

Credentials Matter

Report 1: A National Landscape of High School Student Credential Attainment Compared to Workforce Demand

May 2019



Credentials Matter is a partnership between ExcelinEd and Burning Glass Technologies. This ongoing, comprehensive research project seeks to understand the industry credential landscape in the United States and provide actionable data analysis and resources for states and the public.

Credentials Matter combines ExcelinEd's policy expertise in college and career pathways with Burning Glass' cutting-edge labor market analytics to provide new insights into the alignment between the credentials students earn and the demand for those credentials in the workforce.

This project illustrates the credentials available and highlights the outcomes of credential attainment to inform key policy decisions about which pathways and associated credentials lead to middle- and high-wage employment opportunities and continued career advancement for students.



Launched by former Florida Governor Jeb Bush in 2008, the Foundation for Excellence in Education (ExcelinEd) supports state leaders in transforming education to unlock lifelong opportunity and success for each and every child. From policy development to implementation, ExcelinEd brings deep expertise and experience to customize education solutions for each state's unique needs. Focused on educational quality, innovation and opportunity, ExcelinEd's agenda is increasing student learning, advancing equity and readying graduates for college and career. Learn more at ExcelinEd.org.



Burning Glass Technologies delivers job market analytics that empower employers, workers and educators to make data-driven decisions. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into workforce demand patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need and the career directions that offer the highest potential for workers. For more information, visit burning-glass.com.

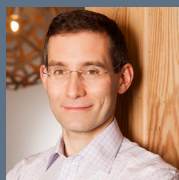


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Foreword



Patricia Levesque
ExcelinEd CEO



Matt Sigelman
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This year, 3.6 million American students will graduate high school.¹ Whether they enter the workforce immediately or pursue postsecondary education they will all eventually find a job market where an estimated 65% of positions demand postsecondary credentials.²

“

States offer a wide range of career and technical education (CTE) programs and credentials intended to prepare these students for success after high school or higher education, but how effective are these programs and the credentials that students are earning?

U.S. employers are struggling to find qualified applicants across a range of career sectors. In 12 career areas—including healthcare, computers and mathematics—demand for workers exceeded available supply by a total of 4.4 million job openings in 2016.³ This gap threatens our economy, undermines the innovation and competitiveness in many of our leading industries and will only worsen in a fast-changing market where jobs increasingly blend capabilities from different domains.

Industry-recognized credentials help address this skills gap by conveying a student's career readiness because they validate the knowledge and skills required for success in a given occupation or industry. In fact, full-time employees with an industry credential earn more than their counterparts without one, and in some cases, the salaries of non-degree credential holders' were found to be similar to workers with college degrees.⁴

***Credentials Matter* is a first-of-its-kind analysis of how the credentials students earn align with employer demand.**

Throughout our research, many states indicated they are working to improve the link between their CTE programs and their labor markets. Yet we found that half of all states aren't collecting the necessary data to know how aligned their credential programs are with employer demand, and not a single state's secondary credential program measures as "highly aligned" with the job market.

To be clear: we are not suggesting that CTE programs are failing to teach the skills they promise. But it is clear from our analysis that the credentials these programs provide too often have little currency with today's employers and are, therefore, of questionable career value to students.

The 2018 reauthorization of the \$1.2 billion Carl D. Perkins Career and Technical Education Act offers states an ideal opportunity to reassess the impact of their programs and make credentials a metric for success.

This report serves as a jumping off point for states to begin conversations about which credentials are most valuable and lead students to good careers. Our findings provide a basis for practical changes in credential programs that can improve the chances of job market success for many young people.

Right now, too many young people are missing the chance to graduate from high school ready to succeed in college and in careers that can support a family. *Credentials Matter* can inform and inspire efforts to build a better career education system for our students and their futures.

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1 National Center for Education Statistics - [Fast Facts](#), 2018

2 Georgetown Center on Education and the Workforce - [Recovery: Job Growth and Education Requirements Through 2020](#), 2014

3 Burning Glass Technologies - [Different Skills, Different Gaps: Measuring & Closing the Skills Gap](#), 2018

4 National Skills Coalition - [Measuring Non-Degree Credential Attainment 50-State Scan](#), 2018



Table of Contents

	Executive Summary	pg 8
	PART 1	
i.	Introduction: Credentials in Context	pg 14
ii.	Our Approach: Limitations & Methodology	pg 20
iii.	The Result: Findings & Recommendations	pg 26
	PART 2	
i.	State of Credentials: Overview of State Data Collection & Alignment	pg 40
ii.	Alignment Analysis 1: By Career Cluster	pg 50
iii.	Alignment Analysis 2: By Credential Type	pg 56
	Looking Forward: What’s Next for This Research?	pg 80
	Appendix	pg 82

Executive Summary

Credentials Matter is a partnership between ExcelinEd and Burning Glass Technologies. This ongoing, comprehensive research project combines ExcelinEd's policy expertise in college and career pathways with Burning Glass' cutting-edge labor market analytics to provide new insights into the alignment between the credentials students earn and the demand for those credentials in the workforce.

The research seeks to answer the following questions:

How many states are collecting data on student credential attainment and what data collection methods are they using?

The data used to answer these questions include:

Data Collection

States collecting data and how they are doing so.

Which credentials are being earned by students?

Supply

Credentials earned by students in high school, generally in state CTE programs provided directly by state education agencies.

What is the employer demand for credentials?

Demand

Employer demand for credentials according to actual job postings sourced from Burning Glass' proprietary job postings database.

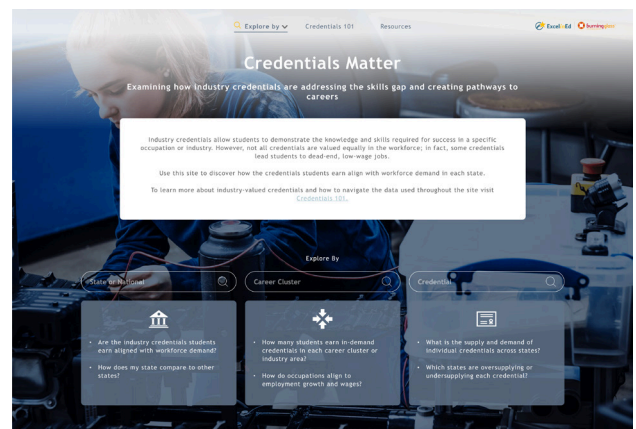
How do credentials earned align with employer demand?

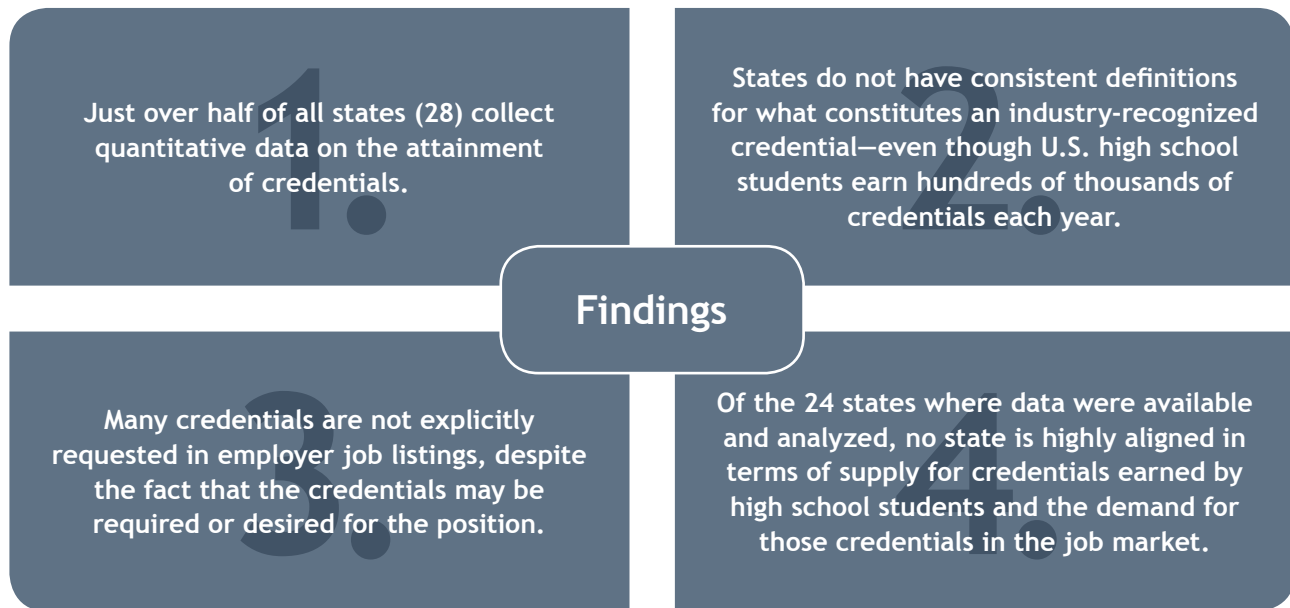
Alignment

Comparing supply to demand to determine how the credentials students earn align with workforce demand in each state.

This research, *Report 1: A National Landscape of High School Student Credential Attainment Compared to Workforce Demand*, along with the accompanying online interactive tool, [CredentialsMatter.org](https://credentialsmatter.org), are the first products of this extensive data collection, analysis and partnership.

The research resulted in the most extensive collection and analysis of supply, demand and alignment of industry-recognized credentials in states to date.





Credentials Matter findings and recommendations represent a critical first step to helping a range of stakeholders understand the current landscape of credentials earned and evaluate whether those credentials have currency in the job market.

- **For Policymakers:** The findings can help inform efforts and strengthen policies to provide high-quality career pathways, including attainment of high-value industry-recognized credentials.
- **For Educators and Administrators:** The findings highlight the need to ensure local CTE programs are aligned with state and regional workforce needs and that each pathway leads to credentials that carry the highest value among employers.
- **For Employers:** The findings provide a view of what students currently earn as well as an opportunity to communicate more effectively with educators and potential employees about credentials that carry value.
- **For Credentialing Bodies:** The findings emphasize the opportunity to collaborate with states and educational institutions to improve data collection and reporting related to industry credential attainment.
- **For Students and Families:** The research can serve as starting point for conversations about which credentials can provide the greatest benefits for a future career and long-term success.



PART 1



PART 1

Introduction: Credentials in Context

As we conducted this research and began writing this report, it became clear the word “credential” can be confusing. So, before digging into the research, we want to define what a credential is in general and how the specific types of credentials examined in this research fit into the overall landscape.

A credential is a verification of an individual's qualification or competence issued by a third party. This umbrella term can include educational certificates, degrees, certifications and government-issued licenses. It is used ubiquitously in conversations related to education and workforce development, sometimes in very vague or confusing ways.

Certification v. License: The Difference

Certifications and licenses are credentials that demonstrate a level of skill or knowledge needed to perform a specific type of job. Certifications are issued by a non-governmental body that is often affiliated with a specific industry or association, while licenses are awarded by a government agency and convey a legal authority to work in an occupation or complete a specific task. People may earn more than one certification or license; people with a license may also have a certification. Similarly, employers may require certifications and/or licenses for employees to perform certain jobs, which is variable by industry and occupation.⁵

Examples of credentials include: the Food Handlers certification awarded by ServSafe,

a Doctor of Engineering degree from a university, the Certified Welder certification awarded by the American Welding Society and a Commercial Driver's License issued by a state government agency.

This report considers the types of credentials available to high school students, often as part of a career and technical education (CTE) program. This generally means certifications or licenses, as well as other distinct types that emerged through this research, which are outlined in detail on page 56.

Not All Credentials Are Created Equal

High school students in all states can earn one—or more—of thousands of credentials intended to help them prepare for success in a specific occupation or industry. However, not all of these credentials are created or valued equally.

Many factors determine the value of specific credentials. To begin, we can look at explicit employer demand signals (i.e. how many job postings call for a particular credential). The content of job postings reflects the credentials and associated skills that are important to employers when they hire for specific positions, and these postings

5 Bureau of Labor Statistics - [Labor Force Statistics from the Current Population Survey](#), 2017

provide insights into how skills required for success in various occupations change over time. But there are other important factors to consider when determining the value of a credential, including the demand or growth projections and wages related to the occupation(s) related to the credential.

Determining value for a credential based on labor market demand is not straightforward. Some credentials may be in high demand but in occupations that pay less than a living wage or that are projected to decline over time. Other credentials may show low labor market demand, but act as prerequisites to additional credentials that lead to career advancement.

For example, most states require cosmetologists to hold a license. Though the demand for cosmetologists is expected to increase by 11 percent, the annual median salary for cosmetologists is \$24,850. Additionally, some states require a license or certification for floral design, which has a median salary of \$26,350 and is projected to decline by 6 percent. These examples stand in stark contrast to computer support specialists, an occupation with an annual median salary of \$56,275 that is projected to grow by 10 percent.⁶ Employers generally seek computer

support specialists who hold certifications or a degree in this field.

As states, educators, students and families consider pathways to various careers, they should consider the long-term outcomes related to wages and potential for employment afforded by each available career pathway and associated credential(s).




















This report unpacks the variations in the wide landscape of credentials earned and demanded across the U.S.

Not all of the credentials offered or earned are considered industry-recognized credentials. As defined by the Association for Career and Technical Education, the term “industry-recognized,” used with respect to a credential, means a credential that:

- Is sought or accepted by employers within the industry or sector involved as a recognized, preferred or required credential for recruitment, screening, hiring, retention or advancement purposes.
- Where appropriate, is endorsed by a nationally recognized industry association or organization representing a significant part of the industry or sector.

6 U.S. Bureau of Labor Statistics - [Occupational Outlook Handbook](#), 2017

Career Growth Projection and Earnings Examples

						
	Floral Design	Hairdressers, Hairstylists and Cosmetologists	Licensed Practical or Vocational Nurse	Computer Support Specialist	Food Preparation and Serving Workers	Automotive Service Technicians and Mechanics
Associated Credentials	 					
Employment# (2016)	55,000	617,300	724,500	835,400	3,452,200	749,900
Median Pay (2017)	\$26,350	\$24,850	\$45,030	\$56,275	\$20,180	\$39,550
Projected Growth (2016-26)	-6% 	13% 	12% 	10% 	17% 	6% 

U.S. Bureau of Labor Statistics, Occupational Outlook Handbook, 2017



License



Certification

While promotion of industry-recognized credentials as part of students' high school experiences has expanded in recent years, there is limited research on educational attainment levels or career outcomes associated with specific credentials. Previous Burning Glass research has found that while there are nearly 2,500 distinct credentials

requested in job openings across the nation **only 50 credentials account for two-thirds of all employer requests.**¹⁹

The limited employer demand for the remaining 2,000+ credentials confirms that the value of each credential may not be clearly communicated or understood.

This confusion leaves students with limited information about which industry-recognized credentials and associated coursework are valuable to pursue as part of a comprehensive career pathway. It can also lead to students earning credentials that provide minimal or no value in the workplace, offering false promises about students' readiness for success in the workforce. Finally, inaccurate or incomplete employer signaling leaves state policymakers and educators with a lack of understanding about the return on investment of offering coursework aligned with credentials that students earn.

The Importance of Employer Signaling

Employer signaling refers to the way employers communicate or signal their needs and requirements to potential employees, including students. Employers signal their needs and requirements through explicit information included in job postings and job descriptions, as well as less-available implicit information like hiring or advancement decisions and recruitment strategies.

One major factor contributing to the skills gap is the disconnect between how employers communicate or signal their

hiring requirements and how students and job seekers communicate how they can meet these requirements.¹⁹

The most serious issue lies with how employers communicate competency and credentialing requirements. And this problem is only getting worse in a dynamic, innovation-based economy with constantly changing competency and credentialing requirements.

