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USER GUIDE
COLLEGE AND CAREER READINESS DATA INFRASTRUCTURE MATRIX

Center for Education Policy Research
HARVARD UNIVERSITY

Matrix Overview and Purpose

The **College and Career Readiness Data Infrastructure Matrix** is a resource developed by the Center for Education Policy Research at Harvard University to help states reflect on and strengthen their data infrastructure, with the ultimate goal of strengthening students' college and career readiness and success. The matrix provides a structured framework for examining how state data systems are designed, governed, and disseminated to support use of data in decision making. Strengthening strategic data use can enhance decision-making at all levels, supporting states in setting priorities, allocating resources effectively, and implementing evidence-based strategies to improve students' college and career readiness (CCR). This matrix was informed by prior reviews and resources on state longitudinal data systems. See the **Matrix Development** section at the end of this guide for a full list of sources.

Using the Data Infrastructure Matrix

Matrix Structure

The matrix is broken into seven separate domains that cover the technical side and components of state data systems; the availability of data through public data products and secure data environments; and the human capacity for using data strategically to advance policy, refine efforts, and direct scarce resources towards effective strategies. Each domain includes two to four subdomains. Within the 21 subdomains, guiding questions are rated along a graduated scale of Foundational to Leading, with definitions tailored to each guiding question. Users are encouraged to:

- Determine a rating for each guiding question.
- Assign an overall rating for each subdomain (including selecting a rating between levels, if appropriate).
- Complete the full matrix or focus on priority domains.

The matrix may be completed by a team or by a single individual, but it is most valuable when used to facilitate discussion with a broader group.

Completing the Matrix

To complete the matrix, we encourage you to draw not only on your own experience and expertise, but on specific, supporting evidence. This process should not be done in isolation; instead:

- Reflect on what you know is currently in place.
- Connect with colleagues across teams, and ideally across both education and workforce agencies, to understand their efforts and perspectives.
- Review formal documentation and resources. As applicable, consider which materials

are publicly available and what an external stakeholder would be able to see or understand about your data systems and use.

As you complete the matrix, consider documenting the evidence that informs your ratings. This may include:

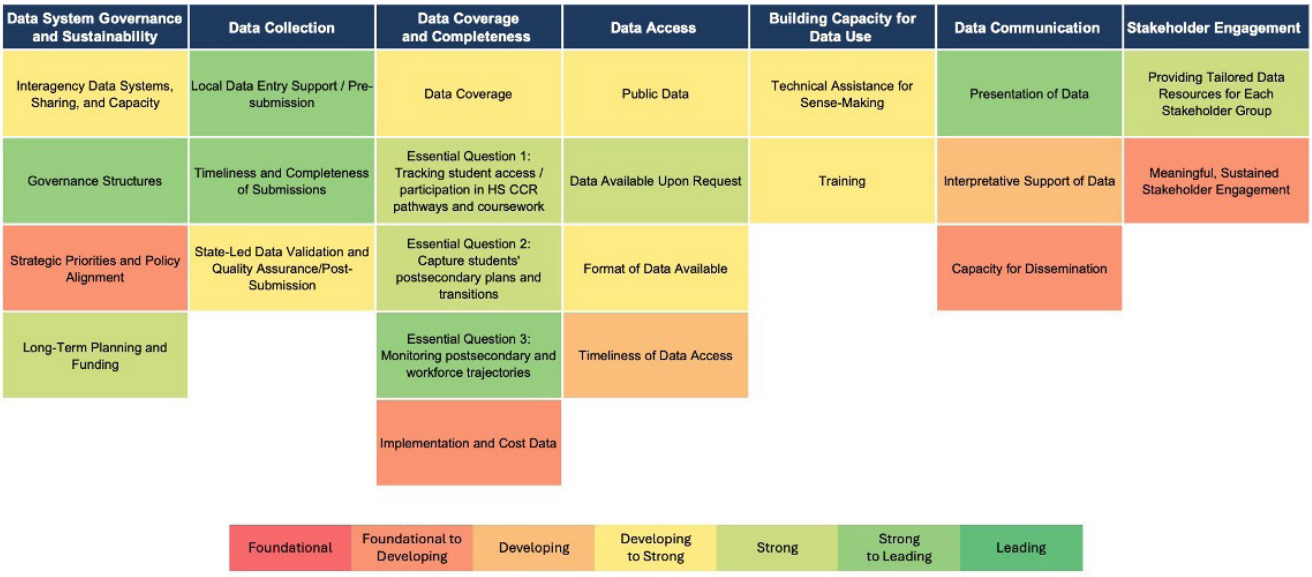
- Documents related to data systems, data entry, data sharing, or data products
- Data-related state policies (e.g., data governance, privacy, reporting)
- Agency publications pertaining to data collection, preparation, analysis, and dissemination, including data codebooks, overviews, guidance from state agencies, media reports, third-party publications, and other relevant materials

