

Roadmap for K–12 and Workforce Data Linkages

Key Focus Areas to Ensure Quality Implementation



Where are we going?

Alignment between K–12 education and the workforce is critical because jobs are changing. Students must be prepared not only for the jobs of today but also for the jobs of the future. The American public [wants](#) schools to prepare students for work as well as higher education, and many states are working toward this goal. With access to current, accurate, and robust data, state education and workforce agencies can work together to support students to successfully transition out of high school, no matter what path they choose.¹ Securely linking data between state K–12 and workforce data systems can create a bridge between these agencies as they develop shared career readiness goals for students and the state. Data can help the K–12 agency understand what training and skills students require to meet employers' needs and help the workforce agency make the best use of students' educations.

Having high-quality data linkages between K–12 and workforce data systems allows states to answer questions such as the following:

- How do we prepare students for the jobs of today and the jobs of the future? What jobs are in demand now, and what jobs will be in demand? What skills, credentials, and degrees are required for those jobs?
- What are the workforce outcomes (e.g., employment rates) of career and technical education (CTE) participants? Which CTE programs are tied to high-paying and high-demand jobs?
- How do workforce outcomes differ among students from different groups (e.g., rural/urban, race/ethnicity)?
- Are students obtaining certification or employment near where they attended high school?
- What are the employment patterns and workforce outcomes of recent high school graduates during the years after graduation?
- In what industries do graduates work after high school? Are students successfully prepared to work in these industries? Is the teaching workforce prepared for workforce-related instruction?

- Are work-based learning opportunities (e.g., apprenticeships, internships) for high school students aligned with industry needs? Are industry needs listed, and if so are they easily accessible?
- How do workforce outcomes vary for high school students who participated in different work-based learning opportunities?
- What are the workforce outcomes of high school noncompleters or adult learners?
- What supports are needed for successful transitions from K–12 to the workforce?

Sharing aggregate data among workforce and state and local education agencies can improve the work of these agencies in the following ways:

- providing policymakers with evidence to demonstrate the value of work-based opportunities for students
- helping state and local policymakers identify how to use linked data for policymaking
- helping stakeholders such as educators, families, and employers advocate for better laws, better policies, or increased funding
- increasing accountability among state and local agencies
- supporting policymakers in evidence-based decisionmaking and resource allocation
- acting as a catalyst to encourage other kinds of data sharing (in compliance with privacy laws), including student-specific sharing and real-time data exchanges to better monitor and support improved outcomes for students

While data linkages can be used in many ways to inform the design of programs at the K–12 level, the value of linkages goes beyond improving program outcomes. Linkages should be leveraged to ensure that students are being best served and that schools and districts are continuously improving.

¹ Most self-sustaining work requires some form of postsecondary education or training, and high schools should prepare students for those postsecondary paths. Many high-priority industries in states require two-year degrees, so states will want to know how many students enroll in those career pathways and programs of study through postsecondary. The ideal program of study is one that spans secondary and postsecondary. However, it is possible for students to prepare for meaningful work immediately after high school through career and technical education or work-based learning. The focus of this roadmap is securely linking data between K–12 and workforce agencies to better understand and support students' paths from high school directly into the workforce. For additional information, see [Roadmap for K–12 and Postsecondary Data Linkages](#).

Why does this matter?

Understanding the varied paths to and through education and careers (e.g., apprenticeships in high school leading to a skills-based career followed by advanced training in postsecondary) allows the education and workforce sectors to ensure that students leave the K–12 system work ready. Students can use the results of linked data to keep pace with changes in the workforce and identify the right career paths for themselves. Additionally, linked data can shine a light on understanding opportunity youth and how they could be reengaged in education or work.²

Securely linking data between K–12 and workforce data systems can help both agencies analyze workforce needs; understand the quality and benefits of work-based learning opportunities and job placements; and calculate the return on investment for programs such as CTE, career academy programs, and apprenticeships. Using data to understand the outcomes of programs such as internships and apprenticeships is critical to identifying effective programs that can be replicated, understanding barriers to accessing work opportunities, and strengthening programs to meet students' and employers' needs.

Recognizing that students take different paths after high school, most states are including college and career readiness indicators in their accountability plans under the Every Student Succeeds Act (ESSA).

Secure, high-quality K–12 and workforce data linkages will be needed to measure and track progress on career readiness indicators. Linked data can also be used to facilitate conversations, create policy, secure funding, and inform decisionmaking within and across the K–12 and workforce sectors.

While the linkages are technical mechanisms that enable a state to connect information housed in different data systems (often across different data owners), this document addresses the policies and supports that enable a high-quality linkage rather than focusing on the technical aspects of this work. Secure, high-quality data linkages between education and workforce agencies are needed at both the state and local levels, but this document focuses on recommendations at the state level. Creating a shared vision and ensuring high-quality data matching and sharing are examples of the steps states can take to facilitate K–12 and workforce data linkages and are included in the six key focus areas highlighted in this document. Collaboration among state and local governments, researchers, and other key players will be crucial to ensuring that all students are successful regardless of the path they choose after K–12.

How do we get there?