This disconnect highlights the need for improved employer signaling that will allow educational systems and potential employees to verify that the skills students learn and the credentials students earn are those most valued by employers. There is much room for improvement in the quality of employer signaling through job postings, yet these data (though imperfect) still provide critical insights into what employers say they desire or require. And these insights will only become stronger as employer signaling improves.

Credentials in CTE Programs

CTE programs are the major provider and funding source for workforce preparation in high schools across the nation. They are also

the primary mechanism for students to earn an industry-recognized credential.

For those credentials that are highly valued by employers, industry-recognized credentials represent clear evidence that students have mastered knowledge and skills needed for entry to and continued advancement in a specific occupation.

In 2018, the federal investment in secondary and postsecondary CTE topped \$1.5 billion dollars.⁹ Currently, 47 states supplement these federal funds by spending millions each year to support statewide CTE programs operated by school districts, high schools

and community and technical colleges.¹⁰ Additionally, many states have adopted policies to provide even more funding to expand learner access to CTE pathways and workforce training.

An important part of this expansion is ensuring CTE programs are high-quality and aligned with business and industry to prepare students with the skills and knowledge employers demand. Industry-recognized credentials represent a critical measure and outcome of high-quality CTE programs, and for good reason. Coupled with postsecondary and work experience, industry-recognized credentials can open doors to middle- and higher-wage careers—something that is no longer possible with just a high school diploma.



7 Burning Glass Technologies - [The Narrow Ladder: The Value of Industry Certifications in the Job Market](#), 2017

8 U.S. Chamber of Commerce Foundation - [Clearer Signals: Building an Employer-Led Job Registry for Talent Pipeline Management](#), 2017

9 U.S. Department of Education, Perkins Collaborative Resource Network - [State Allocations](#), 2019

10 EdBuild - [FundEd: National Policy Maps, A National Overview of State Education Funding Policies](#), 2019

PART 1

Our Approach: Limitations & Methodology

This report evaluates the supply of industry credentials (as earned by high school CTE students) against the demand for credentials from employers (as represented in millions of job postings). It also provides a view of the alignment between the two, defined by comparing supply with demand and data availability. This approach highlights which credentials are most valuable to students as they transition to the labor market and look to use credentials to enter well-paying jobs.

The analyses in this report considers every credential available to high school students in the data provided by states. For the 24 states where data were provided, each state's alignment is measured based on the percent of credentials earned that are in-demand, the percent of credentials in-demand that are not earned and data collection best practices.

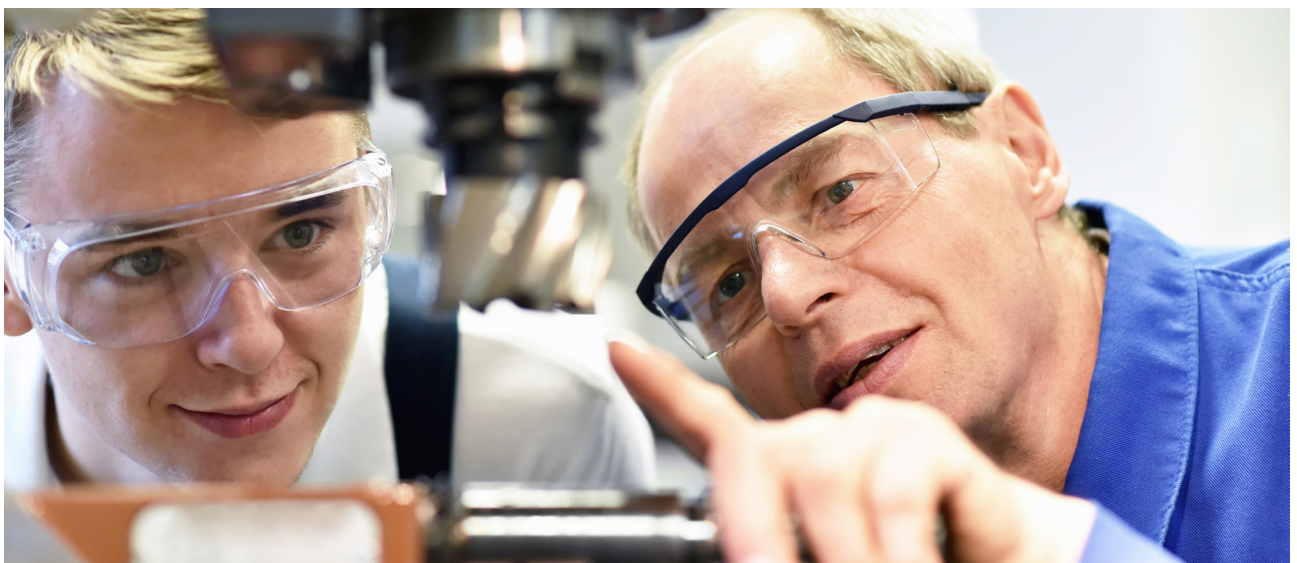
This is done to illustrate the wide range of offerings across states, not to imply that labor market demand is the only measure of quality that states should consider. Our hope is to initiate conversations about assessing the value of industry credentials on a state-by-state basis and ensuring students have opportunities to earn valuable credentials.

Limitations

The approach outlined in this report is designed specifically to assess employers demand for and interest in a specific

credential. This approach has limitations and specifically does not assess a number of other factors which are important to consider when evaluating credentials and assessments. Those include:

- **Assessment of Credential Value Beyond Employer Demand:** While the research clearly points to evidence of undersupply and oversupply of specific credentials, it does not draw conclusions about the “value” of credentials outside of this context. There are a range of factors that make a credential valuable that go beyond the labor market indicators analyzed in this report. Some credentials, particularly assessments, may serve as vehicles to award postsecondary credit or provide important insight into student mastery. Other credentials may be building blocks or prerequisites for credentials that reflect or serve as proxies for labor market demand.



- **Relationship Between Credential Attainment and CTE Program Quality:** Industry-recognized credentials earned in CTE are certainly critical outcomes of such programs. However, not all CTE career clusters or programs of study feature industry-recognized credentials as a key component of broader program quality. For instance, career clusters such as Marketing and Education & Training do not include many credentialing opportunities at the high school level.
- **Postsecondary Attainment of Industry-Recognized Credentials:** While ExcelinEd and Burning Glass asked many states for postsecondary credential attainment data,

only a few responded due to the disparate systems that house such data. As such, there will be instances where students go on to earn credentials in postsecondary after some preparation in high school. A second phase of this research aims to fill in gaps in postsecondary credential attainment data.

Data Methodology, Collection & Considerations

Supply: The Credentials Students Earn

The first step in increasing awareness and understanding of the credential landscape is



to collect available data on the credentials being earned by high school students in states. This dataset is referred to in this report as credentials earned, credential attainment and supply.

Data Collection

State education agencies were contacted directly in all 50 states and the District of Columbia. Each state was requested to provide data on the credentials earned by public K-12 and two-year college students as part of a CTE program for as many years as available. Each state was also asked to provide answers to the following data collection questions:

- 1.** Are data available at the K-12 level?
- 2.** Are data available at the community and or technical college level?
- 3.** Has the state collected the data for at least three years?
- 4.** What systems are in place to enable the state to collect these data?
- 5.** Is credential data linked to further postsecondary data or aligned to employment data?

All credential attainment data in this report were provided by individual state education agencies. Availability of data necessary for this report was limited to what was provided by or available to state education agencies, and it is limited to the latest year of available data from each state.

We received a response to one or more of the questions from 48 of the 51 state education agencies,¹¹ and qualitative or quantitative data were provided directly or gathered from the websites of 40 of them. The most important data, quantitative data, are collected by 28 states, though four of them were unable or unwilling to provide data for inclusion in this analysis.

The following 24 states provided the quantitative credential attainment data used in this report and displayed on [CredentialsMatter.org](https://credentialsmatter.org): Alabama, Alaska, Arkansas, Florida, Georgia, Indiana, Kentucky, Mississippi, Missouri, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, West Virginia and Wyoming.

¹¹ No response was received from Oregon, Virginia or Wisconsin, though data for Virginia was pulled from the state's website.

Of the data collected, the quality, format and detail of the data, as well as the terminology and definitions used by states, differed significantly. In order to allow for state-to-state comparison, some credential names or acronyms were standardized and some credentials were rolled up.

For example, A+ Certification, CompTIA A+ Certification and COMP TIA A PLUS CERTIFICATION were all standardized to CompTIA A+. Similarly, ServSafe Food Protection Manager, ServSafe, ServSafe Certification and ServSafe - Food Handler were rolled into ServSafe Certification (Manager/Food Handler/Allergens/Alcohol). This allowed for more consistent comparisons across states and between supply and demand data.

To help illustrate the magnitude of quantitative data provided by these 24 states, the dataset includes 3,966 raw credentials, 743 standardized credentials, 367 unique vendors and 783,561 credentials earned. Data used in this analysis can be explored at CredentialsMatter.org.

Considerations

Data are included on credentials earned by high school students that are not necessarily recognized by employers. This includes CTE Assessments and General Career Readiness

credentials, which are discussed in more detail further in this report. Credentials that could not be identified or validated for existence based on the description given were excluded.

Data exclude postsecondary data where possible. In cases where states did not differentiate between secondary and postsecondary data, all data were included. Since very few states provided postsecondary data, this is done to ensure apples-to-apples comparison to the extent possible. We hope to consider postsecondary data in an extension of this research.

Demand: Credentials Requested in Job Postings

Data on labor market demand—what jobs exist and what skills they require—are essential to determining the value of specific industry-recognized credentials and the success of state programs.

Data Collection

To investigate demand for this analysis, Burning Glass mined its database of more than 150 million unique online job postings in the U.S. which is built using spidering technology that extracts information from close to 40,000 online job boards, newspapers and employer sites.¹²

¹² Postings are de-duped to ensure postings for the same job, whether it is posted multiple times on the same site or across multiple sites, are only represented one time.

Credential attainment data, or supply data, provided by states informed the specific data points pulled from the comprehensive Burning Glass database to include job postings:

- Localized to the state, as appropriate.
- Requesting specific credentials, occupations or skills found in supply data on credential attainment.
- Matching the year of data in which the credentials earned were reported.

In addition, the demand data are limited to postings in an occupation that paid a living wage, defined as at least \$15/hour in median wages nationally.¹³ This helps to eliminate focus on credentials that lead to low-paying careers.

This strategic approach provides a first-of-its-kind look at how credentials being earned compare to the jobs actually available in a state.

Considerations

Much like supply data, the demand data relies on what is available. Also like the supply data, what data are available is not consistent. Employer rely signaling plays a role in this inconsistency. For example, while all cosmetologist jobs require a cosmetology license, not all job postings specify that requirement explicitly. Similarly, while very few jobs specifically request an employee have a productivity software credential, many jobs require employees be able to use productivity software. In order to account for this variation, Burning Glass searched for demand based on credential type. See page 56 for details on demand analysis by credential type.

Using job postings data also means that jobs that are infrequently posted online are under-represented. For example, while software developer jobs are almost always posted online, construction jobs are sometimes posted on physical job boards. To account for this, Burning Glass adjusted job postings data to account for differences in what is posted online and job openings in the labor market. See Appendix B for more details on this methodology.

¹³ Living wage occupations are based on median hourly wage data from the Bureau of Labor Statistics' [Occupational Employment Statistics program](#).

PART 1

The Result: Findings & Recommendations

Findings

This analysis resulted in the following four major findings related to credential data collection, definitions, employer signaling and alignment with labor market demand.

1. Just over half of all states (28) collect quantitative data on the attainment of credentials.

This means that only approximately half of all states can analyze the credentials their students are earning and evaluate whether those credentials align with their state's employer demands.

- Of the states that do collect data, most rely on self-reported data from schools or districts. Only four states (Indiana, Michigan, North Carolina and Tennessee) receive data from credentialing entities.
- Data collection processes are often inconsistent across secondary and postsecondary systems within the same state. In addition, the data systems may not be able to connect student credential attainment data across systems from secondary to postsecondary to the workforce.

2. States do not have consistent definitions for what constitutes an industry-recognized credential— even though U.S. high school students earn hundreds of thousands of credentials each year.

Some states have clear criteria that include workforce demand for identifying their promoted credentials. Other states include almost any measure of career-related knowledge even though certain types of credentials, while representing important skills, carry little to no weight in the labor market.

- An industry-recognized credential is a credential that is endorsed by a nationally recognized trade association or organization and, most importantly, is **sought or accepted by employers within the industry as a signal of knowledge and skill**. Many states do not have criteria to ensure the credentials offered are truly industry-recognized and valued.
- In this analysis, we identified five types of credentials offered through state CTE programs: License, Certification, Software, General Career Readiness and CTE Assessment. States typically do not use this typology to categorize the types of credentials they offer to students or convey the currency each credential affords in the labor market.

- In many cases, state education agencies promote and include measures of knowledge and skills in their industry-recognized credential lists that are not valued by employers. This is especially true for CTE Assessments and many General Career Readiness credentials. Both CTE Assessments and General Career Readiness credentials can be developed by individual states or offered to students off-the-shelf through assessment vendors or other entities.
- **CTE Assessments do not hold currency in the labor market due to the fact that employers do not recognize them as credentials.** However, many states include them in their list of promoted or earned credentials. While the assessments are often focused on important underlying competencies and may reflect student content mastery or CTE program quality, they should not be considered industry-recognized credentials.
- Of the approximately 780,000 credentials earned in our research, over a quarter are General Career Readiness credentials. While some of these credentials represent important skills, these credentials often carry little to no weight in the labor market.

Many credentials are not explicitly requested in employer job listings, despite the fact that the credentials may be required or desired for the position.

While employers may value credentials, they may not specify their value in job postings or communicate that value to students and prospective employees.

- The lack of employers signaling or directly communicating the need for credentials contributes to misalignment. Without this information, there is no way to know what employers need and what skills they find valuable.
- Most employers do not request credentials to prove software competence, even when the underlying skill is desired or required. In most cases, candidates learn and/or validate these in-demand skills through other means, such as on the job or through coursework that results in a portfolio demonstrating the application of the desired skills. Despite this, Software credentials make up over a quarter of credentials earned.

Of the 24 states where data were available and analyzed, no state is highly aligned in terms of supply for credentials earned by high school students and the demand for those credentials in the job market.

Oversupply of credentials that are not demanded in the labor market is the most significant source of misalignment.

- **Only 19 percent of the credentials earned by K-12 students in this analysis are demanded by employers in the U.S.** The percentage of in-demand credentials earned varies by state, career cluster and credential type.
- **Of the top 15 credentials earned, 10 are entirely oversupplied, meaning in every state with data more students are earning them than there is demand for them.** The primary drivers of this are General Career Readiness credentials and NCCER (construction related) Certifications. These two together account for over 40 percent of credentials earned, despite there being no appetite in the labor market for them.
- **Many of the top Licenses earned are not demanded in occupations that pay a living wage, which contributes to poor alignment.** Of the nine being earned by students in K-12, only four have any demand in occupations that command a living wage. These are Commercial Driver's Licenses (i.e. truck drivers), licensed practical nurses, dental assistants and EMT/paramedics.
- **There are undersupplied Certifications that command good starting salaries.** For example, Automotive Service Excellence Certifications (\$44,000), CompTIA A+ (\$43,000) and AWS Certified Welder (\$43,000) are in high demand in all 24 states with data. These Certifications can open doors to entry-level careers as automotive technicians, help desk operators and welders and, in general, allow for career mobility.