Consider the number, type, and breadth of sources informing your rating. Drawing from multiple perspectives and evidence sources will strengthen the accuracy and usefulness of your assessment.

Interpreting and Using Your Results

The data infrastructure matrix is intended to be a practical tool designed to support ongoing conversations about the strengths and gaps of your state's current college and career readiness data infrastructure and to identify actionable areas for improvement.

We have developed an **accompanying Excel tool** that uses your subdomain ratings to create a visual summary of your state's data infrastructure. This visual summary can help teams identify strengths and prioritize areas to improve. An example is shown below:



Cross-Cutting Reflection Questions

As you complete and use the matrix, consider the following questions that apply across domains:

- **Audience and transparency:** From whose perspective are you assessing your data systems, availability, and use? While you may know that certain processes are in place or resources are available, are they visible and understandable to others across agencies? What about external stakeholders such as district leaders, students, practitioners, and policymakers? Consider what is documented publicly versus what exists internally.
- **Cross-agency coordination:** How effectively do agencies coordinate when initiatives, priorities, and relevant data span multiple agencies?
- **Data use and decision-making:** Who is empowered and supported to use data for decision-making, and who may lack access, capacity, or authority?
- **Alignment with state priorities:** How well do current data systems, investments, and priorities align with the state's CCR goals?
- **Measuring impact of investment**: How does the state assess whether data on investments in college and career success initiatives are being collected and analyzed, communicated clearly to stakeholders, and used to inform decision-making and continuous improvement?

Please note: *This matrix is not intended to serve as a prescriptive roadmap or compliance checklist. Some questions may not apply in every context, and ratings may not fully capture the nuance of work occurring at the state and local levels. We encourage teams to use the matrix as a flexible guide and adapt it to meet their specific needs.*

APPENDIX: DATA INFRASTRUCTURE DOMAINS

The appendix of this guide is organized around seven domains that align with the full college and career readiness data infrastructure matrix. For each domain, you will find a brief description of what the domain covers and why it matters, as well as post-rating action steps and best practices to help guide conversations and translate the matrix into practical next steps. Click the domains listed below to jump to their contents.

Domain 1: Data System Governance & Sustainability

Why This Domain Matters

Strong governance and sustainable support provide the foundation for all other aspects of data infrastructure. Without clear decision-making processes, shared priorities, and stable capacity, even technically strong data systems can become fragmented, underused, or misaligned with policy goals. Effective and documented governance creates shared confidence in how data are managed, accessed, and responsibly used, building trust and mutual understanding across agencies. Formalizing roles, processes, and expectations helps ensure continuity and stability even as leadership or priorities change.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Strengthen formal governance structures.** Formalize roles, decision-making processes, and escalation pathways, especially where informal practices substitute for documented governance.
2. **Bring together staff across agencies and levels of seniority.** Create regular opportunities for senior leadership and staff who work directly with data to connect, both within agencies and across agencies, to surface issues, identify priorities, and address data system needs.
3. **Align CCR priorities with data system design**. Clarify how state CCR goals translate into measurable indicators and examine whether current data collection and reporting fully reflect those priorities.
4. **Plan for continuity and sustainability.** Document processes and cross-train staff to reduce reliance on individual knowledge and ensure continuity through staff turnover or leadership transitions.