What does effective implementation of this work look like? The Data Quality Campaign (DQC) and the Workforce Data Quality Campaign (WDQC) collaborated with a group of workforce, education, research, and policy experts to develop recommendations focusing on the six key areas listed below.³

- 1. Shared Vision:** Establish up front a shared vision between the education and workforce agencies to ensure that the agencies enter the data sharing agreement with an understanding of the unique role and perspective each has in providing information to better support students. This first step is important for successfully linking high-quality data.
- 2. Cross-Agency Data Governance:** Develop a structure in which to define the roles and responsibilities of each agency needed to ensure clear processes and a reasonable timeline for collecting and reporting data and to ensure accountability for data quality and security.
- 3. Data Matching and Sharing:** Develop a deliberate process for securely sharing data between K–12 and workforce data systems to ensure a sustainable linkage. These linkages should include a high-quality matching process that allows data about individual students to be accurately and securely shared between data systems and only with authorized users. Ideally, K–12 and workforce data linkages can be done within the structure of the state's current P–20W statewide longitudinal data system (SLDS), which includes data from early childhood, K–12, postsecondary, and the workforce.
- 4. Data Analysis and Use:** Determine which entities have access to the linked data (including differentiating access to individual student-level data and aggregate data). Determine how the linked data will be analyzed, reported (in a readily accessible format), and used to answer critical policy questions and support student success.
- 5. Capacity Building:** Ensure that all agencies involved have the structure and staffing in place to effectively manage, analyze, and share linked data to take action to support all students.
- 6. Privacy and Security:** Develop strong, multifaceted, and transparent processes to ensure that shared data is safeguarded and consistent with federal and state information sharing laws.

² Opportunity youth are youth ages 16 to 24 who are currently out of school and are not working.

³ See the [Appendix](#) for more details about the expert group, including a full list of participants.

Future considerations

For states that have already linked K-12 and workforce data systems, the following suggestions provide next steps in the evolution of this work. For states that have not yet developed the capacity to build secure, high-quality K-12 and workforce data linkages, the following suggestions are offered with the future in mind. As states develop these linkages, they can consider additional ways to improve and build upon the linkages when additional resources are available.

- Develop high-quality data linkages with workforce agencies in other states. Match and share limited data to understand education and workforce patterns.
- Develop high-quality data linkages among workforce, postsecondary, and other agencies (e.g., child welfare, social services) to identify strategies to address the challenges of preparing the students most in need of support, such as [students in foster care](#), for college and careers.
- Find and work with leaders at the state and local levels (e.g., business leaders, legislators) who can act as data champions and advocate publicly for data linkages.
- Consider a regional economic approach to understanding the workforce outcomes of work-based learning experiences.

Federal policy considerations

This document focuses on recommendations at the state level, but states cannot do it alone. As these linkages are being developed, federal policymakers can consider ways to promote, support, and incentivize the data linkage practices of state and local education and workforce agencies.

- Consider supporting state development and use of purposeful data linkages among high school, postsecondary, and workforce records by continuing to provide funds for these activities through programs such as the Workforce Data Quality Initiative (WDQI) or SLDS grants.
- Consider increasing the alignment of definitions and reporting standards across education and workforce policies such as the Workforce Innovation and Opportunity Act (WIOA), the Carl D. Perkins Career and Technical Education Act of 2006, or ESSA to help states strengthen their secure data linkages across agencies and programs.
- Consider supporting states' efforts to evaluate and improve their implementation of federally funded programs and policies that are aimed at increasing workforce readiness, such as CTE programs funded by the Perkins Act or workforce development programs funded by WIOA. WIOA is designed to help job seekers access employment, education, training, and support services to succeed in the labor market and to match employers with the skilled workers they need to compete in the global economy.

FOCUS AREA

1

Shared Vision

The collaborative creation of a shared vision between the education and workforce agencies is essential to the ability to link and use data to improve student outcomes. Starting with a shared vision ensures that the agencies entering into a data sharing agreement understand the unique role each has in providing high-quality information to realize their mutual goal of better supporting students.

Why does having a shared vision matter?

A shared vision between the education and workforce agencies prioritizes improving the outcomes of students by securely sharing information that leads to better individual and joint decisionmaking by the agencies. With a shared vision, education and workforce agencies can work together to identify the objectives that each agency hopes to achieve through data sharing. Setting mutual goals to communicate critical data points demonstrates an understanding that students take different pathways during and after their K-12 education and that their lives are interconnected across several systems.

A shared vision drives both education and workforce agencies to design and use data systems that spur effective actions to support students. This shared vision also allows for smoother transitions whenever new agency leadership takes over and opens the door for different stakeholders to become involved throughout the data linkage process.

What does a strong shared vision look like?

- The agencies involved mutually understand why each needs data.
- Agencies work collaboratively to be transparent and earn trust. Everyone involved in the data linkages understands how students are doing, why linking data is valuable, and how data is protected and used.
- Agencies start with their policy questions and determine together which stakeholders to engage and how to bring them to the table.
- Agencies demonstrate a collective responsibility to create a sustainable shared vision. Agencies consider year-end activities (e.g., reports, reviews) to ensure that the shared vision is sustained, even during leadership and staff transitions.

How can a state achieve this?

Creating a plan based on common objectives and processes for communication between the education and workforce agencies can ensure the timeliness of critical data points that improve decisionmaking by agency leadership and staff. Together the agencies can decide how they will review and use the data they collect and link. Education and workforce agency staff should know who their counterpart is

in the other agency and what mechanism to use to advance collaboration and lessen areas of misunderstanding or disagreement. Agencies should also consult the state's WIOA and Perkins Act plans to identify the vision for the workforce data system. Specific processes and stakeholders involved in creating a shared vision will depend on the context within a state (e.g., relevant legislation, new political leadership).

