Forum Guide to Strategies for Education Data Collection and Reporting (SEDCAR)

National Forum on Education Statistics

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National Cooperative Education Statistics System

The National Center for Education Statistics (NCES) established the National Cooperative Education Statistics System (Cooperative System) to assist in producing and maintaining comparable and uniform information and data on early childhood, elementary, and secondary education. These data are intended to be useful for policymaking at the federal, state, and local levels.

The National Forum on Education Statistics (Forum) is an entity of the Cooperative System and, among its other activities, proposes principles of good practice to assist state and local education agencies in meeting this purpose. The Cooperative System and the Forum are supported in these endeavors by resources from NCES.

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Suggested Citation

National Forum on Education Statistics. (2021). *Forum Guide to Strategies for Education Data Collection and Reporting* (NFES 2021013). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Foreword

The National Forum on Education Statistics (Forum) is pleased to present the *Forum Guide to Strategies for Education Data Collection and Reporting*. The purpose of this resource is to provide timely and useful best practices for education agencies that are interested in designing and implementing a strategy for data collection and reporting, focusing on these as key elements of the larger data process.

This publication builds upon *Standards for Education Data Collection and Reporting (SEDCAR)*, available at https://nces.ed.gov/forum/pub_1991_92022.asp, which the Forum published in 1991 to provide education agencies with best practices for the collection, processing, analysis, and reporting of education statistics. *SEDCAR* took a comprehensive view of the processes that occur during each phase of data collection and reporting, with six phases forming the conceptual framework: Management of Data Collection and Reporting; Design; Data Collection; Data Preparation and Processing; Data Analysis; and Reporting and Dissemination of Data.

Because of the nature of data collection when *SEDCAR* was published, education agencies did not do nearly the level of compulsory and continual data collection that most do now. Moreover, large-scale data collections generally were conducted for research purposes, and few collections were coordinated as part of an agency's overall data strategy. In contrast, this new resource is designed to be relevant to state and local education agencies (SEAs and LEAs) of today, in which data are collected regularly for multiple purposes, and data collection and recording may be conducted by many different individuals within an agency: teachers, administrators, analysts, or even students themselves. This new *SEDCAR* publication retains many of the relevant concepts and effective practices from the 1991 publication and expands upon the information to demonstrate how the concepts included in that document contribute to an effective data strategy. The new publication includes new and updated best practices, real-world examples, and timely resources that agencies can use to develop and implement a data strategy.

Objectives

This resource is intended to

- address the needs of education agencies related to developing and implementing data strategies;
- identify core practices for data collection and reporting; and
- showcase different data strategy approaches used by SEAs and LEAs.

Audience

This resource is intended for staff and stakeholders in education agencies who are responsible for governing, collecting, and implementing data strategies and data collection and reporting practices. This includes federal, state, and local education agency staff who oversee data strategy development and implementation, as well as staff who are responsible for planning, coordinating, and implementing data collections and data reporting.
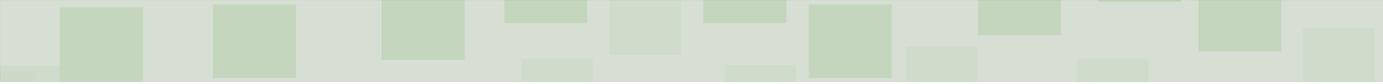
Organization of This Resource

This resource is composed of three sections:

1. An introduction to data strategy and its use in education agencies.
2. An in-depth discussion of strategies for education data collection and reporting.
3. Case studies from SEAs and LEAs.

The information is presented in this manner to be as useful and responsive as possible to the needs of readers. Depending on an agency's particular needs at a given time, one of the sections may be primarily relevant. Alternatively, many agencies will find all three sections applicable to their current needs.

National Forum on Education Statistics

The work of the National Forum on Education Statistics (Forum) is a key aspect of the National Cooperative Education Statistics System (Cooperative System). The Cooperative System was established to produce and maintain, with the cooperation of the states, comparable and uniform education information and data that are useful for policymaking at the federal, state, and local levels. To assist in meeting this goal, the National Center for Education Statistics (NCES) within the Institute of Education Sciences (IES)–a part of the U.S. Department of Education (ED)–established the Forum to improve the collection, reporting, and use of elementary and secondary education statistics. The Forum includes approximately 120 representatives from state and local education agencies, the federal government, and other organizations with an interest in education data. The Forum deals with issues in education data policy, sponsors innovations in data collection and reporting, and provides technical assistance to improve state and local data systems.

Development of Forum Products

Members of the Forum establish working groups to develop guides in data-related areas of interest to federal, state, and local education agencies. They are assisted in this work by NCES, but the content comes from the collective experience of working group members who review all products iteratively throughout the development process. After the working group completes the content and reviews a document a final time, publications are subject to examination by members of the Forum standing committee that sponsors the project. Finally, Forum members review and formally vote to approve all documents before publication. NCES provides final review and approval before online publication. The information and opinions published in Forum products do not necessarily represent the policies or views of ED, IES, or NCES. Readers may modify, customize, or reproduce any or all parts of this document.

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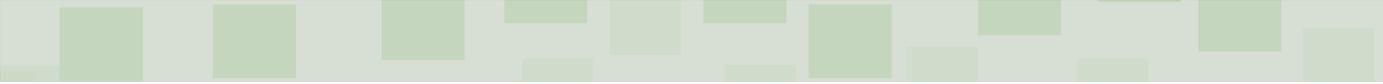
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Section 1:
Data Strategy in Education Agencies

What is a Data Strategy?

A comprehensive data strategy is a robust, integrated approach to using data to deliver on a mission, serve stakeholders, and steward resources while respecting privacy and confidentiality. A data strategy enables education agencies to leverage data to improve education, increase agency effectiveness, facilitate oversight, and promote transparency. Data strategies encompass data principles and practices such as governance, access, privacy, security, dissemination, and use by internal and external stakeholders.

Data strategy can be considered the umbrella that encompasses all other aspects of the data universe within an agency, such as data collection, management, governance, analysis, or implementation. This allows agencies to carefully and deliberately consider the "big picture" of their data, thinking in terms of how and why they collect and store particular data, and how these data can be used most effectively to answer questions, solve problems, or plan for the future. Data strategy can be seen as integrating a system of people, policies, practices, and resources that are required to fully leverage the value of an agency's data.

The Need for Data Strategy

A thoughtfully designed data strategy allows an agency to look beyond the day-to-day needs and purposes of data collection and use and think about the larger picture. A data strategy empowers an agency to think about how the information from different collections can be used to answer targeted questions, eliminate inconsistencies, clarify processes, and unify goals across the agency. Additionally, a clear, site-specific data strategy allows an agency to plan for the future, considering how current and future data provide the information needed to determine and work toward relevant goals.

Many factors may influence how an agency approaches data strategy. Aligning the data strategy with the agency's overarching strategic goals is a best practice. Particular aspects of an agency's location, resources, or population served may influence the design or the approach to data strategy. Outside factors or influences, including unexpected changes or new dynamics, may drive the strategy. Ultimately, the path to and reasons for an agency's data strategy are as individual as the agency itself.

Data Strategies in Federal, State, and Local Education Agencies

In the public sector, data strategy may include multiple government agencies working in coordination. Within the education community, interagency cooperation is more common in higher education and international education than in U.S. elementary and secondary education. When broadly implemented, data strategy in U.S. elementary and secondary education agencies may be a part of an interagency undertaking. When narrowly implemented, data strategy in an agency may be the responsibility of an individual team, division, or department.

At the federal level, the mission of the *Federal Data Strategy* (https://strategy.data.gov/) is to fully leverage the value of federal data for mission, service, and the public good by guiding the federal government in practicing ethical governance, conscious design, and a learning culture. The *Federal Data Strategy* offers guidance on how agencies should manage and use federal data, including principles and practices to deliver a more consistent approach to federal data stewardship, use, and access. While several of these practices are specific to the federal government, many of the practices may be useful to state and local education agencies (SEAs and LEAs) and can provide a starting point for data and administrative teams that are developing, revising, or expanding their data strategies. A complete list of the Federal Data Strategy Core Principles is provided in Appendix A.

SEAs and LEAs are at different stages in their development and implementation of data strategies. Some may be just beginning to think of data from a big-picture perspective, moving beyond the immediate and practical use of data to design a strategy that will allow them to set short- and long-term goals for improvement. Others may be looking to revise or expand an existing data strategy.

The Wisconsin Department of Public Instruction has a robust data system, called WISEdata, by which data from LEAs are collected in near real-time through an application programming interface (API). The data submission and any specific errors and warnings can be monitored by LEAs via a data quality portal. The SEA also reviews the data according to business rules needed for required reporting. The WISEdash data dashboard provides additional data quality metrics for both the SEA and LEA levels, including trend graphs to compare data over time. Overall, this process has improved the quality of data throughout the SEA and LEAs, and has streamlined and consolidated multiple data collections. Over time, this will decrease the effort needed at the LEA level since one system and process will be used for monitoring and maintaining data quality.

The Delaware Department of Education considers its strategies for sharing data from the perspective of access channels, represented by a two-by-two matrix: internal/external on one axis and public/private on the other. Based on who requests the data and what type of data they request, the agency provides the data in a channel. It is working to streamline the channels through which internal and external users can access data. This will reduce the opportunities for consumers to receive multiple answers to questions and increase data privacy.

> In 2018, the Vermont Agency of Education brought together data and measurement teams across the agency to create the Data Management and Analysis Division. The Division created the following set of strategic priorities:
>
> - Modernize, standardize, and fully leverage collection, management, storage and data analysis platforms, tools, and methodologies.
> - Move from a reactive culture to a proactive culture.
> - Effectively coordinate to execute cross-functional workflows.
> - Strengthen security and privacy frameworks while reducing burden of supporting secure and sound data handling.
> - Empower the Vermont Agency of Education and stakeholders with data to support an evidence and result-based approach to decisionmaking.

Student Information Systems (SISs)

SISs are secure information management systems designed to support all aspects of a student's educational experience. They often include demographic data and information related to scheduling, attendance, discipline, health, grades, test results, and academic programs. They also may include data about economic status, accommodations, or geography. SISs allow local education agencies (LEAs) to communicate securely with teaching staff, parents, and students through web-based portals, modern phone apps, or traditional paper reporting.

Definition provided by state education agencies (SEAs) and LEAs, including Fairfax County Public Schools (VA), https://www.fcps.edu/resources/technology/student-information-system-sis-fcps

In recent years, the West Virginia Department of Education has expanded its focus on data quality, beginning with building ZoomWV-e, a single source data dashboard, which allows educators to see the data they enter into the state's student information system (SIS) quickly and easily. The SEA also has developed an extensive data error report that is updated daily, so that local staff can see when data do not conform to expectations. The agency also holds regular internal meetings to discuss data quality issues. The agency's data leaders believe that if data are not accurate, their usefulness is diminished–making all other data endeavors (reporting, funding, accountability) questionable.

While data strategies differ among agencies, several core practices are useful for agencies to consider when establishing a data strategy:[1]

1. Building a Culture that Values Data and Promotes Public Use
2. Governing, Managing, and Protecting Data
3. Promoting Appropriate and Ethical Data Use

Building a Culture that Values Data and Promotes Public Use

The phrase "culture of quality data" is common to most who work with education data, particularly at the LEA or SEA level. A culture of quality data refers to the idea that good data are an integral part of teaching, learning, and managing schools, and that everyone who has a role in student outcomes–teachers, administrators, counselors, office support staff, school board members, and others–has a responsibility to promote high-quality data. Components of a culture of quality data include the following:

> ### Building a Culture of Quality Data
>
> The *Forum Guide to Building a Culture of Quality Data: A School and District Resource* was developed to help schools and school districts improve the quality of data they collect. The resource discusses the importance of helping all staff to understand how data will be used and how data become information, and it shows how quality data can be achieved through the collaborative efforts of all staff. (https://nces.ed.gov/forum/pub_2005801.asp)

- **Accuracy.** The information must be correct and complete. Data entry procedures must be reliable to ensure that a report will have the same information regardless of who completes it.
- **Security.** The confidentiality of student and staff records must be ensured, and data must be protected from unauthorized access.
- **Utility.** The data must provide the right information to answer the question that is asked.[2]
- **Timeliness.** Deadlines are communicated, and data are collected promptly.

At the school level, all staff must understand that data are entered into a data system so that information can be developed and used. One of the tasks of school administrators is to work with staff so that they can see how the information drawn from the data supports the school's instructional program and business operations. Ensuring that those entering the data understand how the data are used, as well as their value, helps to emphasize the importance of their work and the quality of the data they enter. The goal is to establish conditions that will instill confidence and ownership for data quality among data users. Stakeholders who rely on reports must be able to trust that information is accurate, that the confidentiality of student records and the integrity of the data are maintained, and that they are getting the right information to answer their questions.

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1   These practices are drawn and adapted from the Federal Data Strategy: https://strategy.data.gov/.
2   For more information on Data Use, see the *Forum Guide to Taking Action With Education Data*, available at https://nces.ed.gov/forum/pub_2013801.asp.

LEAs also play a key role in ensuring quality data. LEAs respond to the policies and regulations set by state and federal programs, as well as internal policies. LEA personnel usually are responsible for training data collectors and for ensuring that the data gathered are of high quality. They also may be responsible for dedicating resources to provide the best data collection environment possible for their schools.

The collection and use of education data have grown exponentially in recent decades, and as a result, education stakeholders better understand the critical need for quality data. Because of the increased understanding of and focus on high-quality data, this aspect of the data culture features significantly in many agencies' data strategies.