Domain Spotlight: Aligning and tracking state priorities with clear targets

Missouri and Indiana offer useful models for aligning state college and career readiness priorities with clear quantitative targets that are regularly tracked and publicly reported. Missouri has incorporated these kinds of metrics into their **Department of Elementary and Secondary Education's strategic plan**[1] and publicly tracks progress through an **annually updated scorecard.**[2] Indiana's Department of Education's **Graduates Prepared to Succeed Dashboard**[3] tracks progress on five statewide college and career readiness indicator goals with a user-friendly dashboard.

Domain 2: Data Collection

Why This Domain Matters

The quality of analysis and decision-making depends on the quality of the underlying data. Local education agencies (LEAs) often collect much of the data needed to evaluate CCR efforts, and there is often variation in local capacity, data infrastructure, and familiarity with data processes. To ensure consistent and reliable data, states should provide clear guidance, standardized definitions, and user-friendly systems—along with technical assistance, post-submission validation, and ongoing quality assurance. Strong data collection processes make it easier for LEAs to provide high-quality data and for the state to maintain data systems that are timely, accurate, and informative.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Standardize data definitions and expectations statewide.** Maintain clear, consistent definitions and reporting guidance across districts and sectors.
2. **Prioritize high-impact improvements to data quality.** Use matrix results to identify whether timeliness, completeness, or validation is the most urgent leverage point, and focus improvements there.
3. **Shift from reactive to proactive district support.** Provide onboarding for new data submitters, regular trainings, office hours, and help desks to prevent common submission issues.
4. **Differentiate support based on district capacity.** Use feedback from data submitters across different types of districts to identify common challenges and target additional supports accordingly. Pilot shared or regional approaches, such as regional data specialists, that strengthen data quality while reducing burden on individual districts.
5. **Reduce reporting burden while protecting data quality.** Automate and standardize data submissions and validations to improve usability, turnaround time, and data quality, while thoughtfully balancing the benefits of additional CCR data collection against the reporting burden placed on districts.

Domain Spotlight: Streamlining data collection with a shared statewide system

Michigan's **MiDataHub**[4] shows how a coordinated data collection system can strengthen data quality, consistency, and efficiency while generating substantial cost savings. By providing a common platform with standardized definitions and automated validations, the system reduces variation in reporting and minimizes manual data entry. MiDataHub integrates with local student information systems, making it easier for districts to submit timely, accurate data while lowering reporting burden. This **retrospective study**[5] evaluates the return on investment of MiDataHub.

Domain 3: Data Coverage and Completeness

Why This Domain Matters

When state education data systems include comprehensive and coherent data coverage about students' pathways across time and transitions, states are better positioned to understand patterns, outcomes, and disparities. Gaps in coverage—whether across agencies, sectors, initiatives, or student populations—can limit which questions can be answered, for whom, and in what contexts. Being clear about who and what is (and is not) represented in the data helps clarify both the strengths and limitations of available evidence.

Collecting implementation data helps identify the conditions under which initiatives are carried out with fidelity. Such data can help illuminate whether ineffective programs are due to the design of the initiative itself, suggesting a need for redesign or replacement, or due to challenges in implementation that may signal the need for more support. Collecting cost data helps guide strategic investment and resource allocation of limited state funds.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Clarify known gaps in student pathways or outcomes.** Document which students or pathways are not fully captured (e.g., private school students, out-of-state employment, or military service), the approximate scale of these gaps, and the implications for interpreting outcomes or making decisions.
2. **Expand CCR indicators strategically.** Add new data elements only where they clearly inform policy and funding decisions or improvement efforts.
3. **Strengthen implementation and participation data.** Collect consistent information on how statewide CCR initiatives are implemented locally.
4. **Integrate cost data into CCR analysis.** Incorporate cost information into the data system and consider it alongside participation and outcome measures.

