners provide connected and supportive services that contribute to the success of both students and industry.

> "We must step out of our individual comfort zones and work together on behalf of our students" to create an education and training system at the intersection of secondary, postsecondary, workforce, and industry (p. 3).
>
> Council of Chief State School Officers (CCSSO). (2014). *Opportunities and options: Making career preparation work for students*. Washington DC.

Career Pathways System Development: Begin with the End in Mind

Strategies to improve programs must necessarily begin with a vision of what future outcomes ought to be[3]. Stephen Covey coined the term, *begin with the end in mind.*[4] This, he argued, is one of the seven habits of effective people. It is the same for effective organizations and for their leaders. The emerging concept of career pathways systems represents an expansion on the Career Clusters®[5] organizational tools CTE leaders have used to develop POS[6] and career pathways. As you envision aligning CTE with the emerging focus on career pathways systems, what is the end you imagine for CTE students?

The goal of a career pathways system is to ensure that every person can begin a career journey at any stage of life. The pathway must include opportunities to earn credentials that permit a person to move into the labor market and return to education and training when the need or desire arises; in other words, the pathway must include on- and off-ramps.

Though postsecondary programs ideally have multiple on- and off-ramps, K-12 students have only one off-ramp: graduation from high school. Their journey may continue directly to college, but this is not always a clear road, and students may find themselves underprepared for college or unclear about where they want college to lead them. Introducing age-appropriate career information early in K-12 education may smooth that road.

> "Vocational exploration is the process of clarifying the self-concept and translating it into occupational terms, of acquiring the understanding of occupations necessary for this translation, and of trying out this vocational self-concept in vocationally relevant activities."
>
> (Jordaan, 1963, p. 54).

[3] http://siteresources.worldbank.org/INTAFRREGTOPTEIA/Resources/mosaica_10_steps.pdf
[4] https://www.stephencovey.com/7habits/7habits-habit2.php
[5] https://www.careertech.org/career-clusters
[6] http://cte.ed.gov/initiatives/programs-of-study

Career development theory calls for introducing young students to the world around them, including the world of work.[7] This process leads to a middle school experience of deeper career exploration and developing an individualized plan for high school graduation and beyond that includes career pathways. For CTE leaders, this is where career pathways thinking and planning begins.

Stakeholders

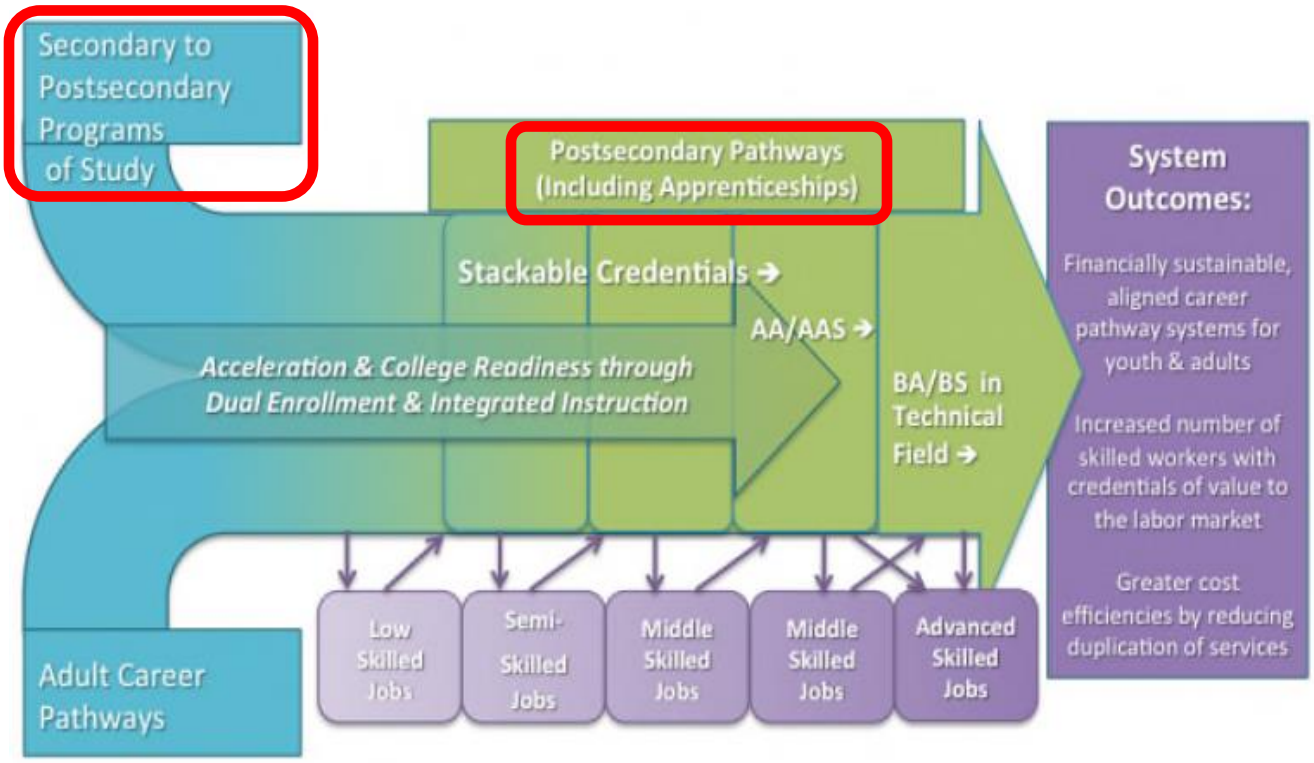
One foundation for a career pathways system is an agreement among stakeholders to begin with the **same** end in mind: individuals achieving success in the emerging labor market through the acquisition of in-demand skills and credentials. The federal WIOA of 2014 emphasizes CTE as an important partner in a career pathways system (see Appendix 6). **Figure 2** illustrates the relationship among key stakeholders and partners. Parallel to CTE career pathways (the part of the model within the red boxes, *Secondary to Postsecondary Programs of Study* and *Postsecondary Pathways*) are efforts for non-school based adults through other federal and state workforce programs (e.g., WIOA, TANF, National Registered Apprenticeship, and Job Corps for at-risk youth). These programs (called *Adult Career Pathways* in **Figure 2**) have existed for decades.

For more WIOA information and resources, visit the Innovation and Opportunity Network (ION) at

https://ion.workforcegps.org/

[7] There is a rich career development literature detailing the importance of early career exploration activities. The Pennsylvania Department of Education's Career and Education Work Standards offer a brief introduction to basic theories: http://www.pacareerstandards.com/documents/pedagogy/career-theory-overview.pdf. The National Career Development Association is also an excellent resource for additional information: http://ncda.org/aws/NCDA/pt/sp/home_page

Figure 1. Integrated Model Aligning Programs of Study and Adult Career Pathways



Source: Adapted from Advancing CTE in State and Local Career Pathways Systems (2014). Jobs for the Future. http://cte.ed.gov/initiatives/advancing-cte-in-state-and-local-career-pathways-system

Playbook Purpose and Structure

This playbook is designed to:

- help CTE leaders better understand how they can apply the federally agreed upon key components of career pathways to CTE;
- show noteworthy practices in career pathways that can offer strategies and potential approaches for CTE leaders;
- provide tips for CTE leaders to consider;
- connect CTE leaders with high-quality career pathways resources and tools; and
- provide "plays" and considerations for further investigation.

Under the U.S. Department of Labor (DOL), The Social Policy Research Associates (Larsen, Kozumplik, Nyborg, Garcia, & Cantu, 2011) laid out the components and strategies necessary for establishing comprehensive career pathways in a six-element framework, which the April 2012 and April 2016 federal joint letters identified as the foundational elements. Those six key elements are

1) Build cross-agency partnerships
2) Identify industry sectors and engage employers

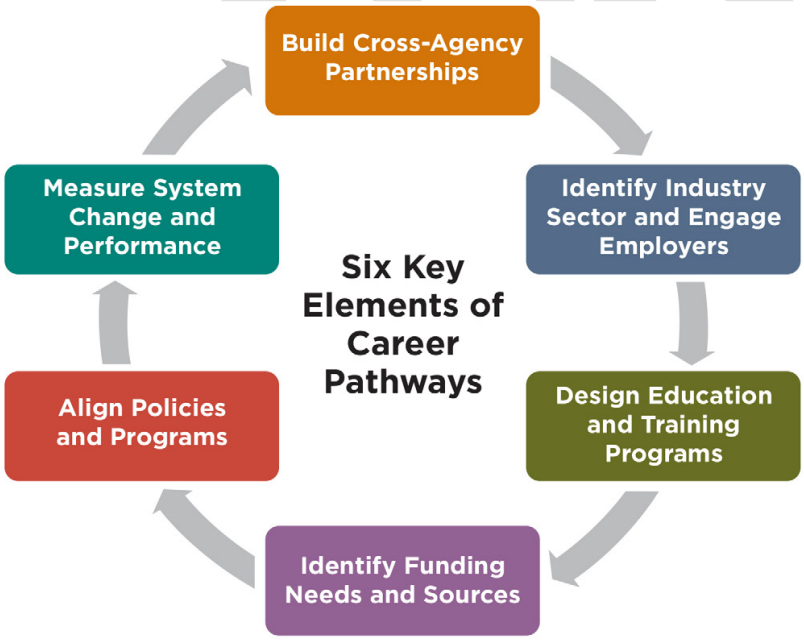
3) Design education and training programs
4) Align policies and programs
5) Identify funding needs and strategies
6) Measure systems change and performance

Resources

- *Career Pathways Toolkit: Six Key Elements* (2011)
- *Career Pathways Toolkit: A Guide for System Development* (2015)
- *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development* (2016)

Since 2011, the DOL has published three successively updated toolkits based on this idea, most recently in October 2016 with its *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development*.[8] These six key elements provide the basis for developing and implementing a career pathways system, and this playbook brings those elements into focus for the CTE community. For each element, the playbook provides a description and key components, the application for CTE, noteworthy practices, tips for CTE leaders, and resources or strategies that may assist CTE leaders in implementing a career pathways system. **Figure 2** illustrates the six key elements of career pathways.

Figure 2. Six Key Elements of Career Pathways



Source: *https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit*

[8] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit

The playbook includes noteworthy practices identified through a comprehensive review of career pathways implementation efforts. These noteworthy practices were strategically selected to provide approaches for state and local CTE leaders to consider in the development of career pathways systems and programs. Some practices highlight approaches that would apply to programs/systems that are further along in career pathways implementation than others, but in general, these practices can inform and be implemented in concert with other career pathway implementation efforts. Education and workforce leaders need to act strategically, and the practices described here may help address a need in your state or region.

The playbook is **not** designed to be a step-by-step guide to creating career pathways systems, nor does it provide an in-depth explanation of career pathways for those new to the concept. The most effective way to use this playbook is in tandem with the leading tools that provide detailed guidance for developing and implementing career pathways systems (see Appendix 6).

SIX KEY ELEMENTS OF CAREER PATHWAYS

I. Build Cross-Agency Partnerships

Description: A cross-agency leadership team clarifies the roles and responsibilities of each partner and gains high level support from political leaders for an integrated career pathways system.

Key Components:

- Engage cross-agency partners and employers.
- Establish a shared vision, mission, and set of goals.
- Define the roles and responsibilities of all partners.
- Develop a work plan and/or memorandum of understanding for the partnership.[9]

A successful career pathways system that serves the needs of all partners requires well-articulated partnerships. Such a system must bring together key institutions in effective relationships, grounded in quality education and career development, and staffed by knowledgeable and effective educators who teach a comprehensive technical and academic curriculum.

Students need the skills and education that lead to family-sustaining wages. Employers need personnel to support and grow their business. States need successful businesses to support the economic base, which ultimately supports schools and other services in the community. These segments are intrinsically bound together by mutual interest and dependency, which can produce great partnerships.

Voices from CTE Leaders in the Field

- Partnerships need to be at the lowest level organizationally to achieve buy-in. They cannot be instituted from above without input from the partners "on the ground" who will collaborate on the pathways.
- Intra-agency stratification can Silos, such as across agency, geography, or education system, must also end. It is no longer tenable for any one agency or institution to consider a student its own: better training options might exist at a different agency, or through distance learning at another institution. The turf wars and sense of ownership must end.
- negatively influence the ability to proceed in partnerships.

To consider CTE as part of a career pathways **system** requires thinking beyond a single program, building, or district. It requires collaborating with other state agencies that have an interest in assisting their clients to achieve success in the workplace or an interest in the economic development of the state.

[9] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit

Cross-agency partnerships work best when partners are engaged and have agreed upon shared goals and responsibilities. It may be helpful to convene stakeholders to develop a shared vision and goals and identify the assets each agency can bring to the partnership. Including industry representatives in planning efforts broadens their perspective and reminds them of the value that secondary and postsecondary educational institutions offer the workforce of the future. Though partnership is a goal that goes beyond the main mission of either education or business, it is a goal that works to the benefit of both institutions.