> Metro Nashville Public Schools (TN) takes a district-wide approach to data quality, with dedicated staff whose role is to identify data quality issues, discover root causes, and work to resolve the issues at their sources to prevent them from recurring.

> The Kentucky Department of Education emphasizes five elements of high-quality data:
>
> - Data have incentives and/or penalties attached.
> - Data have laws attached.
> - Districts see value in and use high-quality data.
> - Data are inspected for quality at the local level.
> - Data are inspected for quality at the state level.

In many LEAs, creating a culture of quality data may be driven partially by the SIS vendor and the tools and procedures they have in place. SIS vendors implement requirements for collection and reporting within the SIS to help the LEA comply with state and federal reporting requirements. Training for the LEA staff responsible for the various required collections often is provided by the vendor directly as part of contracted services.

One misconception that can occur when developing a culture of quality data within an organization is the assumption that once data enter a digital platform, such as an SIS, the data are clean and free of errors. As this approach to data quality develops within an organization, every database user must become a data curator to ensure high-quality data. Bozeman School District #7 (MT) has a developing data culture, with increasing responsibility for data quality across users. For example, the district has modified its procedures so that building secretaries review completed forms submitted by parents before approval and data entry into the SIS, to ensure accurate and complete student data enter the database. Gatekeeping in this way allows secretaries responsibility for the data for the students in their buildings. It also provides an opportunity for communication with families if data are missing or incomplete, before those data are needed during school operations.

Milwaukee Public Schools (WI) has a key team that comes together with ancillary team members depending on the nature of the data. The district has instituted regular meetings to discuss data quality, better management of data quality, necessary professional learning, and procedures to maintain quality. The district also hosts monthly meetings with the SEA and other LEAs to discuss issues with the state and the SIS vendor. This has influenced how the district team looks at other collections, such as the Civil Rights Data Collection (CRDC) and key performance indicators (KPIs), as the team considers how to keep key data elements consistent across data collections.

Data Strategy Models

Depending on their needs and contexts, SEAs and LEAs may use any of the following data strategy models:

- **Single, agency-wide model.** Many locations have an agency-wide model, in which the strategy and related practices are specific to and contained within the individual agency, and in which one strategy guides the entire agency.
- **Multiple-strategy model.** Some agencies may have multiple data strategies operating, with departments or divisions designing individual strategies to suit their particular needs.
- **Interagency model.** In an interagency model, the plans, goals, and practices extend beyond a single agency to integrate with those of related agencies, for example, child welfare, health and human services, or higher education.

> ### Data Strategy Checklist
>
> A checklist can help ensure that an agency's data strategy addresses core concepts and key points. A checklist can help an agency
>
> - build in basics of good information practice;
> - clearly define processes;
> - work collaboratively;
> - build support/buy-in;
> - be clear about who is responsible for each task within the strategy;
> - review the data strategy on a regular basis;
> - have a schedule of who reviews the strategy and how frequently;
> - consider the relationship between information technology (IT) and data governance;
> - maintain a focus on cybersecurity; and
> - back up data.

Each of these models has benefits and challenges. For example, in a large LEA, different departments may be responsible for different data collections and quality assurance. The Milwaukee Public Schools (WI) Department of Research, Assessment, and Data is directly responsible for data that will be collected for state report cards and federal accountability reports. In particular, the department monitors dropout and graduation data. This requires relationships with other departments to maintain and report accurate data. For example, social workers reach out to families and collect data on dropout status, but if the secretary does not input the collected data with appropriate details and accuracy, data pulled from the SIS may be wrong or of poor quality. This results in multiple reviews of data. Additionally, the dropout data directly link to graduation data since the true enrollments determine the cohort size.

The Delaware Department of Education uses a single, agency-wide model. Through the implementation of integrated data, the state is attempting to overlay an interagency model.

The Wisconsin Department of Public Instruction, on the other hand, uses multiple models. The agency's main strategy focuses on a single data standard, but it still has other legacy siloed collections and one-off collections that use a different method. Over time, these collections will be considered for integration into the single data standard. Additionally, the state's Early Childhood Integrated Data System (ECIDS) has a third model that crosses multiple agencies.

Though data strategy and data governance are related concepts within an organization, they are not interchangeable or equivalent.

- **Data governance** refers to a formal and comprehensive set of policies and practices designed to ensure the effective management of data within an organization. For example, an agency's data governance practices would establish which individuals or offices within the agency are responsible for data elements, data sets, and databases. For further information, see the *Forum Guide to Data Governance* (https://nces.ed.gov/forum/pub_2020083.asp).
- **Data strategy** refers to a larger perspective that considers the agency's goals and needs for the data, and how the data and their use fit into the organizational mission. For example, an agency's data strategy might specify how the planned data collections align with the agency's strategic plan.

Therefore, an agency could have data governance practices in place for data collection and reporting, as well as a data strategy. The governance would clarify which data are collected, when collections occur, which individuals do which tasks, the means by which data are reported, and the expectations and requirements of the processes. The strategy would consider the reasons for collecting different data, the logic of having collections scheduled at particular times, the goals for reporting and use of the data, and many other aspects of how the data support the organizational mission. In short, an effective data strategy requires clear data governance. Data governance practices and policies also will be more relevant to stakeholders when they are seen as crucial to the larger data strategy.

Promoting Appropriate and Ethical Data Use

Each day, educators collect and use data about students, staff, and schools. Some of these data originate in individual student and staff records that are confidential or otherwise sensitive. Even the data that are a matter of public record, such as aggregate school enrollment, need to be accessed, presented, and used in an ethically responsible manner. While laws set the legal parameters that govern data use, ethics establish fundamental principles of right and wrong that are critical to the appropriate management and use of education data.

The exponential growth of information systems that provide ready access to education data—often drawing upon individual student records—has heightened the importance of training data users about their ethical responsibilities regarding how they appropriately access, use, share, and manage education data. Technology makes data readily available to many staff members in an education organization. While improved access helps staff perform their jobs more effectively, this access also raises issues about the appropriate use of data because the power to transmit information electronically multiplies the consequences of irresponsible behavior.

> The National Forum on Education Statistics' online *Data Ethics Course* is based on *The Forum Guide to Data Ethics* (https://nces.ed.gov/forum/pub_2010801.asp) and is focused on how ethical principles apply to education data. The course is intended for any person who handles data in an education organization. https://nces.ed.gov/forum/dataethics_course.asp

> When agencies are not careful about ethical management of data, situations can occur, such as embargoed data being released or student lists with personally identifiable information (PII) being emailed to others as a quick way to pass someone some data. These cases usually are the result of users not understanding the specific types of data with which they are working.
>
> To ensure proper dissemination, data should be marked (part of metadata) as to how they should be handled.

In the West Virginia Department of Education's training for data tools, data leaders emphasize that the numbers in the reports represent real students: the children in schools that the state's teachers and administrators try to care for and educate every day. It is important to help trainees focus on the students' stories rather than just the numbers on the screen.

A clear data strategy allows an education agency to design data collection and reporting policies and procedures that promote ethical data use. A data strategy also puts protections in place to identify and alert the agency to any potential ethical concerns. By incorporating the issue of ethics into the data strategy, an agency prominently indicates the value it places on ethical data use. Placing importance on ethics in the data strategy also ensures that the agency will be prepared with specific measures and responses to any unforeseen ethical breaches.

Data use must be considered and designed carefully to ensure that it follows ethical standards. While it is necessary to collect some sensitive or personally identifiable data elements to ensure that students have access to services, access to these data and their use must be controlled carefully according to all federal, state, and local laws and regulations.[3] Beyond meeting regulatory requirements, anyone who works with potentially sensitive data should respect both staff and student privacy. For example, agencies should be aware that

- Social Security numbers can indicate student immigration status;[4]
- status flags for special education, homeless, National School Lunch Program (NSLP), pregnant minor, foster care, and other supports can detail confidential or private services that a student or family receives; and
- third-party vendors providing online services (such as formative testing, remediation) often want various program and demographic flags to provide targeted reporting. Without proper data sharing agreements, collected student data and demographics could be used for research and marketing purposes without recourse by the LEA or SEA.

Potential ethical breaches can occur at the school level if staff members are not properly educated. In some cases, the increased use of technology results in teachers discussing student needs via email, which can lead to careless sharing of sensitive information if all parties are not properly aware of protocols for protecting students' personally identifiable data. It is critical for schools and districts to communicate the concept of collective responsibility and ensure that teachers and other staff members understand how to protect privacy.

Similarly, staff members must be aware that using student data for any reason other than the intended professional need is unethical. While teachers and other staff members may have access to the data platforms that provide student information, data use other than use previously designated and approved is unethical and potentially illegal.

Data experts note that all interactions with student data have ethical ramifications. For example, a social worker dealing

The Delaware Department of Education has handled the ethical issue of inconsistent redaction by employing systematic redaction of data using software and publishing redacted data to the state's open data initiative. The state education agency (SEA) then directs over 95 percent of all external requests for public data to that data channel. This ensures that consumers get consistently redacted data, as opposed to asking the same question at different times and getting data that may not be redacted properly.

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3   For more information, see the U.S. Department of Education's Privacy Technical Assistance Center (PTAC) resources, available at https://studentprivacy.ed.gov/.

4   While Social Security Numbers (SSNs) may be needed internally to identify a student or to link together records from multiple sources, the SSNs should never be used in any type of data report. Once records are linked, they can be assigned a common ID apart from the SSN. If there is an expectation of the need to add data from another source in the future, the link between the SSN and the new ID should be maintained separately in a secure space.
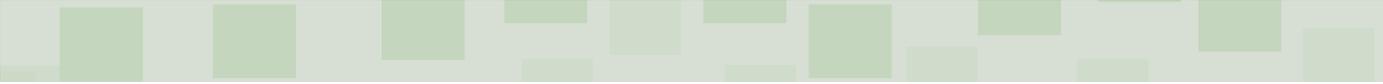
with dropout data may have a direct conversation with a parent or student that allows them to document that the family has left the state. This student can be marked as "transferred out of state" legitimately. In another case, the social worker may have heard from friends of the student that the student moved out of state, but this secondhand information is not sufficient. This could result in the student being listed as a dropout, which is inaccurate, but ethical reporting demands that proper documentation be collected.

Bozeman School District #7 (MT) navigates data ethics in a few ways. First, the district follows the strict Family Education Rights and Privacy Act (FERPA)-informed[5] data security measures within the SIS, only allowing data access to users on a need-to-know basis. Security groups are set up in the SIS to ensure that sensitive student information is seen only by those who need access to it. The district also carefully considers what data are collected from families and how those data will be used. Questions about potentially sensitive issues like a student's academic history, family economic status, or race and ethnicity are requested only for required state and federal reporting or program participation (for example, the Individuals with Disabilities Education Act[6] [IDEA] or School Nutrition). Finally, the district has a comprehensive data governance document guiding the collection, storage, use, and disposal of student data. A staff data governance synopsis was developed from this document, providing staff with a quick resource on best practices around the ethical use of data and reinforcing the concept that the primary and fundamental use of student data collected by the district is to promote the academic and social-emotional success of students.

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5   For more information on the Family Educational Rights and Privacy Act (FERPA), see the U.S. Department of Education's FERPA resources, available at https://www2.ed.gov/policy/gen/guid/fpco/ferpa/
6   For more information on the Individuals with Disabilities Education Act (IDEA), see the U.S. Department of Education's resource, available at https://sites.ed.gov/idea/

Section 2:
Data Collection and Reporting

State and local education agencies (SEAs and LEAs) regularly collect data for multiple purposes, and data collection and reporting may be conducted by many different individuals within an agency: teachers, administrators, analysts, or even students themselves. Data-related activities must be managed and coordinated to focus available resources where they are most needed, and in the most efficient and cost-effective manner. Additionally, processes must be put into place that provide the foundation for sound management and policy decisions about which data collection and reporting initiatives to pursue. Such decisions must be based on adequate information and must include the timely involvement and participation of stakeholders.

Given the complexity of data collection and reporting, SEAs and LEAs increasingly are developing and adopting data strategies to clarify and maximize the purpose of their education data and effectively collect, manage, use, and protect those data. Section 1 of this resource provided an overview of data strategies in education agencies. This section discusses best practices for implementing one aspect of a data strategy–data collection and reporting.

It can be helpful to consider the information lifecycle when planning a strategy for data collection and reporting. The information lifecycle is the series of steps needed in properly planning for, executing, and finalizing a data collection and the resulting uses and releases of data. The six phases of the information lifecycle:

- **Phase 1: Definition, Planning, and Development**
- **Phase 2: Data Collection**
- **Phase 3: Verification and Processing**
- **Phase 4: Analysis and Use**
- **Phase 5: Dissemination**
- **Phase 6: Disposition**

Data do not exist in isolation. They are representations of the status of different parts of an agency and are interrelated and influential upon each other. Similarly, the clarity and effectiveness with which the data move through the phases of the lifecycle affect their quality and usefulness throughout the process. Because a data strategy allows an organization to consider how the collection and reporting of particular data can improve the organization's functioning and allow it to reach specified goals, all parts of the lifecycle should be considered when planning and implementing that strategy. Across all phases, data need to be collected, managed, and used in ways that maintain their integrity, quality, and intended purpose.

Phase 1: Definition, Planning, and Development

Before data collection begins, agencies need not only to define the collection, but also to identify and justify collection activities, to ensure that the data are necessary, not redundant, and will be collected in a manner that allows effective use and interoperability.