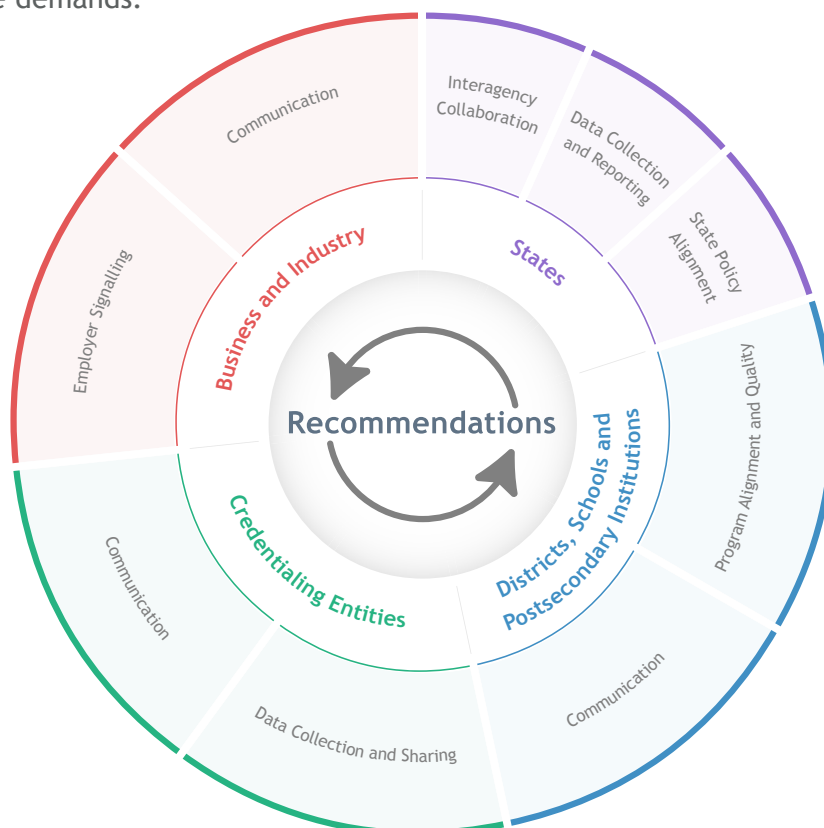
Recommendations

All stakeholders must play a role in improving alignment to ensure students have opportunities to be successful. State agencies, policymakers, employers, educators, credentialing entities and families can improve student career readiness by identifying, promoting and reporting valued industry-recognized credentials.

- **States:** Convene stakeholders to implement policies and processes that leverage data on credential attainment and workforce demands to ensure alignment between education systems and the workforce.
- **Districts, Schools and Postsecondary Institutions:** Improve alignment between program offerings, credentials available and workforce demands.

- **Business and Industry:** Improve employer signaling to better communicate specific needs and the advantages that various credentials provide.
- **Credentialing Entities:** Increase capacity and willingness to provide states with data that can be integrated into their data systems to evaluate the return on investment of credentials for students and the workforce.

Approaching this challenge in siloes may result in piecemeal improvements in student outcomes. To see the greatest impact, states and stakeholders must undertake this work through strategic partnerships and collaboration.



States

Phase One: Identify State Priorities and Establish Definitions

- 1.** Complete an audit¹⁴ of the state's CTE program for quality and alignment, and implement strategies to ensure all offerings lead students to high-skill, high-wage, in-demand careers.
- 2.** Codify a process and criteria to annually identify and approve the state's valued credentials. This process should include:
 - An entity or committee that reviews and approves the state's valued credential list.
 - Valued credential criteria that includes specific thresholds for current and projected demand and wages.
 - Consistent sources and measures for demand of both credentials and skills in the workforce.
 - An appeals process to review requests to approve locally-valued credentials in specific regions of the state (where appropriate) or where trends in new technology are not yet reflected in lagging demand data.
 - A process to phase out credentials that lead students to dead-ends.
- 3.** Establish statewide industry-recognized credential definitions across state agencies (K-12, postsecondary, labor and economic development) that address:
 - Types of credentials (Licenses, Certifications, Software, General Career Readiness and CTE Assessments, etc.) and communicate whether/how each type helps demonstrate student college and career readiness.

14 ExcelinEd - [Auditing a State CTE Program for Quality](#), 2018

- Differentiation¹⁵ between building block Certifications (such as productivity tools or basic first aid), stackable Certifications and credentials that demonstrate mastery/career advancement.
- Identification of which credentials demonstrate mastery at secondary and postsecondary levels.

Phase Two: Align State Policy and Improve Data Collection

- Establish a secondary-postsecondary policy that provides for statewide articulation of valued industry credentials.
- Establish data-sharing agreements with vendors of the state's valued credentials to directly collect individual student attainment data and eliminate or minimize self-reporting.
 - Collect individual student attempts and attainment (and raw scores, where available).
 - Increase efficiency by entering into statewide data-sharing agreements that span secondary and postsecondary systems and students.
 - Collaborate with other states in negotiating consistent data-sharing agreements with credentialing entities to increase administrative efficiency and data consistency.
- Collect student-level credential attainment data connected with CTE program of study and career cluster enrollment (where appropriate) that is integrated into state secondary, postsecondary and longitudinal data systems.
- Design data collection processes and systems to support a return on investment analysis by matching credential attainment data with postsecondary completion, employment/placement and wage data.

¹⁵ Burning Glass Technologies and Jobs for the Future - [When is a Job Just a Job —And When Can it Launch A Career? The Real Economic Opportunities Of Middle-Skill Work](#), 2018

Phase Three: Leverage High-Quality Data to Support State Goals and Local Implementation

- Collaborate with multiple state agencies to provide regional and local labor market data to support local CTE program and credential offerings and evaluate regional/local trends in alignment.
 - Establish a process for industry advisory councils and business partners to identify emerging credentials and skills that may take time to show up in state labor market data.
 - Ensure that state agency and longitudinal data systems can track, match and report K-12, postsecondary, employment and wage outcomes with credential attainment to ensure their long-term value in the labor market.
- Include credential attainment in Perkins V local application approval processes.
- Align Every Student Succeeds Act (ESSA), Perkins V¹⁶ and state accountability and transparency systems to reward schools and districts that have high percentages of students earning valued industry credentials.

16 In 2018 the “Strengthening Career and Technical Education for the 21st Century Act” (Perkins V) was signed into law. This is the primary source of federal funding for CTE. More information about Perkins V can be found in ExcelinEd’s [Perkins V Brief, 2018](#).

4 Steps for Program Improvement

1.

Annually review industry credential data to identify: gaps in the workforce pipeline; opportunities to improve CTE programs; ways to increase equity and access; regional or local trends in alignment; and opportunities to highlight strong local programs.

2.

Identify barriers to students earning valued credentials to increase access and equity for all students. These barriers could include policies, access, program capacity, program quality, exam cost, age requirements or transportation.

3.

Update state-approved programs of study to ensure alignment with industry demand, and provide technical assistance or funding to support the creation of programs that lead to the high-value credentials that are most undersupplied (or to replace misaligned programs).

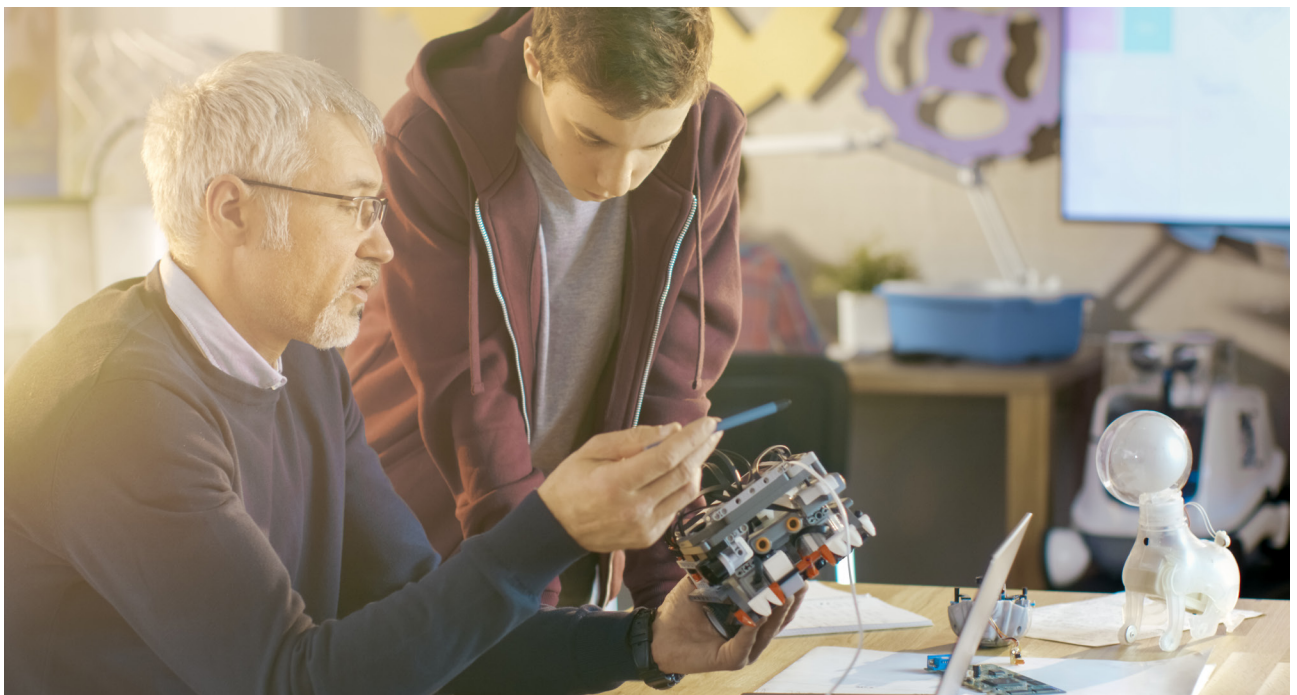
4.

Establish a credentials incentive policy that rewards schools based on the number of valued credentials earned by students.



Districts, Schools and Postsecondary Institutions

- 1.** Ensure that CTE program offerings lead students to valued credentials in your region.
 - Annually evaluate local/regional demand data.
 - Phase out misaligned programs that lead to dead ends/low wage jobs.
 - Add or expand aligned programs.
- 2.** Leverage student credential attainment data to improve CTE program quality.
- 3.** Establish relationships between school districts and postsecondary institutions to accelerate student completion of career pathways that culminate in high-value credentials.
 - Leverage resources (testing site status, faculty, equipment, etc.) across both systems.
 - Communicate the value of industry credentials as part of college and career readiness to students and families.



Business and Industry

1. Improve employer signaling and consistency by clarifying required credentials and skills in job postings.
2. Distinguish between nice-to-have and need-to-have credentials and skills when posting open jobs.
3. Articulate wage increases and advancements related to specific credentials.
4. Work with your local or state education systems, community partners or intermediaries to help them understand the hiring and wage advantages of specific industry credentials.
5. Harness the power of your industry associations to help credentialing entities ensure credentials reflect the knowledge and skills required for success in jobs in your industry. Leverage these relationships to communicate directly with students and parents about the credentials valued for the high-skill, high-wage and in-demand jobs in your industry.



Credentialing Entities

1. Align information collected from students or candidates as part of the credentialing process with state agency data systems to allow for better matching within student and longitudinal information systems. This could include personally identifiable information (full legal name, date of birth, address, driver license number), student identification numbers, high school, postsecondary institution, etc.
2. Increase capacity and willingness to enter into data-sharing agreements with states.
3. Report attempts, raw scores and credential attainment to provide information to improve program quality. Where possible, report employee placement and wage data.
4. Clarify the knowledge and skills encapsulated within each credential offered.
5. Provide an early signal to states, districts and postsecondary institutions about plans to change credential offerings (retiring credentials, replacing content, launching new credentials) to allow systems to plan for appropriate changes in offerings.



PART 2



PART 2

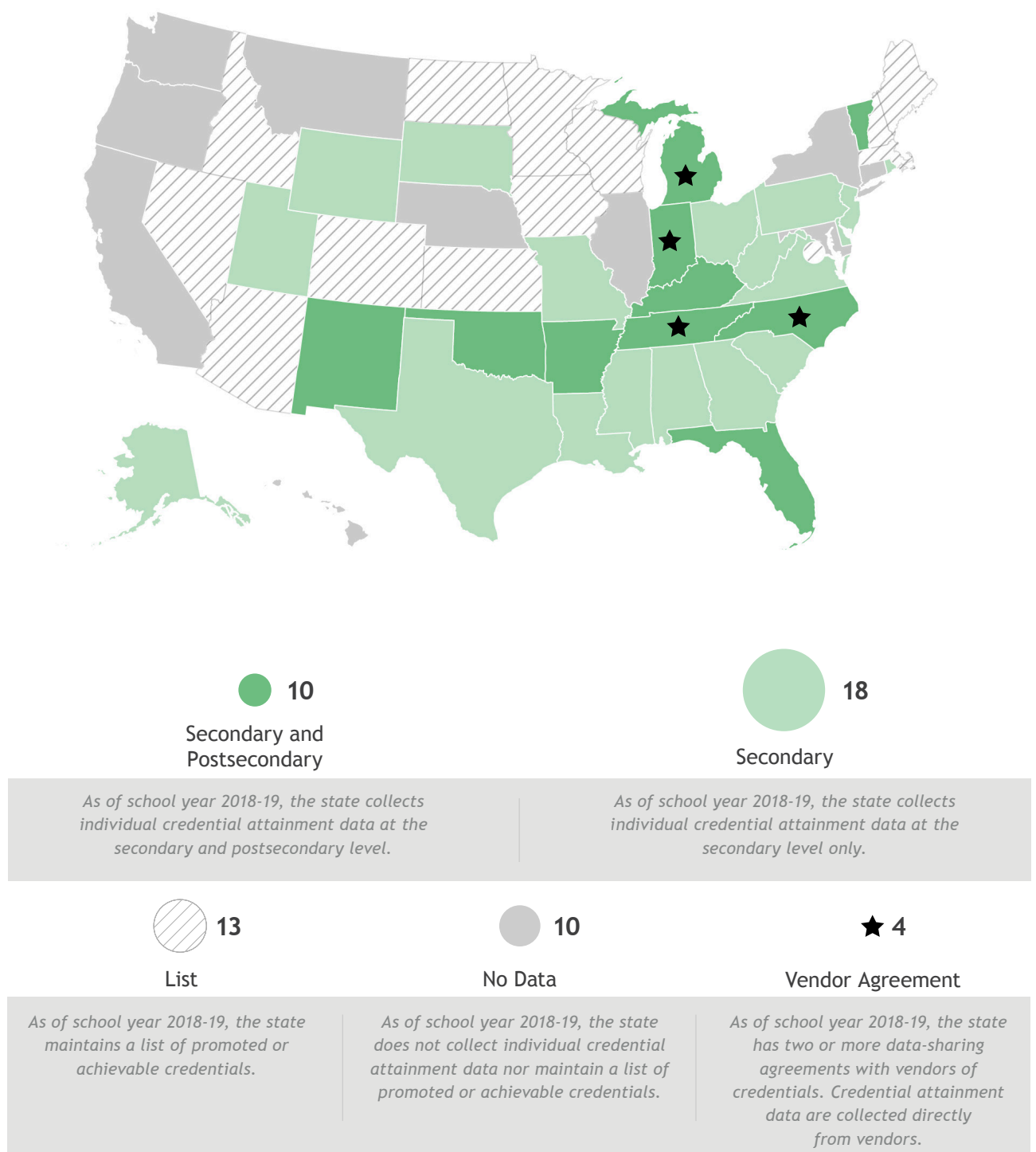
The State of Credentials: Overview of State Data Collection & Alignment

To evaluate workforce alignment, we began with the availability of data in states and what policies exist related to these data. Then we compared the quantitative supply data available from states to the job posting demand data to look at the big picture of industry-recognized credentials alignment.