Resource

For tools for developing a shared vision, see Element One, page 36. To help identify partners' assets, see asset map worksheet, Element One, page 13.

Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development.

Noteworthy Practice: Education/Industry Partnership

In Pima County Arizona, a local school district was working with a mining industry partner to develop a heavy equipment operations (HEO) program to satisfy local needs (http://pimajted.org/programs/heavy-equipment-operations/). The mining industry experienced a downturn at that time, and the business partners could not complete the program development. Concurrently, state and local leaders were negotiating with Caterpillar, Inc. to expand their presence in the state. Caterpillar chose to locate its new Surface Mining and Technology Division in Pima County and completed the development of the HEO program. This included: sitting on the advisory board, collaborating on curriculum development, providing equipment, and offering general guidance. The HEO program allows students to earn several credentials, making them excellent candidates for careers with Caterpillar, as well as careers in the high-demand sectors of construction and mining, many of which can earn as much as $100,000 per year. Through this partnership, Pima County schools engaged in a statewide economic development effort and became a partner with state and regional economic development organizations, a private corporation, and city and county economic revitalization agencies (https://www.azpm.org/p/grid-news/2016/6/17/90164-jted-revs-up-big-engines-for-tucson-job-training/).

Education agencies have two potential advantages when partnering with businesses and workforce development agencies in the service of career readiness and education leading to living-wage employment and broader economic vitality. The first advantage is that many high schools and community colleges, through their CTE programs, already have partnerships with local business and industry through advisory boards and the like. Tapping these partnerships can take CTE participation in career pathways systems development to the next level.

The second advantage for CTE is that if your state has developed career pathways, they may already include (or can be expanded to include) a pathway through high school and into postsecondary education, with postsecondary on- and off-ramps so learners can take classes, earn credentials, and obtain entry-level employment, ideally returning for more training at some point to move up a career ladder. Current industry partners may already have a relationship with workforce development agencies, and may already have career pathways with

ladders and lattices. When secondary CTE, postsecondary CTE, workforce development boards, and industry expand their partnerships to include these and other entities, a career pathways system begins to emerge. As a starting point to identify potential partners for career pathways system building, review the WIOA core and additional partners. The federal programs operating at the state and/or local levels may form a cross-agency leadership team.

Rural Spotlight

Rural areas that have experienced economic decline over the last several decades need to pool resources, form regional alliances and partnerships, and create the critical mass necessary to develop and implement new economic development strategies.

Albert Lea, a rural K-12 district in Minnesota,[10] exemplifies one way to begin partnership exploration: invite local industry representatives and chamber of commerce members into the middle school classroom to discuss careers. Each week for three months, an industry representative provided an overview of the career fields in the area and the prerequisites to enter each career field. One explicit goal of this program was to educate students about careers in their area and the opportunity to continue to reside in the area and obtain jobs that provide a living wage. "One of the pieces that we look at in the middle school is trying to get the students to have an idea of their story or their future story when they leave," said the assistant principal.[11] The executive director of the chamber of commerce agreed, noting the importance to the future labor pool to retain local students by portraying the opportunities in their area, "the earlier the better."

Resource

Partner contact information sheets provide a quick and easy way to keep a contact list of potential partners: Element One, page 8

The work plan/MOU template identifies who, what, when, and how the system partners will carry out the strategies for a comprehensive career pathways system: Element One, page 48

Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development.

Plays for CTE[12]

Many states have created sector-based, career pathway partnerships. If your state has these partnerships that do not include CTE, try to engage with that group.

- ✓ If your state does not have an existing partnership, try taking the initiative to engage with partners representative of existing state, local, and regional career pathways partnerships. Membership should consist of state and local decision-makers from the public, private, and non-profit sectors that represent the workforce development system and its stakeholders, including public education (e.g., community, technical colleges, secondary career centers, secondary comprehensive high schools).

[10] http://albertlea.k12.mn.us/
[11] http://kimt.com/2016/11/18/middle-school-students-looking-at-different-career-paths/
[12] Adapted from the 2014 Minnesota Governor's Workforce Development Council Policy Advisory Report: Building Partnerships to Overcome Barriers: Developing Skills to Thrive in a Changing Economy.

- ✓ Working with the partners, adopt and commit to a shared vision, guiding principles, goals, and strategies. Identify the fundamental components and measurable outcomes of a successful career pathways system.
- ✓ The partnership should support alignment of policies that reduce barriers to building, scaling, and sustaining a career pathways system at all levels. For example, secondary and postsecondary education institutions should have a consistent approach to working together on CTE programs. Entities acting independently create barriers to the design and implementation of a statewide career pathways system.

II. Identify Industry Sectors and Engage Employers

Description: Sectors and industries are selected and are partners and co-investors in the development of career pathways systems.

Key Components:

- Conduct labor market analysis to target high-demand and growing industries.
- Survey and engage key industry leaders from targeted industries and sector partnerships.
- Clarify the role of employers in the development and operation of programs.
- Identify existing training systems within industry as well as the natural progression and/or mobility (career ladders/lattices).
- Identify the skill competencies and associated training needs.
- Sustain and expand business partnerships.[13]

Voices from CTE Leaders in the Field

- CTE has historically had a low status in the education system. Industry can elevate the status of CTE.
- CTE will need access to labor market information to become a valued part of the system.
- CTE needs to engage industry in ways that it has not before.

Traditionally, CTE's exposure to the labor market has been through advisory committees and employers that directly advise on new and existing programs. However, in a career pathways **system** approach, education leaders, industry leaders critical to the economic success of a region, and other stakeholders come together to identify the skills that are necessary to build the region's talent pipeline, as well as the educational and other supports that will comprise the system. This approach, an industry sector approach, allows for the development of career pathways programs for a range of workers within the state's economy.

Sector Strategies

Moving toward a career pathways system means moving away from a program-driven approach and toward a system approach that seeks to serve the constituents of all system partners. That requires an understanding of labor markets, state economic development efforts, and other factors that affect the growth of industry sectors. A *sector strategy* approach is one way to develop a data-based understanding for developing the system and building a skilled workforce; it begins with *sector analysis.*[14] A sector analysis usually requires specialized consultants who

[13] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit
[14] Conway & Giloth, 2014.

identify economic sectors (e.g., advanced manufacturing) where a state, region, or city has competitive advantage. Alignment with state economies allows the partners in a career pathways system to identify careers that are emerging, growing, and/or have the greatest need for replacement employees.

Partnerships in a sector approach include secondary and postsecondary educational institutions, industry leaders, economic development organizations, and workforce agencies that collectively set priorities and create strategies to build the talent pipelines for future economies.

Going from sector analysis to sector strategies means moving the data to action. Sector strategies take a comprehensive, broad-based approach to identifying and addressing skill needs across key industries to meet state economic needs, rather than focusing on the workforce needs of individual employers on a job-by-job, *transactional* basis. These strategies require system partners to establish engaged and sustainable relationships to keep CTE programs updated, thus providing CTE students with the skills they need to compete in the workforce.

In 2012, Kentucky identified five sectors through this approach (advanced manufacturing, sustainable manufacturing/energy, technology, transportation, and healthcare) to guide economic development strategies but also to increase human capital by developing the workforce of the future.[15] New Hampshire and many other states have done the same.[16] CTE[17] should be part of the sector partnerships and planning process that result from the sector analysis.

Resource

To help in making data-driven decisions in your labor market area, see the Labor Market Analysis Worksheet on page 22 of Element Two of the *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development*. For a deeper dive, refer to the Data and Resource Guide for Identifying Target Industry Sectors on page 27 of the same Element.

Sector Partnerships

The National Skills Coalition defines sector partnerships as the means to bring together multiple employers within an industry to collaborate with colleges, schools, labor, workforce agencies, community organizations and other community stakeholders to align training with the skills needed for that industry to grow and compete.

Source: http://www.nationalskillscoalition.org/state-policy/sector-partnerships

[15] http://kwib.ky.gov/stateplan2012/AttachmentC.pdf
[16] http://www.nhworks.org/Sector-Partnership-Initiative/Overview/
[17] Realizing Innovation and Opportunity in WIOA (2015). National Skills Coalition, p. 7.

Engaging Employers

One way to engage industry is to begin discussions around how local high schools and community colleges can become more integrally involved in economic development in their area. Another is to find mutual benefit from providing work-based learning experiences to students, including paid internships. Engagement should be a two-way street in which the goal is to "create a jointly beneficial partnership in which all parties are invested in helping students make informed education and career decisions."[18]

The U.S. Chamber of Commerce recently released a report describing a new framework by which employers might engage in career development with K-12 schools. In the framework, employers are "customers of career development activities who are then responsible for locating the right partners to deliver high-quality employer account management—customer service practices that ensure the needs of the business community are being met. These relationships are at their core designed to provide students access to a network of employers as well as support businesses in need of talent" (p. 2).[19] Businesses want to participate in work-based learning and other experiences when they somehow accrue to the bottom line; this is usually in the form of an investment in the future workforce.

By showcasing their industry in today's work environment, employers hope to spur student interest as they consider future careers. The Chamber proposes that intermediaries coordinate the activities (or in their terms, partners deliver account management) so as not to overwhelm school

TIPS

Your state's labor market Information office can assist in identifying projections for job vacancies, job growth, and replacement employees to target where the greatest demand for employees will be. Your team will wish to develop education programs for occupations in which the demand is high, the supply of employees is low, and the occupations pay a family sustaining wage.

Noteworthy Practice: Sector Strategy Partnership

Memphis, Tennessee is the second largest manufacturer of medical device components in the nation. The need for a trained workforce forced the companies to compete for workers. A local legislator brought together represenatvies from the Greater Memphis Medical Device Council, a local school district, Bartlett City Schools, the medical device industry, and the local Tennessee College of Applied Technology (TCAT created a new technology lab at Bartlett High School with equipment that matches the technology used by local medical device manufacturers in the area. Students receive dual credit for the upper-level manufacturing courses and can earn industry recognized credentials leading to employment when they graduate from high school.

For more information: https://tn.gov/news/46052

[18] Deeds, C., & Malter, Z. (2016). *Career pathway systems: Lessons from Miami*. Washington DC: American Youth Policy Forum, p. 5. http://www.aypf.org/wp-content/uploads/2016/05/Brief-draft-final.pdf.

[19] https://www.uschamberfoundation.org/sites/default/files/USCCF_Connected%20to%20Careers_FINAL_0.pdf

staff. The report is useful to CTE leaders who want to understand the business perspective on work-based learning and career development. It also provides current practices such as creating a separate career development position in addition to counselors and aligning CTE programs with workforce needs.

Rural Spotlight

Tulare Joint Union High School District's agriculture program, known as The Farm,[20] is a great example of aligning programming with employer demands This program has been in existence since 1928, continually changing curriculum to meet local needs. There are currently five pathways: Agricultural Business Management, Agriculture Science, Agriculture Mechanics, Animal Science, and Ornamental Horticulture. Three high schools in TJIHSD offer the agriculture POS. Students participate in hands-on farm experiences like caring for sheep or goats, operating a dairy farm, and growing crops on a 75-acre field laboratory for the dairy herd. In addition to this district resource, students must also complete 40 hours per semester in a supervised agricultural experience (SAE) program at a local business. This exposes students to a full array of local agricultural careers: dairy, milk processing, agricultural engineering, and veterinary clinics. California's agricultural sector is among its largest economic drivers. Other California agricultural sector partnerships that exhibit noteworthy practices for providing students in rural areas with the hope and promise of well-paying careers include the Wonderful College Prep Academy[21] and the Paramount Agriculture Career Academy[22] in the southern Central Valley.

Voices from CTE Leaders in the Field

- Career pathways outcomes must reflect the values of the various sectors, including CTE.
- On- and off-ramps must align across both secondary and postsecondary levels of a pathway.
- There is a shortage of quality CTE teachers.
- CTE teachers must have the industry credentials for which they are preparing students.
- Some industry sectors lack clear stackable credentials.
- High school counselors are not well informed about CTE. We must create a stronger link between guidance and career pathways.
- The education system has strict structures (e.g., semesters) that do not always mesh well with career pathways.

III. Design Education and Training Programs

Description: career pathways programs provide a clear sequence of education courses and credentials that meet the skill needs of high-demand industries.

[20] https://www.careertech.org/sites/default/files/Tulare__Final_1.pdf
[21] http://www.wonderfulcollegeprepacademy.org/
[22] http://www.jff.org/sites/default/files/PACA%20Presentation%205%206%2015.pdf

Key Components:

- Identify and engage education and training partners.
- Identify target populations, entry points, and recruitment strategies.
- Review, develop, or modify competency models with employers and develop and validate career ladders/lattices.
- Develop or modify programs to ensure they meet industry-recognized and/or postsecondary credentials.
- Analyze the state's and region's education and training resource and response capability.
- Research and promote work-based learning opportunities within business and industry.
- Develop integrated, accelerated, contextualized learning strategies.
- Provide flexible delivery methods.
- Provide career services, case management, and comprehensive supportive services.
- Provide employment assistance and retention services.[23]

Once state leaders have begun to build the necessary partnerships for a career pathways system, and identified and engaged industry leaders, they can begin to examine the alignment between CTE offerings and the skill requirements the labor force will need. The goal is to narrow the gap between offerings and industry requirements so students who complete these programs have opportunities for competitive employment.