Engaging Stakeholders Is Critical to Establishing a Shared Vision

Voices and perspectives of stakeholders from outside the education and workforce agencies can also be key to shaping a shared vision. Education and workforce agencies should collaborate with other stakeholders at the state and local levels to determine mutual needs and goals and apply them within the shared vision. Below is a list of potential stakeholders that *could* be involved throughout various parts of the shared vision process, from technical (e.g., writing the data sharing agreement) to broad (e.g., spreading the word about the vision once it is created). For example, involving the state superintendent of education at the beginning of the process could be helpful to build broad support for the shared vision. Which stakeholders to involve and when will also depend on the context within a state (e.g., existing relationships, new political leadership).

- Advocacy organizations
- Attorneys
- Chambers of commerce
- Constituency organizations (e.g., organizations that represent school principals or district superintendents)
- District superintendents/district leaders
- Governor/governor's education policy adviser
- Legislative researchers
- Local education agencies
- Out-of-school time partners (e.g., Boys & Girls Clubs of America)
- Postsecondary institutions and credential providers
- Researchers
- State economic development agency
- State and local boards of education
- State and local workforce boards
- State office of career readiness or office of career and technical education
- State office of legislative services
- State superintendent of education
- Student organizations (e.g., career and technical student organizations)

Shared Vision in Kentucky



The [Kentucky Center for Education and Workforce Statistics \(KCEWS\)](#) is a cross-agency data governance body made up of state K-12, postsecondary, and workforce development agencies that collects and links education and workforce data to provide public reports to empower policymakers and the people of Kentucky to make informed decisions. An organization like KCEWS that has such a broad service base requires a grand shared vision. Leaders at KCEWS helped to create a shared vision by engaging with both public and private agencies. They built support for the KCEWS

data collection and linkage efforts by communicating with local workforce areas, participating in a televised forum, and regularly sharing updates on the KCEWS website and Twitter. Continued outreach is apparent as agency staff often travel throughout the commonwealth to meet with workforce planning regions and local workforce areas to ask about their data needs and promote the [Kentucky Future Skills Report](#), an interactive tool that allows employers and practitioners to view historic workforce supply data by industry and credential type and compare it to future workforce demand.

Cross-Agency Data Governance

Cross-agency data governance provides state agencies a structure in which to define the roles and responsibilities needed to ensure clear processes for collecting, linking, and reporting education and workforce data and to ensure accountability for data quality and security.

Data governance is more than an information technology issue—it is needed to make informed policy decisions across agencies. States can think broadly about data governance as a base on which to build the relationships and trust needed to securely share data across education and workforce agencies to answer questions such as, Are students obtaining certification and employment in high-demand jobs near where they went to high school?

Many states already have cross-agency data governance structures. This focus area provides recommendations for states to strengthen or refine existing data governance structures or for states to develop high-quality data governance structures if they are not currently in place. Ideally, the K-12 and workforce data linkage efforts are done within the cross-agency data governance structure and should not require a separate data governance body. Using this structure allows for efficiency, alignment, and coordination with the state's other cross-agency data efforts.

Why does cross-agency data governance matter?

Linking K-12 and workforce data can be challenging, and data governance helps participating agencies and other stakeholders continually attend to the sustained culture of trust needed to do this work with quality. Clearly defined roles and responsibilities are necessary for states to have secure, high-quality linkages between K-12 and workforce data systems. A clear structure is essential to bringing the right individuals together to oversee and administer the linking of data across education and workforce agencies. Data governance requires commitment and encourages the sustainability of the linkages, even when there is turnover of supportive leadership or skilled staff.

The governance structure often drives data linking and sharing processes. Through the governance structure, participating agencies can agree upon defined criteria for collecting, linking, matching, analyzing, and viewing the data. Agreeing to these parameters can allow for secure and efficient access to the data needed to answer critical policy and practice questions. A high-quality cross-agency data governance structure should be proactive in using data for continuous improvement.

What does good cross-agency data governance look like?

Cross-agency data governance starts with questions.

State agencies take the following steps:

- Identify the policy and practice questions the state and stakeholders are seeking to answer through the use of K-12 and workforce data linkages. Ensure that the data being linked is connected to those questions.
- Develop a shared research agenda that prioritizes the policy and practice questions, ensures that the questions are answered, and determines areas for long-term study.
- Start with a small project that answers a critical question that is shared by the K-12 and workforce sectors as a pilot test. Starting small allows for data linking and sharing on a limited basis toward a common purpose and shows the value of the linkage. Use this kickstarter project to build

support for the data linkage, identify other priorities for data linkages, and grow the relationships to allow data linkages to develop.

- Balance the list of questions with the flexibility to address unanticipated needs or questions.

Cross-agency data governance has a big tent.

State agencies take the following steps:

- Include the agencies that have the source data and the agencies whose programs will be explored using the linked data.
- Identify and involve key agency staff who are empowered to make connections to the K-12 and workforce data and who can advocate for this work to each of the individual participating agencies. Include topic area experts from participating agencies.