Checklist for Justifying Data Collection Activities

1. Document the circumstances that make the collection of information necessary, including any legal or administrative requirements.
2. Indicate as specifically as possible how, by whom, and for what purpose the data will be used.
3. Determine whether available data can be used to meet an emerging information need before initiating a new collection.
4. Identify required data collection activities, as well as the accuracy and specificity necessary to achieve collection objectives.
5. Analyze the costs and benefits of the proposed data collection to the producer and provider and, where appropriate, the costs of alternative strategies.
6. Review the terminology and data definitions to be used in the data collection to ensure that they conform to accepted use. Any deviations from accepted use should be explained. Definitions should conform whenever possible to nationally developed definitions to ensure that the data produced will be comparable to data produced by education agencies and organizations at the school, district, state, and federal levels.
7. Document data providers' concerns and data requestors' responses to those concerns.

> **Ensuring Data are Necessary**
>
> Agencies should avoid collecting personally identifiable information (PII) or other sensitive data unless they are absolutely necessary to the collection. For example, PII likely is not necessary to a collection intended to assess the school or grade as a whole. Collecting overlapping information on different surveys or data collections can increase opportunities for outsiders to crack security measures on more sensitive items.

Managing for Interoperability

In the past, separate data collections were managed independently, and this practice still is common in some SEAs and LEAs. Many categories of data are required to be reported in various ways for various purposes, such as subgroups for state and federal reporting. If the data are collected one way for one report and a different way for another, this can lead to complications for the agency.

> **Interoperability:** the ability of different information systems, devices, and applications ("systems") to access, exchange, integrate, and cooperatively use data in a coordinated manner, within and across organizational, regional, and national boundaries, to provide timely and seamless portability of information

However, it is increasingly important that data are collected in a manner that meets as many needs as possible. For example, the same employee information may need to be collected by the human resources department and the information technology (IT) department, and collecting these data once and sharing them across departments increases both efficiency and accuracy. This practice helps to reduce burdens on agency staff by streamlining data collections (that is, they do not have to collect the same data twice), and it also improves data quality by ensuring that data stored in different systems are not contradictory.

In many agencies, these processes still are not in perfect alignment. For example, in some states, districts may choose their student information system (SIS), which often differs from the state SIS. This puts the onus on districts to ensure that complete and accurate data entry occurs

in both systems. Without automated processes, data transfer must occur via manual entry or batch uploads. Manual entry into two systems can increase the opportunity for data entry error, and a focus on data quality in both systems becomes essential for accuracy in reporting and funding, and for facilitating student success.

Designing the Data Collection

Design is the process of formulating the primary purpose(s) for the collection and developing and describing a plan for conducting the collection, processing, analysis, and reporting of data. An effective design produces accurate and useful information, promotes timely and efficient data collection, and provides methods for resolving both expected and unexpected problems that may arise during data collection and analysis.

Checklist for Formulating and Refining Data Collection Questions and Processes

1. Ensure that the questions that drive the collection have the potential to address the data needs.
2. Ensure that an individual question does not raise another question, or set of questions, that must be resolved before the current question can be answered.
3. Ensure that the questions driving the collection do not make inaccurate assumptions.
4. Ensure that questions do not pose an incorrect dichotomy (for example, make sure that the possible alternative answers are truly different).
5. Ensure that questions do not attempt to resolve non-empirical problems by empirical means.
6. Ensure that questions or collection processes have the same meaning for different persons.

In addition to crafting appropriate data collection questions and processes, a key aspect of planning a data collection is to select appropriate sources of data. The following checklist provides considerations for those designing data collections. These questions may be relevant to arrangements made between LEAs and SEAs for the transfer of data, in which knowing what is feasible and realistic is critical to successful information sharing.

Checklist for Selecting the Appropriate Sources of Data

1. To identify feasible sources of information, ask the following questions:
   a. Can the information be obtained through analysis of existing data?
   b. Are records available from which the information can be compiled?
   c. Are subject matter experts or other knowledgeable persons available from whom the information can be gathered and assembled?
   d. Must the information be generated by controlled observation or measurement?
2. To determine whether existing data can be used to answer the question, ask the following questions:
   a. Are data available that are relevant to the question?
   b. Do available data meet the criteria of reliability, validity, and other aspects of required technical quality?
   c. Are the data structured in a manner that provides the appropriate unit of analysis and that allows appropriate investigation of relationships among variables?
   d. Are the data sufficiently current?
   e. If multiple sources of data are used, are the data sufficiently comparable (for example, dates of collection)?

3. To determine whether administrative records can be used, ask the following questions:
   a. Are there administrative records that contain all the information needed (for example, numbers and characteristics of students by race/ethnicity and gender) for the administrative unit/level required to address the questions?
   b. Are there alternative methods of obtaining the records (once the administrative units in which the records are kept have been identified) that can accommodate different local recordkeeping, practices, and policies?
   c. Are the definitions and concepts employed by the various jurisdictions involved comparable and uniform? Be prepared to invest in methods (for example, crosswalking) that attempt to make data comparable among various jurisdictions.
   d. Does an examination of the uses for which the records are kept reveal clues about possible distortions relative to the questions? Administrative record data are no more immune to validity issues than data from any other source.
4. To determine whether data can be collected from individual data providers, ask the following questions:
   a. Is there a person, position, or department with access to the information being sought? If there is, can that individual or department serve as the data provider?
   b. Is the data provider being asked to obtain information from administrative records? If so, consider the administrative record checklist above (item 3).
   c. Is the data provider being asked to report information about a group or organizational unit in the absence of records?
   d. Is the person from whom the data are being requested the most capable person to act as a data provider? If not, can a procedure be designed for choosing the best data provider?
5. To determine whether data can be obtained via observation, ask the following questions:
   a. Is it feasible to train staff or to hire trained observers?
   b. Do standard protocols for observation exist, or can they be created?
   c. Can the observers be granted access to the phenomena of interest?

If existing data are not available to answer the data collection questions, it may be necessary to design a data collection instrument.

Checklist for Designing the Data Collection Instrument

1. Provide clear and sufficient instructions for completing the data collection instrument (for example, survey, data submission tool, or report). Provide detailed instructions for individual items when necessary.
2. Make definitions of data elements consistent with standard definitions for those data elements, such as those provided by the Common Education Standards (CEDS), when possible.
3. Provide definitions for any words in the data collection instrument whose meaning may be ambiguous.

> **Common Education Data Standards (CEDS)**
>
> The CEDS initiative is a national collaborative effort to develop voluntary, common data standards for a key set of education data elements to streamline the exchange, comparison, and understanding of data within and across P-20W institutions and sectors. For more information, see ceds.ed.gov.

4. Examine each item in the data collection instrument to make sure that the information is needed for data collection.
5. Make sure that the purpose of each item on the instrument is understandable to the data provider.
6. Explain to data providers why questions are included that have no apparent connection to the topic of the data collection. (For example, background questions might be asked to identify connections between people's backgrounds and their views on teacher competency testing.)
7. Ensure that the requested information can be provided by the data providers.
8. Minimize the amount of time data providers will need to complete the data collection form.
9. Wherever possible, use units of measurement that are familiar to the data providers.
10. Use standard language, and avoid jargon and abbreviations. Make sure that the technical terms used are appropriate to the data providers. Review questions for clarity. Keep questions short and simple.
11. Design the item sequence of the data collection instrument to increase the data provider's ability to complete the data collection. Keep topic-related questions together and provide transitions between topics. Ensure that the item sequence does not influence responses to later questions.
12. Make sure that the items on the data collection instrument place the least possible burden on the data providers. Find out how data providers usually keep or process the information being requested.
13. Make sure that items do not combine two separate ideas inappropriately (for example, double-barreled questions) and that they ask for a single response.

Phase 2: Data Collection

Data collectors must handle myriad management activities effectively. Depending on the size of the collection, collectors may need to communicate with data providers at different locations and organizations, schedule data collection activities that may involve hundreds of people, and provide for the manual or electronic transfer of data from numerous collection sites across the district, state, or country. Several best practices improve data collection, especially when LEAs and SEAs may be handling large-scale collections that cover many different areas of data. In short, the greater clarity provided to the data collection process, the smoother and more accurate the collection will be. Best practices include providing written instructions, offering training and support, and establishing procedures that increase accuracy.

> The Kentucky Department of Education has developed a webpage with written guidance for local education agencies (LEAs) to help promote consistency in data collections. The page includes information on the importance of data standardization, data steward contact information for each standard, and links to individual standards. The webpage is available at https://education.ky.gov/districts/tech/sis/Pages/KSIS-Data-Standards.aspx.

Provide Written Instructions for Data Collectors

It is important to provide coding instructions to data collectors in written form. This written guidance must be clearly worded, easily accessible, and customized to each data collector's specific job. When written instructions do not exist or are subpar (that is, if they are poorly written, are not easily accessible, are not tailored to each audience, or are frequently or

haphazardly modified), data collectors might make coding assignments based on their understanding of the codes or other circumstances. Such independent interpretation of decision rules leads to inconsistent collection and decreases the data quality.

Helpful instructional tools include not just explanations of what each code means, but also definitions of terms, flow charts for applying rules, and frequently asked questions. Customizing instructions for different audiences–such as school secretaries, guidance counselors, principals, and district technology staff–is especially helpful. Additionally, screenshots of how and where to enter the data can be helpful. Creating separate screenshots for every different potential data entry situation is not always feasible or desirable, but having basic, straightforward screenshots can be useful and help people feel more comfortable entering data, particularly if it is new to them.

Provide Training and Support for Data Collectors

Even when the data collection is well constructed and the collection instructions are well written, data collectors will need to learn to master the collection and coding protocols, and they may need ongoing monitoring and support. At times, well-trained, highly diligent data collectors still will face complicated scenarios that require additional guidance from their agency's data leads or outside experts like data science professionals. Data collectors should not be forced to wrestle with difficult choices in isolation; instead, they should receive initial training and ongoing support for the duration of their jobs.

> The West Virginia Department of Education has a tiered system of support for questions about data collections. West Virginia Education Information System (WVEIS) County Contacts are the first line of support; local staff go to the County Contact first. If County Contacts do not know the answer, the Contacts then reach out to the West Virginia Department of Education (WVDE), and the state education agency (SEA) provides support (which County Contacts then share back to their local colleagues).

To ensure that data collection is being done appropriately and consistently, all data collectors should be provided with initial training and additional, periodic training as changes arise in the collection or instructional protocols. At the same time, they must have access to ongoing support–that is, they must have a place where they can reach out for assistance when problems arise. Many organizations offer a help desk service via telephone, email, or a website. Some organizations also maintain listservs that share out answers to all questions submitted by data collectors.

Establish Procedures That Facilitate Accurate Data Entry

Good procedures within education agencies can decrease data entry errors and thus improve data quality. For example, one best practice is to make staff assignments in such a way that routine reports are completed by the same people each cycle. For example, if a particular collection is completed three times per year, designate specific personnel to work on this task during all three time periods. Those personnel will develop expertise with that collection and thus make fewer mistakes. Unfortunately, frequent turnover or use of temporary staff can make this difficult in many agencies. However, when consistent connections between staff and collections are possible, this consistency can minimize problems.

Another best practice is to manage the education agency's office organization so that the designated data collectors have blocks of time during which they can enter data without unnecessary distractions. For example, school receptionists cannot be expected to enter data accurately if they are constantly being interrupted by other job responsibilities.

Beyond these practices, agencies need to consider the specific ethical issues related to current technology, means of communication, and privacy laws.

Standard for Ethical Treatment of Data Providers

Data collectors should ensure that the confidentiality of data is protected. Data teams should keep in mind that data providers are students, families, teachers, and other stakeholders, and that careful and thoughtful treatment of their data is critical.

- Data collectors should not discuss confidential aspects of the data collection activity with unauthorized individuals.
- Copies of records, test scores, and other data should be kept in a secure place and delivered promptly to the appropriate location or person.
- Notes and other documentation kept during the data collection activity should not contain identifying information that is not expressly required by the research design.
- Data collection activities should be carried out in compliance with applicable federal, state, and local laws concerning privacy and confidentiality.
- Records should be destroyed upon completion of requirements for the data collection activity.

> **_Forum Guide to Data Ethics_**
>
> The _Forum Guide to Data Ethics_ was developed in response to the need among education organizations for a simple, comprehensive set of standards for establishing plans that encourage the ethical use and management of data. It includes core principles (called "canons"), examples, descriptions, and recommendations that reflect real situations that arise in schools, school districts, and state education agencies (SEAs). https://nces.ed.gov/forum/pub_2010801.asp

Phase 3: Verification and Processing

Planning for data processing should begin during the early stages of a data collection activity. Specific factors to examine when developing the plan include

- types of data to be collected;
- types of edit checks needed (such as verification of submissions of similar data across sources);
- method for receipt control;
- computer system to be used; and
- timing and volume of data retrieval.

Data verification is a process for checking the accuracy and quality of source data to ensure that the data are accurate and useful. There are three times during the process at which verification is crucial: point of entry, use, and application. At the point of entry, those entering the data should review the information carefully and take steps to ensure that all data are entered with precision. Before using or working with the data to answer questions or identify trends, individuals should perform data checks to verify their accuracy. These data checks should include consideration of thresholds and outliers to ensure that the data that have been entered are reasonable. Finally, data should be reviewed and verified once again before application, as a final check that they are worthy of being used as part of a solution, program, or another implementation effort.

Phase 4: Analysis and Use

Data analysis is the process by which data are transformed into information that answers key questions and provides the foundation for decisionmaking.

Reporting and Dissemination of Data

Most data collection and analysis efforts culminate in one or more reports on data or the findings associated with them. Reporting can take many different forms, including formal written reports, data dashboards, or datasets that may be accessed and used for purposes of local, state, or federal reporting. For instance, the Elementary and Secondary Information System (ElSi) (https://nces.ed.gov/ccd/elsi/) makes various types of reports available to stakeholders through quick facts and express tables while also enabling custom reporting through the table generator tool.