Of the six key elements of building career pathways, designing education and training programs is likely the most familiar to CTE leaders. We know that many factors impinge on program success, such as a shortage of CTE teachers, student supports, curriculum, and credentialing and on- and off-ramps. System partners must keep these in mind in the process of designing education and training programs as part of a career pathways system.

TIPS: Career Readiness

- Enlist the employer community as a lead partner in defining the pathways and skills most essential in today's economy.
- Enlist the employer community as a lead partner in identifying the high-demand, high-skill industry sectors that are most important to the state's economy so career pathways can be aligned with those opportunities.
- Engage the employer community in designing career pathways in secondary schools that develop the specific knowledge and skills needed for entry-level work within high-demand, high-skill industries.
- Establish a structured process through which the education and business sectors come together to establish priorities and design pathways.

From Opportunities and Options: Making Career Preparation Work for Students; CCSSO; 2014, p. 4.

Resource

For additional tools, see Element Three in the *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development*.

[23] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit

CTE Teacher Shortage and Training

There are many reasons for the shortage of CTE teachers, but often the difficulty is that individuals can earn more by remaining in industry than by teaching, giving little incentive for nurses, welders, or architects (for example) to teach. It is incumbent upon states to use labor market information to identify high-demand fields and recruit qualified people to teach in those fields.

"Expand Your Horizons" and Double Your Population of STEM Students

Since the early 1970s, female STEM professionals have been concerned about low female participation in math and science courses. Volunteers created the Expanding Your Horizons (EYH) Network to strengthen and support programs and workshops for middle school girls. EYH events consist of an all-day conference with many hands-on workshops. Girls hear from volunteers about their STEM careers, participate in small-group interactions with female STEM role models, and take part in hands-on STEM workshops led by these role models. The goal is to excite girls about STEM, influence them to take more STEM classes in high school, and help them visualize themselves as a STEM professional. Any community can begin its own EYH program and join the EYH Network.

http://www.eyhn.org/

Industry experts can also engage in schools without necessarily changing careers and becoming full-time teachers. Advance CTE, the association of state directors of CTE, published a report on increasing access to industry experts in high schools, which lists many ways in which industry experts can support students in the classroom.[24] For instance, they can become part-time teachers, career advisers, mentors, or career and technical student organization (CTSO) competition judges.

Support Services

Other important aspects of every career pathway program are the supports that help students succeed. In workforce development programs, where the learners are usually adults, supports often include wraparound services: program advising, career guidance, tutoring, counseling, childcare, and transportation assistance.

In the public education system, student support services are less encompassing than in workforce development programs, and traditionally the responsibility of school counselors. However, high school counselors spend much of their time on scheduling, college admissions guidance, disciplinary issues, and academic testing.[25] When counselors have time to fulfill their advising role, they often focus on college admissions guidance and may not be familiar with the school's CTE offerings, leaving students who do not aspire to attend a four-year university with no counsel about how to pursue a career. If CTE is to be a full partner in a career pathways system, counselors will need to help provide the services that students need to prepare for both college and career. One strategy may be for secondary CTE programs to encourage counselors to sit on pathway advisory boards and attend their meetings. Including these pathways-related duties in the counselor's job description when openings occur helps ensure that counselors understand their enhanced role in the school. **Appendix 4** provides a sample job announcement from

[24] https://cte.careertech.org/sites/default/files/files/resources/State_of_CTE_Industry_Experts_2016_0.pdf
[25] http://nces.ed.gov/pubs2003/2003015.pdf, High School Guidance Counseling, Table 14.

Houston, Texas, although spelling out the pathways-linked counselor duties more specifically would make those responsibilities clearer.

High schools provide varying degrees of supportive services other than counseling. There are models for providing wraparound support services that serve the entire family; this often includes the provision of health and dental care, after-school tutoring, and adult education.[26] Many community schools and others, such as Connecticut's Department of Education,[27] understand that schools cannot provide all supportive services, so they partner with community service providers to remove any barriers that limit student's success and retention in high school. Another model for wraparound services in high school is the Linked Learning Alliance in California,[28] which includes five domains of learning: social-emotional learning, academic learning, technical learning, workplace learning, and college and career knowledge. Under the social-emotional learning domain, students develop their ability to regulate emotions (and make appropriate choices regarding risky behaviors), build social skills, and monitor their learning.

Noteworthy Practice: Increasing Capacity of Counselors

Tennessee developed **Advise TN**, a program that embeds college counselors in select high schools where the college-going rate is low. These counselors provide additional resources to help students select a postsecondary institution, fill out college applications and financial aid forms, and ensure that students enroll in the fall at their school of choice.

https://www.tn.gov/thec/topic/advisetn

https://www.tn.gov/thec/topic/advisetn

Resource

USDOL has created the Competency Model Clearinghouse to help educators build a competency model from scratch or validate an existing competency model. These tools can be a good starting point to develop curriculum.

Source: http://careeronestop.org/CompetencyModel/

Curriculum and Credentials

As a partner in a career pathways system, CTE provides a clear roadmap of education courses and credentials that align with industry requirements and prepare students for employment. To meet education goals of preparing students for lifelong learning, career entry and advancement, adaptability in a changing workforce, and the ability to earn a family-sustaining wage, CTE programs should embed traditional academic content (e.g., reading, writing, mathematics) alongside relevant technical skills content. Research indicates that students learn best when lessons relate directly to real work.

Additionally, curriculum in a robust career pathways system ideally incorporates integrated, accelerated, contextualized learning strategies; flexible delivery methods; work-based learning, including pre-apprenticeship, job shadowing, and internships; and mechanisms for students to

[26] https://www.nea.org/assets/docs/Wraparound-Services-05142013.pdf
[27] http://www.sde.ct.gov/sde/lib/sde/pdf/deps/health/factsheet.pdf
[28] https://gardnercenter.stanford.edu/sites/default/files/Equitable%20Access%20By%20Design%20Report.pdf

earn credit for prior learning, attain market-identifiable skills, and obtain postsecondary and/or industry-recognized credentials. The importance of credentials cannot be overemphasized since credentials attests to a specific qualification or competence (see CareerOneStop's certification database for a searchable index of credentials). Entry-level credentials may provide high school students with the opportunity to obtain skills at the first rung of a career ladder.

Perkins describes the outcomes of CTE as
• technical skill proficiency
• an industry-recognized credential
• a certificate
• an associate degree

WIOA defines recognized postsecondary credentials as
• a certificate of completion of an apprenticeship
• an industry-recognized certificate
• a license recognized by state or federal government
• an associate or bachelor's degree

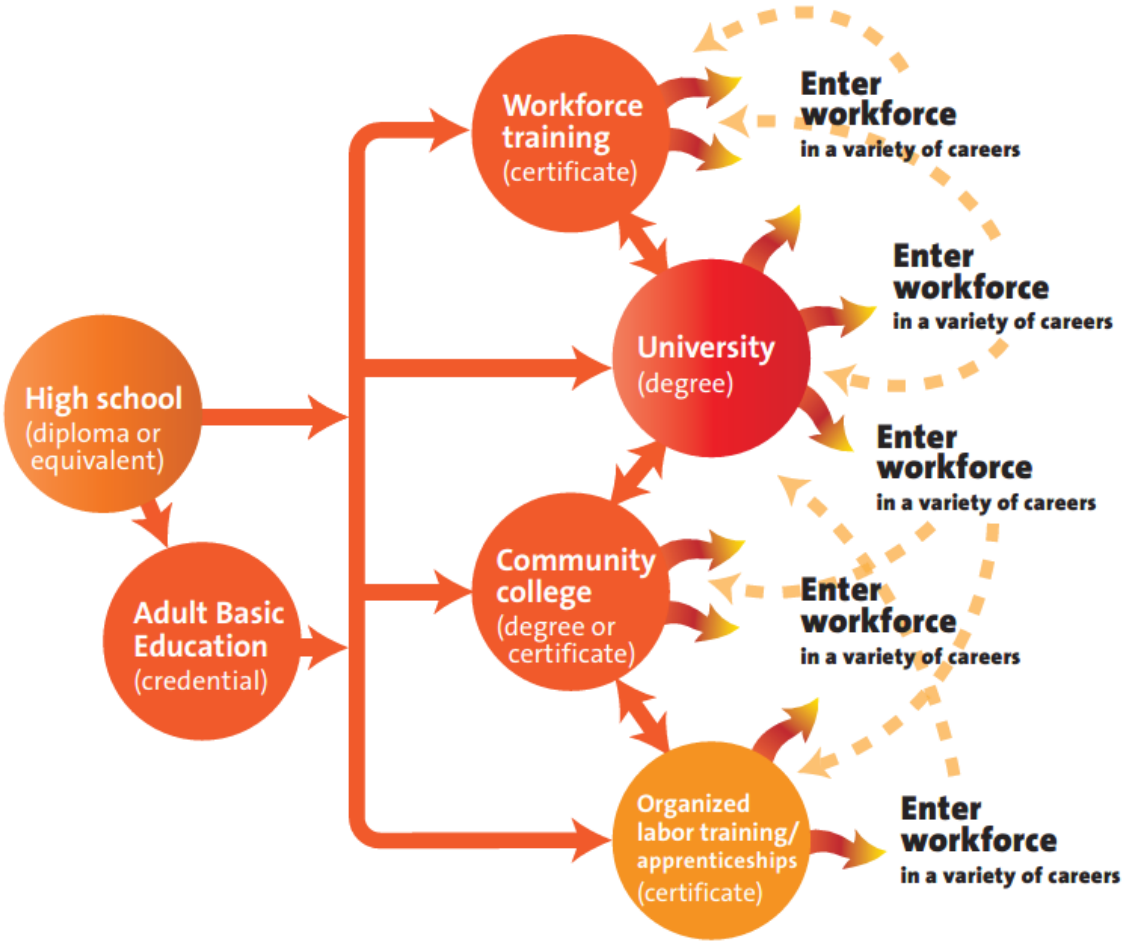
On- and Off-Ramps

Designing programs with multiple on- and off-ramps allows learners to take classes, earn credentials, and obtain entry-level employment, ideally returning for more training at some point to move up a career ladder. Some states have initiated policies impacting postsecondary articulation and transfer. Both Alabama and Washington are requiring higher education institutions to develop reverse transfer policies to enable students in four-year degree programs to apply accumulated credits toward a two-year degree.[29]

See **Appendix 1** for an example of Ohio's career pathway incorporating on- and off-ramps and the associated credentials along the way from secondary to postsecondary education. Not all states have mapped out their pathways to the degree that Ohio has, but all have done some work along these lines. **Figure 3** shows on- and off-ramps for upward and lateral career advancement.

[29] https://cte.careertech.org/sites/default/files/files/resources/2016_State_Policy_Year_in_Review.pdf

Figure 3. On- and Off-Ramps for a Career Pathway



Source: National Governors Association. (2013). State sector strategies coming of age: Implications for state workforce policymakers. Retrieved from: https://www.nga.org/files/live/sites/NGA/files/pdf/2013/1301NGASSSReport.pdf

Rural Spotlight

Rural students often face barriers related to distance from an educational center or lack of internet access. The latter barrier is gradually lessening but still exists in some locations. In many cases, a local school has the capacity to serve as the hub for a live video feed delivered remotely from a technical or community college. Instructors at these locations work closely with remote sites to ensure their students receive the identical curriculum as students on campus. This is the model used in the computer information technology program at the Shelbyville campus of the Tennessee College of Applied Technology (TCAT).[30] Having the curriculum available in the

[30] https://tcatshelbyville.edu/programs/computer-information-technology

cloud has helped with access and retention, because students can virtually attend the class at their convenience.

Another option for high school students with long commute times is to provide buses with wireless routers so that students can access curriculum while in route. In the rural Coachella Valley Unified School District in California, some students spend four hours a day on the bus. The district parks the buses overnight in the remote communities where these students live so that they can benefit from internet access and complete their homework.[31]

Another barrier for rural students is a shortage of opportunities for internships due to limited businesses. Some organizations that provide career academy curriculum (i.e., National Academy Foundation) are experimenting with virtual internships.[32] For example, students might meet business mentors at their schools but subsequently have access to their mentor only on conference calls. The mentor may outline project assignments in person or virtually during the remainder of the project. The student completes the project and solves any issues remotely. This simulation exercise mimics real world experiences where businesses use conference calls to operate around the globe.