Domain Spotlight: Education-to-Workforce Indicator Framework

This domain draws on the **Education-to-Workforce (EW) Framework**,[6] developed by the Gates Foundation and Mathematica, which highlights essential questions that states should be able to answer about student progress from pre-K through higher education and/or into the workforce. States can use this approach to identify priority education and workforce questions that are not currently being examined, assess whether existing data sufficiently support analysis of these priorities, and guide the selection of key student indicators to measure progress.

The Education Commission of the States **created a toolkit**[7] with state-specific and general guidance to help states put the EW Framework into action to build more effective state education data systems.

5. **Assess and address district capacity and infrastructure needs.** Use insights from available data, including cost and implementation data, to identify where districts may need additional support in staffing, technology, or partnerships to implement CCR initiatives and data expectations effectively, and prioritize supports accordingly.

Domain 4: Data Access

Why This Domain Matters

Making education data accessible beyond state agencies helps turn information into action. Clear policies and procedures for public data and secure data access builds trust, increases transparency, and maximizes the value of state data investments. Publicly available data helps students and families understand school performance and make informed decisions about coursework and college and career pathways, while secure access enables school and district leaders to identify strengths and gaps, allocate resources strategically, and design supports that respond to student needs. Well-defined access processes also support strong partnerships, allowing researchers and external organizations to contribute rigorous analysis and technical assistance that expands state capacity while maintaining student privacy.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Clarify public vs. restricted data boundaries.** Clearly document which CCR data are (and are not) publicly available and the rationale for those decisions. Periodically reflect on whether additional data or disaggregation (e.g., district-level, by student subgroup, by pathway) could be made public to better meet stakeholder needs while maintaining privacy protections.
2. **Improve accessibility of public data products.** Provide timely, disaggregated data in formats suitable for

Domain Spotlight: Improving access to public and restricted data

Arkansas' My School Info platform[8] demonstrates how public data can be made accessible and actionable for a wide range of users. The platform allows users to explore data in multiple formats, select metrics of interest, and download files for further analysis. It includes clear documentation, contextual information, and user guides and videos to support understanding and use.

Washington[9] and **Texas**[10] offer strong examples of structures that allow secure access to restricted data for approved external researchers. Both states provide detailed information on their formal data application processes, including documentation of available data; clear criteria, timelines, and points of contact for data access; and guidance on the review process. They also use secure data enclaves that allow approved researchers to analyze cross-agency data in a controlled environment.

independent analysis, accompanied by clear and easy-to-locate data dictionaries, definitions and documentation.

3. **Standardize secure data request process.** Publish clear guidance on eligibility, application and review process, expected timelines, points of contact, and conditions for data use.
4. **Structure data for reuse and efficiency.** Structure data files to minimize user burden and maximize analytical efficiency (e.g., reducing the need to merge multiple files or reconstruct longitudinal datasets). Target upfront investments in data structure and formatting to reduce duplication of effort, improve accuracy, and save time and resources over the long term.
5. **Expand research and data-sharing partnerships thoughtfully**. Ensure non-public data made available upon request are sufficient to support rigorous evaluation and evidence-building, particularly for state priorities and funded initiatives. When appropriate, offer secure access options (such as data enclaves) and streamline access processes to reduce unnecessary barriers and maintain strong student privacy protections, while expanding analytic capacity.