Checklist for Planning the Report

The plan for producing a report should include the following steps:

1. Ensure that adequate resources are available for preparing and disseminating the report in the format(s) required.
2. Ensure that realistic timeframes are set for producing the report.
3. Identify intended audiences.
4. Determine the audiences' information needs.
5. Assess the audiences' level of technical knowledge.
6. Identify the appropriate media for presenting findings to the intended audiences, such as online or printed copies.
7. Follow appropriate protocols for dissemination to special groups (for example, board members or legislators).
8. Consider if presentations are necessary to enhance dissemination efforts to particular audiences, such as boards, legislative education committees, or educational organizations.

Aligning Data Collection and Reporting Schedules

Another best practice to consider when designing a plan for reporting is to align collection and reporting schedules. In many cases, effective use requires that data be timely. For example, data that depict the exit status of last year's student population might be unsatisfactory for planners making programming decisions for the current school population. The most useful data, particularly at the LEA level, reflect the current state of the system and are available to decisionmakers when needed. Alternatively, state policymakers might need the most recent certified/finalized data for a completed school year.

One best practice is to make sure that data collection schedules are timed for optimal data quality and use. Problems with data quality can arise when collections are scheduled too early in an academic year, before the information needed to accurately source the data is available; or too late in a year, when staff may be encumbered by other demands. Similarly, collections not timed to accommodate data demand (when stakeholders need the data) decrease the data's utility and, subsequently, the quality of data-informed decisionmaking.

A gap of time between collection and release is necessary so that personnel can verify the quality and organize the raw data into appropriate, usable formats. However, unnecessary delays might arise when reporting schedules conflict with holidays, releases of other types of data, or other times when staff are unable to dedicate time to releasing the data (or when data systems already are at working capacity). Unnecessary delays to data availability hamper good decisionmaking and should be avoided.

Over time, changes to compulsory data collection at the SEA, LEA, and school levels have affected data systems and overall data strategy in important ways. For example, changes in the past two decades in how variables such as race/ethnicity, as well as sex and gender, are categorized and reported have affected how data are collected and used.

At the Vermont Agency of Education, changes in codesets (such as a change to provide gender-neutral or non-binary as codeset options) will necessitate changes in downstream reporting processes and products. There are costs related to these changes (for example, time, effort, or dollars to pay vendors for adjustments). Data leaders in Vermont note that these types of implementation costs always should be raised as part of the annual budgeting process.

In Wisconsin, new state statutes for reporting additional information with state report cards have necessitated an increase of data collected in the current system. For example, under these statutes, Advanced Placement courses taken are reported on state report cards, which requires these data to be collected through student course roster data via WISEdata. A new level of quality checks was put in place to make certain the data transfer and data input are accurate.

West Virginia's Student DATA Act[7] requires planning and public notification when the education department needs to collect new student data not already contained within the system. The timeline includes a 60-day public comment period with approval from the West Virginia Board of Education (both to release a proposal for comment and to accept the proposal after the comment period), making the actual timeline approximately 4 to 5 months for proposal and approval. State leaders therefore know to plan carefully and be intentional when proposing new data collections. Additionally, West Virginia's data teams have found that local stakeholders need adequate time to adjust and to learn new tools, rules, or processes. When feasible, the data team tries to hold off on changes in the middle of a school year and implement changes for the following year. Because West Virginia has a statewide SIS created by and managed at the West Virginia Department of Education (WVDE), considerations about how to implement changes and the actual implementation of those changes are the purview of WVDE, with input from their local stakeholders. For example, if the WVDE receives approval to add a new data element at the start of a school year, WVDE staff add the ability for districts to collect that element into the SIS, but typically make that collection optional for the first year. Using this strategy, local users have the chance to learn the collection tool/item and definitions during the first year of implementation while the WVDE provides support and training about how to collect the data appropriately.

Case in Point: California's Changes in Data Collections Regarding Gender

In 2016, the Federal Interagency Working Group on Measuring Sexual Orientation and Gender Identity (SOGI) released a paper describing how the concepts of SOGI are measured currently in U.S. Federal surveys. https://nces.ed.gov/FCSM/pdf/buda5.pdf

By August 2019, because of legislation changes, the California student data collection system (CALPADS) changed sex/gender data collection to allow students to declare themselves as non-binary. https://www.cde.ca.gov/ds/sp/cl/calpadsupdflash158.asp

To be compliant with the changes, student information system (SIS) vendors have updated their systems so that they can report student gender within the guidance provided by CALPADS. These changes trickle down to the local education agency (LEA) level with procedural changes being implemented by administration and put into effect by registrar staff charged with collecting this information.

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7   For more on West Virginia's Student DATA Act, see http://www.wvlegislature.gov/WVCODE/ChapterEntire.cfm?chap=18&art=2&section=5H#02

Data Privacy and Security

Rapid advances in technology have changed the nature of data collection and storage. They also significantly influence how LEAs and SEAs look at data privacy and security, both daily and as a critical part of their data strategy. Agencies must consider issues such as cloud storage, third party agreements for storing data, and how ownership of data influences privacy and security.

In Milwaukee Public Schools (WI), the agency has used security management that comes with data systems. The agency developed roles and access by role within the system, ensuring that only individuals who need to see the data have access. The agency has a team that reviews requests to change roles and determines whether the need and purpose are legitimate.

Vendors, grant agencies, and researchers now request data more than ever from schools and districts. All members of an organization should be aware of processes such as data agreements or institutional review board regulations to ensure that approval has been granted before releasing data. Organizations must have appropriate representatives review data requests to ensure that the requests benefit the organization and that data security will be maintained by the requesting agency.[8]

To help education agencies, school officials, teachers, parents, and other education stakeholders understand and implement the requirements of the Family Education Rights and Privacy Act (FERPA), the U.S. Department of Education established the Privacy Technical Assistance Center (PTAC) within the Student Privacy Policy Office. PTAC offers a variety of resources related to student data and student data systems, including publications, training materials, and technical assistance. Resource topics include data privacy, confidentiality, and security practices.[9]

> ### *Forum Guide to Education Data Privacy*
>
> The *Forum Guide to Education Data Privacy* is a resource for state and local education agencies (SEAs and LEAs) to use in assisting school staff in protecting the confidentiality of student data in instructional and administrative practices. The resource provides an overview of education data privacy, including relevant laws, and case studies in protecting student privacy in SEAs and LEAs.
> https://nces.ed.gov/forum/pub_2016096.asp

Maintaining Best Practices in Data Management

As times change, traditional ways of looking at data collection and management may no longer be timely or complete. Things that were state-of-the-art or best practices in previous years may no longer be enough to handle current needs, data uses, or technologies. Awareness of these shifts in best practices, and regular review of practices and standards, is crucial to effective data strategy.

In recent decades, the way that education agencies look at many issues has shifted necessarily. These issues include

- regular evaluations of ongoing data collections;
- standard definitions of data elements;
- determining costs and benefits of data collection;
- justification for data collections;
- data destruction; and
- data sharing agreements.

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8   For more information on developing agreements to share data with researchers and others, see the *Forum Guides to Supporting Data Access for Researchers: A Local Education Agency Perspective* and *A State Education Agency Perspective*, which are available at https://nces.ed.gov/forum/pub_2014801.asp and https://nces.ed.gov/forum/pub_2012809.asp.

9   For more information about PTAC, see https://studentprivacy.ed.gov/.

Phase 5: Dissemination

Data dissemination is the sharing, distribution, or transmitting of data to stakeholders, users, or other interested parties. Data may be shared in multiple formats, such as data files, summaries, or electronic or paper publications.

Checklist for Presenting Data and Findings in a Manner that is Appropriate for the Intended Audiences

1. Consider producing separate reports for selected audiences.
2. Make reports prepared for the public easy to understand, as well as technically accurate.
3. When a narrative is needed, write in straightforward, nontechnical language to the degree that the subject matter permits.
4. Jargon, regional terms, and the like should be avoided.
5. If diverse audiences are expected to read a report, use subheadings and summary data to assist the various audiences in locating salient information. Consider presenting reports or data in multiple languages based on the most prevalent language groups in the area. Additionally, consider the range of potential web access by different individuals, and adhere to web accessibility standards.
6. Consider using a variety of methods for communicating information about the data collection activities. Brochures, fact sheets, videos, and slides may be used in addition to or in place of traditional narrative reports.
7. Ensure that all Americans with Disabilities Act of 1990 (ADA) requirements are met in public reporting products.
8. Include the data source and date data were pulled.

Working with Your Audience

When the West Virginia Department of Education transitioned to the ZoomWV dashboards for public reporting, staff heard from a lot of people who liked the old format for certain reports. In response, the state education agency (SEA) started producing extra reports (in spreadsheet format) so that people could download the reports in the formats they liked from the dashboards.

The agency also tracks data requests to see if multiple similar requests from different stakeholders might indicate a need for a new dashboard or new supplemental downloadable report.

Forum Guide to Data Visualization

Effective data visualization is an important part of dissemination in that it can improve communications, make data more user-friendly, and increase stakeholder access to data. The *Forum Guide to Data Visualization* was designed to help education agencies communicate data meaning in visual formats that are accessible, accurate, and actionable for a wide range of education stakeholders. https://nces.ed.gov/forum/pub_2017016.asp

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The Key Role of Metadata

Metadata are data that classify or otherwise describe other data. Metadata are crucial to data management because they clarify how to search for particular data and understand how they were collected. They also provide information about methods, participating agencies, data sources, and temporal and spatial markers that may be relevant to future data users or researchers.

For more information, see the *Forum Guide to Metadata*, available at https://nces.ed.gov/forum/pub_2009805.asp.

Phase 6: Disposition

The final stage of the information lifecycle, data disposition, is the destruction of the data or transfer of the data to an archive for future reference. In short, disposition refers to the decisions made about the future usefulness or need for the data, consideration of security issues raised by keeping or destroying the data, and plans for its final condition. Though a large amount of potentially sensitive student data may become unnecessary or irrelevant when a student graduates or otherwise leaves the school,[10] some parts of the records of former students are required for varied purposes. For example, students' transcript information may need to be preserved indefinitely, whereas other student information will need to be preserved for a prescribed time period to comply with legal or policy requirements governing record retention. Agencies also should consider accessibility by various types of staff (for example, compliance officers or staff responsible for sending transcripts) in the retention strategy.

> ### The Importance of a Clear Disposition Plan
>
> In West Virginia, some districts are digitizing old records and purging the physical files to help control storage space issues. Some of the data experts involved worry about destroying the "permanent records" of former students, and these concerns may be valid. For example, the education record might be the only record of vaccinations a person can get, or people may need education records to validate their age or eligibility for programs like Medicare and Social Security. Having a plan to digitize the relevant information can help the district maintain the information it thinks it needs to keep to be ready to assist former students, while still destroying (in an appropriate manner) old files or information that no longer is needed.

One of the last decisions in the lifecycle of information comes when specific data cease to be accessed and used for the purposes for which they originally were collected and stored. When they are dormant yet still occupying valuable storage space, a decision must be made whether to archive or destroy the data. Some data by their nature are eternal, and must be properly and securely archived in case they are ever needed again (for example, transcript and financial data). Other records eventually will lose their value and should be destroyed in a manner consistent with their sensitivity. It is a best practice for data teams to review any relevant retention requirements for state and federal programs as they determine disposition plans.

> ### Best Practices for Data Destruction
>
> The U.S. Department of Education's Privacy Technical Assistance Center (PTAC) published *Best Practices for Data Destruction* to provide agencies with best practices for properly destroying sensitive data after the data are no longer needed. The resource details the lifecycle of data, discusses various legal requirements relating to the destruction of data under the Family Educational Rights and Privacy Act (FERPA), and examines a variety of methods for properly destroying data. It also discusses best practices for data destruction and provides real-world examples of how to implement data destruction in an education agency. For more information, see https://studentprivacy.ed.gov/resources/best-practices-data-destruction.

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[10]   Privacy Technical Assistance Center (PTAC). (2014). *Best Practices for Data Destruction*. https://studentprivacy.ed.gov/resources/best-practices-data-destruction.

Section 3:
Case Studies

This chapter provides case studies from state and local education agencies (SEAs and LEAs) that discuss the specifics of their agencies' data strategy plans, how their overall data strategy was envisioned and developed, and potential challenges and solutions they experienced along the way. These case studies also include SEAs or LEAs that still are within the development process for their data strategy, as the details and nuances of creation and implementation are likely to be useful to readers.

Washington State Office of Superintendent of Public Instruction: The Case for Data Strategy Documentation

Though many SEAs and LEAs have well-considered data strategies, they often have varying levels of documentation of their overall strategy or specific processes. Agencies that have clear documentation are in a much better position to navigate through changes or transitions. For example, during a recent change in administration, the Washington State Office of Superintendent of Public Instruction[11] found how advantageous its existing documentation of the agency's data strategy was for the numerous stakeholders involved in the transition. In the data governance manual,[12] which was published publicly and created using significant stakeholder input, the data governance team had not only made a clear case for the "why" of the overall data strategy, but also why particular processes were in place and the origin of those processes. This meant that the incoming new administration found a concise, clear document waiting for it that provided rapid comprehension of the agency's existing data processes, as well as the carefully considered reasons for them.

> The Washington State Office of Superintendent of Public Instruction's "why" for data strategy is that the **data are only as good as the information behind them**, and what that information represents. Policy decisions require accurate and relevant data.

With this documentation in place, the new Superintendent of Public Instruction quickly understood the agency's intentions for different data, how different offices functioned and worked together in data collection and reporting, and the specific roles of individual staff members and teams. The new administration also made a point of meeting with people across a range of positions and departments, asking them to describe their roles and how they fit into the larger system and contribute to the agency's mission. This approach to the transition allowed the new administration to understand the history and goals of the agency's data strategy, and let it expand beyond the foundation of the strategy documentation.