Plays for CTE

- ✓ Each of the subheads is its own, "Next Step."
  - CTE teacher shortage and training
  - Support services
  - Curriculum and credentials
  - On- and off-ramps
- ✓ Working with your sector-based partners, identify the barriers to implementing a career pathway system. You can begin to examine the alignment between current CTE offerings and the skill requirements the regional labor force will need with the goal to narrow that gap between offerings and industry requirements so students who complete these programs have opportunities for competitive employment. You may find the facets described above as relevant to your state. You may identify others. Identifying the barriers, issues, or aspects of designing training programs is the first step. Working with your partners to map solutions is the second.

[31] https://www.districtadministration.com/dod/awards/Wi-Fi-on-%20Wheels
[32] http://naf.org/news_articles/creative-strategies-finding-creating-internships

Resources

A Quick-Start Toolkit Building Registered Apprenticeship Programs (https://doleta.gov/oa/employers/apprenticeship_toolkit.pdf)

Defining a Quality Pre-Apprenticeship Program and Related Tools and Resources (https://wdr.doleta.gov/directives/corr_doc.cfm?docn=5842)

Conducting career and technical education research and applying project results to improve your own state or local policies and services: http://ctecenter.ed.gov/training_center

Reverse transfer policies that enable students in four-year degree programs to apply accumulated credits toward a two-year degree: https://cte.careertech.org/sites/default/files/files/resources/2016_State_Policy_Year_in_Review.pdf

IV. Identify Funding Resources

Description: Necessary resources are raised and/or leveraged to develop, operate, and sustain the career pathways system and programs.

Key Components:

- Identify the costs associated with system and program development and operations.
- Identify sources of funding available from partner agencies and related public and private resources and secure funding.
- Develop long-term sustainability plan with state or local partners.[33]

No one partner can finance a career pathways system. A first step is for each partner to identify the costs associated with developing and operating its own programs, and then all partners coming together to determine the costs associated with developing, implementing, and maintaining the system (i.e., conduct labor market analyses, build participant reporting systems, support work-based learning, etc.). Once the partners understand these costs, the next step may involve creating a joint inventory of funding to see overlaps where moneys can be saved, explore opportunities for braiding funding to improve or expand programs that will be system components, and assess funding gaps to identify additional sources to fill them.

Voices from CTE Leaders in the Field

- Funding and financial aid are important issues in the conversation around building career pathways systems.
- How is dual enrollment to be paid for?
- The secondary and postsecondary education sectors often fear the loss of students (because funding is often tied to students), but they must get beyond this and work for the good of students and to create the system.
- Career pathways partners must stop competing for funding.
- Funding silos, where each partner seeks out and hoards

[33] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit

Funding for career pathways systems that serve secondary and postsecondary CTE students can draw from more sources than just allocations from the Carl D. Perkins grant. Funding a career pathways system involves searching for various sources of funding and applying or braiding them to support the programs determined best suited for the state and finding funding solutions that meet system needs without negatively affecting system partners. For example, state funding policy adjustments may be necessary to equally share the costs of allowing students to progress along a career pathway without impacting secondary or postsecondary education budgets when those pathways include dual enrollment and similar components that cross budget lines. System partners must work toward the shared vision of ensuring secondary and postsecondary education partners can prepare students for occupations that are in demand in their labor market area.

The focus on braided funding has opened many new opportunities and highlighted older ones. The DOL has identified many of these in its Field Guide to Braided Funding,[34] which provides such resources as work plans, funding assessment worksheets, strategies, and a toolkit.

Resources

For a detailed list of allowable federal funds see CLASP, Funding Career Pathways and Career Pathways Bridges: A Federal Funding Toolkit for States

For additional sources of federal funding refer to the Funding Options worksheets on page 9 of Element Four of the *Career Pathways Toolkit: An enhanced Guide and Workbook for System Development*. The toolkit identifies potential federal funding sources that support collaborative work in developing career pathways systems.

In addition to Perkins and other grants available from ED, DOL provides funding that states may apply to a career pathways system. Postsecondary institutions may receive a workforce development grant that has a role for CTE. For instance, the DOL's Employment and Training Administration has given millions of dollars in capacity building training grants to community colleges for cyber security, advanced manufacturing, and allied health occupations, to name a few. Here are a few examples of state's funding innovations:

Minnesota offers dual credit for concurrent enrollment,[35] (college courses taught in high schools), and Postsecondary Enrollment Options (PSEO),[36] (college courses taught on a college campus to high school juniors and seniors). All public colleges and universities and some private ones in the state accept credits earned through concurrent enrollment and PSEO.

Washington is a national leader in capitalizing on the availability of matching funds to support programs directed at various segments of its population. The state inventoried federal, state, and private funding streams and found opportunities to fill gaps in its pipeline through the development of programs for immigrants eligible for federal nutrition assistance.[37]

[34] http://acceleratingopportunity.org/field-guide/braided-funding
[35] http://readysetgo.state.mn.us/RSG/CE/index.html
[36] http://readysetgo.state.mn.us/RSG/PSEO/index.html
[37] http://www.nationalskillscoalition.org/resources/publications/file/Upskilling-the-New-American-Workforce-1.pdf

Tennessee has funded three initiatives by reducing four-year university scholarships funded by their education lottery.[38] It has provided *last-dollar* scholarships to students throughout the state who enroll in programs that will prepare them for high-demand occupations like those in IT. High school graduates can also receive Tennessee Promise dollars to attend community college or a college of applied technology tuition free. Finally, Tennessee Reconnect dollars bring adults back into the education system tuition free.

In 2011, the Arizona state legislature cut funding to CTE and joint educational districts that provide CTE. It made further cuts in 2015, resulting in a total reduction of 53 percent to the CTE budget.[39] Pressure from business partners and the Arizona Chamber of Commerce,[40] including area chambers, convinced the legislature to reverse the cuts to the state budget by presenting arguments that these funds are an investment in the state's future workforce. The legislature reversed the 2015 cuts, revealing the value and power of business advocacy.

Sample strategies for funding dual enrollment

- students pay for dual enrollment costs (e.g., Connecticut)
- school districts pay through their general funds (e.g., Florida)
- community colleges cover the costs (e.g., District of Columbia)
- separate funding sources that do not take away from either institution's funding (e.g., North Carolina, only funds transferable courses, not electives
- braiding funds in which partner organizations identify and share allowable funding sources

TIP – Unique Funding Strategies

Some funding solutions do not involve grants. While housing a high school campus on a college campus has been around for some time (e.g., early and middle college high schools), Design Tech exemplifies a new type of partnership by building its campus on the Oracle headquarters campus in California's San Francisco Bay Area.

Rural Spotlight

In states without a statewide dual enrollment policy, rural areas may not have this option due to lack of resources and/or proximity to colleges. Morenci Unified School District #18, a rural district in Arizona, where the nearest college is three hours away, partnered with Freeport McMoRan Copper and Gold Inc. to support online dual enrollment opportunities for its students. Freeport McMoRan Copper and Gold Inc. operates the Morenci mine, the largest copper mine in the United States. It agreed to help pay tuition, fees, and books for Eastern Arizona College courses that Morenci High School students successfully complete. Students take courses via satellite, instructional TV, or the internet; a distance learning lab monitor or librarian at the high school facilitates the courses. The dual

[38] http://driveto55.org/tennessee-governors-plan-to-make-community-college-free/
[39] http://azednews.com/2015/08/04/budget-cuts-effects-on-career-and-technical-education/
[40] http://www.azchamber.com/assets/files/PDF/2015BusinessAgenda.pdf

enrollment program allows participating students to graduate from high school with an associate degree in general studies.[41]

TIP

System level leaders should seek out philanthropic organizations, which may be able to finance one-time startup funds for the career pathways system or a specific career pathway program. Make sure to include industry associations and state and community economic development organization in your funding request.

V. Align Policies and Programs

Description: State and local policies and administrative reforms have been revised to align with implementation of a career pathways system.

Key Components:

- Identify state and local policies necessary to implement career pathways systems.
- Identify and pursue needed reforms in state and local policy.
- Implement statutory and administrative procedures to facilitate cross-agency collaboration.[42]

Aligning policies that govern the various component entities in a career pathways system is imperative to building and sustaining the system. An understanding of this structure—made up of laws, regulations, policies, and procedures—will help identify any change necessary to implement a common vision.

Voices from CTE Leaders in the Field

- The focus needs to be on college AND career, not college versus career.
- Individualized plans for high school graduation need to be taken down to the middle school.
- Funding sources need to be aligned to effect change.
- Teachers must earn their alternative certification.
- Local control of education can sometimes compete with alignment goals.
- Global issues outside the control of locals can affect the probability of success.
- A stable policy environment is required for success.
- The Perkins legislation needs to align and be on board with career pathways systems.
- Need to identify ways to leverage the demands of

[41] https://www.districtadministration.com/dod/awards/high-school-students-earn-college-credit-free
[42] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit

Policy Considerations

Raising the Bar for CTE Course Requirements

In 2016, 42 states carried out a total of 139 policy actions relevant to CTE, including laws, executive orders, board of education actions, budget provisions and ballot initiatives. This represents an increase over 2015 activity. Several states passed packages of legislation impacting multiple elements of CTE programming, such as Virginia, California, Indiana, and Idaho, while Iowa took a deep dive into redesigning secondary CTE and career development. The governors in several of these states had previously signaled that CTE would be a priority in 2016 in their state of the state addresses, including C.L. "Butch" Otter of Idaho and Terry McAuliffe of Virginia, which helped provide momentum for such reforms. https://cte.careertech.org/sites/default/files/files/resources/2016_State_Policy_Year_in_Review.pdf

One important policy that is currently in flux across the nation is a growing number of states where CTE courses meet high school graduation requirements. According to the Association for Career and Technical Education (ACTE), 15 more states changed high school graduation requirements in 2014, allowing certain CTE courses to qualify as math or science credits toward graduation.[43] This list of states is updated annually. Courses in the Agriculture, Food & Natural Resources, Architecture & Construction, Business Management & Administration, Finance, Health Science, Information Technology, Manufacturing, and Science, Technology, Engineering & Mathematics Career Clusters now count toward math or science graduation requirements in various states.[44] The perception of CTE as a college and career readiness option is critically tied to the weight that the courses carry in meeting graduation requirements, and vice versa. This requires that CTE courses and programs embed rigorous academic standards that meet academic course graduation requirements and that high school students can enroll in rigorous CTE courses.

Resource/Tool

The Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development contains helpful worksheets to evaluate systems alignment on 10 essential factors. The worksheets begin on Page 12 of Element Five.

Another consideration to examine is aligning secondary CTE offerings to higher education and the workforce to assure programs prepare students for both college and career. The career academy model organizes a subset of students and teachers into small learning communities for a two- to four-year span. Career academies in such programs as engineering or health sciences provide opportunities for high school students to explore future careers that require postsecondary education but can range in intensity from earning a two-year degree to become an engineering technician or starting toward a postgraduate degree to become a medical doctor. The exposure high school students receive through high-quality CTE programs can provide an effective pathway to prospective careers as well as a strong foundation for subsequent university education.

[43] https://www.acteonline.org/uploadedFiles/Resources/Publications/2014_State_Policy_Review_FINAL.pdf
[44] https://www.acteonline.org/uploadedfiles/assets_and_documents/global/files/cte_info/acte-nasdctec_state_policy_review_2013.pdf

Early Career Pathway Exploration

Research indicates that career exploration and self-assessment should begin at an early age. Students need to be aware of their interests and how they can translate their interests into potential occupations. This knowledge will prepare them to make an informed choice of career pathways available in high school. Career exploration and interest inventories that start in middle school or earlier can yield an individualized graduation plan that corresponds with area high school offerings. Effective alignment of middle schools to high school career pathway programs may require a policy change within the K-12 system. Including middle schools in a vertical alignment with local high schools can prepare students to enter high school with a career foundation and ensure that students receive age-appropriate preparation for real career opportunities.

Noteworthy Practice: Early Career Pathway Exploration

Georgia passed the BRIDGE (Building Resourceful Individuals to Develop Georgia's Economy) Act in 2010. This statewide policy mandates the provision of career awareness, career interest inventories, and career advising to middle school students. The act is designed to assist middle school students in exploring their academic skills and career interests. Students then must create an individualized graduation plan by the end of middle school that establishes customized electronic portfolios that follow students through high school. To accomplish this within existing resources, Georgia developed the Teachers-As-Advisors program for middle school teachers to bolster the capacity necessary to provide career advising activities. The program provides teachers with curriculum and training to assist middle school counselors. As these activities are new for both middle school counselors and teachers, Georgia provides step-by-step instructions for schools to implement BRIDGE elements.

http://www.gcic.peachnet.edu/content/helpyourself/BridgeAct.aspx

Here are two examples of successful policy alignment:

Kansas established a CTE incentive program awarding school districts $1,000 for each student who graduates and earns an industry-recognized credential on the state list. The legislation also mandates the development of statewide articulation agreements between high schools and community or technical colleges to allow students more options for postsecondary attendance.[45] Both of these measures encourage high schools to develop on-ramps to various career pathways allowing students to earn baseline credentials or to earn college credits in a career area.