What's the Status of State Data Collection?

Surprisingly, just over half of states collect any form of quantitative data, either secondary or postsecondary, on attainment of industry credentials.

How Are States Collecting Data on Credentials?



For the 23 states that do not collect quantitative data on credential attainment, 13 maintain lists of approved or promoted credentials. In some cases, that means there is a website with a credential list on a downloadable PDF. Others are a bit more comprehensive, linking to credential providers and other helpful information. While these lists can help to guide students' understanding of credential offerings in their state, they give no indication of student achievement.

Most concerning are the 10 states that do not collect data or promote a list of achievable credentials. That doesn't mean these states do not offer industry-recognized credentials or CTE programs—in fact, all of them do.

We know of several very successful district programs in these states and that state-level success could also be happening, but without data it is impossible to measure. **It is essential that these states begin collecting data.**

Data Collection Processes

Understanding how data are collected is just as important, if not more so, than what data are collected. Not surprisingly, the policies

and procedures in place to collect credential attainment data vary significantly from state to state.

Each of the 28 states that collects data on industry-recognized credential attainment uses a different process. In some states there is an established process and criteria for which credentials are included on the state's list. Other states maintain a list of credentials without a formal process to identify credentials for inclusion. Still other states collect data on any credential earned by students, as identified by the local district. Finally, some states only collect data on a subset of all credentials earned. These data may or may not be able to be shared across secondary and postsecondary institutions.

Further, nearly all data collected by states are self-reported by schools or districts, meaning they are submitted through various data systems or spreadsheets by educators. In a few states, credential attainment data must be accompanied by documentation that the credential was earned, which is sometimes audited for quality. In some cases, this information is collected at the student level, while in other cases it is collected at the school or district level. Self-reported data require educators to monitor and report the credential(s) each student earns and adds additional opportunity for incomplete or inaccurate data.

Direct collection from vendors is almost always more accurate and comprehensive, but it requires substantial legwork and collaboration between the state and the vendor to put the appropriate data sharing agreements and information systems in place. Once implemented, though, it reduces the administrative burden of data entry and verification.

There is an opportunity for states to work together to aggregate and streamline data-sharing negotiations, resulting in increased efficiency for states and vendors and improved consistency of industry-recognized credential data.

As states continue to build industry-recognized credentials into their accountability and college and career readiness systems, the quality and integration of credential data with other student achievement measures is increasingly important.



Vendor Data Collection Agreements

During our data collection and in other work in this area, many states have expressed a desire to move to vendor agreements to allow for more accurate data collection. It's not easy, but it can be done and exponentially improves data quality.

There are currently only four states collecting data through agreements with vendors.

- **Tennessee** has succeeded in signing data sharing agreements with 19 different certifying agencies and testing vendors covering nearly 50 different credentials. The data collected from these agreements will be first available in Fall 2019; the data from Tennessee in this work do not include vendor-collected data.
- **Indiana** currently collects all of its industry credential attainment data directly from vendors. All licensing data are collected directly from the state's licensing agency.
- **Michigan** currently has data sharing agreements in place with five different credential vendors.
- **North Carolina** currently has agreements for data collection and sharing with three credential vendors.

Without collaboration and quality data, states either have no way of assessing their credential offerings and earnings or are relying on data that are at best incomplete and at worst incorrect or nonexistent.

Steps for states to achieve a streamlined and accurate data collection process are outlined further in the Recommendations section.

Collaboration between schools, states and vendors is essential to understand how best to integrate data systems and to attain reliable data. This is a key component of aligning credential earnings with labor market demand.

Elevating Industry-Recognized Credentials in State Policy

Several states are effectively doubling down on college and career readiness by implementing state plans and policies that integrate industry-recognized credentials into more comprehensive college and career readiness strategies.

Twenty-four states are using student attainment of industry-recognized credentials as indicators of college and career readiness under their ESSA accountability plan, indicating state policymakers understand the importance of industry-recognized credentials. In addition, 13 states have developed financial incentives to reward the attainment of credentials within high school or community and technical colleges.

Some states are also including industry-recognized credentials as part of graduation pathways or distinction, developing policies to allow credentials to articulate for postsecondary credit or providing funding to offset the cost of exam fees for students.

Given this recognition and investment in credentialing, it is critical that states and local CTE programs select and promote those credentials that will have the greatest returns for students and economies.

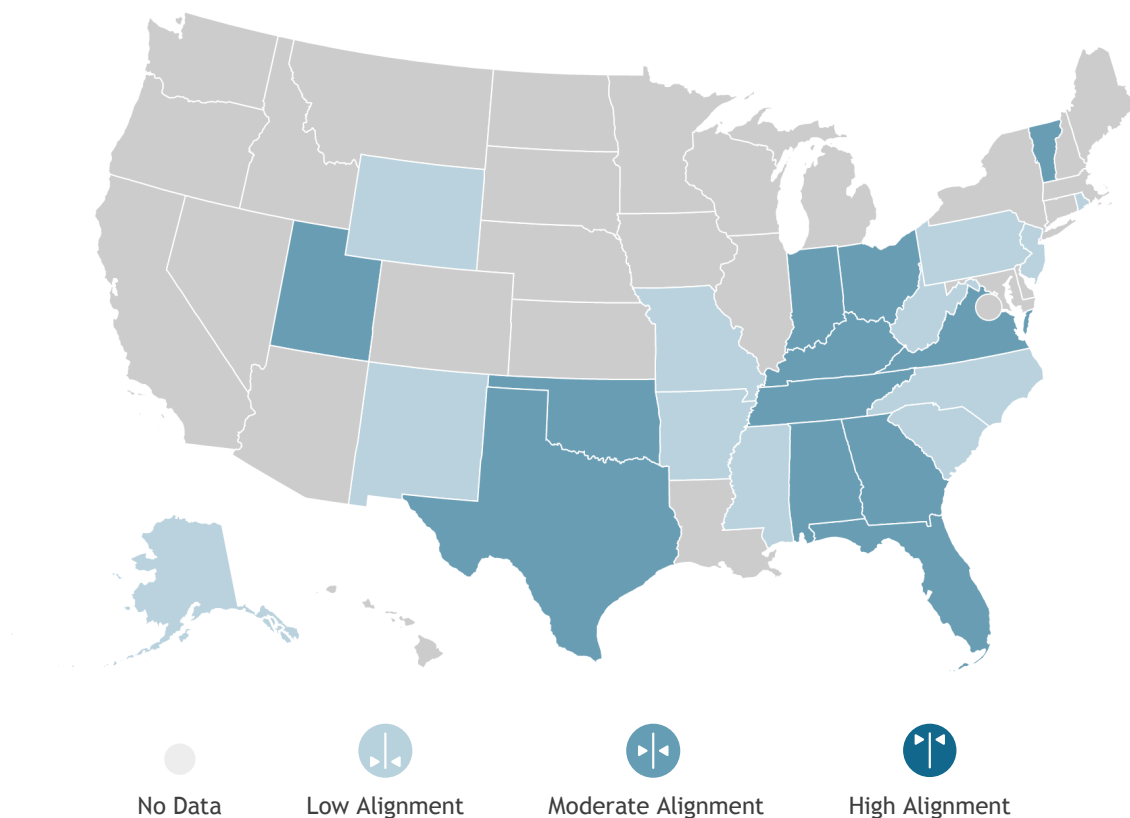


How Do Credentials Earned Align with Demand?

Based on the supply data collected from states and the demand data from real job postings, we can answer the most important question of all: Are students earning credentials that align with workforce demand?

Unfortunately, not a single state is highly aligned in terms of students earning credentials at the same rates the credentials are being demanded in their state's unique workforce.

Are High School Students Earning Credentials That Align with Workforce Demand?



Alignment, as illustrated on the map, is a measure of how the credentials earned—also known as the “supply”—in each state align with the credentials employers demand. No state shows high alignment. Twelve of the 24 states that provided data show moderate alignment. The other 12 states show low alignment.

Weight of Measure (%)	Answers Question	Measure Definition/ Calculation	Alignment Increases When...	Alignment Decreases When...
50	To what extent are the credentials supplied actually demanded by employers?	$\frac{\text{\# of credentials earned that are in demand}}{\text{Total credentials earned}} = \text{\% of credentials earned that are in-demand}$	<p>Students earn in-demand credentials</p> <p>States remove credentials that are not in-demand from the credential options available to students</p>	<p>Oversupply: More credentials are earned than demanded</p> <p>Oversupply: Credentials are earned that are not demanded by employers</p>
40	To what extent do the credentials earned meet the state's employer demand?	$\frac{\text{\# of credentials demanded that are earned}}{\text{Total credentials demanded}} = \text{\% of in-demand credentials supplied}$	<p>Students earn in-demand credentials</p> <p>States include credentials that are in-demand in the credential options available to students</p>	<p>Undersupply: Credentials are demanded but not earned</p>
10	How reliable is the data collection method?	Data collection	States collect data at multiple levels or through data-sharing agreements	States only collect data at one level or rely entirely on self-reported data

The Problem of Oversupply

The primary contributor to most states' low or moderate alignment measure is the issue of oversupply. Ten of the top 15 credentials earned are 100 percent oversupplied, meaning far more students are earning these credentials than employers demand in every state where the credential is earned.

The percent oversupplied is calculated by summing the number of credentials earned in states where the credential is either Moderately Undersupplied or Very Undersupplied and dividing by the number of credentials earned across all states in the data, for each credential. For more information please see Appendix B: Data Collection and Methodology.

Most Commonly Earned Credentials

Rank	Credential	Credential Type	Credentials Earned	Percent Oversupplied	Supply/Demand Category	State Count
1	Microsoft Office Specialist		129,895	--		19
2	WISE Financial Literacy Certification		67,208	100%		7
3	NCCER - Core Curriculum		60,350	100%		12
4	Adobe Certified Associate		52,189	78%		19
5	Virginia Workplace Readiness Skills for the Commonwealth		42,313	100%		1
6	Basic First Aid		36,102	100%		11
7	NCCER - Carpentry		33,392	100%		14
8	IC3 Certification		22,840	100%		13
9	Automotive Service Excellence Certification		22,726	16%		24
10	ServSafe Certification (Manager/Food Handler/Allergens/Alcohol)		21,634	47%		20
11	OSHA 10-Hour - General		18,067	100%		12
12	Certified Nursing Assistant		16,351	100%		19
13	FEMA National Incident Management System Certification		14,544	100%		8
14	Autodesk Certified User		10,394	--		19
15	Certified Internet Web Certification		8,736	100%		10



License




Certification



Software

General Career
Readiness

CTE Assessment

 No DataVery
UndersuppliedModerately
UndersuppliedSupply Meets
DemandModerately
OversuppliedVery
Oversupplied

Note: Percent Oversupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

There are two primary drivers of oversupply visible in this table: General Career Readiness credentials and NCCER Certifications. Both are highly earned, making up six of the top ten credentials earned, and both are consistently 100 percent oversupplied.

The issues of oversupply are not confined to a handful of states; many of these oversupplied credentials are earned across more than half of states. Because states supply and demand credentials at different rates, some credentials are undersupplied in some states and oversupplied in others. States should address this misalignment on an individual basis. Visit CredentialsMatter.org for details on credential supply in a specific state.

States often don't know which credentials are valued by employers. Consequently, states don't provide students with the opportunity to earn those that matter most.



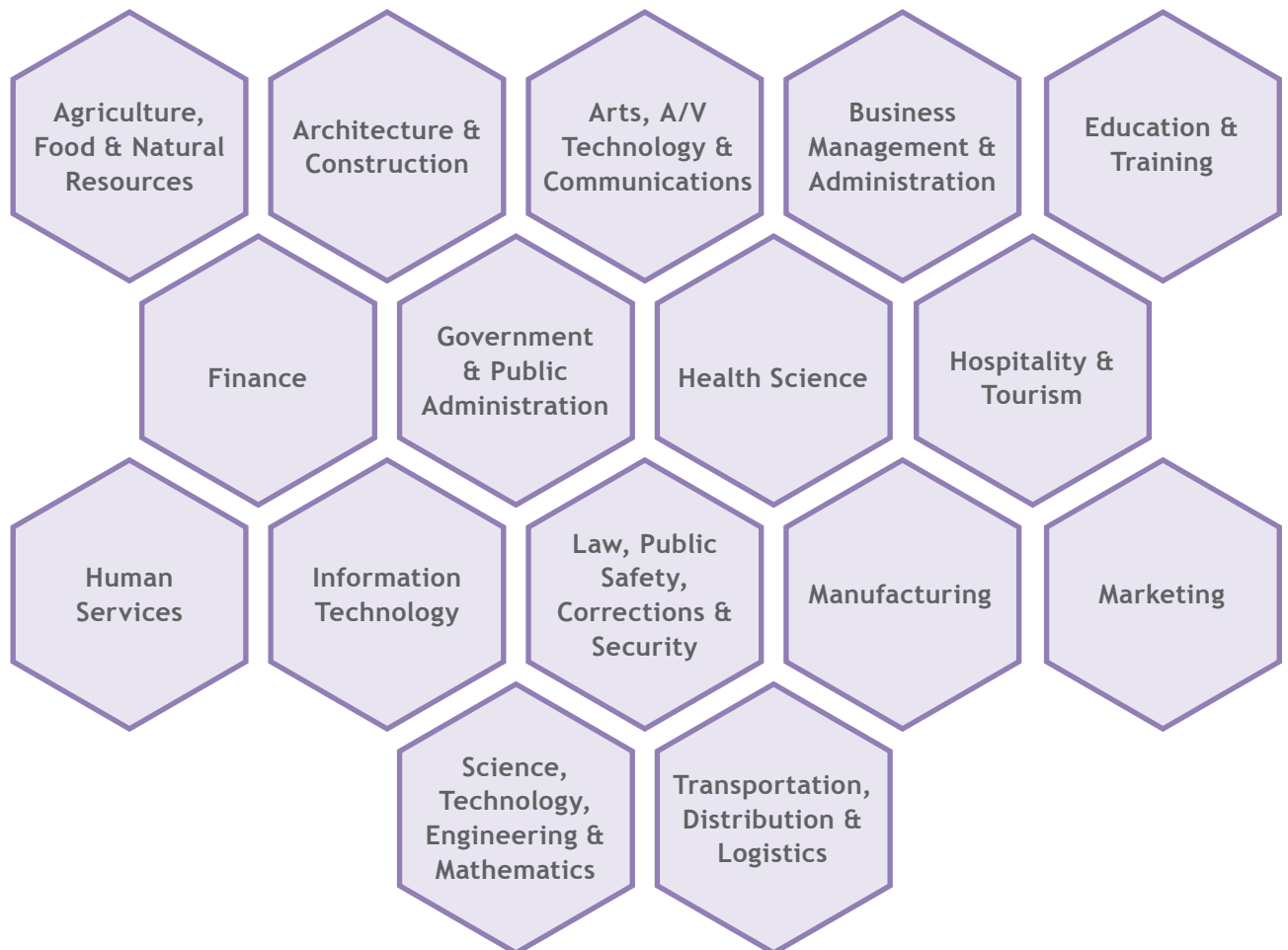
PART 2

Alignment Analysis 1: By Career Cluster

Another view of alignment includes how credential attainment and demand differ across career clusters. State CTE programs of study are typically organized under 16 career clusters that match the career cluster framework used by the U.S. Department of Labor.¹⁷

¹⁷ AdvanceCTE - [Career Clusters](#), 2019

National Career Clusters Framework



Each career cluster includes multiple career pathways that lead to specific occupations. For example, the Information Technology (IT) career cluster in a given state could include career pathways in computer programming, computer systems networking and cybersecurity. The specific career pathways and associated credentials in each state should align with the state's industry priorities within that career cluster.