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11   For more information on the Washington State Office of Superintendent of Public Instruction's K-12 Data Governance workgroup, see https://www.k12.wa.us/about-ospi/workgroups-committees/currently-meeting-workgroups/k-12-data-governance

12   Washington State Office of Superintendent of Public Instruction. (2015). *Data Governance System for K-12 Data: Policies and Procedures*. https://www.k12.wa.us/sites/default/files/public/cisl/pubdocs/DataGovernanceManual.pdf

This view of a data strategy as part of a larger dynamic system is a departure for the agency, which previously had focused on data for compliance with state and federal reporting requirements. A clear data strategy now is a key part of the culture. As new team members come in, there is no need for major changes or fixing processes, because what is in place is defined clearly and working for relevant parties.

The state's clear data strategy also helps the agency to meet the state superintendent's policy and leadership expectations. For example, when the state superintendent and the state legislature were interested in expanding and providing funding to districts for dual language programs, the agency needed to address the issue that no federal data reporting about these programs existed and therefore no quality information was readily available. The agency worked with its steering committee to determine what data would need to be collected, which led to new conversations with schools and districts about the reporting process. It established a data collection to investigate where such programs exist, how many students are served, how many teachers are involved, what types of certifications these teachers have, and which parts of programs are going well or need further strategies to improve. This allowed the development of a timeline to expand the language immersion programs using a phased-in approach. This timeline gave the superintendent the opportunity to monitor progress toward goals, while also giving schools and districts opportunities to learn what other locations were doing and why different data were collected. In short, they were able to strategically consider various needs and uses for the data, including how they might be used beyond the immediate request. This perspective on data strategy allowed a more thoughtful discussion and plan for the dual language data.

Challenges: Coaching Data Leaders and Aligning Processes

While its perspective on data strategy has offered Washington many advantages, the agency has nonetheless faced some challenges. For example, as new cabinet members have come in from other parts of the agency or other locations, they have needed to be educated about the agency's systems, particularly about the collection, reporting, and use of data. These new cabinet members may have had varying levels of familiarity with or use of data in their prior positions and now need to understand and use data with confidence to lead their teams successfully and have their voices heard. The state's data governance leaders have focused on effective coaching of individuals in their new roles, as well as collaborating with related teams, such as information technology (IT), who can support the same messages.

Data leaders also acknowledge another data strategy priority–the continued alignment of the processes of different teams and content areas to make them more consistent. A history of more siloed data activities meant that groups developed different processes as they were needed over time, but the current need for interoperability and data sharing requires a streamlined process and consistent understanding of data policies. The SEA is continuing to work toward greater alignment. This also will benefit the IT group, which is working to move away from its history of building custom systems to meet the needs of different groups, and instead, identify flexible technology tools that can be used for many purposes. With the data governance and IT teams working together to align data collection and reporting processes to meet the state's larger data strategy, the SEA intends to not only improve the quality of the state's data but to focus on long-term goals for the state's technology.

Pasco County Schools (FL): Using a Data Challenge to Improve District Coordination

Pasco County Schools (FL), in Land O' Lakes, Florida, has turned a data challenge into an opportunity for greater clarity and improved data sharing among districts. Initially, the district experienced a complication–when data were intended for a specific purpose across different district information systems, the meaning of these data was not made adequately clear. However, upon becoming aware of the issue, data officials worked with colleagues in other districts, as well as the Florida Association for Testing Administrators (FATA; https://www.floridatestadmin.com/), to correct the confusion and use the situation to guide future decisions.

The Challenge: Non-Reportable SAT and ACT Scores

To meet graduation requirements for the state, students in Florida are allowed to take the SAT or ACT exam under a "non-college reportable" status–meaning that these scores are not intended to be reported to colleges or used for purposes other than high school completion. Students have the option to take these SAT NCR or ACT NCR (NCR meaning non-college reportable) exams in addition to the required state end-of-course (EOC) tests in English Language Arts (ELA) or Algebra if they have not scored at least at the required Level 3 on these EOCs. Students are entitled to extra time when taking NCR versions of the SAT or ACT, without the requirement of an Individualized Education Program (IEP). With this adjustment, many more students achieved scores high enough to qualify for graduation.

Though this allowance benefitted many students in terms of graduation requirements, Pasco County Schools (FL) confronted a dilemma, in that the student information system (SIS) did not mark these scores as non-college reportable. This created both internal and external problems. Internally, it was sometimes unclear whether a score should be included when SAT or ACT scores were used for reporting. Externally, students would encounter problems when transferring to other districts. These scores traveled with them, and the receiving districts did not recognize their non-reportable status.

Solving the Problem

Because there was no state code for these data at the time, the lack of clarity about these scores caused a great deal of confusion, particularly in the cases of transferring students. Luckily, the problem was discovered quickly in Pasco County. By the following test administration, the county had set up subject codes for non-college-reportable scores and

> The Florida Association of Test Administrators (FATA) (https://www.floridatestadmin.com/) is a grassroots organization that brings district test coordinators together to share best practices and address concerns. The group is divided into regions and holds regional meetings and an annual state meeting. FATA allows members to problem solve any issues dealing with assessments and also provides an opportunity for those from similarly sized districts to share ideas and solutions.

added an "NR" flag. At this point, when IT staff load the test scores, they add a clarification of "transcript=NO" so that the score cannot leave the district on a transcript. The information based on these scores is reported only as "graduation requirement met."

In addition to other districts making similar adjustments to avoid this confusion, FATA members have discussed these concerns at their meetings, both to mitigate the immediate problem and to consider how this situation can be a learning experience for future data sharing.

Moving Forward

Data leaders in Pasco County Schools (FL) acknowledge that situations such as this one cannot always be foreseen or prevented. Instead, rapid recognition of the issue and quick mitigation allowed the county to keep data confusion from becoming an ongoing problem. This situation did have positive consequences, in that it provided district leaders an opportunity to reflect on questions that need to be asked when adding new data metrics to the system and to think
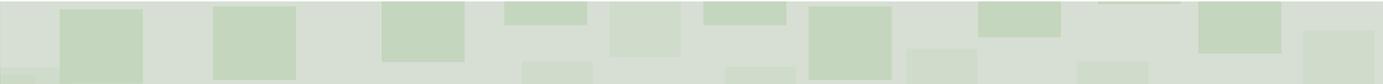
about potential unintended consequences or impacts. Additionally, having worked through this problem, they are better able to anticipate and avoid similar problems in the future. They aim for a collaborative focus. For example, the Director of Accountability, Research, and Measurement works closely with the IT director to coordinate issues such as data sharing and data visualization tools. Similarly, instructional staff members meet with school support staff and the data visualization team, so that the different groups better understand each other's needs and perspectives.

Vermont Agency of Education: Redefining Structures for Data Strategy

The Vermont Agency of Education's data strategy development is an example of how a state can rapidly change its approach to data strategy and reorganize to support its new objectives. Until recent years, the state did not have an official data strategy. Some departments had strategies at varying levels, but these were relatively lean and did not transfer from one group to another. Following the entrance of a new education secretary, Vermont's approach to data strategy has been reworked and redesigned, with a focus on bringing together all mission-critical data teams to work together. A new Data Management and Analysis division was created, aligning what previously had been a loose federation of data teams in different content areas. The state has made strides in recent years and continues to strengthen and implement its data strategy.

Within this new division, the director created a data leadership team with all team leads. This group has created a mission statement and spent significant time identifying issues it felt would be game changers for the agency to develop a comprehensive charter. The team has had multiple strategic planning sessions, investing time in developing a clear data strategy and documenting all details.

Going forward, each data leader will be responsible for one of the annual objectives. Leaders were able to choose their objectives, which increases the level of ownership. The team is in the process of revisiting what the key performance indicators (KPIs) are for each annual objective, and how they will be measured. For each objective, the team identified strategies and specific tasks.

Key Elements of the Vermont Agency of Education's Data Strategy

A central element of the Vermont Agency of Education's data strategy is its focus on standardization. As the state works to rapidly improve its systems from a technical perspective, staff members are dedicated to documenting everything that occurs within the shared space. The data division has a workflow/shared project management system with the IT department, with tools such as a Kanban board (a project management tool designed to visualize work processes and workflows) to show task dependencies. As the team operationalizes different pieces, it always begins with the business process map, considering what the workflow needs to look like, how to assign tasks and set estimates for time duration and deadlines, and how to best build the collective knowledge base. With these processes, it seeks to build a culture of agile work.

Additionally, the team tries to be methodical about modernization and is focused on making sure things are no longer siloed within different groups. Team members created standards for workflows that allow them to move away from individuals owning processes to more of the team having ownership. The team uses a collaborative notebook software tool that allows team members to work within a data science environment. Each team member has a professional development plan geared toward modernizing skill sets, as well as understanding the best tools and means for executing their tasks.

Related to its efforts to modernize its systems to better allow team members to work collaboratively is the data division's emphasis on working from a data lifecycle perspective. The data division has moved away from seeing tasks as specific to separate teams, and instead,

focuses on the lifecycle, such that everyone has an understanding of both upstream and downstream work. It has eliminated the idea of sequestered spaces within a project, aiming instead to have everyone understand how their work affects the other parts of the process. The division has found that it is good for team morale when staff members see how their discrete tasks contribute to the larger project. This perspective also reemphasizes the importance of data quality.

Finally, a central element of Vermont's efforts to move data strategy forward has been the close relationship between the data division and IT. The director of the data division collaborates closely with the head of the IT department, allowing planning and decisions to be collaborative. The two groups have conducted an exercise to determine the roles and responsibilities of each department. In short, who should be doing what? Where does data stop and IT start, and vice versa? Though these are sometimes tough conversations, they have allowed a much greater understanding of roles within the data process and have provided clarity of purpose.

Moving Forward

As Vermont moves beyond various data strategy goals tied to modernization and standardization, the state also is focusing on reducing state reporting burdens. Taking concerns from the districts into consideration, such as their frustration that they are unable to help each other or to share data, the state recently released a request for information (RFI) for a statewide SIS. Although Vermont is a local control state, it is exploring the statewide SIS route due to the extreme burdens LEAs report in simply meeting compliance requirements.

If a statewide SIS were to be implemented, the data division hopes that within 3 to 5 years, state reporting burdens (particularly time burdens) could be reduced by up to 80%, as the state could draw much of the needed data from the SIS. It also would enable the state to begin cycling through data quality checks throughout the year so they would not be an enormous undertaking a few times a year.

With necessary data reporting efforts reduced, Vermont could turn its focus to using the data to do meaningful things in the field. The data division plans to use the data for strategic purposes such as program evaluation, early warning systems, and process improvement.

West Virginia Department of Education: The Importance of Being Intentional

In the process of moving from an administrative or compliance-based data focus to one that is more strategic and future-focused, the West Virginia Department of Education has centered on being intentional, such that those who work with data are effectively supported, dissemination decisions are made judiciously, and data are recognized as representations of real people. Ultimately, state leaders want to ensure that data are used as strategically as possible to drive the decisions that support the state's children.

Support and Training for Data Collectors

This intentionality begins with the state's focus on support and training for data collectors at all levels. Until recently, West Virginia had a tiered system of support that included a layer of regional education service agencies (RESAs) between the SEA and LEA levels. Under this system, data collectors at the school level directed questions to designated representatives at the LEA, and the LEA would contact the RESA. If the RESA could not answer, RESA representatives then went to the SEA. In the wake of changes in state law that eliminated RESAs, the state has streamlined this process while still keeping a tiered system. Currently, questions from the school level go to the WVEIS (West Virginia Education Information System) County Contact within each LEA. These individuals can contact the SEA when needed, as in the past. However, because the RESAs have been eliminated, the SEA meets more regularly
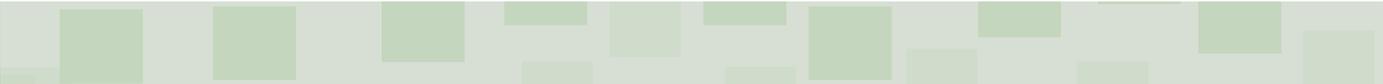
with the WVEIS County Contacts (for example, via virtual meetings and in-person conferences) to keep them updated on important issues. With increased collaboration and improved communication from the SEA, the WVEIS County Contacts are better able to build the capacity to handle local questions and situations directly.

Though WVEIS has existed for several decades, the state has worked in recent years to more intentionally establish coding standards. Traditionally, LEAs had divergent methods of defining and collecting data elements. For example, for many years LEAs defined the concept of "absence" differently–in some LEAs, a student absent due to a chronic medical condition might be counted as absent because they are not physically in class, while in other counties, the same type of absence might be defined as an "allowable deduction" that would not count as an absence. By standardizing how such concepts could be defined (through changes in policy and practice), the state was able to make the data more consistent and accurate. Also, the SEA framed the issue for LEAs as one of fairness–for all to be treated equally, data definitions and collections need to be consistent.

The focus on intentionality also extends to changing processes or collections. In one prior case, the SEA expected data collectors (school secretaries, in this case) to learn a new process quickly before the start of a new school year. The SEA's expectation was unreasonable because it did not allow requisite time for school secretaries to adjust and learn what was needed. Therefore, the process change had to be eliminated. The state learned from the experience and now uses phased-in plans to allow for effective transitions.