Tennessee's "Drive to 55" initiative aims to increase the percentage of Tennessee residents who are college graduates to 55 percent by 2025. Led by the private and non-profit sectors, these initiatives include the last-dollar scholarship initiative (described above in the Identify Funding Resources section) and LEAP, a program geared to provide grants to colleges that partner with employers to develop programs that address the skill gaps in the labor market.[46] In addition, Tennessee has changed the policy landscape for CTE by adding criteria for work-based learning

[45] http://www.kslegislature.org/li_2012/b2011_12/measures/documents/summary_sb_155_2012.pdf
[46] http://driveto55.org/initiatives/tennessee-leap/

experiences,[47] creating statewide dual enrollment opportunities,[48] and providing extra college counselors embedded in high schools (as described in the Design Education and Training Programs section). All these policies aim to create a seamless career pathways system helping students of all ages to fill existing and projected labor market skill gaps.

Data-Driven Policy Changes

WIOA requires the governor to establish a state workforce development board to assist in carrying out key functions to include reviewing statewide policies or programs to align workforce development systems. The statute also requires that state board to align the technology and data systems across one-stop partner programs. Alignment means the policies, procedures, regulations, and practices that govern the programs of each agency can complement each other and do not create barriers in working together. This mandate may provide CTE leaders with a ready opening to approach workforce leaders for partnership.

Besides reviewing workforce projections, labor market information, and postsecondary education offerings, examining CTE data can also reveal ways to align policies and programs to better prepare students to compete in the workforce pipeline. In Bozeman, Montana, the data showed an alarming rate of dropouts among teen parents. School officials knew they were not serving teen parents without onsite childcare facilities, so they collaborated with the YMCA to provide this service. The district provided the space and equipment for a day care facility while the YMCA provided the daycare staff. Teen parents received free daycare and district staff had access to use the facility if slots were open. To further leverage the onsite location of the daycare, the facility was set up as a work-based laboratory setting for the school's child development course, providing hands-on experiential learning for students interested in pursuing a career in early education. Removing the obstacle of childcare for teen parents resulted in a surge in high school completion rates among this target population.

In some cases, current policies create barriers to the kinds of partnerships and alignment that make career pathways systems development possible, or for CTE to participate as a full partner in the effort. For example, it is common for K-12, community colleges, and workforce training programs to have separate funding sources and very different accountability reporting requirements. Such policies are often laid out in laws and statutes. Regulatory barriers and barriers regarding data tracking, data sharing, and electronic system alignment may involve substantial investments and/or require legislative action. In addition to WIOA requiring alignment of education and training programs, the Perkins Act stresses the need for greater alignment between CTE and industry. Jobs for the Future (JFF) published a report, "Advancing Career and Technical Education (CTE) in State and Local Career Pathways," that offers strategies to align these two efforts. The paper provides a helpful crosswalk for states and local communities in aligning these initiatives.

[47] http://www.tennessee.gov/education/topic/work-based-learning
[48] http://www.tennessee.gov/education/topic/dual-credit

Rural Spotlight

An entrepreneurship class at Brownsville Area High School in Pennsylvania has expanded into an educational pathway that starts in middle school and continues through high school.[49] The classes cover all aspects of business startup and operations from the ground up—from sales to management to logistics and scalability. Students participate in national competitions, pitting their business models against peers from around the country. One of the goals is to provide economic opportunities in the southwest Pennsylvania area to retain young people who might otherwise migrate away from an area that has experienced many downtown business closures. About 75 percent of the students who have taken the Advanced Entrepreneurship high school course are now actively selling their products on the open market in the area, through e-commerce.

Plays for CTE

It is important to engage your sector partnership in the identification of entry and exit points for individuals and clear transitions between educational offerings. Policies and practices should be regularly reassessed for continuous improvement. This process requires data on participant progress and outcomes to inform policy, practice, and funding decisions[50].

VI. Measure System Change and Performance

Description: Appropriate measures and evaluation methods are in place to support continuous improvement of the career pathways system.

Key Components:

- Define desired system, program, and participant outcomes.
- Identify the data needed to measure system, program, and participant outcomes.

Voices from CTE Leaders in the Field

- Each program must include quality and equity.
- Some CTE leaders are concerned about meeting accountability measures that require them to create and then be judged on outcomes from programs preparing students for high-wage, high-demand jobs, but industry participation in the design and implementation of the programs may be absent and the regional economy may not support enough high-wage high-demand jobs to justify a program.
- Funding sources must be aligned to outcomes.
- Although high school can be responsible for college and career readiness, it cannot be responsible for college and career outcomes.
- Schools need administration comprised of quality leadership that understands career pathways.
- Agencies also need quality leadership.
- CTE stakeholders understand the need to define outcomes and collect and share data, and they need their concerns to be integrated into the accountability system.

[49] The middle school curriculum is at https://www.dropbox.com/s/ss190fbqreyml7w/14-15%20Grade%208%20Entrepreneurship.doc?dl=0

[50] Adapted from the 2014 Minnesota Governor's Workforce Development Council Policy Advisory Report: Building Partnerships to Overcome Barriers: Developing Skills to Thrive in a Changing Economy.

- Implement a process to collect, store, track, share, and analyze data.
- Design and implement a plan for reporting system and program outcomes.[51]

Effective career pathways systems require robust data feedback loops.[52] Continuous process improvement (career pathways) is one useful model for this effort. career pathways begin with existing data on career pathways (e.g., number of graduates, percentage who enter college and/or the workforce, etc.).[53] Career pathway partners identify system goals,[54] develop improvement plans,[55] implement the plan, and then measure again[56] in a continuous process.

As an example of this feedback loop, consider the Perkins accountability measure for technical skill attainment.

What do the data show for your state? Is this an acceptable percentage? What are the initial goals, interim goals, and long-term goals (goal setting)? What is required to achieve those goals (planning)? How will you measure performance for each goal? How will you revise your goals and plans based on performance outcomes?

As schools continue to build strong career pathways, CTE programs are likely to become more rigorous and robust. But in many communities, CTE still struggles to overcome outdated perceptions that it is a vocational track and does not prepare students for postsecondary education. Including CTE measures in the accountability system is one way to change these perceptions. Two versions of an adage show two perspectives on this idea: we value what we measure, and we measure what we value.

For example, when CTE courses count toward graduation requirements, or when earning an industry-recognized credential also earns high school points in the accountability system, students—and parents—get a powerful signal about the value places on those courses.[57] Data will offer a strong foundation for CTE leaders to forge partnerships, make data-driven decisions for strategic investments, and support marketing efforts to combat negative perceptions that may exist.

Resource

To review the impact of comprehensive systems change at the state level, review Element Six of the *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development*.

[51] https://careerpathways.workforcegps.org/resources/2016/10/20/10/11/Enhanced_Career_Pathways_Toolkit
[52] Graphic https://www.education.ne.gov/ciptoolkit/
[53] https://www.education.ne.gov/ciptoolkit/creating.html
[54] https://www.education.ne.gov/ciptoolkit/setting.html
[55] https://www.education.ne.gov/ciptoolkit/planning.html
[56] https://www.education.ne.gov/ciptoolkit/implementing.html
[57] Council of Chief State School Officers (CCSSO). (2014). Opportunities and options: Making career preparation work for students. Washington DC.

State Performance Metrics and Their Use

Much of the work being done to measure system change and performance is at the system or state level, with data uploaded from local schools, colleges, and agencies. State-level performance includes an evaluation of the system, program, and participant levels. Here are three examples of states treatment of performance metrics:

As in most states, Colorado's career pathways performance metrics refer primarily to postsecondary education or the workforce, but the state also collects data on how many industry-recognized credentials students earn at the high school level and which agencies and institutions are partners in the state's career pathways system. Colorado mapped the metrics of all career pathways system partners to identify where they align and how the metrics portray the entire workforce system, to evaluate and improve it.[58] Its performance indicators measure the impact of career pathways on the student or worker, the employer, and the progress and quality of the career pathways system.[59]

Minnesota has also developed performance metrics for its career pathways system. The state was a leader in developing a statewide longitudinal education data system (SLEDS) spanning K-12 and postsecondary education. Higher education, K-12, and the state unemployment agency retain their own separate data systems but link their data to create the Graduate Employment Outcomes (GEO) online tool and the Minnesota Dashboard. These tools provide aggregate information about the employment rates, hourly wages, and industry of employment of graduates[60] and provide reports of employment conditions and trends.[61] Although high school graduates are not always included in these reports, the reports may be useful in exploring careers as well as reviewing the corresponding outcome data on employment opportunities upon completion of a certificate or degree program. The Governor's Workforce Development Board in Minnesota, comprised of leaders from business, education, labor, community organizations, and government, has developed a *net impact framework*[62] to compare participant outcomes to similar non-participants, controlling for demographic characteristics. This method allows the state to make evidence-based policy decisions as well as to engage in continuous improvement.

Nevada's statewide longitudinal data system is an online research tool that creates on-demand reports. For example, one can request data on the mathematics course-taking patterns of the state's high school students, the high school graduate remediation rate, or state wages by education level.[63] In addition, Washoe County School District has its own in-house data warehouse for CTE and other educators to track students' performance and create individualized improvement plans based on data that are updated daily. can create individualized student profiles for counseling purposes or to inform parent-teacher conferences.

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[58] https://www.colorado.gov/pacific/cwdc/colorado-state-plan-goals

[59] www.sectorssummit.com/wp-content/uploads/2015/06/Career-Pathway-Key-Performance-Indicators-CO-with-discretionary-v1.ppt

[60] https://mn.gov/deed/data/research/

[61] https://mn.gov/deed/newscenter/publications/

[62] http://mn.gov/deed/images/Workforce_Development_Net_Impacts.pdf

[63] http://npwr.nv.gov/reports

Data metrics will evolve as states dive deeper into their career pathways systems implementation. Defining success and how to measure it, setting up a system to collect and analyze cross-system data, measuring system performance, and analyzing the results, will provide funders and other stakeholders with concrete results, and give partners the information needed to continuously improve the system. Determine the data gathering, sharing, and analysis protocols, and use the results to continuously improve the system: How have these outcomes changed since implementing the career pathways system, and how does that change impact the system—what supports does the system need to fortify strengths and what changes does the system need to correct weaknesses?

TIP – Last Word on Measuring Change and Performance

Celebrate every year the hard work that the people in your partnership do. Creating milestones to strive for and progress towards them should be lauded, whether those milestones were met or nearly met.

Plays for CTE

Each partner in the system may have its own interests and its own ideas about how to measure change and assess performance. Partners will determine the most important aspects of the system to measure and/or the statutory accountability measures associated with each system component, as well as how to measure those and analyze the results. To measure how the system has changed outcomes, determine the pre-implementation status of each element you will measure, and set benchmarks and goals for each. For example, ask

- Are youth and adults moving through the system to a completion point?
- Are they successful on the job and how does the system define that success?
- If participants return for further training, are their on- and off-ramps seamless?
- Do employers hire students have completed a pathway in the system?
- Are employers satisfied with the skills of students who have completed a pathway in the system?

Then,

- Working with your state data agency, standardize data metrics related to career pathway systems.
- Ensure data sharing agreements between and within state agencies (e.g., education data and SSI data).
- Create a data warehouse to facilitate data analysis.

Conclusion

CTE has moved to the forefront of the college and career readiness conversation. Career pathways are a means of achieving college and career readiness. A career pathways system needs robust career pathways. Stand-alone programs, focusing on a narrowly defined program no longer meet the needs of students, their communities, or the industries within those communities.

In this current landscape, it is in the interest of CTE leaders to know local labor market projections and expectations for their graduates to better align with career pathways. CTE leaders need to be able to answer the question: Are you preparing your students with the knowledge, skills, and abilities they need to succeed on the job or in the next step in their training? The prospect of joining in the development of a career pathways system through formalized partnerships and blended funding opportunities offers many new mechanisms for CTE leaders to expand the effectiveness of CTE programs and possibly bring the importance of CTE programs into public focus.

A better understanding of career pathways systems implementation, strategies, and considerations will be necessary for CTE leaders to position themselves as equal partners in preparing our nation's workforce. *Beginning with the End in Mind: A Career Pathways Playbook for CTE Leaders* provides tools and resources to assume a leadership role in the larger career pathways discussions. It is designed to provide a planning tool to help CTE leaders move CTE from stand-alone programs to becoming part of a career pathways system. Beginning with this end in mind is the challenge for CTE leaders at the state, regional, and local levels.