Credential Attainment Patterns in Career Clusters

Analyzing the student enrollment and credential attainment patterns across career clusters allows policymakers to understand which clusters are both popular and feature the highest rates of credential attainment. Employer demand data within a career cluster can help policymakers consider how much return on investment those credentials provide. Taken together, a career cluster analysis of the data can help shape critical questions about access, credential availability and overall value to students who earn them.

For instance, over 230,000 students nationally concentrated¹⁸ in the IT career cluster.

Within the 24 states that provided data, students earned more than 97,000 credentials associated with the IT career cluster.

However, only about a quarter (26 percent) of those credentials earned in IT are demanded by employers. This reveals both a high rate of enrollment coupled with a similarly high rate of credentials earned, as well as some lingering questions about the labor market value of the credentials being attained.

Many states include each credential in one or multiple career clusters, and often within specific career pathways.¹⁹ This allows students to understand which credentials are the most relevant for their pathways and their goals. For this analysis, credentials were matched with up to four career clusters to allow for cross-cutting credentials to be included in multiple career clusters.

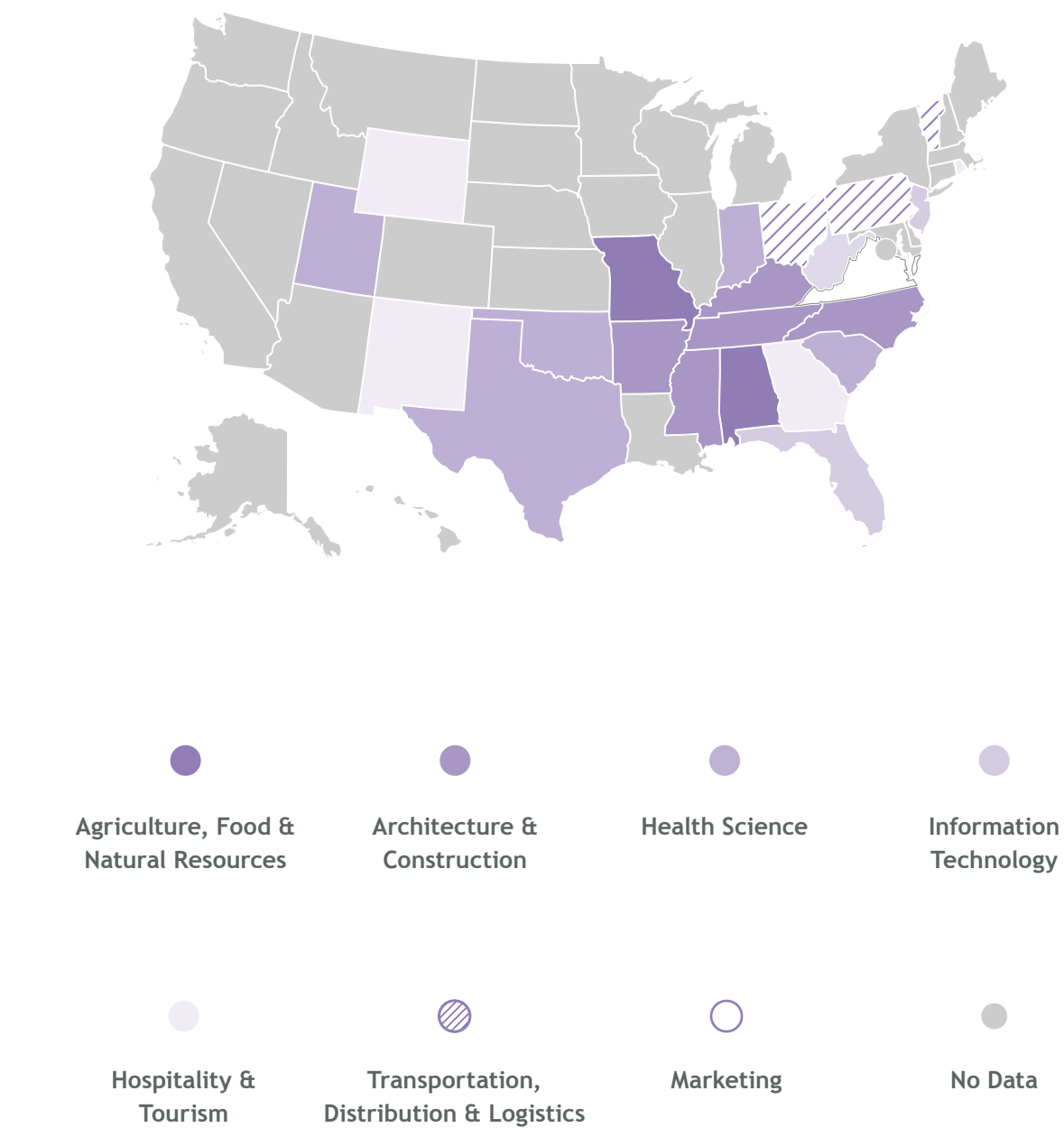
For example, the AWS Welding Certification is aligned with both the Architecture & Construction and the Manufacturing career clusters. These career cluster mappings may or may not align directly with individual state offerings, as each state determines whether or how specific credentials fit within career pathways and career clusters. Because of their general applicability, Microsoft Office and General Career Readiness credentials are not included in any career cluster.

Credentials earned by students are not evenly distributed across career clusters, and credentials earned by career cluster—or supply—does not align with demand.

18 Students who concentrated in CTE during 2016-17 met criteria defined by states as part of their annual Perkins IV reporting processes. In many cases, concentrating in CTE refers to completing a certain number of courses or credits within a career cluster or program of study. U.S. Department of Education - [Perkins Data Explorer](#), 2019

19 Career pathways are subsets of career clusters that lay out specific coursework toward an occupation.

Most Common Credentials Earned by Career Cluster



Credentials Earned and Demanded Across Clusters

Career Cluster	Credentials Earned		Percent of In-Demand Credentials Earned
	Total	Percent	
Architecture & Construction	153,707	20%	7%
Information Technology	97,667	12%	26%
Arts, Audio/Video Technology & Communications	69,938	9%	31%
Health Science	42,998	5%	19%
Transportation, Distribution & Logistics	37,639	5%	56%
Law, Public Safety, Corrections & Security	31,603	4%	13%
Hospitality & Tourism	28,645	4%	65%
Agriculture, Food & Natural Resources	25,754	3%	1%
Science, Technology, Engineering & Mathematics	23,531	3%	32%
Manufacturing	17,228	2%	33%
Government & Public Administration	15,292	2%	5%
Human Services	13,190	2%	8%
Marketing	7,314	1%	3%
Business Management & Administration	5,285	1%	0.3%
Education & Training	5,281	1%	18%
Finance	2,206	0.3%	37%
Career Cluster Subtotal	436,523	56%	19%
General Career Readiness	347,038	44%	19%
Total	783,561	100%	19%

● Very Low
 ● Low
 ● Average
 ● High
 ● Very High

Note: Credentials may be counted toward multiple career clusters. The total row reflects the total number of credentials earned across all career clusters, not the sum of the column. General Career Readiness credentials as well as Microsoft Office credentials are included separately in this table because they are not aligned with a specific career cluster. Visit [CredentialsMatter.org](https://credentialsmatter.org) to interact with the data in this table.

Career clusters where students earn the most credentials include Architecture & Construction (20 percent), Information Technology (12 percent) and Arts, Audio/Video Technology & Communications (9 percent). Credentials commonly earned in Architecture & Construction include NCCER Certifications, Autodesk Certified User and AWS Certified Welder. In Information Technology, CompTIA Certifications are frequently earned. In Arts, Audio/Video Technology & Communications, students frequently earn Adobe Certifications and PrintEd/Skills USA Certifications.

The career clusters in which students are earning in-demand credentials at the highest rates include: Transportation, Distribution & Logistics (56 percent); Hospitality & Tourism (65 percent); and Finance (37 percent). The credentials in demand in Transportation, Distribution & Logistics are driven by Automotive Service Excellence Certifications, in Hospitality & Tourism credentials are driven by ServSafe Certifications and in Finance credentials are driven by QuickBooks Certifications.

Six of the 16 career clusters represent a very small share (less than 10 percent) of the total number of in-demand credentials earned. This may reflect the natural variation across career clusters in terms of demanded credentials that are attainable by high school students.

For example, there are very few in-demand credentials in the Education & Training career cluster due to many education careers requiring a postsecondary degree. The major exception is the Child Development Associate Certification, which is demanded for early childhood educators and does not require a postsecondary degree. This example highlights the variation within and across career clusters in terms of credentials achievable in high school and employer demand.

There is an opportunity for industry leader engagement and credential creation in all clusters, especially those that lack many options for credentials that are valued by employers. Collaboration between businesses and states could lead to a better understanding of what skill sets jobs require and how to create credentials that employers can rely on and students can achieve.

PART 2

Alignment Analysis 2: By Credential Type

The vast array of credential options available to students makes for a confusing set of terms and definitions—even for those who work in this field. Using the results of the supply and demand data collection from states and job postings we can get a clearer picture of the variation of credentials earned in states.

Defining Credential Types

We covered a few general terms in the introduction on page 15 to establish context and draw attention to the fact the word “credential” is an umbrella term. Through analysis of supply data, we have identified five types of credentials offered in states: License, Certification, Software, General Career Readiness and CTE Assessment. Unlike career clusters which are widely recognized and defined terms from the Department of Labor, these definitions are specific to this research to help guide understanding and analysis.

These five types, listed in order of labor market relevance, provide the framework for analyzing alignment to determine how a state is preparing students for the workforce demand in their state. These credential types emerged through this analysis based on how they interact with labor market demand through employer signaling, industry validation mechanisms and state regulation.



License

Mandated by law for workers to gain permission to practice in specific occupations and must be renewed periodically. Requirements vary by state and/or by licensing agency.

Credential Examples

- Commercial Driver’s License (CDL)
- EMT/Paramedic License
- Licensed Cosmetologist

Occupation Examples

- Truck Driver
- Emergency Responder
- Hair Stylist/ Barber/ Cosmetologist



Certification

Signal an individual has acquired a set of abilities and, in some cases, allow them to perform a specific job. Certifications are not a legal requirement, but may open doors to entry-level jobs or help seasoned workers advance up the career ladder in their field.

Credential Examples

- Automotive Service Excellence Certification
- AWS Certified Welder
- CompTIA Network+

Occupation Examples

- Auto Mechanic
- Welder
- Computer Network Administrator



Software

Demonstrate competence of a specific software. This includes productivity software and job-specific applications such as graphic or computer-aided design.

Credential Examples

- Adobe Certified Expert
- Microsoft Office Specialist
- QuickBooks Certified User

Occupation Examples

- Graphic Designer
- Administrative Assistant
- Accounting Technician



General Career Readiness

Measure foundational workplace skills including basic reading, math, financial and digital literacy, workplace safety and basic life support or first aid.

Measure Examples

- WISE Financial Literacy Certification
- Basic First Aid
- OSHA 10-Hour - General
- National Career Readiness Certificate

Occupation Examples

These types of skills are applicable across virtually all occupations.



CTE Assessment

Measure the skill attainment of students who have completed a program course sequence or CTE pathway.

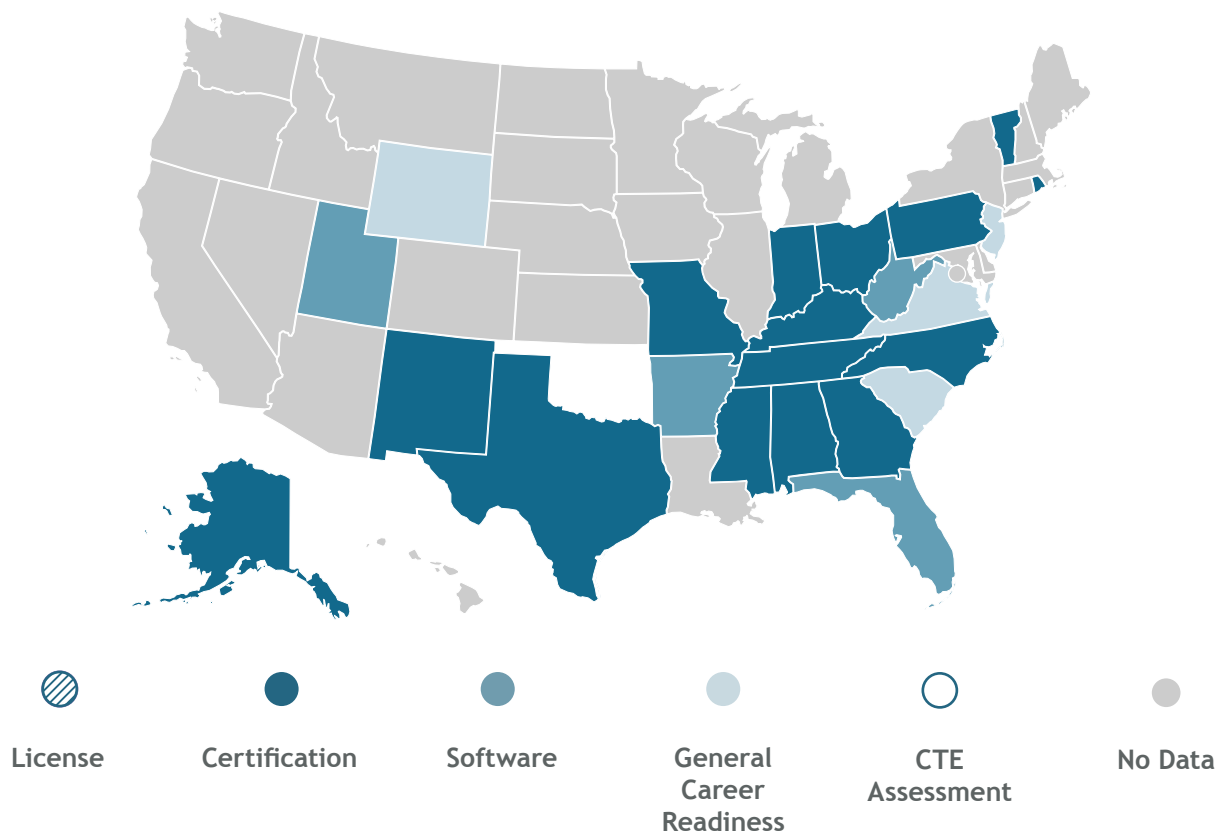
Measure Examples

- PLTW Principles of Engineering
- NOCTI - Carpentry
- QuickBooks Certified User
- Precision Exams Health Science
- AAFCS Pre-PAC Education Fundamentals

Occupation Examples

These assessments test the student's mastery of state standards and are not necessarily aligned with or approved by an industry body or used in hiring or advancement decisions. Some states include CTE Assessments, in addition to other types of industry credentials, within their CTE accountability and reporting systems.

Most Common Credential Type Earned










Determining Value

Although every credential reported by states is included in this analysis, this does not mean that every credential in the analysis has labor market value. Credentials that could not be identified or validated for existence based on the description given were excluded.

Determining value for a credential based on labor market demand is not straightforward. Some credentials may be in high demand but in occupations that pay less than a living wage or that are projected to decline over time. Other credentials may show low labor market demand, but act as prerequisites to or building blocks for additional credentials that lead to career advancement.

Other important factors to consider include explicit employer demand signals (i.e. how many job postings call for a particular credential) as well as the demand or growth projections and wages related to the occupation(s) for which the credential provides an advantage to prospective employees.