Finally, the West Virginia Department of Education also carefully considers the level of instruction provided to various data collectors. The SEA provides detailed data collection instruction documents on how to use SEA applications, which include an interactive table of contents that users can click through to find the information they need. Detailed instructions for major data collections include contact information for particular content areas, specific instructions, key codes, and screenshots of individual steps. State leaders acknowledge that such a comprehensive document can be daunting, but explain that a decision was made to provide all needed information in one place rather than attempting to maintain several separate documents for different portions of the same collection. WVEIS County Contacts are available to answer questions and provide support.

Dissemination

The West Virginia Department of Education also has considered its various stakeholders in its data dissemination strategy. Some of this has been dependent on the type of data requested, and some has been in response to stakeholder reactions to changes in dissemination.

For standard dissemination, the state has a public dashboard reporting site, as well as a state report card site. They ensure that there are various downloads available, noting that different stakeholders have different interests in and uses for the public data. State data leaders note that when these options were first available, some users did not want to download the data for each county or school individually, as allowed for by standard dashboard functionality: They wanted the spreadsheets to which they were accustomed. In response, the state created a comprehensive spreadsheet of assessment performance levels and proficiencies, as well as a school composition report. In short, the state remained responsive to the data needs and comfort levels of data users.

When requests for information go beyond what is regularly available, an initial data request process with a brief form allows state data staff to pull the data for the requestor, if possible and in compliance with standard privacy protections. The form clarifies the request and allows the data team to keep track of requests to inform planning for additional public reporting.

Beyond this level of information is a tier for researchers who want access to restricted-use or suppressed data. In these cases, researchers must submit a more official and detailed proposal application. The data team reviews the request to determine if appropriate suppression is possible and to what level the research may benefit the SEA. The latter is always positive, but well-designed studies can be approved even if they do not directly benefit the SEA.

Data Ethics

A third area in which the West Virginia Department of Education has been meaningfully intentional is in communicating with data collectors about ethics. The state emphasizes that data collectors must remember that data represent students, noting that when local staff focus on accountability, they can forget that each number represents a real student. The SEA encourages local staff to think of the data in terms of what they demonstrate about students and the struggles they may be facing. For example, the importance of attendance data is not just that they are compulsory, but that they offer a chance to investigate whether students have appropriate transportation, whether they have unreported illnesses, or whether they are facing unknown struggles at home. The SEA reminds local staff to see the children behind the charts and remember that numbers only tell part of the story.

The SEA has found that it often is reassuring to local staff to see that the SEA is viewing the data in this manner. Because the SEA's official role is monitoring and compliance, LEAs may feel pressure regarding reporting. Knowing that the SEA goes beyond merely caring about compliance to thinking about what the data can tell educators about individual students and how those data can be used to assist students' needs can help to build connections and collaboration between the different agency levels.

## Loudoun County Public Schools (VA): Focusing on Interoperability and Increasing Transparency

For Loudoun County Public Schools (VA), the integration of data governance and data strategy has guided the district to a focus on data analytics and data science. As district data leaders recognized the need for more centralized and strategic data governance, they worked to democratize their approach to governance by empowering team members and increasing data transparency.

A Need for Interoperability

Loudoun County Public Schools (VA) initially began its interoperability efforts by developing elements, creating definitions, and working on mapping both strategic and tactical plans and goals. Over time, the team identified key gaps in knowledge and resources, and team members realized that they needed to accelerate their interoperability work and secure additional funding to support their interoperability goals. After considering their options, the team partnered with an outside organization to enhance its interoperability work. Financially, this work was supported by a grant to create data analytics that provided unified student assessment data.

These arrangements and tools provided the acceleration of interoperability that the district needed. Shared code and connectors clarified relationships within the data and allowed the data team to handle technical issues team members had encountered with the use of different systems. A data import tool made data management much easier, allowing the team to quickly integrate data.

The grant funding supported the team's effort to develop a unified student assessment application that provides the basis for data dashboards for teachers. These dashboards offer quick, useful indicators, as well as data visualizations for teachers that connect and demonstrate patterns in the data from all student assessments.
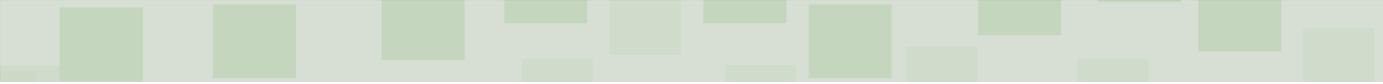
Before these efforts, the team had been focused on the storming stage of team development,[13] unable to agree upon definitions and uses of elements. Members now had access to different use cases for elements, allowing teams to move forward from these types of inconsistencies. Therefore the team reduced time spent on data literacy because users are given a clear framework that allows them to see where their needs fit.

Increasing Data Transparency for Stakeholders

Data leaders worked with different educational units to create an effective data governance team.[14] The team includes individuals identified by their departments as having data science skills, and senior leadership grants them the authority to speak on their behalf. The team meets biweekly to move the district's data analytics forward.

The team also has worked to mitigate the concerns expressed by different departments as they increase the focus on data science. For example, some staff members were concerned about sharing human resources data. Concerns ranged from worries about how data might be perceived by stakeholders to fears that limited time and resources could not be spent on data sharing. However, senior leadership in the district has supported the perspective that there must be data transparency, and the greatest concern should be data accuracy. Also, the district will provide necessary clarification or disclaimers for data that may be confusing to the average stakeholder: for example, explaining that reports may reflect data collected at different times, or that terms may be defined and used differently at different levels or across educational units.

Ultimately, the data team–and district leaders–understand the key role transparency plays in the district's data strategy. Integrating transparency means that difficult questions may be raised, but these questions are part of why the data are made available to the public. The data belong to the community and its stakeholders, and they need to be able to understand what is happening in the district. Therefore, the district's data strategy uses its focus on data analytics to improve transparency.

Moving Forward

As district staff have improved the interoperability of the LEA's data and increased the use of data analytics, they have worked with teachers to ensure that they understand the data and solicit their feedback about ways to improve data dashboards and visualizations. A group of teachers has reviewed the visualizations, allowing the data team to realize that some needed to be presented more clearly and simply. Moving to analytics and visualizations also has allowed the team to work with teachers to increase their data literacy. A data app for teachers provides five guiding questions, giving them prompts and allowing a new understanding of the data. Making the process inquiry-based has allowed teachers to understand what the data mean within the context of instructional questions. They now are achieving greater levels of data literacy by working with their student's actual data.

Beyond this direct work with teachers, the data team has plans to get students involved in data science, giving them access to real data. In the coming years, they hope to include data science in the district's curriculum.

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13   For more information about the storming stage, see *5 Stages of Team Development: Tuckman's Group Development*, from https://project-management.com/stages-of-team-development/
14   For more information on data governance in Loudoun County Public Schools (VA), see the case study that begins on page 44 of the *Forum Guide to Data Governance*, available at https://nces.ed.gov/forum/pub_2020083.asp.

Data Destruction

Loudoun County Public Schools (VA) requires any parties using its data to follow the Virginia Data Protection Agreement (https://www.lcps.org/cms/lib/VA01000195/Centricity/Domain/111/20_Virginia_School_Data_Privacy_Agreement_DPA_FINAL_7-25-19.pdf), building this agreement into the contracting process. Users must adhere to or exceed the data destruction component. Though the district is not able to actively validate adherence at this point, they address the issue through the non-renewal process.

Data Privacy and Security

Loudoun County Public Schools (VA) received the designation of Consortium for School Networking (CoSN) Trusted Learning Environment (TLE; https://trustedlearning.org/). This designation requires a rigorous certification process, and signals that a district has taken strong and measurable steps to help ensure the privacy of student data. The district has built the TLE elements into its policies. Additionally, data leaders have developed a course for teachers on data privacy, which they take each year.

Wisconsin Department of Public Instruction (DPI): Strong Data Quality Measures and Agile Leadership Transform Strategic Data Use

The Wisconsin Information System for Education (WISE) comprises multiple interoperable tools that support data collection to meet all state and federal reporting requirements. The complexity of these interoperable systems drove state data leaders to establish formalized data and project governance, as well as a structured data quality process. While the state's foundational priority is collecting and sharing required data, a specific focus on data quality and transparency has allowed Wisconsin to be more strategic in its coordination, analysis, and use of data.

Agile Leadership and the Scrum Process

From a structural and process perspective, the Wisconsin Department of Public Instruction's (DPI's) data strategy focuses on one major project management philosophy: agile development practices that use the scrum process at the team level, which then is scaled. The agile development methodology is an iterative approach in which large projects are broken down into more manageable tasks tackled in short iterations or "sprints," empowered by small teams. The scrum team framework is a team design with specific roles and teamwork expectations, in which the members work together to deliver required product increments. Wisconsin uses these concepts in tandem to direct its product development and data strategy.

DPI's product development revolves around an agile leadership mindset. The philosophy focuses on satisfying the customer (in this case, program areas or LEAs) through early and continuous delivery of valuable software and data solutions. In the agile approach, team members identify what they are working toward with the customer, and the team begins by building a small initial piece to get feedback from the customer. The team continues to develop new iterations, rolling out small pieces every 2 weeks (the time of the agency's "sprint" cycle). The belief is that constant feedback allows for a better product, as the teams interact regularly with customers throughout the sprints. The state's data leaders find that they have been able to connect better with customers, built a relationship based on trust, and have bridged gaps between program areas and IT. Advisory groups consisting of LEA users for specific products were established to receive continuous feedback on product developments, which ensures development is prioritized based on the most important needs.

Within the agile mindset, Wisconsin also depends on the scrum team, a structure that encourages high levels of communication among team members and an integrated working environment. Each scrum team is empowered to deliver solutions based on an assigned vision, and each has standard team roles. The product owner's main responsibility is to answer the question, "What is the team doing next?" This person prioritizes key tasks and is responsible for coordinating the product vision and conveying it to the development team. The scrum master is considered the process owner. This person helps remove impediments, facilitates meetings, and works with the
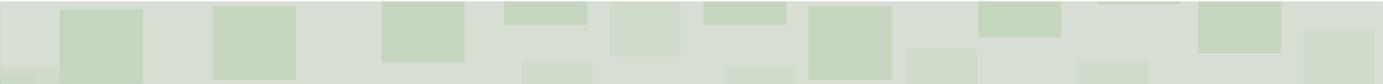
product owner to make sure the backlog is in good shape. Finally, the development team consists of the business analyst, the quality assurance analyst, and the developers. Depending on the scrum team, the development team may range from three to seven members.

Before implementing the scrum process as a core element of project and data governance, the state conducted development efforts that were not as streamlined, leading to potential redundancies or unidentified needs. Additionally, these projects used traditional waterfall project management methods, which map out a project into distinct, sequential phases, with each new phase beginning only when the prior phase has been completed. Over time, data leaders have made changes to the entire process to increase productivity, collaboration, and transparency. They now have the timely and accurate data they need to identify and provide needed resources, support students and educators, and continually improve processes.

Wisconsin now uses a scaling framework for its approach to project governance. It comprises multiple scrum teams, the WISE Leadership Team, the WISE Steering Committee, and the IT Project Request and Prioritization Process.

- Scrum teams (application development, data warehouse, and DevOps) use the scaling framework as an agile development methodology, which uses a strategy that allows solutions to be delivered in usable and workable iterations. Each program area, or core product, has an assigned scrum team. Each scrum team has one individual assigned to the role of product owner, a scrum master, and one or more team members assigned to the development team (analysts, developers, and quality assurance).
- The WISE Leadership Team, which meets weekly, is made up of the IT management team, scrum team product owners, and other key team members. This team handles the project request process, which involves a weekly review of any project requests entered by agency staff through a form on the agency's intranet site. The team determines whether the project request can be assigned directly to a scrum team or if it needs review and prioritization by the WISE Steering Committee. The leadership team also communicates across the agency about items that may affect more than one team.
- Although the WISE Steering Committee originally was developed for the WISEdata project, the committee now is a cross-agency group that covers the entire WISE product suite. It includes IT directors and program area directors from any program area that has data at the DPI, essentially every division and team in the agency. The steering committee prioritizes project work using a decision protocol it developed itself, which is crucial when program areas are competing for scrum team or staff time. The committee informs the product roadmap, following the group's central goals of transparency and criterion-driven, consensus-based decisionmaking. The steering committee also represents the policy tier of the data governance structure at DPI and can make decisions and set priorities on that level.

The scaling framework allows DPI to coordinate and facilitate work between multiple scrum teams and also to provide accountability and transparency. Each scrum team performs a daily scrum stand-up. This meeting lasts 15 minutes or less, and all team members share information based on three questions: What did you do yesterday? What are you doing today? What is standing in your way?

Like the daily scrum standups, there also is a daily scrum of scrums, or scaled daily scrum meeting. This meeting consists of one representative from each scrum team. The purpose of the meeting is to discuss how teams can work together efficiently, provide team updates, and identify and resolve any dependencies between teams.

Project Roadmaps

Another key element of DPI's data strategy is the use of product roadmaps, which are used to define targeted deliverable goals, communicate plans to stakeholders, and help keep teams on track from a high-level perspective. Each project—that is, any new request for data, an application, or a new dashboard, graph, report, map, or visualization— is discussed by the leadership committee and assigned to a particular scrum team, unless there is a need to discuss the project at a higher level. The project then is added to a product roadmap associated with the assigned scrum team. If a project is larger or may impact multiple teams, it is brought to the WISE Steering Committee for discussion before being approved to be added to a roadmap and moved forward.

The WISE Leadership Team meets three times a year to review the roadmaps from all teams to make sure they align with agency priorities and goals. The team then presents these roadmaps to the WISE Steering Committee. Sharing this information lets stakeholders in program areas or LEAs understand the status and timing of their projects, as well as how they fit into the larger goals of DPI. This helps agency leadership communicate the reasoning behind certain decisions and allows stakeholders a better understanding of scheduling and priorities. For example, at one point requests came in at the same time to integrate both financial data and career and technical education (CTE) data into the data system. As these were large-scale tasks that could not be accomplished simultaneously, the discussion was brought to the WISE Steering Committee (which includes the program area directors). When the steering committee reviewed the roadmap, using the decisionmaking criteria it had developed itself, it was agreed that prioritizing the CTE data integration was the best choice.