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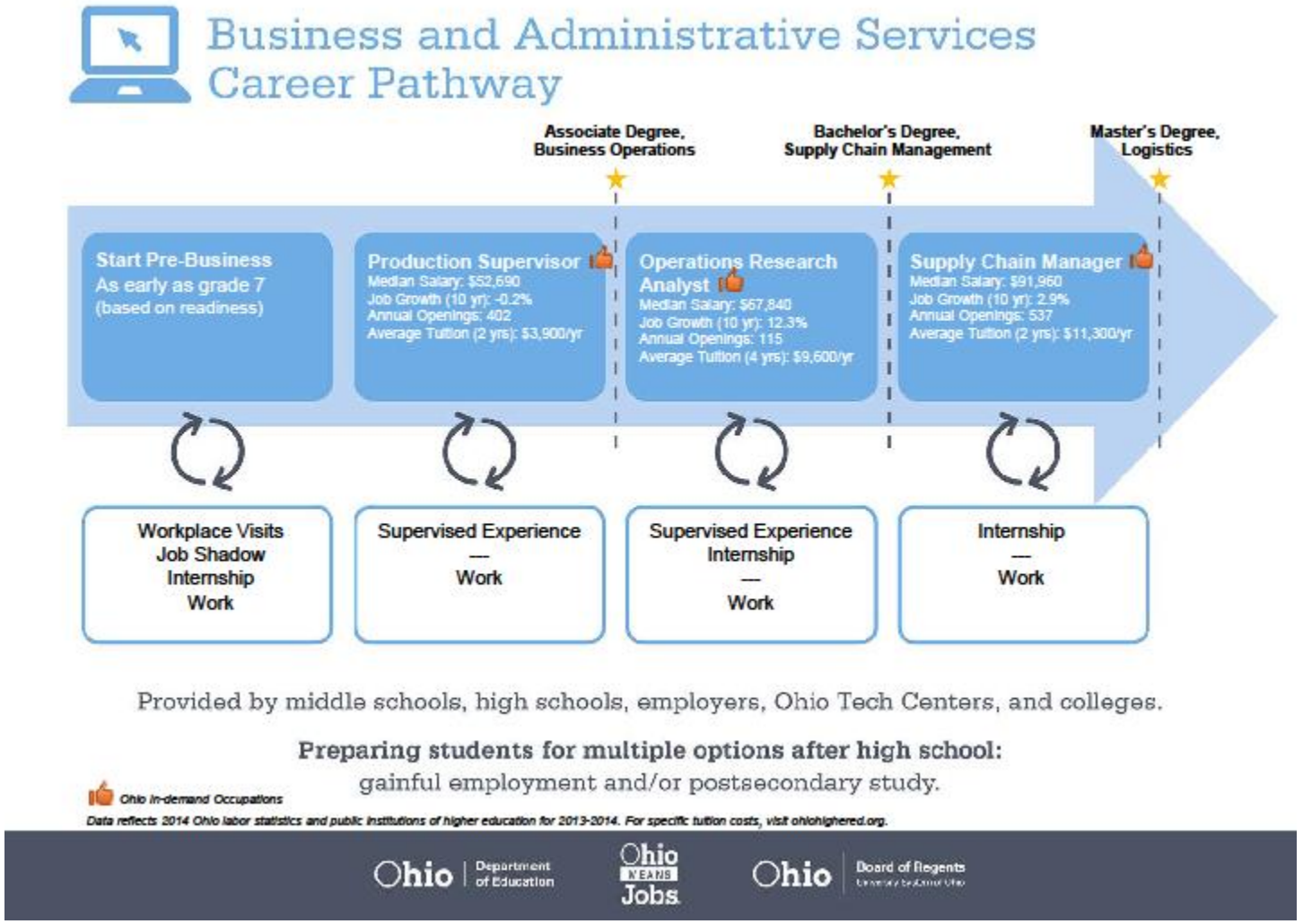
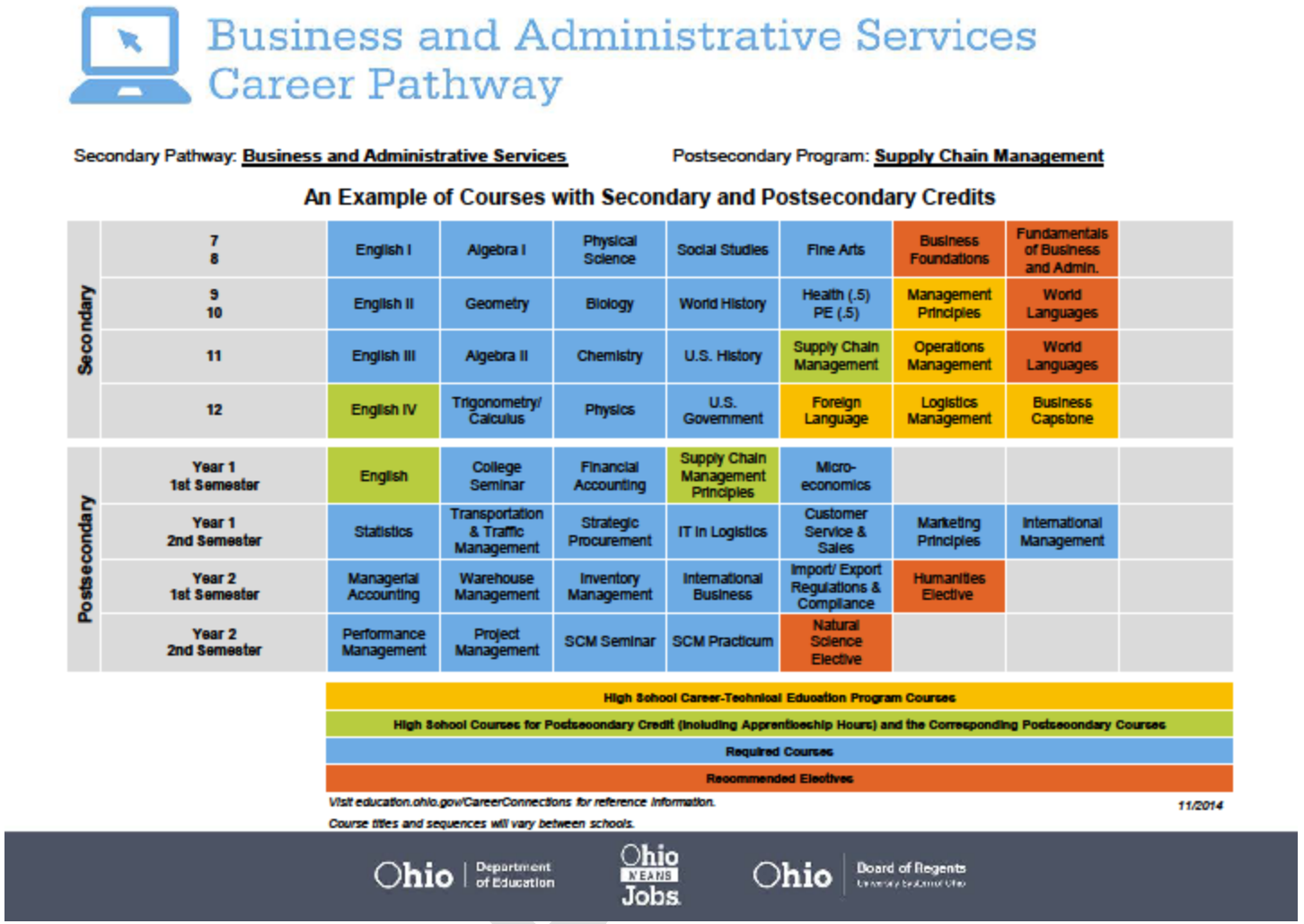
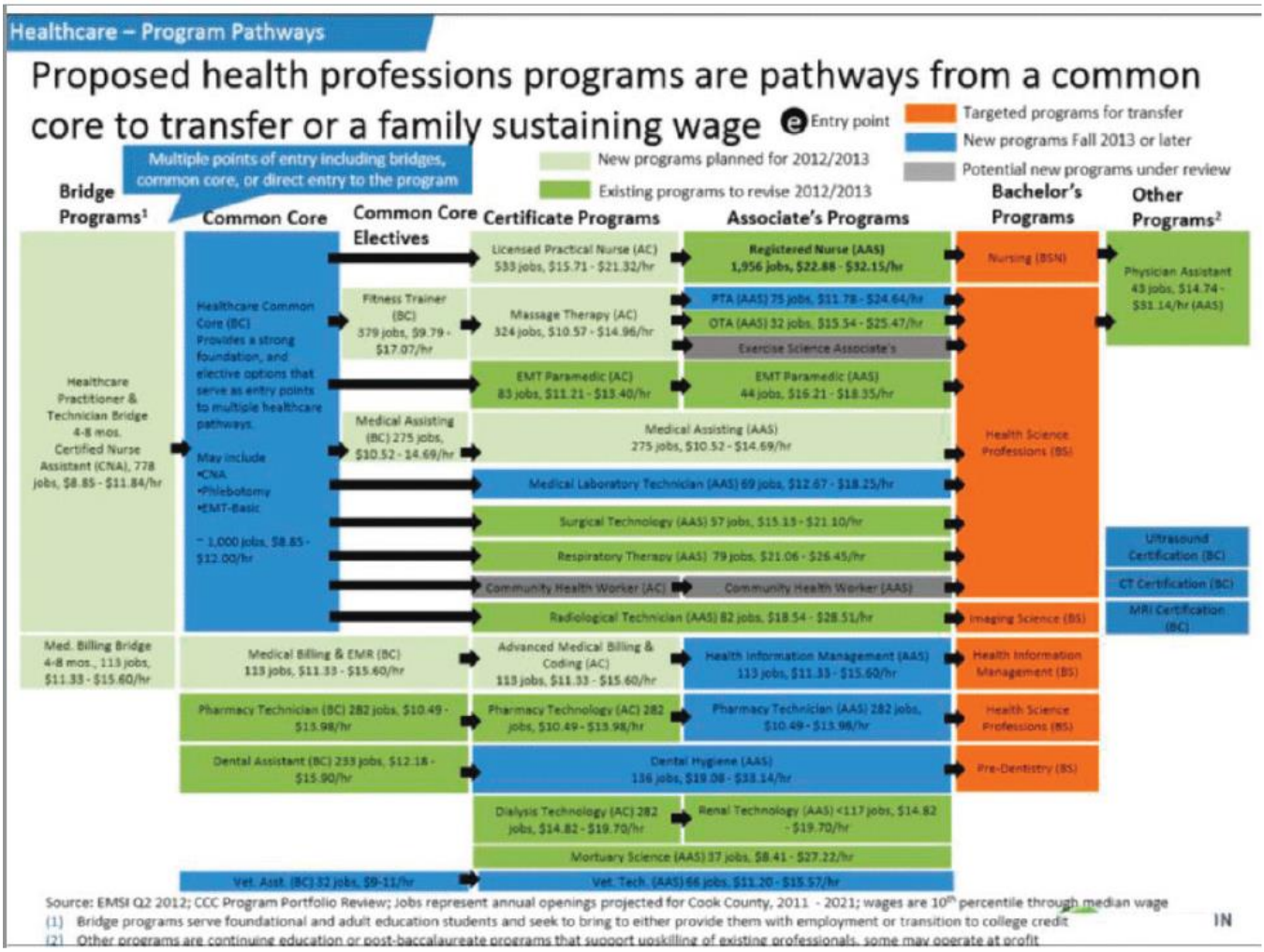
Appendix 1. Ohio 2-Page Career Pathway Schematic: Business and Administrative Services