- Bring as many stakeholders together as possible to discuss linking K–12 and workforce data and explain any proposed products, such as reports or data dashboards, to be created from the linked data (see [Focus Area 1: Shared Vision](#) for a list of possible stakeholders).
- Encourage a diverse group of stakeholders to shed light on opportunities or constraints for the linkage work.
- Keep stakeholders informed and provide them the opportunity to give feedback through the data governance structure. Stakeholders are more likely to support linking data and to use products created from the linked data if they are actively involved in discussions and the decisionmaking process.
- Consider partnering with external stakeholders, such as cooperative educational service agencies, professional associations (e.g., superintendents, principals, school boards), and researchers to garner support for the linkages.
- Ensure that data governance is a collaborative effort among participating agencies.
- Give each participating agency an equal voice. The equal involvement of different agencies contributes to longevity.

Cross-agency data governance defines key responsibilities.

These responsibilities may vary depending on the structure of the governance body, but they may include the following:

- Organize the cross-agency data governance body to reflect the data model used by the state.
- Develop data sharing agreements.

- Determine levels of access to the linked data, including a process for providing data access to individuals outside of state agencies (e.g., university researchers).
- Develop policies and criteria for data analysis. For example, data analysis could be presented to the data governance body first and then to leadership before it goes public. All parties could sign off before releasing data or analyses to the public, or the leadership could have time to draft communications materials about the data.
- Incorporate roles and responsibilities related to both the performance and reporting aspects of data linkages and policy and research. Define how those responsibilities are either centralized or shared between the education and workforce agencies and where and how they function together.
- Determine the authoritative source for each data element that will be included in the linkage.
- Document the decisions and rationale for data policy changes, especially legal decisions.
- Develop data privacy and security policies and procedures (see [Focus Area 6: Privacy and Security](#)).
- Be aware of any important legal constraints or ramifications to linking K–12 and workforce data. For example, consult with legal counsel for guidance on issues such as state public information requirements.
- Ensure sustainability, which can include staffing and funding.
- Take advantage of opportunities to align metrics and indicators where possible, such as in state ESSA and WIOA plans.

How can a state achieve this?

Instead of being thought of in isolation, K–12 and workforce linkages should be part of a larger understanding of students' transitions across the early childhood, K–12, postsecondary, and workforce pipeline. For additional

recommendations on developing and implementing a high-quality cross-agency data governance structure, see [Roadmap for Cross-Agency Data Governance](#).

Memorandum of Understanding (MOU) Tips

Below are some tips for establishing an MOU between an education agency and a workforce agency for the purposes of linking K-12 and workforce data.

- Determine how long each party will need data (e.g., whether or not the MOU needs to be a long-term agreement).
- Determine what data each party will share.
- Determine how often the data should be shared and what process will be used.
- Set clear, realistic, and timely expectations about processes and tasks.
- Set clear guidelines for how the data can be used and shared.
- Formalize the privacy and security practices that each party should follow.
- Formalize an approval process for responding to outside requests to use data.

Data Matching and Sharing

Linkages are the connections between data systems that allow information to flow back and forth between programs and agencies. Linkages enable data matching, which is a technical process that allows the same individual’s data to be found in different data systems.

A high-quality data matching process uses individually identifying information (e.g., Social Security number, name, date of birth) to ensure that the records for the same individual are being accurately matched between data systems. Data sharing means that the participating agencies, such as the K–12 agency and the workforce agency, are providing individual-level information that would not otherwise be available to the other agency. Securely sharing data provides transparency and helps answer questions about program outcomes, resource allocation, nontraditional pathways through education and the workforce, the value of different credentials, gaps between the education and skills of an individual and workforce needs, equitable access to work-based learning opportunities, and more.

Why do data matching and sharing matter?

Apprenticeships, career pathways, CTE, dual enrollment, and stackable credentials: new and existing programs that impart the skills students need for the workplace receive a lot of interest and attention. However, these skills are difficult to count and measure—and often are captured in databases that are not linked to other data to understand the quality and outcomes of

these strategies. Linking K–12 and workforce data helps answer questions policymakers, program administrators, education leaders, workforce leaders, families, communities, and students have (e.g., Which programs work for which students in what contexts? How and why do these programs work?).

What do good data matching and sharing look like?

- K–12 and workforce data linkages are created within the structure of the state’s current P–20W SLDS, which includes data from early childhood, K–12, postsecondary, and workforce data systems.
- The state’s shared vision for the linkage work (see [Focus Area 1](#)) and cross-agency data governance structure (see [Focus Area 2: Cross-Agency Data Governance](#)) guides the data matching and sharing processes.
- Stakeholders understand that linking K–12 and workforce data is different from linking K–12 and postsecondary data.
- Because states can use different methods to match and share data, the state collects as much information as possible on these different methods and brings this information to bear on its goals and constraints to select the matching method that is best for the state.
- Data sharing agreements withstand political transitions and include individual student-level data.
- Agencies define and crosswalk occupational codes and course codes.
- One or more individual identifiers match individual-level data across the K–12 and workforce data systems (e.g., Social Security number, name, date of birth).
 - Most state K–12 agencies do not collect students’ Social Security numbers, but these numbers are the key identifiers for individuals in state workforce data systems, especially the information employers submit for unemployment insurance tax purposes (a key source of workforce data). Likewise, workforce agencies do not ask employers to report demographic information about their employees. This disconnect limits the types of information that can be used to match individual records across education and workforce data systems.
 - Linkages may require data from an agency that is external to the education and workforce systems, such as the motor vehicle agency, to bridge this gap.
 - Leveraging data from another state agency will likely require a separate data sharing agreement.
 - It is important to understand the processes for using data from other agencies to facilitate the K–12 and workforce linkages and decisions around the direction in which data may be shared.