Differences in Supply and Demand of Credentials Offered and Earned by Type

Typology		Credentials Earned by Students	Credentials Demanded by Employers
License		<div><div>1%</div></div>	<div><div>21%</div></div>
Certification		<div><div>43%</div></div>	<div><div>16%</div></div>
Software		<div><div>25%</div></div>	<div><div>64%</div></div>
General Career Readiness		<div><div>28%</div></div>	<div><div>0%</div></div>
CTE Assessment		<div><div>3%</div></div>	<div><div>0.1%</div></div>

Note: Columns may not sum to 100 due to rounding.

Demand for each credential was calculated based on the level of regulation and employer signaling trends for each credential type. See Appendix B for a table of the demand methodology by credential type.

A Certification or License is most likely to be directly requested by employers, in some cases because they are required for the occupation and in others because they are a strong signal to an employer that an applicant has mastered highly-valued skills. These credentials are often measuring skills that are directly applicable to their respective occupations. However, because these Certifications are often mandatory—or close-to—employers do not necessarily specifically request them in job descriptions. They rely on the implied requirement of needing a License or Certification to do a job. This means that

demand for some of these credentials is likely underestimated because employers do not signal that they need or want a specific credential.

Demand for Licenses is based on demand for the licensed occupation in the state where the License is required in most or all states. If the License is only required in a few states, demand is based on specific requests in job postings for that License. Demand for Certifications is based on specific requests for those credentials.

In contrast, Software credentials represent proxies for expected competencies. Employers rarely require that students have a credential of these types by name. Rather, they request the underlying skill sets. This means that employers generally want employees who

are proficient in productivity software, such as Microsoft Word. However, employers do not ask for students to signal these abilities through a credential. In order to address this, we looked at demand for the underlying skill (i.e. an employer requesting an employee be proficient in a specific software) rather than demand for the credential itself (i.e. an employer requesting a Microsoft Office Specialist credential). This means that demand for the credential itself is overestimated. Demand for Software credentials is based on entry-level postings requesting competence in the software, but not necessarily requesting the credential itself.

Lastly, CTE Assessments and General Career Readiness credentials are rarely requested in middle- and high-wage occupations. While employers may want employees with some of these skills, these credentials

represent fundamental building blocks to future employment rather than valuable additions that will open the door to specific occupations. Examples of General Career Readiness skills include basic first aid, financial literacy, general safety (such as OSHA) and application of academic content (math, literacy and/or career awareness) in workplace situations.

Many CTE Assessments should be considered strong assessments that reflect student knowledge or program quality rather than industry credentials. Demand for General Career Readiness credentials in living-wage jobs cannot be calculated. Demand for CTE Assessments is based on specific requests for those credentials.

Details are outlined further in the following sections and specific actions states can consider are outlined in the Recommendations section.

State programs should place more emphasis on the capstone credentials that are most demanded by employers and less emphasis on credentials that may signal specific underlying skill sets or competencies but do not provide students with an advantage in terms of employment, wages and career advancement.






A Closer Look at the State Landscape by Credential Type






There is substantial variation in the types of credentials students earn across states. In most states, Certifications are the most commonly earned type of credential, making up almost half of all credentials earned. In Florida, Arkansas, Utah and West Virginia,

half or more credentials earned are Software credentials. In Wyoming, Virginia, South Carolina, Pennsylvania and New Jersey, the most frequently earned credential type is General Career Readiness. The only state that has relatively high earnings in CTE Assessments is Oklahoma, which has developed CTE Assessment credentials through its CareerTech centers.



State Supply by Credential Type

State	 License	 Certification	 Software	 General Career Readiness	 CTE Assessment
Alabama	0.4%	63%	27%	9%	0.04%
Alaska	5%	67%	3%	19%	7%
Arkansas	0%	8%	66%	26%	0.05%
Florida	1%	34%	51%	15%	0%
Georgia	1%	56%	41%	3%	0%
Indiana	5%	76%	4%	0%	14%
Kentucky	0.2%	58%	26%	13%	3%
Mississippi	0%	100%	0%	0%	0%
Missouri	1%	84%	2%	0%	13%
New Jersey	10%	28%	26%	36%	0%
New Mexico	0%	52%	2%	32%	15%
North Carolina	0.1%	64%	24%	12%	0.002%
Ohio	3%	52%	7%	38%	0%
Oklahoma	6%	37%	5%	5%	47%
Pennsylvania	1%	49%	2%	47%	0%
Rhode Island	4%	75%	10%	1%	10%
South Carolina	1%	27%	21%	47%	3%
Tennessee	1%	64%	29%	5%	1%
Texas	15%	71%	13%	0%	1%
Utah	7%	12%	78%	0.2%	2%

State	 License	 Certification	 Software	 General Career Readiness	 CTE Assessment
Vermont	0.2%	52%	1%	47%	0.2%
Virginia	1%	10%	12%	72%	5%
West Virginia	0%	13%	51%	35%	0%
Wyoming	0%	40%	8%	52%	0%
National	1%	43%	25%	28%	3%

Note: Columns may not sum to 100 percent due to rounding.

Key Terms

Supply/Demand Category

This measures the extent to which each credential is oversupplied or undersupplied. The metric is based on a comparison of the number of credentials earned and the number demanded in each state and for each credential. Categories include:



Percent Oversupplied

The percent oversupplied measures the percent of credentials earned in states where the credential is considered oversupplied relative to demand. If a credential is oversupplied in every state in which it is earned, it would be 100 percent oversupplied.

Percent Undersupplied

The percent undersupplied measures the percent of credentials earned in states where the credential is considered undersupplied relative to demand. If a credential is undersupplied in every state in which it is earned, it would be considered 100 percent undersupplied.



License

Overall, Licenses are the least common credential that students earn in high school; however, the Licenses students are earning are misaligned with industry demand. This misalignment is due to extreme oversupply of Licenses associated with low-wage occupations and undersupply of the Licenses associated with middle- and high-wage occupations.

While certain Licenses require advanced degrees, there are licensed occupations that are available to students directly after high school graduation. These include healthcare occupations like dental assistants, EMTs and paramedics, as well as service occupations like manicurists and cosmetologists.

Because Licenses are a requirement to enter into specific occupations, the demand for a License can be thought of as the demand for the associated licensed occupations. However, just because a License is required does not mean the occupation is in demand or commands a living wage.





Licenses Earned

Rank	Credential	Credentials Earned	Percent Oversupplied	Supply/Demand Category
1	Hair Stylist / Cosmetologist / Barber License	4,433	100%	⬆️
2	EMT / Paramedic License	4,316	36%	⬇️
3	Licensed Practical Nurse	804	0%	⬇️
4	Dental Assistant	608	0%	⬇️
5	Pesticide Applicator License	590	99%	⬆️
6	Manicurist License	161	100%	⬆️
7	Esthetician License	80	94%	⬆️
8	Commercial Driver's License	14	0%	⬇️
9	Dental Radiographer	13	62%	⬆️

As we expected, the top Licenses being earned in states are grossly misaligned with demand for those Licenses. Out of the nine Licenses being earned by students in

high school, only four have any demand in occupations that command a living wage, all four of which show positive projected growth.

Licenses Demanded

Rank	Credential	National Demand	Projected Growth (2016-26) ²⁰	Percent Under-supplied	Supply/Demand Category	Median Salary
1	Commercial Driver's License	594,563	6%	100%		\$70,621
2	Licensed Practical Nurse	364,610	12%	100%		\$42,078
3	Dental Assistant	182,377	20%	100%		\$32,896
4	EMT / Paramedic License	97,611	15%	64%		\$35,115

Note: This table is limited to credentials demanded in at least two states. For data specific to a state, see [CredentialsMatter.org](https://credentialsmatter.org). Percent Undersupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

Many of the top oversupplied Licenses are related to personal care occupations: Hair Stylist / Cosmetologist/ Barber (100 percent oversupplied), Manicurist (100 percent oversupplied) and Esthetician (94 percent oversupplied). These occupations do not command high salaries²¹ and do not have high projected growth.

In these cases, rather than acting as a stepping-stone to a sustainable career, Licenses may simply be a bureaucratic necessity to entry that do not signal value to a potential employer or guarantee job placement given the oversupply.

States should reconsider whether it is worth investing in these Licenses, and policymakers may want to reevaluate whether Licenses are

necessary for these occupations in the first place.²²

²⁰ The projected growth listed includes the following occupations: Heavy and Tractor-Trailer Truck Drivers (Commercial Driver's License), Licensed Practical and Licensed Vocational Nurses (Licensed Practical Nurse), Dental Assistant (Dental Assistant License), Emergency Medical Technicians and Paramedics (EMT/Paramedic License)

²¹ None of the licensed personal care occupations listed have meet the \$15/hour minimum salary required for the living-wage threshold in this analysis. See Appendix B for more information.

²² Department of the Treasury Office of Economic Policy, the Council of Economic Advisers, and the Department of Labor - [Occupational Licensing: A Framework For Policymakers](#), 2015

The other commonly earned Licenses are in the health care sector, which generally present better opportunities for students in terms of associated wages and potential for career advancement. These Licenses are linked to allied health professions and nurses, including paramedics and dental assistants.

For example, 64 percent of the EMT/Paramedic Licenses earned are earned in states where the License is undersupplied; the remaining 36 percent of the EMT Licenses earned are in states where the License

is oversupplied for the occupation. This emphasizes how important it is that each state focus on their labor market and that conclusions not be drawn for individual states or credentials solely.

In this case, the License is often a stepping-stone to other careers, such as firefighters or further health careers. In the health care sector, Licenses and Certifications often work hand-in-hand to ensure quality of care. This relationship and Certifications are explored further in the next section.





Certification

Certifications have the potential to open doors for entry-level workers or help seasoned workers advance their careers. However, overall alignment of Certifications is poor, with only two Certifications (Automotive Service Excellence and ServSafe Certifications) appearing on both the top supplied and top demanded lists.

Certifications signal that an individual has acquired a specific set of abilities. In some cases, Certifications allow individuals to perform a specific job, or to perform

specific tasks within an occupation.

Unlike Licenses, however, Certifications are not legal requirements.

Top 10 Certifications Demanded

Rank	Credential	National Demand	Percent Undersupplied	Supply/Demand Category	Median Salary
1	Certified Medical Assistant	181,281	100%	⌵	\$31,235
2	Automotive Service Excellence Certification	170,866	34%	⌵	\$44,269
3	Certified Pharmacy Technician	142,835	100%	⌵	\$32,344
4	ServSafe Certification (Manager/Food Handler/Allergens/Alcohol)	92,757	41%	⌵	\$31,617
5	CompTIA Security+	76,409	100%	⌵	\$82,296
6	Cisco Certified Network Associate	70,466	100%	⌵	\$81,480
7	CompTIA A+	70,101	100%	⌵	\$43,226
8	Certified EEG/EKG/ECG Technician	40,956	100%	⌵	\$50,132
9	AWS Certified Welder	26,143	57%	⌵	\$42,652
10	NCCT Medical Assistant	17,247	28%	⌵	\$31,330

Note: This table is limited to credentials demanded in at least two states. For data specific to a state, see [CredentialsMatter.org](https://credentialsmatter.org). Percent Undersupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

There are some highly demanded—and undersupplied—Certifications that command mid-level salaries. These include Automotive Service Excellence Certifications (\$44,000), CompTIA A+ (\$43,000) and AWS Certified Welder (\$43,000). These Certifications allow for career mobility and can open doors to entry-level careers as automotive technicians, help desk operators and welders.²³

For example, the table below shows a potential career pathway for students seeking IT jobs. In the case of these CompTIA stackable Certifications, each additional credential earned in the pathway increases median salary.

CompTIA Pathway

Credential	Credentials Earned	Demand	Median Salary
CompTIA ITF+	1,229	86	\$40,094
CompTIA A+	907	70,101	\$43,226
CompTIA Network+	202	696	\$50,024
CompTIA Security+	86	76,409	\$82,296

Many health care occupations also call for Certifications. Among the most in-demand Certifications are Certified Medical Assistants, Certified Pharmacy Technicians, Certified EEG/EKG/ECG Technicians and NCCT Medical Assistants. These Certifications are largely undersupplied, although three of the four command salaries that are only barely above a living wage which is an essential factor when deciding whether to encourage students to pursue these.

Similarly, while ServSafe Certifications are demanded, median salary is only slightly above a living wage. This is because many states and employers do not differentiate between ServSafe Manager Certifications and ServSafe Food Handler Certifications, the former of which is crucial for managerial positions that result in higher salaries.

In contrast, the top Certifications earned by students across our dataset are largely oversupplied.

²³ For more information on the career mobility of middle-skill jobs, see Burning Glass Technologies and Jobs for the Future - [When is a Job Just a Job —And When Can it Launch A Career? The Real Economic Opportunities of Middle-Skill Work](#), 2018

Top 10 Certifications Earned

Rank	Credential	Credentials Earned	Percent Oversupplied	Supply/Demand Category
1	NCCER - Core Curriculum	60,350	100%	⬆️
2	NCCER - Carpentry	33,392	100%	⬆️
3	Automotive Service Excellence Certification	22,726	16%	⬇️
4	ServSafe Certification (Manager/Food Handler/Allergens/Alcohol)	21,634	47%	⬇️
5	Certified Nursing Assistant	16,351	100%	⬆️
6	FEMA National Incident Management System	14,544	100%	⬆️
7	Certified Internet Web Certification	8,736	100%	⬆️
8	NCCER - Masonry	8,184	100%	⬆️
9	NCCER - Electrical	7,874	99%	⬆️
10	S/P2 - Automotive Service	6,552	100%	⬆️

Eight of the top 10 most-earned Certifications are entirely oversupplied. This is in part driven by the NCCER Certifications in Core Curriculum, Carpentry, Masonry and Electrical, which are 99-100 percent oversupplied. These Certification alone account for over 100,000 credentials earned, more than one in eight of all credentials earned, despite there being no appetite in the labor market for them.

Oversupply is not limited to NCCER credentials; FEMA National Incident Management System certification, Certified Nursing Assistant, Certified Internet Web Certification and S/P2 - Automotive Service Certification are all 100 percent oversupplied.



Software

Overall, employers do not request credentials to prove software competence, and most people learn and validate these in-demand skills through other means. Despite this, Software credentials make up over 25 percent of credentials earned.

Software credentials demonstrate competence particular to a specific software, including productivity software and job-specific applications such as graphic or computer-aided design software. These skills are requested by employers across many industries but are not easily mapped to specific occupations. We considered nine specific credentials to be Software credentials.

Most Software credentials earned are Microsoft Office Specialist credentials (130,000), which is also a highly-requested skill, demanded in over 4 million entry-level jobs. Students also earn Adobe, Autodesk and QuickBooks credentials at high rates, all of which are in demand.

In order to understand Software demand, the demand for the associated skill was measured rather than the demand for the credential itself. This assumes that these Software credentials properly signal the underlying skill to employers and that employers recognize their value. However, this does not take into account the opportunity cost or actual cost of earning a Software credential in lieu of an in-demand Certification or License.

For example, students completing an engineering program of study in the STEM career cluster may need to demonstrate proficiency in productivity software skills (such as Microsoft Office) in order to manage projects and develop effective communication with clients. However, the Autodesk Certified User Software credential may more clearly signal the engineering-specific skills valued by software firms. While students can earn multiple credentials, many students may need to evaluate which of the available credentials will best support their career goals.

Software credentials are most impactful for students when they directly accelerate a student's career progression. They are less impactful when the credential is considered nice to have instead of necessary by employers. This is not to say that students

should avoid earning nice-to-have credentials; rather, it highlights the need for states, educators and employers to help students prioritize the credentials that will carry the most value in the workforce given the time and resource constraints inherent in schools.