Domain 5: Building Capacity for Data Use

Why This Domain Matters

Even when high-quality data systems exist, stakeholders often lack the tools, training, time, or support needed to interpret and use data effectively. This challenge is often pronounced for CCR data, which can be complex, span multiple agencies, and require contextual knowledge to accurately interpret. Developing strong data use systems therefore requires more than simply providing access to data. States must also invest in human capacity through technical assistance, clear guidance, professional learning opportunities, and partnerships that help translate data into actionable insights. When these supports are in place, CCR data becomes a practical tool for diagnosing challenges, informing improvement strategies, and strengthening outcomes for students.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Provide ongoing district support for interpreting CCR data.** Offer help desks, technical assistance teams, or dedicated points of contact to support districts as they interpret CCR data, ask follow-up questions, and apply insights to planning and decision-making.
2. **Offer role-specific and tiered professional learning.** Differentiate training by role (e.g., counselors, district leaders, teachers, and workforce partners) and by experience level—providing foundational supports for newer staff and advanced opportunities for those seeking to deepen analytic skills or lead data-informed improvement efforts.

3. **Develop self-paced data literacy resources.** Create recorded trainings, guide, and learning modules that stakeholders can access as needed to build data literacy over time and reinforce learning beyond one-time trainings.
4. **Leverage partnerships to extend analytic capacity.** Build and strengthen collaborations with universities, regional entities, research organizations, and nonprofit organizations to help interpret and contextualize CCR data for districts and policymakers. Where appropriate, consider additional staffing or shared regional resources (e.g., regional data analyst) to expand access to dedicated analytic capacity.
5. **Provide districts with actionable toolkits for improvement.** Offer ready-to-use tools that help districts explore root causes and identify evidence-based strategies when CCR data surface challenges (e.g., low FAFSA completion or postsecondary enrollment). Include guidance on when and how to collect or analyze additional data-such as combining quantitative indicators with insights from teachers, students, or families.

Domain Spotlight: Building data capacity through targeted support and tools

Minnesota employs regional data coaches[11] who work directly with local education agencies and workforce agencies to provide training, technical assistance, and analysis to support data-informed decision making.

Colorado has developed resources to build districts' data literacy and data use skills. Examples include a **Data-Based Decision-Making Protocol**[12], as well as a **Data-Based Problem Solving and Decision-Making training**[13] that provides an hour of continuing education credit.

Domain 6: Data Communication

Why This Domain Matters

The value of education data depends not only on its availability, but also on whether it is communicated in ways that enable diverse audiences to understand its meaning and implications. District leaders, school staff, students and families, policymakers, and other stakeholders often have limited time, varying levels of technical expertise, and different baseline knowledge. Long reports, jargony language, or non-user-friendly dashboards can obscure key takeaways and make it difficult for users to answer important questions and translate data into action. Even high-quality data will have limited impact if it is difficult to find, interpret, or connect to questions of policy and practice. Effective data communication—through clear presentation, strong interpretative support, and intentional dissemination—ensures that college and career pathway data are understandable, relevant, and actionable for different audiences.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Clarify the intended takeaway for each data product.** Identify the primary insight each report, dashboard, or visualization is meant to convey, and ensure users can understand these key takeaways quickly. Use benchmarks, narrative explanations, and plain language to support accurate interpretation of the data and to reduce the risk of misinterpretation.
2. **Design data products for multiple audiences.** Balance high-level summaries with opportunities for deeper exploration. Differentiate how information is presented or disseminated based on audience needs, and provide scaffolding (e.g., definitions, plain-language summaries, contextualizing information) to support students, families, and community members with varying levels of prior knowledge.
3. **Support districts in communicating data.** Provide templates, visuals, and tools that help districts share CCR data and insights with families, community members, and partners. Design materials to be easily shared, such as concise summaries and standalone visuals that can be used in meetings or presentation.
4. **Track reach and refine dissemination strategies.** Monitor engagement metrics (e.g., website traffic, downloads, email engagement) and adjust communication strategies accordingly. Proactively deliver data and insights to stakeholders to expand reach, rather than relying primarily on users to seek out data and tools.

Domain Spotlight: Making Data Visible Through Dashboards

This State of Teaching in Oklahoma Dashboard,[14] developed by Oklahoma's Office of Educational Quality and Accountability, illustrates several of the data communication best practices highlighted in this domain and demonstrates how dashboards can support understanding and decision-making rather than simply reporting data. The dashboard presents key indicators in a clear, organized, and visually accessible way, helping users quickly identify patterns, understand context, and connect the data to relevant questions about the teacher workforce.