- A process is in place to understand the quality of the matches between the K–12 and workforce data systems. For example, states can create a data map or data flow to [illustrate](#) how data moves from school data systems to state data systems. Or they can create a data fact table to identify key data dimensions and measures. The quality of the matches will define how confident the state can be in drawing conclusions or making decisions based on the linked data.
- Stakeholders understand the data privacy and security laws (federal, state, and local) that may affect how much and how often data is matched and shared between K–12 and workforce agencies. These laws may address topics such as defining which agencies have access to which data, which agencies are responsible for safeguarding data, and data redisclosure rules.
- Stakeholders understand employment laws for students in high school.
- Other data sources may be linked to the K–12 and workforce data to help answer key policy and practice questions. For example, data from the motor vehicle agency can help answer questions about worker mobility. Data from social services agencies, such as participation in programs like Temporary Assistance for Needy Families or the Supplemental Nutrition Assistance Program, can help states understand the effects of socioeconomic status on learning outcomes.

How can a state achieve this?

States can start small by using a deliberate, strategic staging process for prioritizing the linkages made between the K–12 and workforce data systems and building on successful linkages. States can use the key policy and practice questions they develop to help determine which data linkages to prioritize. For example, in Maryland key questions include, What are the workforce outcomes for Maryland high school students who complete CTE coursework and either enter the workforce directly or also obtain postsecondary education or training? And what are the workforce outcomes of Maryland high school noncompleters? To help answer those questions, the Maryland Longitudinal Data System (MLDS) Center includes data on high school transitions to the workforce in its [dashboard series](#), one of which examines the workforce outcomes of high school noncompleters.

The MLDS Center recently revised its research agenda to reflect the Governing Board’s commitment to longitudinal analyses of critical education and workforce transitions and outcomes. To facilitate data matching and sharing among the three participating agencies (Maryland State Department of Education; Maryland Higher Education Commission; and Department of Labor, Licensing, and Regulation), the MLDS Center uses data from at least two of the agencies for each analysis and report. This allows the focus of the research to remain on what happens to students of all subgroups and backgrounds before and after these transitions.

To learn more about state progress toward achieving inclusive, aligned, and market-relevant state data systems, see the WDQC’s [Mastering the Blueprint: State Progress on Workforce Data](#). WDQC has also produced a [Data Policy Toolkit](#), which provides legislative templates for sharing data and creating SLDS and data tools.

Data Sharing in Action

CREDENTIAL REGISTRY ALLOWS EMPLOYERS TO SHARE KEY DATA

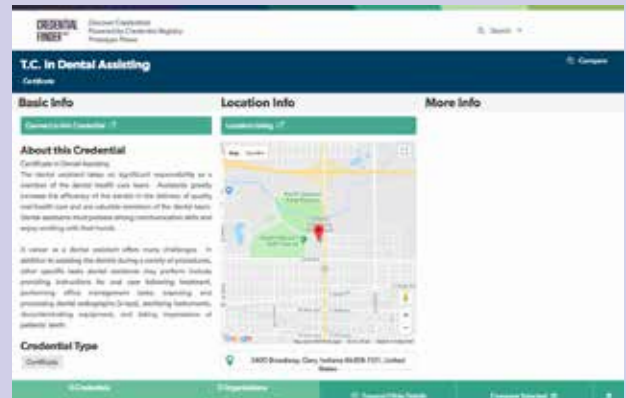
Credential Engine is the nonprofit organization that operates the [Credential Registry](#) and the [Credential Finder](#), tools that employers and educators can use to list the credentials they offer and to search, discover, and compare credentials and competencies they are interested in. Students and workers can use the tools to find the best credentials to meet their needs and advance them on their education and career pathways. These tools provide simultaneous benefits for employers and job seekers by using a common language around credentials, competencies, quality assurance, pathways, employer preferences, and labor market outcomes. States can facilitate hiring in key industries by supporting efforts to scale up Credential Engine. Demand for a common language around workplace skills is increasing, and thoughtful data sharing can make this information accessible to anyone interested in workforce development.

COLLABORATION IN INDIANA LEADS TO DATA SHARING THROUGH THE CREDENTIAL REGISTRY

The [Indiana Commission for Higher Education \(ICHE\)](#), in collaboration with the [Indiana Professional Licensing Agency](#), brought together 13 health professional boards to gain their perspectives on how to approach listing credentials in the Credential Registry. In addition to hundreds of health certificate and degree programs offered by state public institutions, credentials offered by secondary career centers are also made available. Indiana is also working with its [Department of Workforce Development \(DWD\)](#) to link to the department’s career exploration toolset. This linkage would allow users to view job market data and see what credentials they can earn to become competitive candidates. State policymakers are also working to link this information to DWD and ICHE employment and earnings data so job seekers can get a more complete picture of their expected return on investment. Such efforts are crucial in empowering students to make informed decisions on their education and career paths.