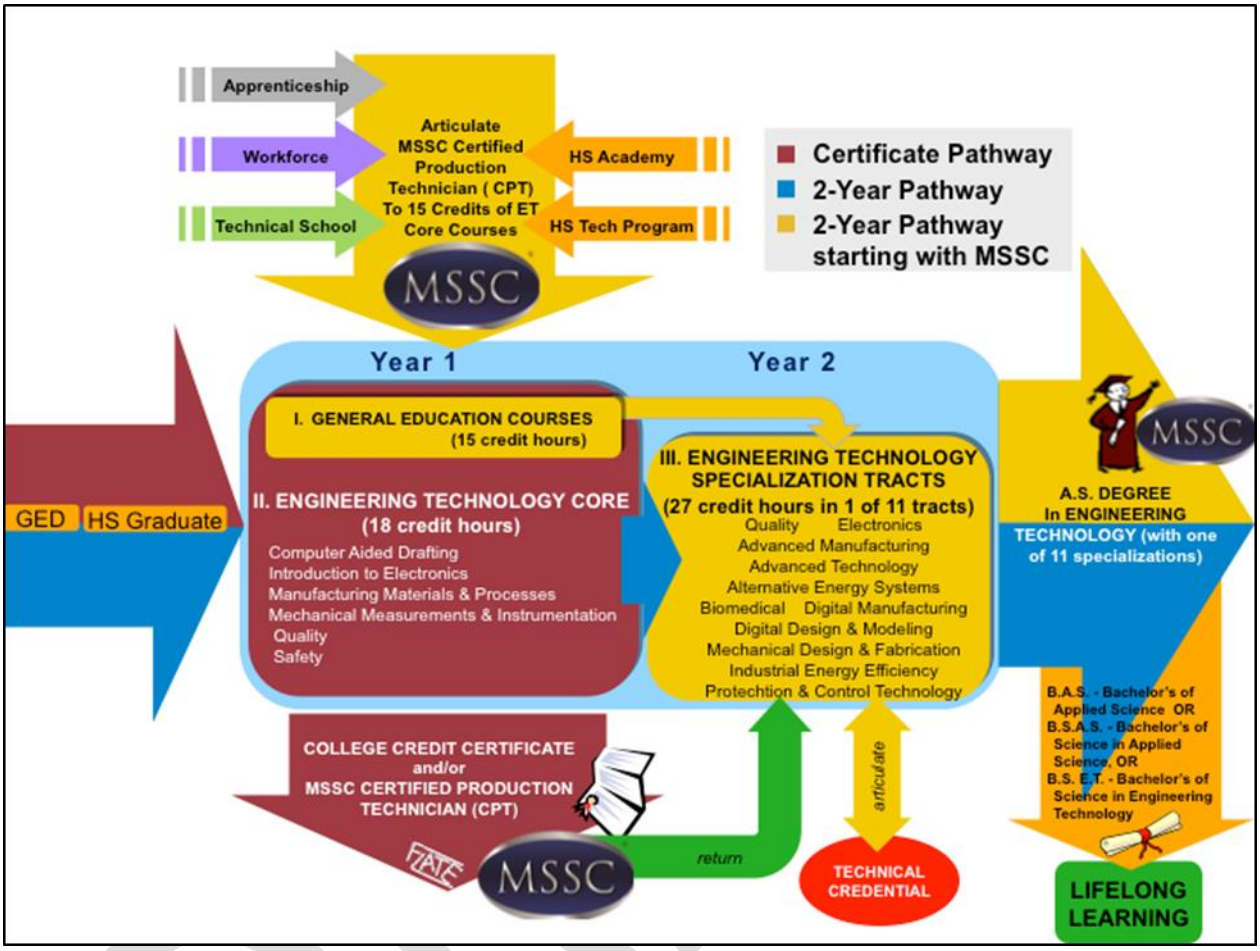
Source: http://education.ohio.gov/getattachment/Topics/Career-Tech/Career-Connections/Career-Pathways/Business-supply_chain_mgmt1_11-2014.pdf.aspx

Appendix 2. Colorado Worksheet: Building the Sector Partnership and Mapping Assets



Source: http://www.sectorssummit.com/wp-content/uploads/2015/07/Creating-Career-Pathways-in-Colorado.pdf

Appendix 3. Florida Skill Attainment Map: Engineering Technology



Source: http://fl-ate.org/programs/stackable-credentials/

Appendix 4. Houston Independent School District Job Announcement: Linked Learning Counselor

HOUSTON INDEPENDENT SCHOOL DISTRICT
JOB DESCRIPTION

POSITION TITLE: Linked Learning Career Counselor — Date: 3/26/15
JOB CODE: 000250, 000128

CONTRACT LENGTH: 11 Months or 12 Months

PAY GRADE: Teacher Salary Schedule

IMMEDIATE SUPERVISOR: Principal

POSITION SUMMARY

The Career Counselor is responsible for oversight of a cohort of high school students at a campus offering a Linked Learning program as well as for the identification of students for participation in the program.

ILLUSTRATIVE DUTIES

- Administers vocational interest and aptitude tests to 8th grade students in feeder pattern of assigned high school to identify students for Linked Learning programs.
- Analyzes and interprets results of the vocational assessments for students and school staff.
- Guides individual and groups of students in the cohort through Linked Learning principles leading to the development of career awareness and education planning.
- Collaborates with evaluation specialists, guidance counselors, vocational counselors, and parents regarding test results and recommendations for Linked Learning and other vocational programs.
- Consults with parents, teachers, administrators, and other relevant individuals to enhance their work with students. Coordinates with school and community personnel to bring together resources for students. Provides in-services and workshops for appropriate school personnel.
- Performs miscellaneous job-related duties as assigned.

EDUCATIONAL REQUIREMENTS

- Master Degree from an accredited college or university in Guidance and Counseling
- Texas Education Agency Counseling Certification

EXPERIENCE

- Two years exemplary teaching experience.
- Detailed knowledge of career and technology programs
- Knowledge of vocational assessment instruments to ascertain interests and abilities of students

OTHER REQUIREMENTS

Ability to communicate effectively in both written and oral forms with all levels of management both internal and external to the district.
Ability to acquire information regarding different subjects, analyze, select, and present information in an acceptable form.
Ability to establish and maintain effective working relationships with all levels of management both internal and external to the district.
Ability to adjust the eye to bring an object into focus; judge distance (close and distant); reach with arms extended and use hands to manipulate the keyboard.
Ability to travel throughout the district.
Ability to lift and carry up to 20 pounds, stoop, kneel, crouch, walk, twist, climb, drive and/or be mobile.
Valid Texas Driver's License with appropriate insurance coverage.

Source: *https://www.applitrack.com/houstonisd/onlineapp/1BrowseFile.aspx?id=506554*

Appendix 6. About WIOA and DOL Resources

The WIOA passed into law in 2014 and took effect in 2015, replacing the Workforce Investment Act of 1998 and amending the Adult Education and Family Literacy Act, the Wagner-Peyser Act, and the Rehabilitation Act of 1973.

WIOA mandates that state employment and training systems forge greater partnerships between employers and education and training institutions to ensure that programs are demand-driven and provide some type of education and/or industry-recognized credentials that lead to employment.

WIOA requires action from state leaders to establish a state workforce development board to assist the governor in carrying out critical functions of the workforce development system. Included in this mandate is the requirement to establish strategies to support the use of career pathways. For states submitting a unified state plan under WIOA, the state-level representatives on the cross-agency leadership team must include, at a minimum, the WIOA core partners but are encouraged to include additional partners to lay out a four-year strategy for developing and sustaining a career pathways system. Those partnerships may serve as a useful starting point for CTE leaders working at the systems level.

WIOA also requires the governor, in partnership with the state workforce development board, to submit a four-year unified or combined state plan WIOA encourages CTE participation in the development of a combined plan to develop a more comprehensive education and workforce system.

Another feature of the WIOA legislation is the ability to blend and braid disparate sources of state, federal, and philanthropic funding to better meet the collective needs of students/future employees, employers, and state economies. In a career pathways system, Perkins funding, the largest federal source of support for CTE, could become one of the funding braids to better serve the system's constituents. As an example, out-of-school youth—who would normally fall under WIOA—might be better served in a Perkins-funded area skills center program rather than an adult training program. If the public school system is a partner in a career pathways system, it becomes possible to place that individual in a more appropriate setting.

The DOL's 2016 *Career Pathways Toolkit: An Enhanced Guide and Workbook for System Development* updates the 2011 and 2015 versions. The 2016 toolkit maintains the six key elements framework and updates the essential components for implementing an effective career pathways system. The toolkit also embeds hands-on worksheets for each element to assist state and local partners in planning and implementing a comprehensive career pathways system.

Appendix 7. A Six-Step Process to Workforce Alignment

Workforce alignment is a strategy to engage employers in the career pathway process and build an information base for designing education and training programs. The objective is to understand the state's economy and industry staffing structure, and to achieve consensus among partners on the industries to target. A useful approach to this strategy is the following six-step process adapted from South Carolina's approach to sector strategies.[64]

1. **Form sector partnerships**: Identify the partners needed for each sector and begin to develop sector partnerships that will form the basis for building sector strategies. When all partners are part of the relationship from the beginning, they can work together to mutually meet all partners' needs; however, over time, system partners may change as system needs change.

2. **Gather workforce data and intelligence**: Partners should collaborate in collecting and analyzing data (including anecdotal information on industries' futures from stakeholders, especially economic development entities) and in making decisions on the industries and occupations to target.

   Labor market analyses at several levels of the economy can inform the analysis: local,[65] regional,[66] and statewide.[67] In general, the analysis will identify sectors of the economy that are projected to grow. Companies like Burning Glass[68] or EMSI[69] provide these types of projections on a real-time basis. These entities analyze thousands of job postings daily for an up-to-the minute labor market picture. These projections will form the foundation for identifying career pathways, which will form components of the career pathways system.

3. **Assess talent needs and gaps**: Working with the sectors the partners discover in the data analysis, the next step is to define the skills standards for those sectors (talent needs), then identify occupational skill gaps, and education and credential needs. Next, they take an inventory of education and training programs (asset mapping: see *Career Pathways Toolkit*, Element One, page 13; **Appendix 2**; and below for more information). They use the results to develop an education and training gap analysis[70] in relation to industry and workforce needs.

Once the partners have both the occupational skills standards and the education, training, and credentialing gaps to meeting those standards, they can use that information to begin to build the POSs in the career pathways that will form components of the career pathways system. Fundamentally, documented skills standards[71] should be a guideline for education and training providers to make changes and upgrades to existing curriculum, and to create new programs

[64] http://www.sctalentpipeline.com/resource-center/six-step-development-process
[65] http://www.ci.porterville.ca.us/depts/CommunityDevelopment/documents/Chapter3EconomicDevelopment_000.pdf
[66] http://ieep.com/wp-content/uploads/2014/11/QER-April-2016-web.pdf
[67] http://kwib.ky.gov/stateplan2012/AttachmentC.pdf
[68] http://burning-glass.com/
[69] http://www.economicmodeling.com/
[70] http://www.designtrainingprograms.com/training-gap-analysis/
[71] http://cleanenergyexcellence.org/industry/skill-standards/

and credentials. Regularly updating curriculum is particularly important to keeping the system relevant.

Appendix 2 illustrates a sector partnership and asset map example from Colorado. An asset map is a tool partners can use to show the transferability and connections among the certifications, credentials, and degrees currently offered.[72] In this context, creators develop an inventory of existing education and training assets that apply to the target industry sector. This inventory should include three elements: the providing institution or organization, the program title, and the resulting credentials or certifications.

Well-defined lists of KSAs are also useful for employers who should be encouraged to review their job descriptions and hiring requirements, which, if inaccurate, can lead to personnel issues down the road. It may be that your industry partners are not skilled in conducting a competency or skill assessment. Another option is to use other resources to begin the conversation. CareerOneStop[73] is a useful resource.

Once you have detailed skills standards profiles for critical occupations, educators, trainers, and employers will have a clearer picture of the occupational requirements. The analysis will also provide a sense of compatible jobs and transferable skills in other industry sectors. It is now time to create a *skill attainment map* of your career pathway. To do this, you will need to dig into the specific skills needed for an individual to advance from an entry-level occupation to a mid-level occupation by assessing the needed skills attainment for such advancement. The skill attainment map becomes the career pathway, a map of how a student can move through education and training into a career of choice. An example of a skill attainment map for engineering technology in Florida is show in **Appendix 3**.

This will require cross-analysis between levels. For example, an entry-level heavy equipment operator will need additional skills in repair, equipment maintenance, troubleshooting, reading, math, and blueprint reading if he or she is to advance to a mid-level assembler. Once again, find a creative way to graphically depict this, and start labeling the gaps in programming. Use this as a guide for finding critical touch points between institutions where articulation agreements, MOUs, and improved navigation for students is needed. Finally, find a way to insert actual projected demand in real numbers into your map. The pitfall at this point is not paying attention to the number of jobs that exist within a certain occupation category and potentially training too few jobseekers. Equally problematic is over-saturating the labor market by training too many.

4. **Identify and develop education and training resources to actualize career pathways:** The partners work collaboratively to identify and develop education, training, and related resources to convert into investments that actualize career pathways.

5. **Organize and deliver services:** Having created a shared understanding of the labor market, the partners can develop a shared vision for designing a career pathways system that meets

[72] http://www.sectorssummit.com/wp-content/uploads/2015/07/Creating-Career-Pathways-in-Colorado.pdf
[73] http://www.careeronestop.org/CompetencyModel/competency-models/pyramid-home.aspx

industry needs by preparing students for promising occupations, and identify key strategies to realize this vision, as well as determine the most efficient and effective arrangement for organizing and delivering services. The trend for states to submit joint plans for federal Perkins, WIOA, and other workforce-related programs reinforces a move for collaboration and alignment.

6. **Assess, adjust, and improve services:** The full partnership team continues to assess the value the career pathways system provides to industry employers and jobseekers/students, adjusting and improving as appropriate.

TIP

Industry partnerships will continually change and evolve as key occupations and industries shift. These critical changes require adjustments to career pathway programs. Changes in this key element based on data and ongoing industry needs may require changes in other elements, to include partnerships and curriculum changes.