This research review[15] synthesizes findings from 47 academic articles on K–12 data dashboards, highlighting how dashboards are commonly designed, how educators and families use them, and where design choices can unintentionally limit impact.

Domain 7: Stakeholder Engagement

Why This Domain Matters

College and career readiness (CCR) data systems are most effective when they are designed with the needs and perspectives of their users in mind. Engaging stakeholders throughout the design, improvement, and use of data systems helps ensure that data

products are relevant, accessible, and actionable. Regular engagement provides insight into how different users interpret data, the questions they are trying to answer, and the barriers they encounter. States that establish sustained and meaningful engagement processes are better positioned to build trusted data systems, improve data use across the education and workforce ecosystem, and adapt data tools as priorities and stakeholder needs evolve. By co-designing data platforms and responding intentionally to feedback, states can strengthen both data quality and a broader culture of data-informed improvement.

From Ratings to Action: Next Steps to Strengthen this Domain

1. **Engage broad range of stakeholders in the design and improvement of CCR data systems and resources**. Involve students, families, educators, researchers, workforce partners, and others in the design, refinement, and improvement of CCR data tools and resources, and make intentional efforts to identify and include perspectives that may be missing.
2. **Clarify stakeholder priorities and information needs**. Identify the questions different stakeholder groups are trying to answer and ensure data products are designed and refined to meet those needs.
3. **Collect and act on stakeholder feedback.** Provide multiple, accessible ways for stakeholders to share input and reduce barriers to participation by offering supports such as translated materials, flexible formats, and partnerships with trusted organizations. Engage users in testing new data tools before they are released; and provide stakeholders with clear pathways to request new data views, reports, or analyses.

Domain Spotlight: Centering Stakeholders in Data Systems and Data Products

Washington, DC's redesign of their school report card included a robust and intentional stakeholder engagement campaign[16] to ensure the report card was accessible, relevant, and responsive to families' needs. Through a multiphase process that reduced barriers to participation—such as providing transportation, translated materials, and childcare—and by partnering with trusted community organizations, the city gathered extensive input. Feedback from more than 120 in-person listening sessions, along with online surveys, enabled DC to incorporate the perspectives of over 4,000 community members into the final content and design of the new report card.

A webinar from the Institute of Education Sciences State Longitudinal Data Systems (SLDS) Grant program[17] highlights examples from Illinois, Mississippi and Hawai'i of intentional stakeholder engagement across the full lifecycle of data initiatives. Illinois describes their approach to engaging stakeholders before, during, and after the launch off a new data system. Mississippi emphasizes intentional branding as a central strategy for building trust, recognition, and user connection. Hawai'i focuses on gathering in-depth feedback from school leaders and staff through targeted questions.

4. **Create structures for sustained two-way engagement**. Establish ongoing mechanisms, such as advisory groups, partnerships, or recurring listening session, that support regular engagement and move beyond one-time consultation. Focus engagement efforts on high-impact priorities. Identify a few engagement efforts to focus on in the next year, such as expanding feedback mechanisms or piloting co-design processes with key users. Access the impact of these new efforts.

Matrix Development

Our matrix draws on prior reviews of state longitudinal data systems (from **Education Commission of the States**,[18] **George W. Bush Institute**,[19] **RTI International,**[20] **SHEEO**,[21] **SHEEO and Complete College America**[22]), best practices for cradle-to-career systems (from the **Data Quality Campaign**,[23] **Institute of Education Sciences' SLDS Technical Assistance Program**,[24] **National Forum on Education Statistics**,[25] **Naviance**,[26] **WestEd**[27]), guidance for college and career readiness standards (including from **Maryland**,[28] **Texas**,[29] **ConnectED**[30]), the **Education-to-Workforce Indicator Framework**,[31] and the **Strategic Data Project's Strategic Use of Data Rubric.**[32] These prior resources informed the elements included in the matrix.

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