Strong Relationships Support Data Quality

One of the ways DPI maintains its high-quality data is through strong relationships between the IT team and the program areas. When data are submitted to the state's data warehouse, the IT team works with program areas to determine how the information can best be visualized and provided to stakeholders. IT also works through a data quality review process with the program areas before the publishing of any reports. This process uses warnings and error checks within the system to allow both sides to be aware of any discrepancies. In this way, data quality becomes a shared responsibility owned by the program area and IT. The IT team is working continually to reduce redundancies and make the system work better for LEAs.

These relationships and mutual understanding of needs allow both groups to work successfully with WISEdata, the state's multi-vendor, open data collection system that leverages an application programming interface (API) toolset. WISEdata allows school districts, charter schools, and private schools participating in a parental choice program to submit data to DPI from the SIS vendor of their choice. Under a plan approved by the legislature, DPI created the system to achieve multiple goals: to meet all required state and federal reporting mandates; present data through the secure WISEdash data portal to support continuous improvement planning, data quality, and early warning; eliminate duplicate data collection tools and processes; and partner with SIS vendors on data collection standards to make high-quality data available more easily and frequently.

WISEdash: Providing Data to Stakeholders and Informing Early Warning Systems

Data are available via WISEdash on two separate portals that use the same underlying software: a public portal, open to all users, and a secure portal, available to districts and schools to view their data via a secure, role-based login. DPI shares summarized and redacted data (to protect student privacy) with public stakeholders via the WISEdash Public Portal, a data portal that uses dashboards to provide multi-year education data about Wisconsin schools. Data on the
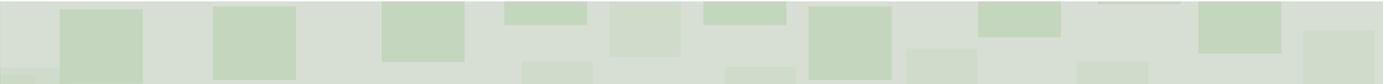
portal are driven mostly by required reporting: for example, enrollment data or achievement data for various student groups. Data are available by school, district, or aggregated at the state level; can be displayed for multiple years; and can be grouped and filtered by a variety of demographics, including grade level, gender, race/ethnicity, economic status, disability, English proficiency, and migrant status. Statewide data download files also are available. Data leaders worked with different stakeholders, such as state legislators, parents, and reporters, to determine which types of data and data visualizations would be most useful. The most requested feature was a comparison tool for schools and LEAs. As a public reporting tool, WISEdash is used by districts, schools, parents, researchers, media, and other community members to view data published by DPI.

WISEdash for Districts, the secure portal, has a carefully designed system of role-based security, allowing different staff varying levels of data access. Some only see summary data, while others can see student profiles and other more sensitive information. WISEdash for Districts provides multiple tools, including supports for data inquiry and continuous improvement planning; data and dashboards for district-wide use of student data to drive school improvement; dashboards to help with district and school data verification and comparisons, such as certified data from one year to the next, for upcoming snapshots; and a secure platform to protect student privacy while viewing student outcomes. Much of what is housed on the secure portal is driven by user requests for items such as new data, dashboards, or visualizations. These requests are sometimes internal (from the SEA program area teams), but often are from LEAs throughout the state. Wisconsin has many small LEAs that have benefitted from having their data consolidated in one data dashboard system for them to use for analysis instead of having to build one.

Because there are such robust data in WISEdash, the state has been able to use it to develop varied early warning systems. An early warning system provides information to help schools identify students who are not on track for desirable outcomes. The Dropout Early Warning System (DEWS) and the College and Career Readiness Early Warning System (CCREWS) are available in WISEdash, as well as Chronic Absenteeism and Free Application for Financial Student Aid (FAFSA) Filing Status. Therefore, instead of needing to create their early warning system (EWS), LEAs can use the statewide EWS options available through WISEdash.[15]

In the Future

DPI's dual focus on data quality and collaborative project governance has allowed the state to streamline and improve its data strategy processes in recent years. Data leaders suggest that a potential next

> More information about project management can be found in the Project Management Institute's *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide): https://www.pmi.org/pmbok-guide-standards

step is to work on adding additional supports in the WISE tools for educators. The agency has adopted the same toolset, which resides in WISEdash, for continuous improvement planning for all schools and districts identified within the accountability system, providing a common and robust method for conducting such planning. While the state recognizes that district and school administrative staff use WISEdash and other secure tools for continuous improvement planning, data quality, and student support, it plans to also help educators navigate through and use the tools for student and classroom support. The early warning indicators currently in use are a piece of that, but agency leadership seeks to expand the support available to those working directly with DPI's students via local benchmark and classroom assessment data availability and the integration of other data sources.

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15   For more information on the Wisconsin DPI's early warning systems, see the case study that begins on page 48 of the *Forum Guide to Early Warning Systems*, available at https://nces.ed.gov/forum/pub_2019035.asp.

Appendix A: Federal Data Strategy Core Principles (https://strategy.data.gov/)

Building a Culture that Values Data and Promotes Public Use

- **Identify Data Needs to Answer Key Agency Questions:** Use the learning agenda process to identify and prioritize the agency's key questions and the data needed to answer them.
- **Assess and Balance the Needs of Stakeholders:** Identify and engage stakeholders throughout the data lifecycle to identify stakeholder needs and to incorporate stakeholder feedback into government priorities to maximize entrepreneurship, innovation, scientific discovery, economic growth, and the public good.
- **Champion Data Use:** Leaders set an example, incorporating data in decisionmaking and targeting resources to maximize the value of data for decisionmaking, accountability, and the public good.
- **Use Data to Guide Decisionmaking:** Effectively, routinely, transparently, and appropriately use data in policy, planning, and operations to guide decisionmaking; share the data and analyses behind those decisions.
- **Prepare to Share:** Assess and proactively address the procedural, regulatory, legal, and cultural barriers to sharing data within and across federal agencies, as well as with external partners.
- **Convey Insights from Data:** Use a range of communication tools and techniques to effectively present insights from data to a broad set of audiences.
- **Increase Accountability of Federal Spending:** Align federal spending data with performance data to enable the public to understand the results of federal investments and to support informed decisionmaking.
- **Monitor and Address Public Perceptions:** Regularly assess and address public confidence in the value, accuracy, objectivity, and privacy protection of federal data to make strategic improvements, advance agency missions, and improve public messages about planned and potential uses of federal data.
- **Connect Data Functions Across Agencies:** Establish Communities of Practice for common agency data functions (for example, data management, access, analytics, informatics, user support) to promote efficiency, collaboration, and coordination.
- **Provide Resources to Explicitly Leverage Data Assets:** Ensure that sufficient human and fiscal resources are available to support using data for agency decisionmaking and accountability and to spur commercialization, innovation, and public use.

- **Prioritize Data Governance:** Ensure there are sufficient authorities, roles, organizational structures, policies, and resources in place to transparently support the management, maintenance, and use of strategic data assets.
- **Govern Data to Protect Confidentiality and Privacy:** Ensure there are sufficient authorities, roles, organizational structures, policies, and resources in place to provide appropriate access to confidential data and maintain public trust and safeguard privacy.
- **Protect Data Integrity:** Emphasize state-of-the-art data security in information technology (IT) security practices for every system that is refreshed, architected, or replaced to address current and emerging threats; foster innovation and leverage new technologies to maintain protection.
- **Convey Data Authenticity:** Disseminate data sets such that their authenticity is discoverable and verifiable by users throughout the information lifecycle, consistent with open data practice, and encourage appropriate attribution from users.
- **Assess Maturity:** Evaluate the maturity of all aspects of agency data capabilities to inform priorities for strategic resource investment.
- **Inventory Data Assets:** Maintain an inventory of data assets with sufficient completeness, quality, and metadata to facilitate discovery and collaboration in support of informing key agency questions and meeting stakeholder needs.
- **Recognize the Value of Data Assets:** Assign a value to data assets based on maturity, key agency questions, stakeholder feedback, and applicable law and regulation to appropriately prioritize and document resource decisions.
- **Manage with a Long View:** Include data investments in annual capital planning processes and associated guidance to ensure appropriated funds are being used efficiently to leverage data as a strategic long-term asset.
- **Maintain Data Documentation:** Store up-to-date and comprehensive data documentation in accessible repositories to facilitate use and document quality, utility, and provenance in support of informing key agency questions and meeting stakeholder needs.
- **Leverage Data Standards:** Adopt or adapt, create if needed, and implement data standards within relevant communities of interest to maximize data quality and facilitate use, access, sharing, and interoperability.
- **Align Agreements with Data Management Requirements:** Establish terms and conditions for contracts, grants, cooperative agreements, and other agreements that meet data management requirements for processing, storage, access, transmission, and disposition.
- **Identify Opportunities to Overcome Resource Obstacles:** Coordinate with stakeholders to identify mutually-acceptable cost recovery, shared service, or partnership opportunities to enable data access while conserving available resources to meet user demand.
- **Allow Amendment:** Establish clear procedures to allow members of the public to access and amend federal data about themselves, as appropriate and in accordance with federal laws, regulations, and policies, to safeguard privacy, reduce potential harm from inaccurate data, and promote transparency.
- **Enhance Data Preservation:** Preserve federal data in accordance with applicable law, regulation, policy, approved schedules, and mission relevance.

- **Coordinate Federal Data Assets:** Coordinate and share data assets across federal agencies to advance progress on shared and similar objectives, fulfill broader federal information needs, and reduce collection burden.
- **Share Data Between State, Local, and Tribal Governments and Federal Agencies:** Facilitate data sharing between state, local, and tribal governments and the federal government, where relevant and appropriate and with proper protections, particularly for programs that are federally funded and locally administered, to enable richer analyses for more informed decisionmaking.

Promoting Efficient and Appropriate Data Use

- **Increase Capacity for Data Management and Analysis:** Educate and empower the federal workforce by investing in training, tools, communities, and other opportunities to expand capacity for critical data-related activities such as analysis and evaluation, data management, and privacy protection.
- **Align Quality with Intended Use:** Data likely to inform important public policy or private sector decisions must be of appropriate utility, integrity, and objectivity.
- **Design Data for Use and Re-use:** Design new data collections with the end use and users in mind to ensure that data are necessary and of high enough quality to meet planned and future agency and stakeholder needs.
- **Communicate Planned and Potential Uses of Data:** Review data collection procedures to update and improve how planned and future uses of data are communicated, promoting public trust through transparency.
- **Explicitly Communicate Allowable Use:** Regularly employ descriptive metadata that provides clarity about access and use restrictions for federal data, explicitly recognizes and safeguards applicable intellectual property rights, conveys attribution as needed, and optimizes potential value to stakeholders to maximize appropriate legal use.
- **Harness Safe Data Linkage:** Test, review, and deploy data linkage and analysis tools that use secure and privacy-protective technologies to address key agency questions and meet stakeholder needs while protecting privacy.
- **Promote Wide Access:** Promote equitable and appropriate access to data in open, machine-readable form and through multiple mechanisms, including through both federal and non-federal providers, to meet stakeholder needs while protecting privacy, confidentiality, and proprietary interests.
- **Diversify Data Access Methods:** Invest in the creation and usability of multiple tiers of access to make data as accessible as possible while minimizing privacy risk and protecting confidentiality.
- **Review Data Releases for Disclosure Risk:** Review federal data releases to the public to assess and minimize the risk of re-identification, consistent with applicable laws and policies, and publish reviews to promote transparency and public trust.
- **Leverage Partnerships:** Create and sustain partnerships that facilitate innovation with commercial, academic, and other partners to advance agency mission and maximize economic opportunities, intellectual value, and the public good.
- **Leverage Buying Power:** Monitor needs and systematically leverage buying power for private-sector data assets, services, and infrastructure to promote efficiency and reduce federal costs.
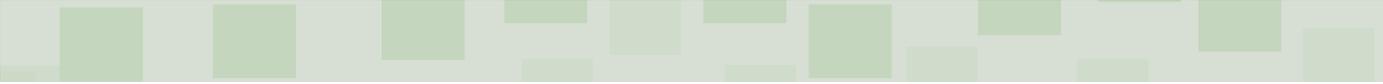
- **Leverage Collaborative Computing Platforms:** Periodically review and optimize the use of modern collaborative computing platforms to minimize costs, improve performance, and increase use.
- **Support Federal Stakeholders:** Engage with relevant agencies to share expert knowledge of data assets, promote wider use, improve usability and quality, and meet mission goals.
- **Support Non-Federal Stakeholders:** Engage with industry, academic, and other non-federal users of data to share expert knowledge of data assets, promote wider use, improve usability and quality, and advance innovation and commercialization.