Users can search for credentials in any number of fields and further filter their results to show categories such as time of completion or whether a result is part of a separate but related credential.



Users can learn about the requirements and benefits of any credential, as well as where it is offered.

Data Analysis and Use

Data analysis and use allow teachers, program administrators, education and business leaders, employers, researchers, and other partners to answer questions about the progress students are making and the progress of the education and workforce systems at large.

States should consider who will have access to the linked data (including differentiating access to individual student-level data and aggregate data) and what questions need to be answered through analysis of this data. Additionally, states should determine how the results of data analysis will be delivered to stakeholders, including the public, so that vital information necessary for decisionmaking is available while individual student data remains protected. Data analysis and use should have meaningful purposes for both education and workforce agencies and must lead to useful information that improves decisionmaking.

Why do data analysis and use matter?

In addition to being used for compliance or accountability purposes (e.g., meeting some reporting requirements under the Perkins Act), states should use linked data to make informed decisions to support students. Analysis of data on students who, for example, choose to enter the workforce directly after

graduating high school is key to finding solutions for identified challenges and policy issues. When K-12 data is linked to workforce data and used to meet the needs of students, support for the practical use of linked data can grow.

What do high-quality data analysis and use look like?

- All agencies involved have a common language around data that reaches all stakeholder groups (see [Focus Area 1](#) for a list of possible stakeholders).
- All agencies involved determine at what level to report data, how high-quality data is made available at local levels, and who has access to what data and when.
 - Agencies can consider many options for conducting data analysis, such as doing it in house, through a legislatively mandated center (such as the [MLDS Center](#)), through university and research partners, or some combination of these methods.
- State and local governments work together to specify the levels of analysis and use at the state and local levels. The state can be responsible for conducting research, allocating resources, and identifying best practices that can be shared.
 - Both levels of government can consider how to leverage already available resources such as staff time and funding.
- All agencies involved determine how to disaggregate data by variables, such as race/ethnicity or length of time in CTE programs, so it is useful for both K-12 and workforce agencies.
- Agencies take a collaborative approach to identifying data uses that include workforce, K-12, researchers, and key partners (e.g., universities, nonprofit organizations that support students).
- Aggregate data is in an easy-to-access, quick-to-understand format (e.g., an online consumer information tool) to help employers inform recruitment and help parents understand their children's education and employment options.
- Educators can access student-level data to inform instruction.
- Agencies develop a mutual understanding of the quality of the data and linkages. One way to approach this step is by including metrics.
- All agencies involved have confidence that the available data is secure, high quality, trustworthy, and easy to understand and interpret for decisionmaking purposes.

How can a state achieve this?

States can lay the foundation for secure and accessible linked data by creating data access and use policies that answer the following questions:

- Who has access to the data?
- What data do they have access to?
- How do they have access to the data?
- Why do they have access to the data?
- What training must they participate in prior to accessing the data?
- Is the data used to help mobilize resources on behalf of the students who need them most?
- Is the data used to inform program planning and policies?
- Is the data used to inform stakeholders of hiring trends and wage projections?
- What capacity exists to actually make use of whatever linked data the state is able to produce?
- Is the analysis of the data valid?

To guide data analysis and use, states can develop a set of questions to be answered with linked data. These questions may include the following:

- What characteristics of CTE programs, apprenticeships, or other programs are associated with positive outcomes for which students?
- How prepared are students, as a whole and by subgroups, for careers after K-12?
 - What challenges have students encountered?
 - What milestones have students reached?
- How prepared are high school students for postsecondary CTE programs or apprenticeships?

Data Analysis and Use in New Jersey



New Jersey's statewide longitudinal data system, the [New Jersey Education to Earnings Data System \(NJEEDS\)](#), houses high school, college, and career data. It is supported by partners at Rutgers University's [John J. Heldrich Center for Workforce Development](#) alongside state agencies that provide data for NJEEDS ([State Department of Education](#), [Office of the Secretary of Higher Education](#), [Department of Labor and Workforce Development](#)). The Heldrich Center uses data from the New Jersey Motor Vehicle Commission to match high school records to college and career outcomes when a common identifier is not available. Data sharing and creative matching techniques allow NJEEDS to track data over long-term periods and use the information to evaluate programs.

This partnership and the data it produces empower policymakers to understand the impacts of policies that affect education and career outcomes. For example, NJEEDS simultaneously informed education and workforce policy when it was used to support the [Office of Career Readiness \(OCR\)](#) in its program evaluation process. The partnership identified not only 68 high-paying jobs in in-demand industries but also a looming teacher shortage. The data found that many current CTE teachers will retire in the next 5 to 10 years and that there is a particularly acute shortage in science, technology, engineering, and math (STEM). These findings prompted OCR to take action by engaging with its workforce to better understand the barriers that keep people out of the CTE teaching field. By understanding the median age of CTE teachers by key industry career clusters, policymakers were able to pinpoint future recruitment efforts to reverse the problem.

FOCUS AREA
5

Capacity Building

States need capacity, including the structures and staff, to establish and maintain a high-quality linkage between K-12 and workforce data systems. Linking data between these systems is not a one-time project. Rather, states should make a long-term effort to sustain these linkages and ensure that they continue to meet people's changing information needs.

Why does capacity building matter?