Supply and Demand of Software Credentials

Demand Rank	Credential	Credentials Earned	National Skill Demand	Percent Undersupplied	Supply/Demand Category
1	Microsoft Office Specialist	129,895	4,046,879	100%	⌵
2	Adobe Certified Associate	52,189	168,901	11%	—
3	Adobe Certified Expert	575	168,901	100%	⌵
4	QuickBooks Certified User	1,631	111,687	100%	⌵
5	Autodesk Certified Professional	271	76,765	100%	⌵
6	Autodesk Certified User	10,394	76,765	43%	⌵
7	Avid Certified User - Media Composer	85	520	8%	⌵
8	Certified Solidworks Associate - Academic	814	0	0%	⌶
9	Certified Solidworks Associate	297	0	0%	⌶

Note: This table is limited to credentials earned in at least two states. For data specific to a state, see [CredentialsMatter.org](https://credentialsmatter.org). Percent Undersupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

Credentials earned only captures the number of students who earn a specific credential—not necessarily all those who have the skill. This makes it difficult to compare to demand, which is the number of entry-level jobs requesting these skills. In other

words, more students may be proficient in a software than is reflected in the number of credentials earned— while the number of jobs explicitly signaling the need for that software proficiency is likely higher than the number of jobs that would value the credential itself.

General Career Readiness











Overall, General Career Readiness credentials make up more than 25 percent of the credentials earned in high schools. Yet they are often either unnecessary to get a job or represent such a small fraction of what is necessary that holding one—without complementary credentials—does not lead to a clear or successful pathway in the workforce.

General Career Readiness credentials measure general foundational workplace skills including basic reading, math, financial and digital literacy, workplace safety as well as basic life support or first aid. These types of skills are necessary in some way across virtually all occupations, but are not sufficient measures of knowledge and skill to gain entry into specific occupations. As such, job postings are an inappropriate measure of employer demand for General Career Readiness credentials.

These credentials often represent either (a) a bare-minimum skill required for much more skill-intensive jobs, such as a basic life support Certification requirement for a registered nurse; or (b) a nice-to-have skill that employers will invest in if deemed necessary and does not guarantee entry for a specific job.



Top 10 General Career Readiness Credentials Earned

Rank	Credential	Credentials Earned	Percent Oversupplied	Supply/Demand Category
1	WISE Financial Literacy Certification	67,208	100%	
2	Basic First Aid	36,102	100%	
3	IC3 Certification	22,840	100%	
4	OSHA 10-Hour - General	18,067	100%	
5	EVERFI - Financial Literacy	8,197	100%	
6	Conover Workplace Readiness	6,461	100%	
7	National Career Readiness Certificate	2,561	100%	
8	OSHA 10-Hour - Healthcare	2,175	100%	
9	OSHA 10-Hour - Construction	2,165	100%	
10	Army JROTC Certificate	2,119	100%	

Note: This table is limited to credentials earned in at least two states. For data specific to a state, see [CredentialsMatter.org](https://credentialsmatter.org). Percent Oversupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

Labor market demand is an inappropriate measure of demand for General Career Readiness credentials and these credentials should not be considered industry-recognized credentials in the way that they currently are in state CTE programs, ESSA accountability systems or credential incentive policies.

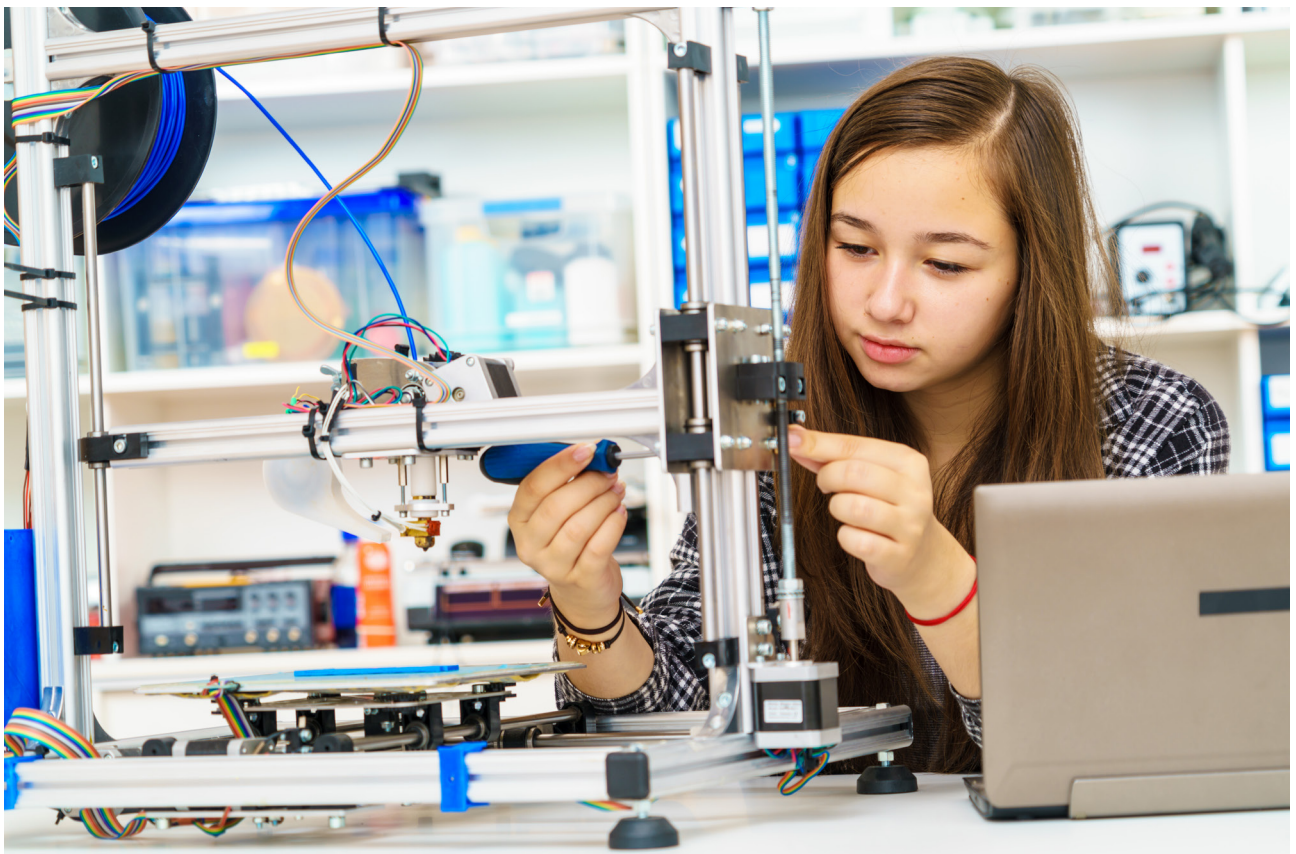
This is not to say skills acquired as a result of earning these credentials are not important life skills and valuable in the workplace. Instead, **General Career Readiness** credentials should be incorporated into appropriate introductory CTE courses and considered foundational knowledge that all students should have the opportunity to learn as part of a career pathway that leads to a credential that is truly valued by employers.

CTE Assessments

Overall, there is a lack of employer demand for or recognition of CTE Assessments. This suggests states could reconsider how they use and promote these assessments within their CTE programs.

CTE Assessments measure the skill attainment of students who have completed a program course sequence or CTE pathway. These assessments test students' mastery of state or course standards and are not necessarily aligned with or approved by an industry body. Organizations such as Project Lead The Way (PLTW), American Association of Family and Consumer Sciences (AAFCS) and NOCTI frequently create these types of assessments.

Some states include CTE Assessments, in addition to other types of industry credentials, within their CTE accountability and reporting systems. All CTE Assessments included in this analysis originated from the data and lists provided by state education agencies as being earned by or available to students.



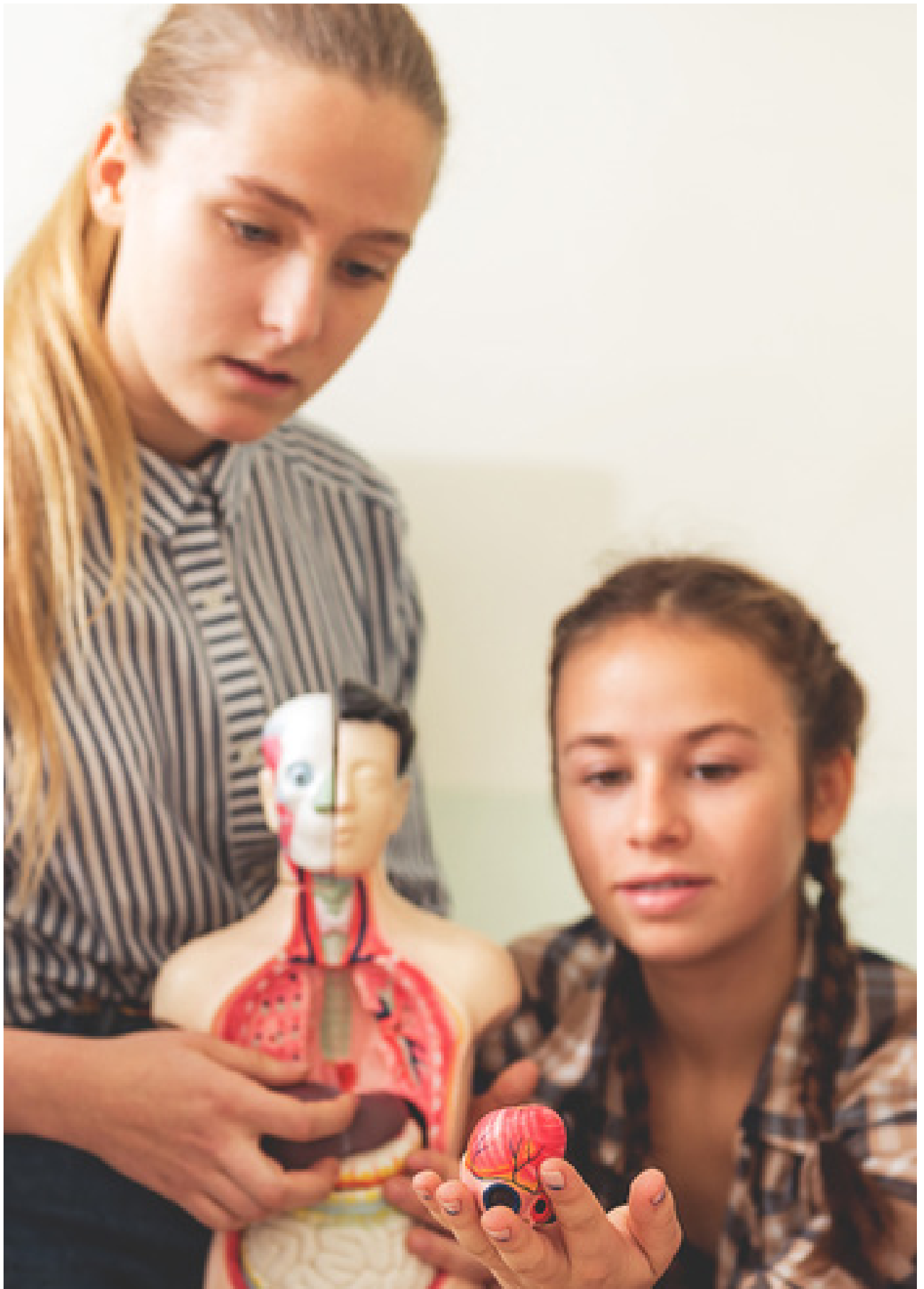
Top 10 CTE Assessments Earned

Rank	Credential	Credentials Earned	Percent Oversupplied	Supply/Demand Category
1	PLTW Introduction to Engineering Design	1,342	100%	⬆️
2	PLTW Principles of Engineering	1,028	100%	⬆️
3	AAFCS Pre-PAC - Early Childhood Education	965	100%	⬆️
4	AAFCS Pre-PAC - Education Fundamentals	863	100%	⬆️
5	PLTW Principles of Biomedical Sciences	752	100%	⬆️
6	AAFCS Pre-PAC - Broad Field Family and Consumer Sciences	620	100%	⬆️
7	National Health Science Assessment	569	100%	⬆️
8	PLTW Human Body Systems	480	100%	⬆️
9	AAFCS Pre-PAC - Culinary Arts	468	100%	⬆️
10	NOCTI Job Ready Assessment - Criminal Justice	352	100%	⬆️

Note: This table is limited to credentials earned in at least two states. For data specific to a state, see [CredentialsMatter.org](https://credentialsmatter.org). Percent Oversupplied and Supply/Demand Category are based on comparing credentials earned to demand data from just those states that provided data.

Virtually no CTE Assessments hold currency in the labor market. Although it is possible that at the state level individual employers recognize state-specific assessments, these are non-transferable across state lines or to non-participating employers and will likely pigeonhole students into employment with one employer rather than giving them options for career advancement. Because of this, our analysis found virtually all CTE Assessments earned are oversupplied when evaluated against labor market demand.

While CTE Assessments are often focused on important underlying competencies, they should be considered separately from industry-recognized credentials, given a lack of employer or industry recognition. This is not to say that CTE Assessments are low quality or low value; they may provide important insights into student mastery, serve as vehicles to award postsecondary credit or fit within CTE program evaluation and accountability systems. Rather, CTE Assessments should not be included as part of a state's industry-recognized credential portfolio.



Looking Forward: What's Next For This Research?

This first-of-its kind research represents a foundation for deeper conversation and policies that states can advance to evaluate and strengthen their credential offerings as part of broader CTE programs.

To help states understand the broader landscape of offerings and outcomes—and tackle key questions about the “value” of industry-recognized credentials to both employers and students—ExcelinEd and Burning Glass will add to this research in the months ahead.

Key activities include:

- Updating and expanding the data in Credentials Matter to reflect the most recent findings and acknowledge that more states are beginning to collect credential attainment data.
- Incorporating postsecondary attainment of credentials data in the *Credentials Matter* websites to examine the full impact of CTE pathways that begin in high schools and terminate in postsecondary study.
- Collecting and analyzing findings at the regional level in states where data are available, and pairing that analysis with information about access to credentialing opportunities available to students.

All students deserve an opportunity to graduate ready to succeed in college and career. Ensuring that the credentials they earn matter is one step to helping students do just that.

Appendix

Appendix A: Other Research to Reference

While there is ongoing research on industry credential attainment, there are substantial gaps that this research hopes to address.

This section outlines some of the strengths of the current literature and highlights where this report fits into the broader landscape of industry credential work.

Credential Currency

[Credential Currency: How States Can Identify and Promote Credentials of Value](#) is a collaborative effort by the Council of Chief State School Officers (CCSSO), Education Strategy Group (ESG) and AdvanceCTE. This resource includes a series of recommendations for states to ensure students pursue and attain industry-recognized credentials with real marketplace value. With the large and complex web that is credentialing bodies in the U.S. and offer thousands of various industry-recognized credentials, it can be challenging for states to know how to effectively focus incentives and resources. The report provides a framework to aid states' strategic planning processes. It also recommends states focus on identifying and incentivizing high-value credentials and to begin (if they are not already) collecting and reporting credential attainment data.

Workforce Data Quality Campaign

[Workforce Data Quality Campaign](#) (WDQC), an initiative of the National Skills Coalition, represents a broad coalition of national partners from the education and workforce development world. The campaign advocates at the national and state levels to continually strengthen governmental data systems related to educational and employment outcomes. If the plethora of valuable data that already exists is brought together in a useful way for the public, policymakers, educational institutions and the business community, it could be leveraged to propel better and deeper investments in the skills of American workers.

Besides advocating and encouraging public officials, WDQC recently conducted a survey of the states to better understand if and how states are using data to answer key questions about credentials. This effort aimed to learn more about whether states are collecting individual-level data about non-degree credentials, incorporating these data into their Statewide Longitudinal Data Systems, evaluating attainment by subpopulation and identifying credentials of value.