Appendix B: Resources for Strategies for Education Data Collection and Reporting

Legal References

Americans With Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990). https://www.ada.gov/pubs/adastatute08.htm

Family Educational Rights and Privacy Act, 20 U.S.C. § 1232g (1974). https://www2.ed.gov/policy/gen/guid/fpco/ferpa/

Additional Resources

California Department of Education Guidance for Changing a Student's Gender in the California Longitudinal Pupil Achievement Data System: https://www.cde.ca.gov/ds/sp/cl/calpadsupdflash158.asp

Common Education Data Standards (CEDS): https://ceds.ed.gov/

Current Measures of Sexual Orientation and Gender Identity in Federal Surveys: https://nces.ed.gov/FCSM/pdf/buda5.pdf

ED*Facts* Disclosure Review Board: https://www2.ed.gov/about/inits/ed/edfacts/ed-disclosure-avoidance-overview.pdf

Elementary and Secondary Information System (ElSi): https://nces.ed.gov/ccd/elsi

Fairfax County Public Schools (VA) Student Information System (SIS): https://www.fcps.edu/resources/technology/student-information-system-sis-fcps

Five Stages of Team Development: Tuckman's Group Development: https://project-management.com/stages-of-team-development/

Florida Association for Testing Administrators: https://www.floridatestadmin.com/

Kentucky Student Information System Data Standards: https://education.ky.gov/districts/tech/sis/Pages/KSIS-Data-Standards.aspx

National Center for Education Statistics (NCES) Confidentiality Procedures: https://nces.ed.gov/statprog/confproc.asp

Privacy Technical Assistance Center (PTAC): https://studentprivacy.ed.gov

PTAC Best Practices for Data Destruction: https://studentprivacy.ed.gov/resources/best-practices-data-destruction

PTAC Data Governance Checklist: https://nces.ed.gov/Forum/pdf/data_governance_checklist.pdf

Project Management Institute's A *Guide to the Project Management Body of Knowledge (PMBOK® Guide)*: https://www.pmi.org/pmbok-guide-standards

Statewide Longitudinal Data System (SLDS) Data Governance Toolkit: https://slds.grads360.org/#program/data-governance

SLDS Data Maturity Model: https://slds.ed.gov/#communities/pdc/documents/19350

SLDS Data Use Strategy: https://nces.ed.gov/programs/slds/pdf/data_use_strategy.pdf

SLDS Technical Brief: *Statistical Methods for Protecting Personally Identifiable Information in Aggregate Reporting*: https://nces.ed.gov/pubs2011/2011603.pdf

Trusted Learning Environment Seal Program: https://trustedlearning.org/

Virginia School Data Policy Agreement: https://www.lcps.org/cms/lib/VA01000195/Centricity/Domain/111/20_Virginia_School_Data_Privacy_Agreement_DPA_FINAL_7-25-19.pdf

Washington State Office of Superintendent of Public Instruction's K-12 Data Governance workgroup: https://www.k12.wa.us/about-ospi/workgroups-committees/currently-meeting-workgroups/k-12-data-governance

Washington State Office of Superintendent of Public Instruction K-12 Data Governance: https://www.k12.wa.us/sites/default/files/public/cisl/pubdocs/DataGovernanceManual.pdf

West Virginia Student Data Accessibility, Transparency and Accountability Act: http://www.wvlegislature.gov/WVCODE/ChapterEntire.cfm?chap=18&art=2&section=5H#02

National Forum on Education Statistics Resources

Forum Guide to Building a Culture of Quality Data: A School and District Resource (2004)
https://nces.ed.gov/forum/pub_2005801.asp
This guide was developed by the Forum's Data Quality Task Force to help schools and school districts improve the quality of data they collect and to provide processes for developing a "Culture of Quality Data" by focusing on data entry–getting things right at the source.

Forum Guide to Data Ethics (2010)
http://nces.ed.gov/forum/pub_2010801.asp

While laws set the legal parameters that govern data use, ethics establish fundamental principles of "right and wrong" that are critical to the appropriate management and use of education data in the technology age. This guide reflects the experience and judgment of seasoned data managers; while there is no mandate to follow these principles, it is hoped that the contents will prove a useful reference to others in their work.

Forum Guide to Data Ethics Online Course (2010)
https://nces.ed.gov/forum/dataethics_course.asp
This course is based on The Forum Guide to Data Ethics and is focused on how ethical principles apply to education data. The course is intended for any person who handles data in an education organization.

Forum Guide to Data Governance (2020)
https://nces.ed.gov/forum/pub_2020083.asp
This resource provides timely and useful best practices, examples, and resources for agencies implementing or updating their data governance programs. It provides an overview of data governance; discusses effective data governance practices, structures, and essential elements; describes how to meet privacy and security requirements while also meeting data accessibility and sharing needs; and includes detailed case studies from education agencies in their data governance efforts.

Forum Guide to Data Visualization: A Resource for Education Agencies (2016)
https://nces.ed.gov/forum/pub_2017016.asp
This resource recommends data visualization practices that will help education agencies communicate data meaning in visual formats that are accessible, accurate, and actionable for a wide range of education stakeholders. Although this resource is designed for staff in education agencies, many of the visualization principles apply to other fields as well.

Forum Guide to Early Warning Systems (2018)
https://nces.ed.gov/forum/pub_2019035.asp
This resource provides information and best practices that will help education agencies plan, develop,implement, and use an early warning system in their agency to inform interventions that improve student outcomes. This document focuses on early warning systems and their data from the perspective of the education data community.

Forum Guide to Education Data Privacy (2016)
https://nces.ed.gov/forum/pub_2016096.asp

This resource provides SEAs and LEAs with best practice information to use in assisting school staff in protecting the confidentiality of student data in instructional and administrative practices. SEAs and LEAs may also find the guide useful in developing privacy programs and related professional development programs.

Forum Guide to Metadata: The Meaning Behind Education Data (2009)
https://nces.ed.gov/forum/pub_2009805.asp
This resource offers best practice concepts, definitions, implementation strategies, and templates/tools for an audience of data, technology, and program staff in SEAs and LEAs. It is hoped that this resource will improve this audience's awareness and understanding of metadata and, subsequently, the quality of the data in the systems they maintain.

Forum Guide to Supporting Data Access for Researchers: A Local Education Agency Perspective (2014)
https://nces.ed.gov/forum/pub_2014801.asp
This resource recommends a set of core practices, operations, and templates that can be adopted and adapted by LEAs as they consider how to respond to requests for both new and existing data about the education enterprise.

Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective (2012)
https://nces.ed.gov/forum/pub_2012809.asp
This resource recommends a set of core practices, operations, and templates that can be adopted and adapted by SEAs as they consider how to respond to requests for data about the education enterprise, including data maintained in longitudinal data systems.

Forum Guide to Taking Action with Education Data (2013)
https://nces.ed.gov/forum/pub_2013801.asp
This resource provides practical information about the knowledge, skills, and abilities needed to identify, access, interpret, and use data to improve instruction in classrooms and the operation of schools, LEAs, and SEAs.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) – *NOAA Data Strategy: Maximizing the Value of NOAA Data*
https://nrc.noaa.gov/Portals/0/Final%20Data%20Strategy.pdf
The purpose of the NOAA Data Strategy is to dramatically accelerate the use of data across the agency and with other key partners, maximize openness and transparency, deliver on mission, and steward resources while protecting quality, integrity, security, privacy, and confidentiality. The overall strategy is designed to serve as a framework for consistency that builds upon existing laws and regulations related to how NOAA uses and manages data while being flexible and adaptable to external influences such as new policies, Executive Orders, stakeholder input, and new technologies that drive innovation within the agency.

U.S. Department of Defense (DoD) – *DoD Data Strategy*
https://media.defense.gov/2020/Oct/08/2002514180/-1/-1/0/DOD-DATA-STRATEGY.PDF
The DoD Data Strategy, as a key component of the Department's Digital Modernization program, supports the National Defense Strategy (NDS) by enhancing military effectiveness through access to accurate, timely, and secure data. In addition to combat effectiveness, DoD leaders–including members of the Office of the Secretary of Defense (OSD), the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff (CJCS) and the Joint Staff, Combatant Commands, Defense Agencies, and DoD Field Activities (referred to collectively in this strategy as Components)–require data-driven insights that provide a fair and accurate Department-wide representation of DoD operations and management.

U.S. Department of Education – *Data Strategy*
https://www.ed.gov/sites/default/files/cdo/ed-data-strategy.pdf
The Department Data Strategy describes a vision, establishes strategic goals for advancing data capabilities, and envisions agency-wide outcomes. It establishes an ambitious vision as the point on the horizon: To realize the full potential of data to improve education outcomes and lead the nation in a new era of evidence-based policy insights and data-driven operations. This Department-wide effort will include discussions across the agency about data priorities that will help improve data maturity and the Department's capabilities to leverage data, operationalize and optimize data governance, and drive cultural change for the benefit of internal and external stakeholders.

U.S. Department of Health and Human Services (HHS) – *2018 HHS Data Strategy: Enhancing the HHS Evidence-Based Portfolio*
https://aspe.hhs.gov/pdf-report/2018-hhs-data-strategy-enhancing-hhs-evidence-based-portfolio
The 2018 HHS Data Strategy focuses on improving the Department's capacity to develop statistical evidence to support policymaking and program evaluation over the next six to eight years. As the principal internal advisory body to the Secretary of Health and Human Services on the Department's data and statistical policy, the HHS Data Council develops, implements, and updates the Department's data strategy. There are six priorities outlined in the strategy: 1) improving access to HHS data, 2) enhancing administrative data for research, 3) increasing data linkages across diverse data assets, 4) modernizing privacy protections, 5) increasing data policy coordination and information sharing across the department, and 6) building a 21st-century data-oriented workforce.

U.S. Department of Justice (DOJ) – *Data Strategy for the U.S. Department of Justice*
https://www.justice.gov/jmd/page/file/1135081/download
The DOJ *Data Strategy* is a foundational framework that will enable the Department to build a standardized, programmatic approach to manage and share data as well as advance its data

communities. The long-term objective of the *Data Strategy* is to optimize the value of the Department's data assets for use in its missions. Consistent with the *Federal Data Strategy*, amongst other federal statutory and regulatory requirements, the *Data Strategy* seeks to build enterprise capabilities for data management, information sharing, controlled access, and maintaining a modern and relevant data workforce. The long-term objective is to optimize the impact of information and related information technology (IT) investments on the mission and the people serving the mission.

U.S. Federal Government – ***The Federal Data Strategy: Principles and Practices***
https://strategy.data.gov
The mission of the *Federal Data Strategy* is to leverage the full value of federal data for mission, service, and the public good by guiding the federal government in practicing ethical governance, conscious design, and a learning culture. The *Federal Data Strategy* offers agencies guidance about managing and using federal data. It consists of principles and practices to deliver a more consistent approach to federal data stewardship, use, and access. The principles are a timeless, enduring framework for agencies. They are actionable, yet aspirational, goals for a 5- to 10-year time horizon, and the yearly Action Plans identify concrete steps for agencies to undertake to achieve this long-term vision.

Examples of Data Strategy in Other State and Local Agencies

Atlanta Public Schools (GA) – ***Data and Information Group***
https://www.atlantapublicschools.us/dig
Comprising three departments – Research and Evaluation, Student Information Systems (SIS), and Testing and Assessment – the Data and Information Group (DIG) looks after the lifecycle of student data for Atlanta Public Schools (APS). DIG collects data; provides applications, protocols, and resources to track, protect and measure data; and through research, mines data for positive trends to help school and district leaders form better strategies for learning. Its purview is broad and the group works with teachers, parents, district staff, APS leaders, state agencies, and university research partners.

Colorado Office of Information Technology – ***State of Colorado Data Strategy***
http://hermes.cde.state.co.us/drupal/islandora/object/co:11294/datastream/OBJ/view
The State of Colorado Data Strategy was developed to ensure that state government policymakers and knowledge workers have the data and information they need to do their work. The State of Colorado Data Strategy outlines the state's data management and governance program. It describes the key business drivers behind the program, the status of the as-is environment of data, the organizational alignment of the program, and the migration plan for moving forward with an enterprise approach.

Connecticut Office of Policy and Management – ***Connecticut State Data Plan***
https://portal.ct.gov/CTData/Content/Connecticut-State-Data-Plan
The Connecticut State Data Plan serves as a framework for the state's executive branch agencies to engage in a consistent approach to data stewardship, use, and access. Its purpose is to connect the people and processes involved with data to promote communication between, and appropriate integration of, formerly siloed data, teams, and systems. The plan is organized around principles that represent a framework under which state agencies should organize and operate; focal points that represent areas where agencies should emphasize the sharing, integration, and availability of data; and goals that represent the desired outcomes of plan implementation. This framework is based on an approach currently being used at the federal level in the formulation of the Federal Data Strategy.
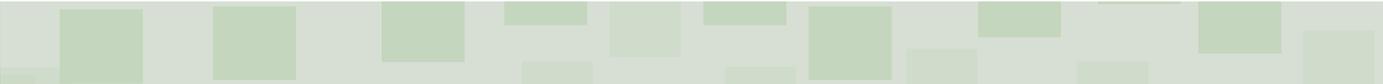
Illinois State Board of Education - *Department of Data Strategies and Analytics*
https://www.isbe.net/Pages/Data-Analysis.aspx
The Department of Data Strategies and Analytics (DSA) coordinates annual reporting, collects data, implements data sharing, administers the data governance program, and analyzes data for policy and strategic planning related to Board goals and legislative requirements. DSA also advises agency staff on data governance policies and procedures. DSA assists in metadata collection, design, and implementation. DSA helps local education agencies in meeting their mission, vision, and goals.

Public Schools of Brookline (MA) - *Office of Strategy and Performance*
https://www.brookline.k12.ma.us/domain/721
The Office of Strategy and Performance was created during the 2015-2016 school year to coordinate the district's strategic planning, the district-wide management of student information systems, the use of student data, the district's internal and external communications, and family and community outreach. The Office is a renamed, reorganized department comprised primarily of staff from what was previously called the Data Team.

Tulsa Public Schools (OK) - *Data Strategy and Analytics*
https://www.tulsaschools.org/about/teams/data-team
The Data Strategy and Analytics Team supports teachers, schools, and other district team members by providing analytic reports, creating data tools, developing dashboards, fulfilling data requests, and conducting research and program evaluations.