Linking data between K-12 and workforce data systems is often resource intensive. Without the right resources, the work cannot be supported or maintained. Establishing and growing strong state capacity means that the linkages can continue, even during changes in leadership or transitions to new systems or processes. Strong state capacity allows data to be translated into useful information that can lead to needed changes in

programs, schools, districts, agencies, and the state. Having the capacity to interpret and use data can help the state invest resources at the right time to meet the needs of students and employers. Capacity can be built within the context of the state to reflect the state's vision and goals for strong education and workforce sectors.

What does strong capacity building look like?

- Strong capacity building starts with questions. Building off a shared vision (see [Focus Area 1](#)), states develop and clearly define the critical policy and practice questions that linked K-12 and workforce data can answer. Staff have the right training and skills to link the data to answer these questions.
- States take a realistic assessment of the participating agencies' current capacity to do the linkage work and identify and address gaps or areas for improvement. Stakeholders understand the quality of the data that will be linked.
- In addition to having technical capacity, staff have the capacity to clearly and effectively communicate and disseminate data.
- Funding for the linkage work is sustainable and state based. For example, agencies can advocate for state-level funding in the form of an annual appropriation to maintain and grow the data work. Though funding serves as a key component in capacity building, states can explore low-cost options for maintaining their data systems. States can also consider growing the capacity of staff to apply for grants to obtain supplemental funds for this work.
- Agencies think creatively about the outputs of the linked K-12 and workforce data, such as data tools, apps, or code. Traditionally, these data linkages have resulted in analyses that have been disseminated in written reports or online data dashboards. In recent years, some states have developed and shared code. This approach can vastly accelerate the kind of analysis states can do and also begin to create an ecosystem of public-facing tools so that civic data entrepreneurs and data customers, such as students themselves, can access and use data in the social media space.
- Agencies can consider partnering with trusted external sources of additional capacity, such as university researchers.
- Programs and agencies that provide K-12 and workforce data understand and use their own data. Integrating capacity into their own agencies is the new norm, not a separate project. Program and agency staff receive data literacy training or coaching to ensure that they have the knowledge and skills to effectively use data to make informed program and policy decisions.
- Local decisionmakers, such as program administrators, district superintendents, employers, and local policymakers, understand how they can use the data generated from the K-12 and workforce linkages to reflect on their progress toward meeting their education and workforce goals, advocate for change, continuously improve their programs, and support students' education and workforce training. Legislators engage in these conversations, which are grounded in data from the K-12 and workforce linkages.

How can a state achieve this?

In addition to state-level funding, federal grants offer states opportunities to create high-quality linkages. States should leverage these opportunities to demonstrate capacity for linkage work and apply for additional grants. For example, in its WDQI grant application, Washington characterized its data warehouse as “partially developed.” Though it could link data across various systems, researchers often found that they lacked external data and could not directly identify cohorts. The increased capacity they gained from

the grant allowed practitioners and researchers expanded access and tools to use data more seamlessly by engaging in sophisticated analysis such as propensity score matching, which allows for more accurate program evaluation and evidence-based policymaking. Capacity building goes beyond the ability to create databases. These efforts also help public agencies better understand their data, how to access it, and how to use it to inform decisionmaking.

Capacity Building in Washington



Leaders at Washington’s [Education Research & Data Center \(ERDC\)](#) have been leveraging existing trust across state agencies to build the state’s capacity to link, share, and use K-12 and workforce data. ERDC developed a purposeful list of questions about employment and education that it wanted to answer using the linked K-12 and workforce data. For example, ERDC staff grouped questions into two critical areas of understanding: employment status of students while enrolled (e.g., How many students are employed during the school year?) and employment as an outcome (e.g., How do employment and enrollment after high school relate to employment patterns established during high school?). Working from existing data quality strategies, leaders at ERDC developed a clear understanding of the quality and timeliness of the data sources available. They considered

who would use the data from these linkages, including students and their families, and how and when to share the data in a digestible way. They also used the linked data to understand students’ employment patterns by industry during the last two years of high school. ERDC has published research using data from the K-12 and workforce linkages, such as [Workforce Participation, Washington State High School Graduates, 2008–09](#). ERDC’s work in this area is documented in its [Employment Data Handbook](#). ERDC has also been building the capacity of its staff to effectively present and communicate about data using its [Research Writing Guide](#). Moving forward, ERDC will continue to build its capacity to link K-12 and workforce data by examining student education and workforce outcomes eight years after graduating high school.

Privacy and Security

Methods to ensure data privacy and security must be in place, particularly when dealing with potentially sensitive information about students. These strategies should be multifaceted and transparent so all stakeholders understand how information is kept secure. Privacy laws and the data security practices of both education and workforce agencies must be considered to ensure compliance with federal and state regulations.

Why do privacy and security matter?

If students, teachers, education and workforce leaders, policymakers, and others do not feel that student data is being kept secure, they are unlikely to support data linkages between education and workforce data systems. The actual security of data, as well as transparency about data security processes and procedures, is essential to ensuring that all stakeholders

are both comfortable with and understand how this data is being safeguarded. Creating clear data privacy policies that are consistent across agencies and aligned with federal and state privacy laws is essential to ensuring data security and support for education and workforce data linkages.

What do strong privacy and security look like?