Certification Data Exchange Project




Similar to the WDQC in that their mission is to improve and support data sharing and systems, the [Certification Data Exchange Project](#), a venture between the Association for Career and Technical Education and various national and state partners, was created to help build, refine and replicate comprehensive and sustainable data linkages between state data systems and third-party industry certification organizations. Since its creation, a handful of states have partnered with CompTIA, an IT industry association, to receive exam records from exams taken in their respective states, which they have then been able to match with their own postsecondary systems. As part of this work, one main finding has been to advocate for a national data exchange clearinghouse in order to sustainably address data-matching challenges.

Credential Engine









































As previously mentioned, the number of credentials (as well as the entities that supply them) is vast and inundating. To simplify that reality, [Credential Engine](#) has created a centralized, web-based tool that allows users to search for any credential (which they define very broadly) that might exist in that immense universe. Their database of information about postsecondary credentials is fueled by credential providers actively contributing information about what they offer within the structure of a common terminology. By supplying metadata such as competencies one would obtain through earning the credential, how long it takes to earn the credential and common occupations that are natural fits, the overall public can begin to gain a deeper comprehension of the value of a credential and the connections it has to various education and career pathways.























































Appendix B: Data Details and Calculations









Data Collection and Alignment Results by State

 High Alignment
  Moderate Alignment
  Low Alignment
  No Data

 Secondary and Postsecondary
  Secondary
  List
  No Data

State	Alignment Category	Data Collection Category
Alabama	 Moderate	 Secondary
Alaska	 Low	 Secondary
Arizona	 No Data	 List
Arkansas	 Low	 Secondary and Postsecondary
California	 No Data	 No Data
Colorado	 No Data	 List
Connecticut	 No Data	 No Data
Delaware	 No Data	 Secondary
District of Columbia	 No Data	 List
Florida	 Moderate	 Secondary and Postsecondary
Georgia	 Moderate	 Secondary
Hawaii	 No Data	 No Data
Idaho	 No Data	 List
Illinois	 No Data	 No Data
Indiana	 Moderate	 Secondary and Postsecondary
Iowa	 No Data	 List
Kansas	 No Data	 List
Kentucky	 Moderate	 Secondary and Postsecondary
Louisiana	 No Data	 Secondary
Maine	 No Data	 List

Maryland	 No Data	 No Data
Massachusetts	 No Data	 List
Michigan	 No Data	 Secondary and Postsecondary
Minnesota	 No Data	 List
Mississippi	 Low	 Secondary
Missouri	 Low	 Secondary
Montana	 No Data	 No Data
Nebraska	 No Data	 No Data
Nevada	 No Data	 List
New Hampshire	 No Data	 List
New Jersey	 Low	 Secondary
New Mexico	 Low	 Secondary and Postsecondary
New York	 No Data	 No Data
North Carolina	 Low	 Secondary and Postsecondary
North Dakota	 No Data	 List
Ohio	 Moderate	 Secondary
Oklahoma	 Moderate	 Secondary and Postsecondary
Oregon	 No Data	 No Data
Pennsylvania	 Low	 Secondary
Rhode Island	 Low	 Secondary
South Carolina	 Low	 Secondary
South Dakota	 No Data	 Secondary
Tennessee	 Moderate	 Secondary and Postsecondary
Texas	 Moderate	 Secondary
Utah	 Moderate	 Secondary
Vermont	 Moderate	 Secondary and Postsecondary
Virginia	 Moderate	 Secondary




Washington	 No Data	 No Data
West Virginia	 Low	 Secondary
Wisconsin	 No Data	 List
Wyoming	 Low	 Secondary

Demand

To understand labor market demand for credentials, Burning Glass used its proprietary dataset to search for job postings that requested specific credentials or skills. Burning Glass' spidering technology extracts information from close to 40,000 online job boards, newspapers, and employer sites and

de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. All Burning Glass postings data in this report reflect all job postings collected in the U.S., localized to the appropriate state when necessary.

Demand data used vary by credential type, as outlined in the following table:

Credential Type	Demand
 Licenses	Demand for the licensed occupation in the state where a license is required in most or all states. Specific requests in job postings for that license if the license is only required in a few states.
 Certifications	Specific requests for the credential.
 Software	Entry-level postings requesting competence in the software but not necessarily the credential itself.
 General Career Readiness	N/A: Job postings are an inappropriate measure of demand for general career readiness credentials.
 CTE Assessments	Specific requests for the credential.

Demand data were sourced for all credentials earned across all states in K-12. Demand data are not included in states for credentials where the number of credentials earned in that state was zero and either (a) the number

of credentials earned across all states was fewer than 15 or (b) the number of credentials earned across all states was fewer less than 20 and those credentials were only earned in one state.

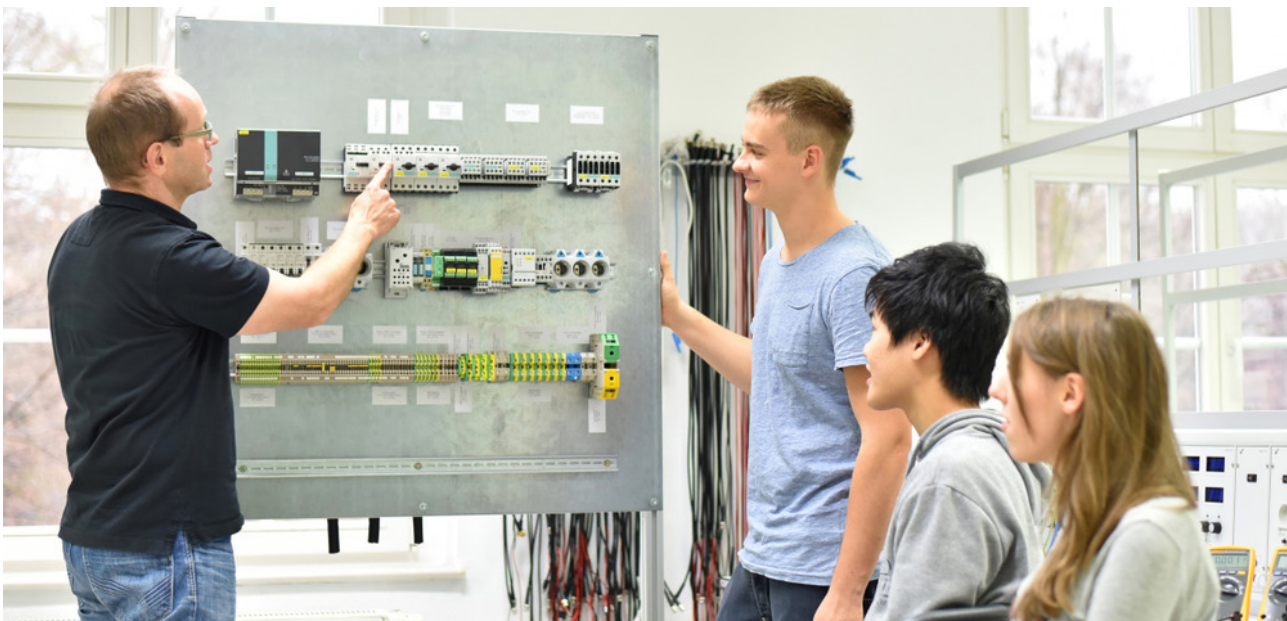
Demand is limited to postings in occupations that command a living wage. A living wage is defined by an occupation commanding a median hourly wage national of at least \$15/hour based on Occupational Employment Statistics (OES) data from the Bureau of Labor Statistics. Demand is normalized to account for the difference between actual openings and job postings posted online.

Definition of Normalized Job Openings

Normalized openings are a modeled version of real-time posting data and can be considered as the best available proxy of labor market demand. Burning Glass uses a sophisticated proprietary model, which utilizes Census and Bureau of Labor Statistics data to adjust the level and trend of real-time postings data.

More specifically the model utilizes the following third-party data (and components) to estimate and validate the model:

1. Job Openings and Labor Turnover Survey (JOLTS): Monthly job openings by industry
2. Occupational Employment Statistics (OES): Employment by state, occupation industry and year
3. The Quarterly Workforce Indicators (QWI): Employment and hires by state, industry, year and quarter
4. The Bureau of Labor Statistics (BLS) Occupational Projections
5. Job Vacancy Surveys (JVS) from several states



The model accounts for occupations that tend to be under-represented in real-time postings data such as construction or food service jobs. Additionally, the model removes the over-time volatility that is observed in real-time postings data, even for well-represented occupations such as IT and health care jobs.

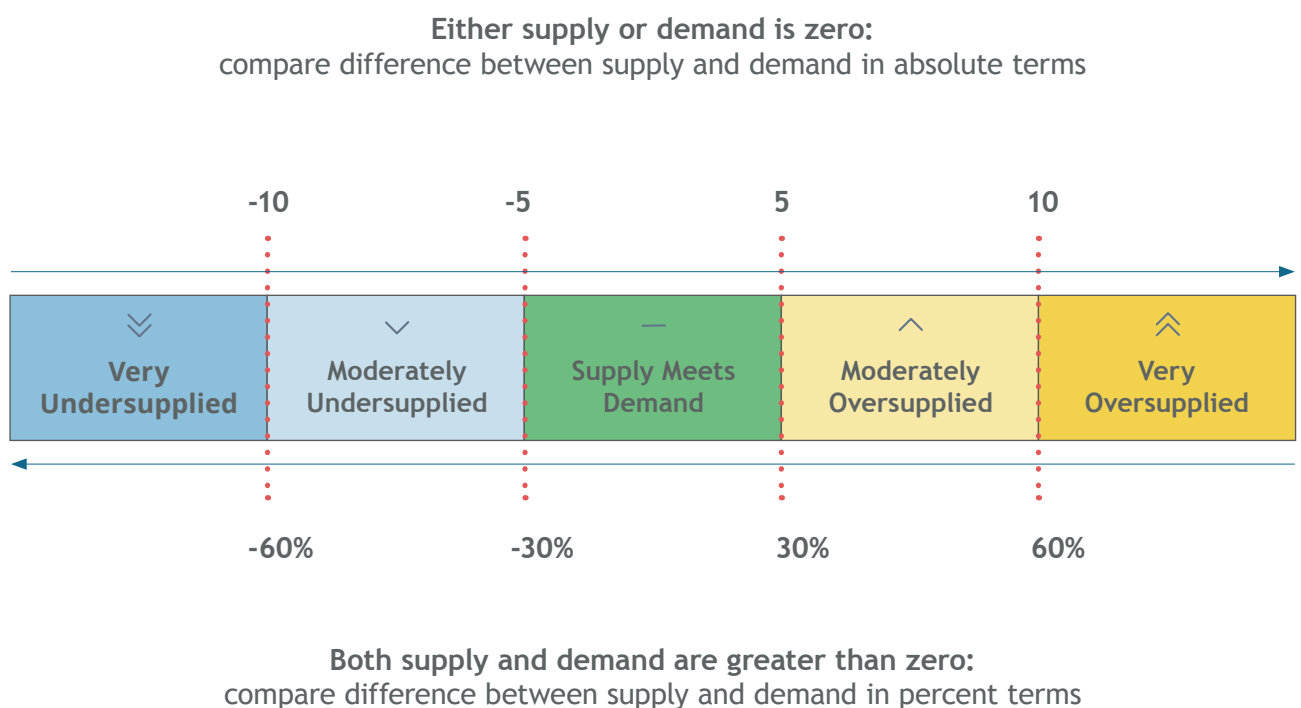
Supply and Demand Categories

This measures the extent to which each credential is oversupplied or undersupplied.

The metric is based on a comparison of the number of credentials earned and the number demanded in each state and for each credential.

Categories include:

- Very Undersupplied
- Moderately Undersupplied
- Supply Meets Demand
- Moderately Oversupplied
- Very Oversupplied
- No Data Available



Credentials with a difference of supply and demand within 5 if only either supply or demand was non-zero or within 30 percent if both were non-zero were considered to be in the Supply Meets Demand. Credentials with a difference of supply and demand within 10 if only either supply or demand was non-zero or within 60 percent if both were non-zero were considered to be either in the Moderately Undersupplied if supply was less than demand or Moderately Oversupplied if demand was less than supply categories. Credentials with greater differences were considered to be either Very Undersupplied or Very Oversupplied.

Credentials in states where no data were available are considered to be in the No Data Available category.

Percent Oversupplied

The percent oversupplied is calculated by summing the number of credentials earned in states where the credential is either Moderately Oversupplied or Very Oversupplied and dividing by the number of credentials earned across all states in the data, for each credential.

Percent Undersupplied

The percent undersupplied is calculated by summing the number of credentials

earned in states where the credential is either Moderately Undersupplied or Very Undersupplied and dividing by the number of credentials earned across all states in the data, for each credential.

Alignment

This shows a measurement of how aligned the state's credential attainment and data collection practices are with demand for credentials at the state level. The factors that affect this score include the percent of credentials earned that are in demand, the percent of credentials in demand that are not earned and data collection best practices. Categories include:

- Low Alignment
- Moderate Alignment
- High Alignment
- No Data

Alignment is based on the following components: the percent of credentials earned that are in demand (50 percent); the percent of credentials demanded that are supplied (40 percent); and the status of data collection (10 percent).

To account for credentials that could not be earned in high school, demand data are not included where the number of credentials earned in that state was zero and either (a) the number of credentials earned across all states was fewer than 15 or (b) the number of credentials earned across all states was fewer than 20 and those credentials were only earned in one state. This is to ensure that states are not penalized for students who don't earn credentials that they likely would not have been eligible for.

Percent In Demand

The percent of credentials in demand is calculated based on the number of credentials earned in states where demand for that credential is greater than 5. In-demand credentials are capped at the number of credentials demanded. This is weighted by credential type and then summed to the career cluster, state or national level. This is then divided by the total credentials earned in the career cluster, state or nationally. The weights for credential type are as follows:

- Licenses: 0.5-1 depending on median market salary, with 0.5 the weight for the lowest median market salary and 1 the weight for the highest median market salary amongst the distribution across all Licenses.

- Certifications: 1
- Software: 0.5
- General Career Readiness: 0
- CTE Assessments: 0.3

Percent Not Supplied

The percent of credentials that are not supplied is calculated based on the number of credentials demanded in states where supply for that credential is zero and demand for that credential is greater than 5. This is weighted by credential type and then summed to the career cluster, state or national level. This is then divided by the total credentials demanded in the state. The weights for credential type are as follows:

- Licenses: 0.1 depending on median market salary, with 0.5 the weight for the lowest median market salary and 1 the weight for the highest median market salary amongst the distribution across all Licenses.
- Certifications: 1
- Software: Capped at the number of postings that specifically require the credential rather than the postings that require the underlying skill.
- CTE Assessments: 0
- General Career Readiness: 0

Data Collection

Data collection points are allocated as follows:

- 100: States collect secondary and postsecondary data and collect data directly from vendors.
- 75: States collect secondary and postsecondary data; States collect secondary data and collect data directly from vendors; States collect postsecondary data and collect data directly from vendors.
- 50: States collect secondary data only.
- 0: States collect no quantitative data.

Salary

Living-Wage Occupations

Living-wage occupations are based on median hourly wage data from the Bureau of Labor Statistics Occupational Employment Statistics program. [Living wage occupations](#) are considered to be those that make at least \$15/hour.

Median Salary

Median salary information comes from Burning Glass' market salary data. Market salary is calculated using a machine learning model built off of millions of job postings every year, and accounting for adjustments based on locations, industry, skills, experience, education requirements and other variables. Actual compensation may vary based on individual employer salary practices and experience.

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