The Six-Step Process to Workforce Alignment as

Demonstrated by One Community, One Goal (Miami-Dade County, FL)

Miami-Dade County, Florida, has had an economic development partnership since 1985. Known as the Beacon Council, its role is to promote jobs and investment in Miami-Dade County by working with business and industry of all sizes and sectors to locate or expand in the Miami area. The long-term goal is to create sustainable economic prosperity. The Council does this through disseminating information about Miami-Dade County and the benefits of locating there, as well as by growing local businesses. The Beacon Council's economic development initiative called One CountyOne Goal (OCOG), begun in 2012, serves as a model for the six-step process to workforce alignment.

1. Gather Workforce Data and Intelligence

One County, One Goal (OCOG) began by reading prior studies and strategic plans in order to update information. They conducted a SWOT analysis, exploring the strengths, weaknesses, opportunities, and threats to siting businesses in the county. They then used growth forecast and trend tools to identify and target industry sectors with the highest potential for creating new jobs. These sectors also had to have an existing base of community assets and match community goals for growth and sustainability. They identified seven target industry sectors: aviation, banking & finance, creative design, hospitality & tourism, IT, life sciences & healthcare, and trade & logistics.

2. Form Sector Partnerships

OCOG worked with the education sector to develop a workforce to fill those positions. They assessed whether college graduates in the area were obtaining degrees that were aligned with future job growth. With respect to K-12, OCOG noted many challenges, including poverty and immigrant populations with limited English. The school system developed career academies which increased employer participation. The recommendations from the OCOG report suggests developing programming relative to industry needs and providing best practice examples for schools and universities to consider.

3. Assess Talent Needs

OCOG mapped the skills local and future employers in Miami-Dade County needed and compared them to the current education and training programs offered. The gap analysis provided data to stakeholders regarding their capacity to develop a talent pool whose competencies aligned with the identified target industries. Gaps in the pipeline were identified and shared with stakeholders.

4. Identify and Develop Education and Training Resources to Actualize Career Pathways

The sector analysis performed by OCOG revealed opportunities to enhance the number and types of learning opportunities, programs, and policies that lead to target industry growth and a prosperous economy. Recommendations to business leaders included becoming more involved with schools and students at all levels, including helping to develop on-ramps to careers in their industries for adult workers.

5. Organize and Deliver Services

Internships were among the chief services that OCOG included in their economic development plan, because strong internship experiences for students were crucial to prepare and retain homegrown talent. Internships had the potential to keep Miami graduates in Miami—employers would not need to recruit nationally, and graduates would not need to leave home to find fulfilling careers.

6. Assess, Adjust, and Improve Services

In 2015, the Beacon Council spun off the internship program to the Talent Development Network. Foundations provided seed money to start the program that offers paid, 12-week internships to students in the partner institutions (colleges and universities with local campuses in Miami-Dade County as well as Miami-Dade County Public Schools' career academy students). Interns register online and employers post internships online, for which registered students may apply. The website contains videos and other tips ("Internship in a Box" guide) for students and employers.

More information on the Beacon Council and OCOG may be found at http://www.beaconcouncil.com/ and the TDN internship program is at http://home.tdnmiami.com/

Appendix 8: Four States Address the CTE Teacher Shortage

South Dakota recognized this need and passed legislation that raised certain sales taxes by ½ cent to fund pay raises for both K-12 and postsecondary technical school instructor salaries.[74] South Dakota is not known as a heavily-taxed state (there is no individual or corporate income tax), yet state leaders understood that in order to entice workers from industry and "educate a top-notch workforce, we need top-notch instructors" (Raposa, 2016).

Texas recognized that their teacher certification process for industry professionals was very time-consuming and often costly to candidates, creating a low-incentive path from industry to teaching. The state legislature passed a bill that created a District of Innovation designation, allowing school districts exemptions from certain provisions of the Texas Education Code, including the teacher certification criteria. Now, districts may hire professionals without teaching certificates to teach CTE classes, and the districts are responsible for establishing their own teacher certification criteria.[75] This has allowed industry professionals—who are qualified to teach in postsecondary institutions—to teach in high schools. The state will monitor each District of Innovation's long-term results.

Noteworthy Practice: Industry-Certified Teachers

Louisiana requires teachers who are expected to teach students the knowledge, skills, and abilities necessary to earn industry certification to themselves be certified in that area. The state facilitates this with a Super Summer Institute that provides teachers training for industry certifications that are aligned with the state's pathways. The state department of education pays for the training costs (outside of travel expenses and registration fees).

https://www.louisianabelieves.com

Iowa, like many states, has a policy that certifies industry experts to teach only part-time in secondary school, similar to an adjunct faculty position at the postsecondary level. However, Iowa's model is like an internship in that the experts team teach with experienced teachers while they also work to earn the alternative licensure. In this way, students are exposed to industry expertise in the classroom, and the experts benefit from experienced teacher mentors in the classroom.[76]

Without such a mentorship model, many CTE teachers from industry are lost in a classroom. They often lack experience in classroom management, lesson planning, and recording and using academic data. To address the very high CTE teacher turnover rate in 2006, the Colton-Redlands-Yucaipa Regional Occupational Program (CRY-ROP) in California developed a two-year Teacher Induction Program (TIP). New CTE teachers receive

- an online early orientation program,
- an online professional development program, and

[74] http://www.sdlegislature.gov/docs/legsession/2016/Bills/HB1182P.pdf
[75] http://www.dallasnews.com/news/grand-prairie/2016/11/04/innovative-thinking-state-clears-path-grand-prairie-districts-boost-local-control
[76] https://cte.careertech.org/sites/default/files/files/resources/State_of_CTE_Industry_Experts_2016_0.pdf

- the two-year TIP program consisting of
    - several days of professional development before school starts
    - afternoon workshops during the school year
    - coaching during the school day
    - observations of experienced CTE teachers

TIP was so successful, the state of California adopted and funded it in 2008 for induction of CTE teachers statewide.[77] TIP is still run by CRY-ROP, which has collaborated with NOCTI to bring in an evidenced-based component to the induction called CTEDDI (Career and Technical Educators using Data-Driven Improvement) that helps CTE educators use their own students' assessment data to help create classroom- and student-level improvement plans.[78]

[77] https://www.districtadministration.com/dod/awards/stop-voc-ed-teacher-turnover
[78] http://www.nocti.org/ProfessionalDevelopment.cfm?m=3

Appendix 9: Intermediaries in a Cross-Agency Partnership

International Trade Education Programs (ITEP), Port of Los Angeles, California:

Intermediaries in a Cross-Agency Partnership

There are times and places when neither education nor business realistically has the expertise, resources, or staff time to commit to desired goals. In these cases, it is helpful to consider an intermediary organization to do the required tasks. The ITEP in the Port of Los Angeles is an example of how intermediaries can work to meet education and business goals.

ITEP is a non-profit intermediary organization that partners with employers in port, maritime trade, transportation, logistics, business and finance, and related industries to provide broad work-based learning opportunities for related career academies in high schools near the Port of Los Angeles and beyond. ITEP works with employer partners to offer internships and career mentors to students as well as to prepare them for the diverse and high-growth opportunities in the many industry sectors related to port operations.

ITEP is an excellent example of an intermediary organization linking schools and industry. It serves as a stable partner linking the institutions regardless of leadership turnover within the organizations. ITEP's CEO noted that intermediaries bring "an element of independence and long-term sustainability" to the enterprise. Intermediaries "keep a bridge in place even when both shores wash away."

The Story of ITEP

ITEP began with a commitment to provide access to and ensure economic justice and equity for the often-neglected population of Wilmington, the city adjacent to the Port of Los Angeles. The people in Wilmington were predominantly low income and minority, and they often suffered from the effects of living near the port (e.g., health impacts such as asthma). According to the 2000 census, the city of Wilmington's population is 87% Latino. Its only high school, Banning High School, had a student population that was 95% Latino, and 76% of students were socioeconomically disadvantaged.

Two women, a harbor commissioner and a freelance grant writer/fundraiser founded ITEP in 1999 to build goodwill in the local community and develop a workforce pipeline.

ITEP originally focused its efforts on community college programs in international trade but found them unwilling to collaborate as their faculty were stuck in silos. ITEP turned its efforts toward secondary educators in Wilmington who had been looking for a way to address low student graduation rates, low teacher morale, and low parent support. ITEP worked with Banning High School, which was receptive to the idea and had a need for the enrichment activities that ITEP planned. ITEP linked together the port business leaders and Banning High School to design an international trade elective track. They soon joined the California Partnership Academies network of career academies. The program also joined the Linked Learning Alliance, a statewide secondary education program that integrates college-ready academics with high-quality CTE, work-based learning, and student supports.

ITEP's Success and Expansion

Banning High School now boasts five career academies associated with ITEP, in the following industry sectors: Advanced Manufacturing & Trades; Engineering, Architecture, & STEM; Environmental Science; Global Business & Logistics; Hospitality, Tourism, & Culinary Arts; and Law & Government. The academies are small learning communities that prepare students for career opportunities at the port in high-growth sectors including business, international trade, and logistics/distribution.

By 2014, the graduation rate for Banning High School academy students who complete an ITEP internship was 97%. ITEP served more than 4,500 students in 2016, a 35% increase from the prior year. Through the activities ITEP supports, these students are receiving a high school experience that brings confidence, choice, and opportunity.

In addition to Banning High School, ITEP has expanded its intermediary activities to other high schools in cities near the Port of Los Angeles and beyond. A school district in the California desert participates with academies devoted to logistics and transportation, as many of the goods transported to or from the port travel through the California desert. ITEP currently supports extracurricular activities for 16 associated career academies in ten southern California high schools.

Career Guidance Events

ITEP offers several annual events allowing students to learn more about port-related industries and network with industry representatives. Freshman students participate in "GPS Your Future," a student expo to explore careers (*hard hats and suits*) through industry-sponsored exhibits and explore apprenticeship and postsecondary opportunities. Freshman students also participate in "Discovery Day" at the U.S. Coast Guard base, where they explore careers such as search and rescue, navigation, emergency response, and law enforcement.

ITEP has an active alumni network, which sponsors mixers to provide opportunities for current students to meet and hear the experiences of graduates who work at the ports. Alumnus include a trucking company owner, a port operations superintendent, an engineer, and a labor relations assistant.

Work-Based Learning Activities

ITEP developed a work-based learning sequence that includes career awareness in 9th grade (e.g., career fairs, guest speakers), career exploration in 10th grade (e.g., college tours, networking opportunities), career preparation in 11th grade (e.g., industry coaching, student competitions, summer internships), and career training in 12th grade (e.g., dual enrollment, on the job training). Many students participate in Virtual Enterprise, a business simulation that involves creating a virtual business and managing all aspects of it, including profitability. Industry mentors assist by hearing students' elevator pitches. ITEP also continues to serve alumni through a professional development component consisting of alumni mixers, scholarship opportunities, and resume writing assistance.

ITEP's efforts are supported by business and philanthropic donations, as well as events such as the annual scholarship dinner, where proceeds go back to the programs. The Culinary Academy helps prepare the dinner, and each ITEP-supported academy has a booth at the event. Port employee volunteers log thousands of hours each year on events like these, and they raised $1.6 million dollars in financial support in 2015.

How ITEP Works with Industry

The ITEP board of directors includes a chair for each academy/sector, including presidents and human resources representatives from the transportation, banking, and engineering firms at the port, as well as city and labor representatives. Industry leaders can also participate as local advisory board members, speakers, mentors, and internship providers.

ITEP's work spans across industry sectors, as is the nature of port operations. The ITEP CEO noted that employers are not interested in dividing the world into CTE's 15 separate Career Clusters. "Industry partners don't get it when you say, 'but wait, that's the Business and Finance pathway.'" The strategy pertinent to the port is a cross-sector strategy that works for a complex workplace like the largest port in the United States.

See more information on ITEP at http://www.itepinc.org/.

Noteworthy Practice: Intermediaries Engaging Employers

International Trade Education Programs (ITEP) is a California non-profit intermediary organization that partners with employers in port, maritime trade, transportation, logistics, business and finance, and related industries to provide work-based learning opportunities for related career academies in high schools near the Port of Los Angeles and beyond. Employer partners serve as career mentors to students and help prepare them for the diverse and high-growth opportunities in the many industry sectors related to port operations. ITEP developed a work-based learning sequence of activities: career awareness in 9th grade (e.g., career fairs, guest speakers), exploration in 10th grade (e.g., college tours, networking opportunities), preparation in 11th grade (e.g., industry coaching, student competitions, summer internships), culminating in training in 12th grade (e.g., dual enrollment or on the job training). Many students participate in Virtual Enterprise, a business simulation that involves creating a virtual business and managing all aspects of it, including profitability. Career mentors assist by hearing students' "elevator pitches." Port employee volunteers log thousands of hours each year, and the project raised $1.6 million dollars in financial support in 2015. ITEP also continues to serve alumni through a professional development component of alumni mixers, scholarship opportunities, and resume writing assistance. Through the activities supported by ITEP, students receive a high school experience that brings confidence, choice, and opportunity. See more information on ITEP at http://www.itepinc.org/.