- Ensuring strong privacy and security policies and practices is a responsibility of the cross-agency data governance body (see [Focus Area 2](#)).
- Protections required by unemployment insurance confidentiality laws and regulations; the Family Educational Rights and Privacy Act (FERPA), a federal law that protects the privacy of student education records; and any relevant state laws are fully integrated into systems and processes and are fully understood by agencies and stakeholders.
- Those who are working with the data are aware of and have received training on all federal, state, and local privacy legislation and on the interplay among these laws. They are also aware of how state laws affect the sharing of information and specific exceptions governing research studies.
- It is clear who has access to what information and what should be done with it.
- Those who are working with the data understand what policy or practice questions can be answered by using aggregate data.
- A data inventory or data classification (e.g., data dictionary) defines each data element collected and stored by the state. The inventory or classification is regularly reviewed and updated. Levels of data sensitivity are clearly defined, and data is categorized by these levels, with corresponding differences in levels of protection depending on the sensitive nature of the data. Definitions recognize that although all student data may be considered sensitive, some pieces of data may be considered more sensitive (e.g., special education status) than other pieces of data (e.g., aggregate graduation rates available to the general public).
- A trusted repository of data that can be shared but does not compromise privacy may be in place.
- Procedures to handle data breaches are in place and clearly specified for all users and the public.
- Policies addressing the redisclosure of data are in place.
- State leaders clearly communicate to the field that securely linking key data between K–12 and workforce data systems is in compliance with the law. This formal communication can provide clarity that data privacy and security issues can be addressed and concerns about privacy do not have to prevent data linkages. State leaders can help the public understand why the state is interested in linking this data, what the state intends to do with the linked data, and how the linked data can benefit the public.
- State leaders discuss how information can be de-identified, when necessary, for further analysis and for reporting purposes.

How can a state achieve this?

Safeguarding student information is critical to developing linkages between the K-12 and workforce data systems. Data privacy policies and practices should be clearly communicated to education and workforce agency staff, teachers, program administrators, parents, students, education and workforce leaders, and other stakeholders. Several resources are available for states developing privacy policies and procedures. The US Department of Education [Privacy Technical Assistance Center's website](#) and the [Family Policy Compliance Office's website](#) provide information about FERPA and other federal laws that

provide parents and students with privacy rights. DQC's [Roadmap to Safeguarding Student Data](#) provides specific, practical recommendations for prioritizing the safeguarding of student data and continuously reviewing and updating data privacy policies and practices to address changes in technology. DQC's [Complying with FERPA and Other Federal Privacy and Security Laws and Maximizing Appropriate Data Use](#) is a tool for aligning new privacy policies with existing federal and state laws. The Future of Privacy Forum's [FERPA Sherpa website](#) includes resources and guidance for many audiences on understanding FERPA.



**WORKFORCE
DATA QUALITY
CAMPAIGN**

Workforce Data Quality Campaign (WDQC) is a non-profit, non-partisan project of [National Skills Coalition](#). Our initiative promotes federal and state policies that provide stakeholders such as students, workers, employers, policymakers, educators, and practitioners with actionable data that is effectively used to assess and improve our nation's education and workforce strategies. For more information, go to www.workforcedqc.org.



The Data Quality Campaign is a nonprofit policy and advocacy organization leading the effort to bring every part of the education community together to empower educators, families, and policymakers with quality information to make decisions that ensure that students excel. For more information, go to www.dataqualitycampaign.org and follow us on [Facebook](#) and Twitter ([@EdDataCampaign](#)).

APPENDIX

In October 2017, the Data Quality Campaign (DQC) and the Workforce Data Quality Campaign (WDQC) embarked on a project to define what a quality linkage between K-12 data systems and workforce data systems looks like. DQC and WDQC identified the experts listed below to develop the experience-based recommendations that are outlined in this roadmap. These experts represent states and organizations that have emerged as leaders in creating high-quality linkages between K-12 and workforce data at the state level. The experts participated in an introductory conference call in October 2017; met once in person in Washington, DC, in December 2017; and helped develop and refine the recommendations. States that are looking to develop strong linkages between these two sectors can build on the lessons that these leaders provided in this roadmap.

NAME	ORGANIZATION
Kate Akers and Jessica Cunningham	Kentucky Center for Education and Workforce Statistics
Marie Barry	Formerly of New Jersey Department of Education
Melissa Beard	Formerly of Education Research & Data Center (Washington)
Charlotte Cahill	Jobs for the Future
Elizabeth Dabney	Data Quality Campaign
Ross Goldstein	Maryland Longitudinal Data System Center
Deborah Jonas	SRI International
Jenna Leventoff	Workforce Data Quality Campaign
Jackie Lundberg	GA•AWARDS
Ashleigh McFadden	Advance CTE
Etnyre Osias	StrivePartnership
Scott Powell	Michigan Bureau of Labor Market Information and Strategic Initiatives
Michelle Sager	Formerly of National Governors Association
Maureen Sarver	Social Policy Research Associates
David Seith	John J. Heldrich Center for Workforce Development at Rutgers University
Martin Simon	National Governors Association
Lauren Sisneros	Education Commission of the States
Susan Therriault	American Institutes for Research
Rachel Vilsack	Minnesota Department of Employment and Economic Development
Kristin Wolff	Social Policy Research Associates
Geoff Zimmerman	KnowledgeWorks